The role of innovation management units (InMUs) in radical innovation: case studies in the Deutsche Telekom Group

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The Role of Innovation Management Units (InMUs) in Radical Innovation
- Case Studies in the Deutsche Telekom Group

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Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy of The Open University
Milton Keynes / United Kingdom

The Open University

January 2007
# Table of Contents

Abstract ........................................................................................................................................... 1  
Abbreviations .......................................................................................................................... 2  
List of Tables ........................................................................................................................ 4  
List of Figures ........................................................................................................................ 5  

Chapter One - Setting the Scene ............................................................................................. 6  
1.1 Introduction .................................................................................................................... 6  
1.2 Research Scope and Objectives .................................................................................... 8  
1.3 Structure of the Thesis ............................................................................................... 11  

Chapter Two – Background to the Research ........................................................................ 13  
2.1 Introduction ................................................................................................................ 13  
2.2 The Information and Telecommunications Market .................................................... 14  
2.2.1 The Telecommunications Segment .................................................................. 16  
2.2.2 Key Drivers in the Telecommunication Segment ............................................. 17  
2.2.3 Development of the Telecommunication Market ............................................. 18  
2.2.4 Telecommunication Value Chain .................................................................... 19  
2.3 Deutsche Telekom Group (DT) at a Glance .............................................................. 20  
2.4 Liberalisation and Competition - Consequences for DT ........................................... 22  
2.5 Problems of Telco's to Innovate Radically ................................................................. 28  
2.6 Summary and Conclusions ......................................................................................... 30
Chapter Three – Existing Literature and Theories ....................................................... 32

3.1 Introduction........................................................................................................ 32

3.2 Focus of the Literature Review ......................................................................... 34

3.3 Innovation - Definition and Conceptual Differentiation ............................... 35
   3.3.1 Conceptual Issues of the Term ‘Innovation’............................................. 36
   3.3.2 Conceptual Issues: ‘Radical vs. Incremental Innovation’.................... 41
   3.3.3 ‘Radical’ and ‘Incremental’ Innovation at the Product Level ............... 46
   3.3.4 ‘Radical’ Innovation in the Telecommunication Segment .................. 50
   3.3.5 Summary and Conclusions................................................................. 57

3.4 Managing Innovation - Innovation Management .............................................. 58
   3.4.1 Introduction............................................................................................ 58
   3.4.2 Barriers – An Inherent Feature of Innovation...................................... 59
   3.4.3 Overcoming Barriers - Drivers and Pathways to Innovate............... 68
   3.4.4 The Role of Champions, Promoters and Top Management in Innovation 71
   3.4.5 Innovation and Organisation............................................................... 79
   3.4.6 Conceptual Issues of ‘Innovation Management’................................. 86
   3.4.7 Summary and Conclusions................................................................. 98

3.5 InMUs - Structural Response to Innovation Management ........................... 99
   3.5.1 Introduction............................................................................................ 99
   3.5.2 Structural Approaches to Innovate with Limited Duration............... 102
   3.5.3 InMUs - Structural Response to Innovate as a Permanent Task.......... 104
   3.5.4 Innovating Organisation – How to Measure Success......................... 112
   3.5.5 Lessons-Learnt from Success and Failure (S&F) Research .................. 121
   3.5.6 Summary and Conclusions................................................................. 125

3.6 Outcomes of Literature Review and Research Questions.............................. 129
Chapter Four - Research Methodology ................................................................. 134

4.1 Introduction ........................................................................................................ 134

4.2 Research Design and Strategy ......................................................................... 134

4.2.1 Philosophical Stance ....................................................................................... 134

4.2.2 Quantitative Versus Qualitative Research ....................................................... 137

4.2.3 Theory-Building Versus Theory-Testing .......................................................... 140

4.2.4 Logical Structure of the Research Process ..................................................... 144

4.3 Case Study Research Design ........................................................................... 146

4.3.1 Introduction ...................................................................................................... 146

4.3.2 The Aim of Case Study Research ................................................................... 147

4.3.3 Design and Features of Case Study Research ............................................... 148

4.3.4 Case Study Selection ...................................................................................... 151

4.3.5 Research Quality and Limitations of the Research Design ............................. 157

4.4 Data Collection .................................................................................................. 161

4.4.1 Preparation Phase ........................................................................................... 161

4.4.2 Data Collection Approaches ............................................................................ 162

4.4.3 The Pilot Case .................................................................................................. 163

4.4.4 Interviews ......................................................................................................... 164

4.4.5 Observation .................................................................................................... 170

4.4.6 Documentation and Archival Sources .............................................................. 172

4.4.7 Timing of Data Collection ................................................................................. 173

4.5 Data Analysis and Interpretation ..................................................................... 174

4.5.1 Strategy and Techniques for Data Analysis..................................................... 175

4.5.2 The Process of Data Analysis ......................................................................... 177

4.6 Doing Research – Limitations and Opportunities ............................................ 179
6.1.3 The Conceptual Framework of this Study ........................................................ 228

6.2 **Strategy** .............................................................................................................. 231
6.2.1 Value Proposition of Innovation ................................................................. 232
6.2.2 InMU Aspiration and Strategy ................................................................. 236
6.2.3 Summary Component “Strategy” ............................................................ 241

6.3 **Functions** ........................................................................................................... 243
6.3.1 Innovation Strategy ..................................................................................... 243
6.3.2 Core Tasks and Functions of InMUs ......................................................... 245
6.3.3 Monitoring Mechanisms ............................................................................ 250
6.3.4 Performance of InMUs ............................................................................... 253
6.3.5 Summary Component “Functions” ............................................................. 256

6.4 **Organisation** ...................................................................................................... 258
6.4.1 Centralised Versus Decentralised InMU Approach ................................... 258
6.4.2 Connection and Interfaces ......................................................................... 261
6.4.3 Budgeting Mechanisms and Funding Principles ....................................... 265
6.4.4 Steering Mechanisms .................................................................................. 271
6.4.5 Summary Component “Organisation” ......................................................... 275

6.5 **Environment** ..................................................................................................... 277
6.5.1 Regulatory Framework ................................................................................ 277
6.5.2 Frequency of Reorganisation ...................................................................... 285
6.5.3 Sponsorship - Board Member as Promoter .............................................. 288
6.5.4 “In-House” Competition .......................................................................... 290
6.5.5 Summary Component “Environment” ....................................................... 293

6.6 **Summary of key findings** ................................................................................. 295

6.7 Interrelationships between InMU organisational design components ........ 296
Acknowledgements

During all the years of progression of my PhD as a part time student, there were not only intellectual challenges, but also those requiring considerable perseverance, with the many demands of work and life presenting themselves along this journey. I could not have edged my way towards completion without the assistance, support and inspiration of many colleagues, social relations and loved ones. In the course of writing this thesis, a great many people have contributed to its completion in a great many ways.

First of all, I wish to thank Dr. Albert Zandvoort, the former Senior Executive Vice President HR Development at T-Mobile, who inspired me to write this thesis. His open-minded nature and intellectual curiosity convinced me to progress academically with a subject that has fascinated me for some time. Through his personal commitment, he ensured that I could start to pursue this dissertation as a part-time PhD student in tandem with work.

My deepest intellectual gratitude goes to my supervisors Prof. Paul Quintas and Prof. John Storey, both from Open University Business School. They gave me the opportunity for this thesis as an overseas part time student and inspired much of my thinking during the various stages of my PhD. Their constructive comments and discussions influenced my ideas, the design, execution and reporting of this study. They have provided a wealth of continual encouragement, inspiration, support and help throughout this research. Through their open-minded nature and that of the other peer students, I have been able to learn about and value new inter-cultural elements as an overseas student from Germany.
Special thanks goes to Deutsche Telekom AG and many managers of the company, who gave me the opportunity to realise my PhD as a part time student and supported me in many ways. Owing to them, I have had the chance to gain the necessary insights into the strategies, structures, processes and organisations of Deutsche Telekom, which were of crucial importance for my study. I would like to thank them for the time they spent on my questions and interviews, as well as for the abundance of documents made available. Not least, I would like to thank my professional colleagues and superiors, who were so understanding about my academic research and gave me support for it in many respects.

I wish to thank my family, parents and friends for understanding that I did not have as much time for them as I would have liked. It was not always easy to balance the demands of family, friends, career and PhD over the years.

Finally, many thanks to my wonderful and patient wife Beate for our many inspiring discussions, who had to suffer listening to my concerns, provide some much welcomed inputs and who encouraged me during somehow less enjoyable phases. Without her encouragement, support and understanding, I could not have made this long, inspiring and knowledge-creating journey. This dissertation is dedicated to her.

‘Success is a journey, not a destination’

E. Swedenborg; (1688 – 1722)
Declaration

This thesis is represented in accordance with the regulations for the degree of Doctor of Philosophy (PhD) of The Open University, Milton Keynes. The work described in this thesis is entirely original and my own, unless otherwise indicated. None of the material contained hereafter has been submitted for a degree at any other university. The interpretations in this thesis are the sole responsibility of the author, and do not in any way represent the views of the case company or The Open University.
Abstract

The long-term success of companies often depends on innovating beyond incremental change, but internal organisational factors often push efforts towards incremental innovations. Considerably less is known about appropriate structural solutions to foster radical innovation compared with incremental developments.

This research seeks to extend the theory and understanding of how to organise innovation activities through supporting structures that foster radical innovation. The focus of the study is on structures known as Innovation Management Units (InMUs), operating at the corporate and divisional levels within a large organisation operating in turbulent markets. The research provides an explorative account supported by empirical evidence, featuring embedded case studies within a single organisation. Comparative cases were used to explore the similarities and differences between InMU approaches, as exemplified by the Deutsche Telekom Group.

Through the analysis of core functions and the role comprehension of InMUs, this study contributes to the academic understanding of innovation, and informs discussions on ‘Innovation Hubs’ and whether such units should be separated from, or integrated in, the operational organisation. It contributes to theory by providing empirical evidence that corporate and divisional InMU approaches - despite partial differences in the spectrum of tasks and organisational integration – can be an appropriate structural vehicle for fostering radical innovation. This study demonstrates that the tasks of such units described in the innovation management literature have to be expanded and that the “transfer-point”, where the preliminary work of an InMU is handed over for implementation, is crucial. Moreover, in turbulent environments, such structural approaches must seriously take into account the ‘promoter-approach’ to implement an efficient innovation management system within an enterprise. Finally, by providing a conceptual framework based upon ‘InMU design components’ and by identifying lessons learnt that are critical to success, the implications for practice are also covered within this study.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADSL</td>
<td>Asymmetric Digital Subscriber Line</td>
</tr>
<tr>
<td>AG</td>
<td>'Aktien Gesellschaft'; public limited company (plc)</td>
</tr>
<tr>
<td>APQC</td>
<td>American Productivity and Quality Centre</td>
</tr>
<tr>
<td>APRU</td>
<td>Average Revenue Per User</td>
</tr>
<tr>
<td>BMBF</td>
<td>'Bundesministerium für Bildung und Forschung'; Federal Ministry of Education &amp; Research</td>
</tr>
<tr>
<td>BMWA</td>
<td>'Bundesministerium für Wirtschaft und Arbeit'; Federal Ministry of Economics and Labour</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CFO</td>
<td>Chief Financial Officer</td>
</tr>
<tr>
<td>CI</td>
<td>Corporate Innovation</td>
</tr>
<tr>
<td>CIM</td>
<td>Corporate Innovation Management</td>
</tr>
<tr>
<td>CoPS</td>
<td>Complex Products and Systems</td>
</tr>
<tr>
<td>DIC</td>
<td>Divisional Innovation Committee</td>
</tr>
<tr>
<td>DIM</td>
<td>Divisional Innovation Management</td>
</tr>
<tr>
<td>DSL</td>
<td>Digital Subscriber Line</td>
</tr>
<tr>
<td>DT</td>
<td>Deutsche Telekom (Group)</td>
</tr>
<tr>
<td>EBITDA</td>
<td>Earnings Before Interest, Tax, Depreciation and Amortization</td>
</tr>
<tr>
<td>EITO</td>
<td>European Information Technology Observatory</td>
</tr>
<tr>
<td>FTZ</td>
<td>'Forschungs- und Technologie-Zentren'; Research and Technology Centers</td>
</tr>
<tr>
<td>GLORIA</td>
<td>‘Global Redesign of Innovation Activities’</td>
</tr>
<tr>
<td>GPRS</td>
<td>General Packet Radio Service</td>
</tr>
<tr>
<td>GSM</td>
<td>Global System for Mobile Communications</td>
</tr>
<tr>
<td>HQ</td>
<td>Headquarters Project</td>
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<tr>
<td>IBC</td>
<td>Innovation Board Committee</td>
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<td>InM</td>
<td>Innovation Management</td>
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<tr>
<td>InMU</td>
<td>Innovation Management Unit</td>
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<tr>
<td>IPR</td>
<td>Intellectual Property Rights</td>
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<tr>
<td>ISDN</td>
<td>Integrated Services Digital Network</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
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<tr>
<td>ITC</td>
<td>Information and Telecommunication</td>
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<tr>
<td>KPI</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>KSF</td>
<td>Key Success Factors</td>
</tr>
<tr>
<td>LoBs</td>
<td>Lines of Business; similar to ‘SBU’</td>
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<tr>
<td>M-O</td>
<td>Mechanistic-Organic</td>
</tr>
<tr>
<td>NBD</td>
<td>New Business Development</td>
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<tr>
<td>NBI</td>
<td>New Business Innovation</td>
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<tr>
<td>NBO</td>
<td>New Business Opportunities</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>NIH</td>
<td>Not Invented Here</td>
</tr>
<tr>
<td>NPD</td>
<td>New Product Development</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
</tr>
<tr>
<td>PG</td>
<td>‘Produktgenerierung’; Product Generation</td>
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<tr>
<td>PI</td>
<td>Product Innovation</td>
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<tr>
<td>PJM</td>
<td>Project Management</td>
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<td>PM</td>
<td>Product Management</td>
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<tr>
<td>PNO</td>
<td>Public Network Operator</td>
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<tr>
<td>PRIMA</td>
<td>Product Lifecycle Management</td>
</tr>
<tr>
<td>PSTN</td>
<td>Public Services Telephone Network</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research &amp; Development</td>
</tr>
<tr>
<td>RegTP</td>
<td>‘Regulierungsbehörde für Telekommunikation und Post’ (Regulatory Authority for Telecommunications and Posts)</td>
</tr>
<tr>
<td>RIH</td>
<td>Radical Innovation Hub</td>
</tr>
<tr>
<td>S&amp;F</td>
<td>Success and Failure</td>
</tr>
<tr>
<td>SAP</td>
<td>Software Products and Trademark of SAP AG, Germany</td>
</tr>
<tr>
<td>SBU</td>
<td>Strategic Business Unit</td>
</tr>
<tr>
<td>SLIM</td>
<td>Name of cost-cutting programme of central business units</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Midsize/Medium Enterprises</td>
</tr>
<tr>
<td>TC</td>
<td>Telecommunication</td>
</tr>
<tr>
<td>T-Com</td>
<td>DT pillar for ‘fixed line business’</td>
</tr>
<tr>
<td>Telco</td>
<td>Telecommunication Operator</td>
</tr>
<tr>
<td>TIMES</td>
<td>Telecommunications, Information technology, Mobile communication, Entertainment and Security</td>
</tr>
<tr>
<td>TK</td>
<td>‘Telekommunikation’; telecommunication</td>
</tr>
<tr>
<td>TM</td>
<td>Technology Management</td>
</tr>
<tr>
<td>TMO</td>
<td>T-Mobile International; DT pillar for ‘mobile business’</td>
</tr>
<tr>
<td>TO</td>
<td>T-Online International; DT pillar for ‘online business’</td>
</tr>
<tr>
<td>TS</td>
<td>T-Systems International; DT pillar for ‘systems solution business’</td>
</tr>
<tr>
<td>UMTS</td>
<td>Universal Mobile Telecommunications Systems</td>
</tr>
<tr>
<td>VAS</td>
<td>Value-Added-Service</td>
</tr>
<tr>
<td>WAP</td>
<td>Wireless Application Protocol</td>
</tr>
<tr>
<td>WLAN</td>
<td>Wireless Local Area Network</td>
</tr>
</tbody>
</table>
### List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Market Drivers</td>
<td>17</td>
</tr>
<tr>
<td>Table 2</td>
<td>Transformation Phases within the Telco Context</td>
<td>23</td>
</tr>
<tr>
<td>Table 3</td>
<td>‘Incremental’ Versus. ‘Radical’ Innovations from a Company Perspective</td>
<td>46</td>
</tr>
<tr>
<td>Table 4</td>
<td>‘Radical’ and ‘Incremental’ Innovation at Product Level</td>
<td>49</td>
</tr>
<tr>
<td>Table 5</td>
<td>Basic Definition of Innovative Products at Deutsche Telekom</td>
<td>52</td>
</tr>
<tr>
<td>Table 6</td>
<td>Radical &amp; Incremental Innovation in Telecommunication</td>
<td>55</td>
</tr>
<tr>
<td>Table 7</td>
<td>Definition of the Concept ‘More Radical Innovation’ in the Telco Environment</td>
<td>56</td>
</tr>
<tr>
<td>Table 8</td>
<td>Generic Problems in Implementing Innovations</td>
<td>69</td>
</tr>
<tr>
<td>Table 9</td>
<td>Top Management as a “Promoter” of Innovation</td>
<td>77</td>
</tr>
<tr>
<td>Table 10</td>
<td>Tasks and Objectives of Innovation Management</td>
<td>89</td>
</tr>
<tr>
<td>Table 11</td>
<td>Goffin / Pfeiffer’s ‘Five Key Areas of Innovation Management’</td>
<td>90</td>
</tr>
<tr>
<td>Table 12</td>
<td>Focus of Explorative Research (R) versus Development (D)</td>
<td>93</td>
</tr>
<tr>
<td>Table 13</td>
<td>Characteristics of InM in Comparison with other Management Functions</td>
<td>96</td>
</tr>
<tr>
<td>Table 14</td>
<td>Organisational Forms Oriented to One-Off Projects</td>
<td>103</td>
</tr>
<tr>
<td>Table 15</td>
<td>Requirements on InMUs From the S&amp;F Research Perspective</td>
<td>125</td>
</tr>
<tr>
<td>Table 16</td>
<td>Research Questions</td>
<td>133</td>
</tr>
<tr>
<td>Table 17</td>
<td>Kinds of Research in Relation to its Purpose</td>
<td>136</td>
</tr>
<tr>
<td>Table 18</td>
<td>Potential Weaknesses of Qualitative Research</td>
<td>139</td>
</tr>
<tr>
<td>Table 19</td>
<td>Three Steps of Building Descriptive Theory</td>
<td>142</td>
</tr>
<tr>
<td>Table 20</td>
<td>Relevant Situations for Different Research Strategies</td>
<td>146</td>
</tr>
<tr>
<td>Table 21</td>
<td>Six Sources of Evidence: Strengths and Weaknesses</td>
<td>162</td>
</tr>
<tr>
<td>Table 22</td>
<td>Interview Schedule - Data contribution matrix</td>
<td>167</td>
</tr>
<tr>
<td>Table 23</td>
<td>Interview Distribution in the Case Organisation</td>
<td>168</td>
</tr>
<tr>
<td>Table 24</td>
<td>Dominant Modes of Analysis</td>
<td>176</td>
</tr>
<tr>
<td>Table 25</td>
<td>Advantages and Disadvantages of Doing Research as an Internal</td>
<td>182</td>
</tr>
<tr>
<td>Table 26</td>
<td>Case Specific InMU Characteristics</td>
<td>224</td>
</tr>
<tr>
<td>Table 27</td>
<td>Correlation Map - Research Questions Vis-à-Vis Conceptual Framework</td>
<td>231</td>
</tr>
<tr>
<td>Table 28</td>
<td>Views on Innovation by Different Parts of Management</td>
<td>234</td>
</tr>
<tr>
<td>Table 29</td>
<td>Core Functions of InMUs in Case Organisation</td>
<td>247</td>
</tr>
<tr>
<td>Table 30</td>
<td>Key Findings and their Sources of Empirical Evidence</td>
<td>296</td>
</tr>
</tbody>
</table>
List of Figures

Figure 1: German Communications Market: Revenue-Structure Development ........................................18
Figure 2: Generic Value Chain of Telco’s ..........................................................................................19
Figure 3: Transforming Phases of DT ...............................................................................................26
Figure 4: Innovation - Overview of the Variety of Definition Approaches ..........................................40
Figure 5: Incremental/Radical Innovation – Technology and Market Uncertainties .............................42
Figure 6: S-Curve Approach - Radical Versus Incremental Innovation ...............................................44
Figure 7: Categorisation of New Product Developments ....................................................................47
Figure 8: ‘Phase-Linkage’ Model for Innovation Management ............................................................78
Figure 9: Interaction of Innovation Management vis-à-vis R&D, PM, Marketing ...................................97
Figure 10: Innovation Type and Fit with Organisational Capability ....................................................106
Figure 11: Radical Innovation Hub ....................................................................................................109
Figure 12: Corporate versus Divisional InMU Structuring Principles (CIM vs. DIM) .........................112
Figure 13: Hierarchical Structure of the Organisational Effectiveness Problem ..................................117
Figure 14: The Process of Building Theory .......................................................................................141
Figure 15: The Transition from Descriptive Theory to Normative Theory .........................................143
Figure 16: Thesis Process Map .........................................................................................................145
Figure 17: Overview of InMU Distribution Within the Deutsche Telekom Group ..............................156
Figure 18: Timing and Sequence of Interviews ..................................................................................169
Figure 19: Innovation-KPIs of Case Organisation .............................................................................251
Figure 20: Task Assignment of Corporate InMU versus Divisional InMU ...........................................260
Figure 21: InMU Project Structure and Project Funding Principles ....................................................270
Figure 22: Conceptual Framework of this Study: “The InMU Design Components” .........................297
Figure 23: Holistic InMU Organisational Model ...............................................................................304
Chapter One - Setting the Scene

1.1 Introduction

‘Telecommunication’ - hardly any other market is subjected to such a dynamic, continuous change resulting from privatisation, deregulation and globalisation followed by dramatic decreasing revenue through phone rates, shrinking product lifecycles and increasing competition, than the telecommunications industry. In Germany in 1999, the gross domestic product of the telecommunications industry surmounted the leading car manufacturing industry, underpinning the commercial relevance of this industry.

The Deutsche Telekom Group is the leading telecommunications company in Europe and offers the full range of communication products and services. Innovation, and therefore optimised innovation management, is a very important competitive factor, which ensures market leadership and sustainable competitiveness. This ‘innovation pressure’ on the ex-monopolist Deutsche Telekom will increase with the approaching liberalisation of the telecommunications market in Germany. The Deutsche Telekom Group needs to be able to react and shape these changes with innovative products, especially of a radical nature, i.e. product innovations which have a targeted period from original idea to market introduction of approx. 2 to 4 years.

Existing theories in the broad field of innovation management have produced a good understanding of the innovative organisation, at least as an ideal type. Whilst a large proportion of existing research has concentrated on incremental innovation or innovation management in general, there is little known about the specific aspects of fostering radical innovation within large, mature organisations which are acting in turbulent environments like Deutsche Telekom, especially if this is to be understood as a standard, regular task of an organisation and not just as a series of temporary projects via interdisciplinary teams. (McLaughlin et al. 2005, p.2) noted ‘For incremental innovation, much is known about management of the process. The innovation process is routine and
systematic and can be modelled relatively simply. For radical innovation, less is known about its management, the process is ill-defined and modelling is more complex.

It is undeniable that radical product innovations are necessary for long-term success. But while incremental innovations in new product introductions appear to be dependent on traditional management structures and processes (Ettlie et al. 1984), radical innovation can demand an organisational response that reaches beyond the ‘steady state’ approach to managing innovation (McDermott and O’Conner 2002). As such, radical innovations have great potential but are associated with a high level of complexity, much uncertainty and great entrepreneurial risk. Radical innovation projects are marked by discontinuities, gaps, critical transitions and leverage points and require a different set of knowledge, rules and methods to manage the innovation process. What is more, they often render traditional management modes of operation inappropriate, and therefore do not respond well to the management practices applied to incremental innovation activities. All these aspects ‘indicate why the business practices in some larger established firms mitigate against radical innovation, as the systems and processes that ensure continuity (the incremental innovations) become the inhibitors to innovation’ (McLaughlin et al. 2005, p.3).

Large, mature firms like Deutsche Telekom are often faced with the problem that although they have an efficient structure tailored to the needs of their market; this market is now changing dramatically as a result of multiple influences. This means that they have to adapt their structure and processes to the changed conditions relatively quickly. Kanter (1990) paraphrased such situations with ‘When giants learn to dance’.

In view of such realignment, companies need to fundamentally change the way in which they organise (Hage 1988). But a complete organisational shift as a whole - especially of a large, mature organisation - needs time and new organisational capabilities are difficult to create and costly to adjust (Nelson and Winter 1982). Some authors referred to meeting the challenge to be innovative without a complete organisational shift as a call for
a separate innovating organisation with unique structure, information and decision processes, and rewards and people-selection systems completely different to existing, operating organisations, which are designed to do something well and efficiently for the millionth time (Galbraith 1982).

Against the background that management practices that work for incremental innovations are often inadequate for radical innovations, the aspect of managing radical innovations by means of dedicated organisational approaches has recently received far more attention in the literature. Now that the link between ‘innovation hub approaches’ as an instrument for radical innovations and Innovation Management Units has been established, the question must be posed as to how such InMUs can be structurally mapped within an enterprise. The ‘official’ designation or formal ‘titles’ or names of such units in practice (e.g. R&D, Product Management or New Business Development) are irrelevant. Rather, it is the core functions and functionalities actually realised in terms of innovation management activities that are the decisive factor. The question now raised is how large, well-established organisations like Deutsche Telekom can push innovation capability - particularly radical innovations – through structural approaches established expressly for this purpose.

1.2 Research Scope and Objectives

Companies in this decade are strongly influenced by mergers and acquisitions, with globalisation activities accompanying increasing competition. Furthermore, former monopolists such as Deutsche Telekom are burdened by deregulation and privatisation accompanied by permanent cost reduction, ever shorter technology and product lifecycles and therefore a new demand to innovate.

The substantial management literature in the context of ‘innovation management’ shows that the subject of ‘how to innovate’ has been a central research topic for several
decades. Based on different approaches in the innovation management literature, including a certain amount of successes / failures and barrier-aspects, and due to the complexity of different influencing factors such as strategy, structure, processes and, last but not least, human factors, there is no common theory which allows the consolidated findings to be linked with a general theory or concept.

Organisational considerations of ‘Innovation Management Units (InMUs)’, i.e. separate units which are responsible for innovation activities and the goal of ramping up product innovations, are less explored. Especially the transformation of telecommunication companies from public authority to private sector status, along with the shift from ‘technology push’ to ‘market pull’, is historically new. The research aims at assisting the understanding of how a former monopolist handles the necessity of fostering radical innovation by investigating the ‘Innovation Management Units’ (InMUs), their major strategies and how such InMUs can operate.

This study thus focuses on the use of InMUs as an organisational tool for driving innovation activities. Such structural approaches in this context are defined as the formal structural organisations as usually described by an organisational chart and a corresponding description of the mission, core tasks and responsibilities. The structural approaches in this sense do not comprise the informal organisation (e.g. communities of practice, informal working groups or informal networks). The structure of an organisation can be understood as the pattern of relationships between roles in an organisation and its different parts (compare e.g. Mabey et al. 2001). This study puts the primary focus and emphasis on the principal structural mechanisms that foster more radical innovation, which comprises the clarification of the core functions and role comprehension realised by organisational units (InMUs), established expressly for this purpose.
The implementation of innovations via project work and teamwork is not appraised within the scope of this study\(^1\). The aspect of ‘How do I come up with new ideas’ and the role of individuals in creating innovations including the related subject areas of individual efforts and institutionalised mechanisms to facilitate creativity, knowledge and learning, etc. are likewise beyond the scope of this study. This choice does not intend to neglect or undermine its emerging and important role in creating and managing innovations. It is simply that there is generally no lack of ideas, at least from a corporate perspective (Albers and Eggers 1991). The more important question is how to implement suitable organisational forms to manage the ‘more radical’ innovation options - meaning product innovation with a radical character and a targeted period from original idea to market introduction of approx. 2 to 4 years (see Table 7 on page 56), as highlighted by Galbraith: ‘…an organisation that is designed to do something well for the millionth time is not good at doing something for the first time’ (Galbraith 1982, p.6).

The proposed research and the corresponding research questions seek to contribute to a better understanding of the core functions and role comprehension of corporate and divisional InMUs and the critical issues that they are facing in their implementation and running-business phase and to thus fill in the gaps that have been identified within the literature review. Due to the lack of existing theories in this environment, the research points the way toward an understanding of InMUs in a broader sense. Therefore, the research effort utilised case study research methodology which asks ‘how’ and ‘why’ questions to explore a complex phenomenon about which there is little or no theory (Yin 1993) through the analysis of InMUs of the German incumbent Deutsche Telekom – the leading telecommunication company in Europe and one of the largest carriers in the world.

\(^1\) Please refer instead to the dissertation of Gmeiner (1997).
The objective of this study is to render a contribution towards expanding the knowledge available on managing innovation in mature, established companies in turbulent environments that foster radical product-innovations by implementing InMUs in their organisations. The present study addresses the issue of InMUs as a structural instrument for promoting radical innovations as regards both the current ‘innovation hub’ theory and the debate as to whether InMUs should be integrated or separated from the operational organisation.

Note:
The framework of reference incorporates both German and English-language literature, in order to maximise the abundance of insights. Quotations from German-language sources have been translated into English by the author – crosschecked by a native speaker - and ‘italicised’.

1.3 Structure of the Thesis

Before the literature review is described, it is necessary to gain an understanding of the environment underlying the research. The remainder of this thesis is structured as follows:

Chapter Two provides a general insight into the telecommunications (TC) segment, i.e. the environment in which the cases analysed operate. This chapter illustrates the significance of the TC segment for the economy and society, explains the demand for continuous innovations and provides an initial insight into precisely why this segment is of such interest for the analysis of organisational structures supportive of innovation. Furthermore, the Deutsche Telekom Group is also briefly presented, as this is the enterprise in which the InMU cases examined are integrated.
Chapter Three highlights existing theories and perspectives regarding the demand for ‘incremental’ and ‘radical’ innovations, how to manage them through organisational structures supportive of innovation, the tasks of Innovation Management Units (InMUs) and the specifics of the TC segment. Other issues essential to ascertaining the success and failure research and how to measure the innovativeness of organisations are also examined. Finally, the literature review demonstrates gaps in the literature and identifies researchable questions to be explored in this research.

Chapter Four describes the research process and the methodology utilised to explore the proposed research questions. The attempt is to detail the process and the data collection methods, in order to provide information and justification of how the case study was prepared and how the major findings were analysed during the research process. A ‘research process map’ is presented to outline the research activities. Other issues, such as conducting research in a single organisation, on a part-time basis or as an internal researcher, are also examined.

Chapter Five provides the findings and in depth case descriptions for the three main InMU cases – one corporate, two divisional. Case-specific findings are individually described for each case.

Chapter Six analyses the research findings from the case studies, with the emphasis on the proposed conceptual framework (“InMU design components”) and the deduced research questions driven by the literature review. Also presented are the empirical findings of InMUs’ core functions, patterns of behaviour, drivers & barriers and lessons learnt based on the analysis of the data collected from the case studies, as well as comparisons with existing literature and theories.

Chapter Seven concludes the core findings and describes their implications in theory and practice. The limitations of the research, together with future research directions, are practice to highlight opportunities for further investigations.
Chapter Two – Background to the Research

Before dealing in greater detail with the literature and theories upon which this dissertation is based, an initial general insight into the underlying environment, i.e. the telecommunications segment, could prove helpful. The TC environment specifies the boundaries in which the literature, theories and insights are reflected in the further course of this dissertation, and is likewise the boundary within which the cases analysed can be found.

2.1 Introduction

After changing moderately for decades, the telecommunications environment is now changing very dramatically. Technology is no longer in evolution, it is in revolution - a revolution that is transforming modern industrial societies into information societies. The pace of liberalisation within the telecommunications segment is increasing, changing not only the competitive environment itself, but also the rules and the players in the telecommunications sector (Lindberg et al. 1995). As technological possibilities explode and competition booms, continental Europe is experiencing privatisation initiatives of public network operators (PNO) – so-called ‘incumbents’ – that are changing the economic foundations of the PNOs, their role on the capital market and their behaviour – especially with regard to innovations.

Great expectations are being placed on the telecommunications industry. For example, the Federal Ministry of Economics and Labour (BMWA 2003) consider telecommunications to be the motor driving structural change in our time, and it notes:

‘...Telecommunications is a key factor for the way to the information society. It provides the technical basis for global networks linking private citizens and companies. As structural change continues, Germany will continue to need internationally competitive prices, high-quality infrastructures and highly capable telecommunications companies. We are providing decisive impetus
towards these things via a modern, competitively oriented telecommunications policy’ [Author’s remark: meaning ‘regulatory policy’].

The changing telecommunications environment is having a dramatic impact on customers, on service providers, on manufacturers, on society and especially on the Telco’s themselves. For example, Telco’s – especially the incumbents – are struggling with massive (internal) efficiency problems and with network overcapacities. One manager in Deutsche Telekom’s strategy department described the situation as follows:

‘Telecommunication players are facing significant financial constraints, consolidation and reluctant demand. They have overcapacity for backbone transport but only some of their services are profitable.’

In sum, telecommunications companies, especially the incumbents, are having to face major new challenges, in both the above areas and in their ability to foster innovations.

To assist readers in understanding the special challenges faced by telecommunications companies, and the environment in which they operate, the following introduction to the telecommunications segment outlines the industry’s economic importance, including the industry’s primary forces for fostering innovation in value creation. It also outlines the factors which, apart from external influences such as liberalisation, regulation and market changes, are dramatically changing incumbents’ structures and processes. The resulting changes are virtually unique to the industry, and thus make Telco’s an interesting subject indeed.

2.2 The Information and Telecommunications Market

The telecommunications industry is considered part of the so-called ‘information and telecommunications’ (ITC) market. This market is the market for both information technology (IT) and telecommunications (TC), and it is divided into the segments telecommunications services, IT services, hardware, software, terminal devices, network
infrastructure and office machines. At nearly 40%, telecommunications services account for the largest share of Western Europe's ITC market.

The Federal Ministry of Economics and Labour (Bundesministerium für Wirtschaft and Arbeit; BMWA) has carried out a study of the IT industry (Graumann and Bärbel 2003) that focuses on the economic development of the ITC segment and compares it with development in the manufacturing sector. This comparison reveals the ITC industry's importance for the German economy. For example, in 2001 the ITC industry accounted for 6.4% of the country's gross national product and became one of the top three industrial sectors in Germany (along with the automotive and electrical products industries). In 2002, it slipped from this position somewhat, as a result of the economy's sluggishness and the consolidation underway in many of the ITC industry's areas, and ceded its third place to the machine tools industry. Pursuant to the European Information Technology Observatory (EITO), in 2003 Germany's information technology and telecommunications market is expected to generate some 131 billion euros in revenue. With this figure, Germany is Western Europe's ITC leader and, with a world market share of 5.8%, it is the world's third-largest national market, after the U.S. and Japan.

Some 84% of the telecommunications market's 66.3 billion euros total revenue (2003) – the telecommunications market (TC) is the market in which Deutsche Telekom operates, with segments in network infrastructure, terminal devices and TC services – is earned with TC services (such as telephone and mobile communications services). With 57.7 billion euros in this category, Germany is the European leader, ahead of the UK. Regarded in relationship to Deutsche Telekom's (external) revenue of about 35 billion euros (revenue for the fixed line, mobile and internet segments in 2002), this figure provides an initial impression of the company's economic importance. As a result, policymakers, financial markets and the general public all place enormous expectations on the company. This applies especially to one of the key elements of Deutsche
Telekom's business and growth strategy: its ability to foster innovation. As a senior manager emphasised at a recent Deutsche Telekom manager workshop:

‘In spite of the burdens that liberalisation and TC-market privatisation will place on us, we are expected to be successful, with no ifs, ands or buts.’

2.2.1 The Telecommunications Segment

Companies in the telecommunication (TC) segment must face a number of challenges in addition to the above-described pressures to succeed and transform themselves. On the one hand, the number of competitors is increasing as a result of active regulatory policy in the TC segment, and this has a negative effect on achievable margins and customer fluctuation (this is referred to as a change from a ‘buyer's market’ to a ‘seller's market’; (Picot et al. 2001). On the other hand, the industry is subject to economic fluctuations and associated shifts in consumer purchasing power. Significantly, while per-capita expenditures for information technology and telecommunications have remained nearly constant over the years, at about 1660 euros / year in 2001 (Graumann and Bärbel 2003), a number of pronounced shifts between expenditure segments have occurred, e.g. from fixed networks to mobile networks (see also Figure 1 on page 18). As a result, each Telco, in its own segment, seeks to gain a maximum of customers' communications budgets by offering innovative products and services. This also means that strong competitive pressures will stimulate each competitor to intensify and optimise its own innovation activities. Since TC products are not comparable to an 'off-the-shelf' hardware product, i.e. they are products that combine complex product/services elements with hardware/software components (input / output devices; access points, network aspects) and process elements (administration, accounting, billing ...), it is useful to know – for companies seeking to develop innovative TC products – what the key drivers of the telecom market are, how the market will develop and what the TC segment's value chain involves.
2.2.2 Key Drivers in the Telecommunication Segment

In general, the key drivers in the telecommunication segment include customer needs, competitive activities and technological developments. These key drivers are significant insofar as they are medium-term to long-term socio-economic and technological trends (c.f. Bülling and Stamm 2001) that influence companies' general business orientations, even down to the specific product level, and thus help shape the development of new, innovative products and services within the TC segment.

In light of the mid-term trends and activities on the Telco market, the following conclusions regarding these key drivers can be drawn:

<table>
<thead>
<tr>
<th>Customer needs</th>
</tr>
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<tbody>
<tr>
<td>Mobility – Demand for flexibility and constant remote access is increasing due to the changes in lifestyles and working practices</td>
</tr>
<tr>
<td>Integration – Integration of voice and data services based on device-independent applications and services means reduced complexity for customers</td>
</tr>
<tr>
<td>Security – Unique identification and authentication represents one of the key factors for setting up personalised value-added services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competitive Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price - Commoditisation of basic services promotes migration to increased value addition – loss of USP when sticking to voice telephony approach</td>
</tr>
<tr>
<td>Products - Emergence of competitors from outside the industry providing new products and services; specialisation of sub segment providers alongside full-service providers</td>
</tr>
<tr>
<td>Partnering - Development of new competitive alliances compared with conventional providers</td>
</tr>
<tr>
<td>Regulation – Continuing intervention in corporate autonomy (ex-ante/ex-post approval for incumbents) and active promotion of competition</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology developments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networks – Substitution of the PSTN infrastructure due to technology development of IP networks, UMTS, etc. with high potential for broadband technologies</td>
</tr>
<tr>
<td>Applications - New technologies (Bluetooth, WLAN, IPv6) are enablers for broadband and mobility, intelligence within the network rather than in terminal devices</td>
</tr>
</tbody>
</table>

Table 1: Market Drivers
A closer look at key drivers in the TC segment indicates that the convergence of IT and TC will have an especially strong effect on the future of TC companies\(^2\) and thus will strongly influence their future structures and business models.

### 2.2.3 Development of the Telecommunication Market

As implied above, call volumes are increasing as prices drop and consumers change their calling patterns, but the ‘average revenue per user’ (so-called ‘ARPU’) is not increasing to the same degree (single-digit percentages). And the average breakdown of telecommunications expenditures is changing, as consumers spend more on certain telecommunications categories and less on others.

![Figure 1: German Communications Market: Revenue-Structure Development](image)

As the figure shows, among individual segments, mobile services and online services are gaining increasing shares of total revenue. In addition, the ‘other revenue’ category, which includes service numbers (e.g. 0190) etc., is also increasing. Telco’s are thus now asking how they can maximise their revenue in their own business segments within the value chain. In most cases, the answer to this question points to areas in which greater

\(^2\) For a more detailed description of the interaction between converging market structures, see Wöhler-Moorhoff, Dieter et al. (2004) and innovation strategies, see Thielmann (2000).
attention is given to product innovation. Significantly, the increasing convergence of TC services (e.g. fixed-mobile convergence) is making it more difficult for companies to set themselves apart from the competition.

2.2.4 Telecommunication Value Chain

The general value chain in the telecommunication segment (see sketch) shows that prior to market liberalisation, incumbents offer basic functions such as ‘providing and operating telecommunications platforms (TC)’ and providing customers with access and terminal devices – basic functionalities that customers need in order to be able to use the incumbents’ TC services.

As the TC market changes, value creation is shifting into higher levels, such as applications or content. Some TC companies, such as online business companies, originate directly in the content and access / portal business areas and are now seeking the profitable value-creation areas of established fixed-line or mobile Telco’s. This leads to additional competition among ‘Sub Business Units’ (SBUs) for the same value-creation
elements. And this effect is intensified by the increasing convergence of the classic TC segments, i.e. fixed-line, mobile and online (Internet) and TC/IT.

2.3 Deutsche Telekom Group (DT) at a Glance

The subject of this thesis is the analysis of Innovation Management Units (InMUs), using Deutsche Telekom as an example. Deutsche Telekom is the leading telecommunications company in Europe and one of the four largest carriers in the world. The following sections provide an introduction to Deutsche Telekom's activities and structure.

Following conversion from a public-sector utility to a privatised corporation starting in 1989, Deutsche Telekom now presents itself, together with its subsidiaries and affiliates, as a high-tech corporation operating in the telecommunications marketplace. The products and services it offers have given Deutsche Telekom a leading position in numerous different segments: in 2005 it has about 42 million fixed-network customers, 86 million mobile customers and 14 million T-Online (=Internet) subscribers (Deutsche Telekom 2006).

Deutsche Telekom is in a position to offer comprehensive technical expertise across the entire telecommunications sector. The strategic business segments it covers are network communications, data communications, value-added services, multimedia, mobile communications and information and communications systems. Mobile communications, online services, and IP-based solutions for corporate customers are considered to be its main areas of growth. Since 2001 Deutsche Telekom has had a decentralised structure consisting of the headquarters as a strategic management holding and four divisions – T-Com, T-Mobile, T-Online and T-Systems - as single entities covering the entire spectrum of modern telecommunications with integrated solutions from the company's core business areas, i.e. mobile communications, Internet, fixed-line networks and
system solutions. Altogether, they strive to represent technological progress and innovation in specific TC segments:

- **T-Com**: Telecommunications partner for about 40 million private customers
- **T-Mobile**: One of the leading mobile communications providers worldwide
- **T-Online**: One of the biggest Internet-service providers in Europe
- **T-Systems**: One of the largest systems houses in Europe

The key aspects of DT’s corporate strategy are to secure and expand the company’s competitive position against new vendors in the market. At the same time, the company seeks to penetrate new markets, and hence also to exploit additional potential for revenue and earnings. Through its systematic growth-oriented strategy within the four strategic divisions, Deutsche Telekom strives to be at the forefront of technological developments and to be an innovation driver for the telecommunications branch. The company's four divisions orient themselves to increasing the convergence of technology, media, networks and services as they position themselves strategically within the new ‘TIMES’ market – **Telecommunications**, **Information technology**, **Mobile communication**, **Entertainment** and **Security services**. At the same time, DT as a whole works to create new growth opportunities and improve synergies within the four pillars.

Deutsche Telekom has energetically advanced internationalisation over the last few years. With a wealth of international subsidiaries and affiliates in over 60 countries, Deutsche Telekom is present not only in western, central and eastern Europe, but also in the U.S. and all other major markets. Deutsche Telekom (including affiliates) employs over 243,000 people. About one out of every three Group employees works abroad, and about one-third of Deutsche Telekom's 2005 revenue of roughly EUR 59.6 billion was generated outside of Germany.
2.4 Liberalisation and Competition - Consequences for DT

Liberalisation of a market such as the telecommunications market means a reduction of the state's control over that market, in combination with an increase in competition, which normally reapportions the market (Picot et al. 2002). At the outset of liberalisation, a regulatory framework is established for the ensuing competition, so that new providers can position themselves in the market and the former monopolist cannot hinder them by abusing its market power. In the case of liberalisation of the German TC market, Deutsche Telekom had to trade its monopolistic position for a number of obligations. Its compliance with these obligations is monitored by a state authority, the RegTP\(^3\). The responsibilities in question include obligations to provide infrastructure services (‘public service mandate’), to interconnect its networks with those of other operators (‘interconnection’) and to keep its rates within prescribed levels (‘price cap’) (Knieps 2000). In contrast to its effect in other European countries, liberalisation in Germany has brought about very active competition, and thus Germany's telecommunications market is one of the most highly competitive markets anywhere.

Although the TC segment is extremely important economically (a reminder: the fourth-largest industry in Germany), relatively few specific studies have been carried out on the impacts of the kinds of market changes described above on the orientation (strategy) and structure (organisation) of former monopolists (c.f. Dowling et al. 1994). Since the changes influence the operations and the environment of incumbent monopolists, they cannot be understood in this regard without a basic understanding of the impacts of liberalisation on the TC segment as a whole. A useful way to proceed is thus to use a meta-analysis to consider the changes’ effects on the relevant company.

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\(^3\) RegTP: The Regulatory Authority for Telecommunications and Posts, which took up its work on 1 January 1998, is tasked with promoting the development of the postal and telecommunications markets through liberalization and deregulation. These include information and investigative rights as well as a set of sanctions. In July '05, the Federal Network Agency 'RegTP' was renamed 'BNetzA': Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway.
Based upon case studies in the telecommunications industry in Europe and North America as well as market research results (e.g. OVUM, Andersen Consulting Research Group U.K.), Wirtz (1995) portrayed in his article about organisational transformation processes within the telecommunications context the different phases of development and transformation that determine company strategy and organisational structures:

<table>
<thead>
<tr>
<th>1st phase</th>
<th>2nd phase</th>
<th>3rd phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network platform available</strong> ('be able to deliver')</td>
<td><strong>Product and price</strong> ('do more with less')</td>
<td><strong>Customer orientation</strong> ('improve service')</td>
</tr>
<tr>
<td>Critical success factors:</td>
<td>Critical success factors:</td>
<td>Critical success factors:</td>
</tr>
<tr>
<td>- Offer of platforms</td>
<td>- Product differentiation</td>
<td>- Customer-specific product solutions</td>
</tr>
<tr>
<td>- Optimising of capacity</td>
<td>- Competitive price</td>
<td>- Individual service</td>
</tr>
<tr>
<td>Core competencies:</td>
<td>Core competencies:</td>
<td>Core competencies:</td>
</tr>
<tr>
<td>- Network design and implementation</td>
<td>- Product development</td>
<td>- Recognise customer needs and preferences</td>
</tr>
<tr>
<td>- Network management</td>
<td>- Cost management</td>
<td></td>
</tr>
<tr>
<td>Organisational processes:</td>
<td>Organisational processes:</td>
<td>Organisational processes:</td>
</tr>
<tr>
<td>Organised around the network structure</td>
<td>Organised around the products</td>
<td>Organised around the customer groups / communities and platforms</td>
</tr>
<tr>
<td>Organisational culture:</td>
<td>Organisational culture:</td>
<td>Organisational culture:</td>
</tr>
<tr>
<td>Engineer culture</td>
<td>Make or buy culture</td>
<td>Customer-oriented culture</td>
</tr>
<tr>
<td>User of TC services seen as:</td>
<td>User of TC services seen as:</td>
<td>User of TC services seen as:</td>
</tr>
<tr>
<td>Applicant</td>
<td>Subscriber</td>
<td>Customer</td>
</tr>
<tr>
<td>Trigger to innovate:</td>
<td>Trigger to innovate:</td>
<td>Trigger to innovate:</td>
</tr>
<tr>
<td>Technology push</td>
<td>Technology push</td>
<td>Technology push</td>
</tr>
<tr>
<td>Market pull</td>
<td>Market pull</td>
<td>Market pull</td>
</tr>
</tbody>
</table>

Source: in adaptation of Wirtz, 1995; translated and further elaborated by author

Table 2: Transformation Phases within the Telco Context

Wirtz argues that established telecommunications companies (incumbents), unlike private telecommunications newcomers, have to undergo a process of transformation from a ‘network-platform’ phase via a ‘product and price’ phase to a ‘customer-oriented’ phase, which comes along with massive restructuring activities of such incumbents. In contrast to

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4 Called "Enterprise and Industry Transformation" in Anglo-American management science.
that newcomers develop their processes and organisations with a focus on ‘first market-entrance opportunities’, because they have no structural, process-related, organisational or employee-related history to struggle with.

This view is helpful to understand the strategic focus of such newcomers. In keeping with the theory (cf. e.g. Holt 1988, p. 250) that approximately 60% - 80% of successful innovations are generated by market pull resulting from customer needs (which represents mainly incremental innovation), and not by technology push (radical innovation), newcomers have concentrated on the second and third phases mentioned above – and have used the existing technology developed by traditional Telco’s. As a result, established Telco’s (incumbents) have normally had to bear the risks of network-infrastructure investment by themselves. Furthermore, they have had to earn these investments via new products and services (innovations). Newcomers, on the other hand, have been able to purchase network services – thanks to the active regulatory policies in the TC segment – from incumbents, sometimes even at prices below the incumbents’ own costs, and thus have been able to ‘produce’ and offer services more cheaply than incumbents.

Unlike newcomers, SBU’s of traditional telecommunication companies act within predetermined frameworks, governed by strategic, process-related, organisational interrelationships, and make management decisions in accordance with predetermined scopes and rules. They also have to pass through these transformation phases (more or less intensively) during their ‘life cycles’. In practice, such transformation involves major changes. For example, during the evolution from a supplier-driven market to a demand-driven market, incumbents have to undergo structural changes exemplified by Pospischil (1993) with the cases British Telecom, France Telecom and Deutsche Telekom, and they have to carry out major staffing reorganisations. Many employee skills required in earlier phases (the ‘network culture’ phase normally called for large numbers of engineers) are
no longer required. Other types of skills and expertise, in areas such as marketing and sales, become more important. But transfers of staff to other areas are possible only to a limited extent. The transformation process in DT has shown that only very few technical managers were able to become effectively performing marketing managers. Furthermore, a new competition situation calls for greater efficiency. Incumbents are often unable to replace employees, since they normally have large numbers of civil servants who cannot be laid off (absolute job protection). Therefore, while incumbents have positive outset positions thanks to their large market shares, they tend to encounter difficulties, as they make necessary changes that newcomers do not have to face.

The model of Mehler and Grawe (1998), in which changes and shrinking in liberalised TC markets are described in terms of competitive intensity and value for customers, represents a further approach. But Deutsche Telekom's reorientation in the TC sector, as a result of liberalisation, regulation and market changes, is best understood, however, via adaptation of the four-phase model developed by Sattelberger and Westerbarkey (1998, p.31) to describe Deutsche Lufthansa's transformation from monolith to network company (see figure below). Although Lufthansa is an aviation company, during its transformation from a monopolistic state-owned company to a private corporation it underwent a comparable development in terms of its organisational form with varying degrees of integration and performance. The model helps to understand the organisational context in which InMUs were integrated and the impact of the organisational concept (e.g. frequent restructuring, competition for resources) on these units.
The first phase includes the Federal Government’s decision to liberalise the telecommunications market. Prior to that decision, control of all telecommunications activities resided with a ministry with highly bureaucratic structures.

Market liberalisation made it necessary to divide the sector into the three sectors: postal service, postal banking service and telecommunications (Phase II). This produced three enterprises owned by the Federal Government (Postal Reform 1 in 1990). A first group of competitors then appeared to challenge the established and former monopolist public network operator (PNO) ‘Deutsche Telekom’. These newcomers had to position themselves against Deutsche Telekom, the incumbent. At the same time, new market segments (such as mobile and online business) appeared, with their own business models and market dynamics.

For deeper insights about the restructuring process and privatizations of DT: see Blank and Hungenberg (1995); Mansell (1993, pp.137); Schäfer (1996).

For further details see Frühbrodt (2002, pp. 236) or Darbishire (1997, pp. 189).
In a ‘simplification phase’, the incumbent Deutsche Telekom reacted to these market changes by spinning off segments as separate sub-business units (SBUs). This increased autonomy within the individual segments (Phase III). Deutsche Telekom then began to transfer new business areas, such as mobile communications and Internet business, from the ‘parent company’ (fixed-network business) into SBUs (in this case, T-Mobile and T-Online). In addition, Deutsche Telekom went public in 1995 on the basis of Postal Reform II with its ‘T-Shares’ and took on a new legal form (Deutsche Telekom AG). These events were driven by the capital market and by regulation, and they were also measures aimed at optimising the company’s structures, to enhance growth in defined markets. As liberalisation continued, new competitors emerged in niche segments (such as portal operators). In addition, industry outsiders (such as Microsoft) entered the TC market, thereby increasing the competition and differentiation pressures on existing Telco’s.

In Phase IV, the focus is on the ‘company group’; the company is working to integrate the now-different structures (and cultures) of the independent SBUs, in order to generate synergies, and to respond effectively to growing consolidation in the TC market and to increasing convergence in TC services. Deutsche Telekom is developing its ‘four-pillar’ structure\(^7\), while also seeking to expand into international markets through acquisitions of suitable companies. Also in Phase IV, TC companies are entering into synergy-oriented alliances. For example, a European mobile provider alliance, involving T-Mobile, Orange, Telefónica Móviles and Telecom Italia Mobile, was recently announced that is aiming to introduce customer-friendly and ‘borderless’ products and services.

All of these transformation phases described in figure 3 on page 26 have been accompanied by considerable restructuring, and have taken place within a relatively short

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\(^7\) One reason for introducing the four-pillar structure was a desire, driven by company policy and by the capital market, to enter defined markets with their own growth dynamics (fixed-line, mobile, Internet, systems business) and to do so via organisational structures especially optimized for these markets.
time. Deutsche Telekom, for example, completed this transformation cycle within about 10 years. This was accomplished, on the one hand, through smaller reorganisational measures involving multiple units (cycle: almost every year), and on the other hand through the major restructuring of entire sections of the group - or indeed the whole group itself - involving several thousand employees (cycle: approx. every 2 to 3 years). The following section briefly appraises the significance of these effects, particularly on the implementation of radical innovation.

2.5 Problems of Telco’s to Innovate Radically

As the previous sections have shown, the changes in the telecommunication market have resulted in an increasing pressure to innovate. In his empirical study on the liberalisation of the telecommunication industry, Frühbrodt (2002, p. 247) shows that a much more drastic decrease of prices and market shares caused by increasing competition could be observed in Germany in comparison with the UK and many other countries. The market shares decreased by roughly 18% and prices by as much as 85% in less than eighteen months after the liberalisation of the Telco market. At the same time, it could be observed that value creation shifted to higher levels, such as applications or content with new products and services. And this effect is intensified by the increasing convergence of classical TC segments: fixed-line, mobile and online (Internet) and TC/IT. As the literature review will show in detail, a company like DT should promote all forms of innovation, i.e. radical and incremental, in order to secure its long-term survival. However, the multifaceted conditions predominant in the telecommunications environment influence the innovative behaviour of incumbents in special ways.

For instance, the investment behaviour of the incumbents is changing as a result of increasing competitive pressure and a shift towards an increasingly market-specific orientation: a transition away from that of a technology push driven ‘platform operator’ to
a market pull oriented ‘service operator’. While mention was made in the past of a public supply mandate (telecommunications access must be provided to everyone), the primary focus today is on economic aspects (not every technology can be made available to everybody at all costs). While incumbents previously commissioned new platforms and technologies from technology producers and performed development work together with those companies, these platforms and technologies are nowadays purchased from vendors in line with cost-benefit aspects. This shift in perception and management in terms of investments, R&D expenses and - ultimately – also innovation behaviour goes hand in hand with management focussing on more or less short-term goals. Consequently, the operational units also adopt this orientation. This gives rise to the danger of nobody assuming responsibility any more for innovation activities with a medium to long-term character, despite the fact that precisely these innovation activities are crucial to the survival of an enterprise. This trend towards more or less incremental innovation is intensified even further by the requisite reorganisations associated with the transformation processes. This results in the incumbents having no option but to deal with structural approaches that ensure that radical innovations are promoted.

For incumbents such as Deutsche Telekom, these market changes mean a significant reshaping of structures and processes within a few years. Although frequent restructuring undeniably prises organisational structures out of a deadlock – which can generally be regarded as promoting innovation – (newly) established units that deal with medium to long-term subjects are hardly given the chance to prove their added value in the short time available - typical statement e.g. from a senior manager of the corporate InMU:

‘In an environment of constant reorganisation where one does not even wait long enough to see if it has any effect, new themes simply have no time to work’.

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8 For further insights into the consequences of telcos’ need to innovate, see also Godell (2004).
As the literature review will show in detail, a company has, in principle, numerous organisational options and structural forms for promoting innovation activities of an incremental or radical nature - either to integrate or to separate such units that foster more radical innovation from the other operational organisations. It is perhaps interesting that despite the importance of radical innovations for a company, we know considerably less about the effective management of realisation in the radical than in the incremental context – especially if this is to be understood as a standard, regular task of an organisation and not just as a series of temporary projects via interdisciplinary teams. Thus, fundamental activities that are understood to be regular tasks are accounted for by organisational units established specifically to this end. Therefore, so called ‘Innovation Management Units (InMUs)’ - units, which are responsible for fostering the innovation activities - are of specific interest to large companies like DT as an organisational instrument to cover the demand for more radical innovation. However, the lack of a clear demarcation of the spectrum of tasks of innovation management activities in the literature is also reflected in deficits in the design, integration and role comprehension of such specific units (InMUs).

2.6 Summary and Conclusions

As illustrated by the introduction to the telecommunications (TC) segment, this is a sector characterised by a high degree of economic significance. However, it is also undergoing a strong shift from the status of a monopolistic ‘buyer's market' to a competition-oriented ‘seller's market'. Companies operating in the TC segment must face up to a number of challenges if they wish to succeed and transform themselves. Innovativeness is one of the major challenges in this context when it comes to persevering in an increasingly competitive environment for gaining customer favour. In contrast to other sectors, the TC sector is also characterised by only marginal increases in the budget for communication services, resulting in fierce competition (fixed line, mobile, online) associated with high
innovation pressure for new products, followed by a shift into higher levels within the value chain, such as applications and content.

For incumbents such as Deutsche Telekom – the leading telecommunications company in Europe and one of the four largest carriers in the world – this means a significant reshaping of structures and processes within a few years. The demand for continuous – particularly radical – innovations in the form of new business models, products, as well as the ability to innovate in itself, play a crucial role in achieving sustainable reorientation in this context. However, the question is how an incumbent and ex-monopolist such as Deutsche Telekom should deal with such a challenge on an organisational level. Innovation Management Units (InMUs) are thus of particular importance in this context due to their role as the accountable organisational unit for the innovation management activities within their company, i.e. structural approaches. Therefore, the proposed research seeks to contribute to a better comprehension of the tasks and responsibilities (role comprehensions) of InMUs at corporate and divisional level to foster more radical innovation, and the critical issues that they face in their implementation and running-business phase.
Chapter Three – Existing Literature and Theories

3.1 Introduction

In view of the environmental dynamics and serious changes in the competitive environment, both on local markets and in a global context, keeping pace through the offensive utilisation of the opportunities yielded by new technologies (Pfeiffer et al. 1997) and their implementation in successful new products and services is one of the most significant factors for the survival of a company today – especially to companies in competitive environments (Hill and Jones 1998; Tidd et al. 1997). Although companies are generally well aware of the importance of innovations (Kelly and Littman 2001), this understanding is put into practice infrequently, and just a few feel that they are effective innovators today (A.D.Little, 1999). In addition, to innovate is risky and very often plans to innovate fail (Trott 1998). Therefore, for some, innovation is ‘the most important shaping force in the history of mankind’ (Cumming 1998). In this context, product innovations are one of the most important ways, if not ‘the’ most important way, for organisations to adapt to change in environments, markets, technology and competition (Dougherty and Hardy 1996). There is a vast amount of research and writing of relevance to clarifying the question of which methodology is the best suited to recognise innovation opportunities promptly, to evaluate these correctly and implement them in corresponding measures. In spite of that companies continue relentlessly to seek methods and tools to improve innovation capability (Tang 1999).

A trend has already been evident for some time now of boosting innovation capability, particularly through the promotion of an ‘innovation-friendly corporate culture’. However, only a handful of operational and applicable methods are currently known of that allow the implementation of such a culture in a company (De Pay 1990; Hauser 1998). Large, mature organisations, in particular, therefore continue to search for possibilities of driving and improving innovation capability via structural and organisational measures, especially
in relation to product innovations (Morner 1997). This becomes all the more decisive for companies and corporations having to deal with massive organisational changes in a period of market liberalisation and deregulation.

It thus comes as no surprise that a large and growing pool of literature exists concerning product innovation at the level of specific projects (e.g. Cooper 1983; Zirger and Maidique 1990) and the organisation as a whole (e.g. Kanter 1990; Morner 1997). In literature a series of organisational characteristics were identified, that relate successful product innovation, such as organisational configurations (e.g. Burns and Stalker 1966; Mintzberg 1979), strategy (Burgelman et al. 1995; Johnson and Scholes 1999; Wit and Meyer 1998), culture (e.g. Kanter 1988) leadership and champions, and various combinations of these. Although many details remain to be articulated, this previous work has produced a good understanding of the innovative organisation, at least as an ideal type. However, organisations are especially challenged by changes in technology, environments, competition, etc., and many organisations still have difficulty with sustained product innovation, especially if they have a radical character. But in doing so, they must fundamentally change how they organise (Hage 1988). A complete organisational shift as a whole - especially in the case of a large, mature organisation - needs time and new organisational capabilities are difficult to create and costly to adjust (Nelson and Winter, 1982). Galbraith and others referred to meeting the challenge to be innovative without a complete organisational shift as a call for a separate innovating organisation with unique structure, information and decision processes and reward and people-selection systems completely different to existing, operating organisations, which are designed to do something well and efficient for the millionth time (Galbraith 1982).

Against the background that management practices that work for incremental innovations are often inadequate for radical innovations, the aspect of managing radical innovations

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9 e.g. Ettlie, Bridges et al. (1984); Quinn and College (1979); Rothwell, Freeman et al. (1974); Schön (1963).
10 e.g. Galbraith (1973); Henry and Walker (1991); Jelinek and Schoonhoven (1990); Morgan (1997); Van de Ven (1986).
11 e.g. Billing (2003); Leifer, McDermott et al. (2000); Nord and Tucker (1987); Scigliano (2003).
by means of dedicated organisational approaches – so-called Innovation Hubs\footnote{Innovation hubs are organisations with separate structures, cultures and processes that serve as repositories for all those who play pivotal roles in bringing about radical innovation.} - has recently received far more attention in the literature (cf. e.g. Leifer et al. 2000). The questions now raised are how companies like Deutsche Telekom meet this challenge? And which role is played in this context by the Innovation Management Units (InMUs) – organisational units established expressly to foster incremental and/or radical product-innovations.

3.2 Focus of the Literature Review

The preceding sections initially addressed and delimited the vast amount of research, theories and literature within the field of managing innovation to the objective upon which this study is based. However, an additional structuring and identification of relevant topics is also necessary. As already implied above, managing incremental and radical innovations in large, mature companies has long been a topic of great interest both in theory and in practice. Recently, the focus has increasingly shifted towards aspects of managing radical innovations, especially in light of their significance as an instrument for safeguarding the long-term growth of a company.

As already commented on at the beginning, we know considerably less about the effective management of realisation in the radical than in the incremental context – especially if this is to be understood as a standard, regular task of an organisation and not just as a series of temporary projects via interdisciplinary teams. Therefore, this study does not focus on temporary organisational forms (e.g. project organisations) and approaches in which companies realise innovation as part of an external network (e.g. cooperation in research and development). The focus of this study is on the use of ‘Innovation Management Units’ (InMUs) as an organisational tool for driving innovation activities – especially of a radical nature - established expressly for this purpose.
The primary focus and emphasis is on how can a large, mature organisation tackle the challenge of fostering more radical innovation through structural approaches\textsuperscript{13}, so called Innovation Management Units (InMUs) - implemented expressly for this purpose.

The main purpose of this chapter is to present and discuss the corresponding and relevant literature. The literature review starts with a clarification of defining and conceptual aspects of innovations in this special context, to determine how they can be measured and managed. This is followed by a discussion of specific aspects to innovate within the telecommunication segment which is of particular importance within this research. Furthermore, the literature review outline and critically examine how innovation capability - particularly regarding radical innovations - can be pushed within this environment in large, mature organisations, and which role InMUs adopt in this context. The question of the role played by InMUs is also closely tied to the clarification of what an Innovation Management Unit (InMU) actually implies, what it is used for and which drivers & barriers must be expected in this context. This further focal convergence yields the structure of the literature review in the following sections as 'the thesis writers' version of the literature, their selection and arrangement of their summaries and critiques' (Murray 2002, p. 101), leading in turn to the concrete research questions presented by the literature review.

3.3 Innovation - Definition and Conceptual Differentiation

As mentioned above, a vast amount of research, theories and literature exists within the field of innovation (see e.g. Storey 2004)\textsuperscript{14}, and a definition and conceptual differentiation of relevant topics in the context of this research is therefore necessary. Consequently,

\textsuperscript{13} Structural approaches are defined here as the formal structural organisations as it is usually described by an organisational chart, a corresponding description of a mission, core tasks and responsibilities and do not comprise the informal organisation e.g. communities of practice, informal working groups or networks.

\textsuperscript{14} Consists of fifty-three social science works on organizational and technological innovation (majority of the pieces originally were published in the 1990s).
this section will clarify the term ‘innovation’, will highlight the demand for incremental and radical innovations, specify the term ‘radical’ innovation in the context of this research, discuss issues on how to manage them in an organisational context and describe the tasks and objectives (role comprehension) of Innovation Management Units (InMUs).

3.3.1 Conceptual Issues of the Term ‘Innovation’

Today, the word ‘innovation’ is a glamorous and fashionable term that has encroached into virtually every scientific discipline (Hübner 1997, p. 1898) and is used in the most diverse contexts. Yet in view of the popular innovation debate in the public eye, one question is perhaps raised more than ever before: what exactly constitutes an innovation?

The diversity of use of the term innovation is also characterised by a host of different approaches to its definition, with the spectrum ranging from the perspective of science to the perspective of economic practice. There is dissension both regarding the definition of the term and the description and classification of innovation characteristics (Pleschak and Sabisch 1996). On account of the diversity of definitions, it is therefore important for both the scientist and the practitioner to stipulate for themselves precisely what they wish to designate as innovation. This classification then dictates the further handling of the innovation problem, which is why a more precise definition of the term is also necessary within the scope of this study.

The foundations of contemporary innovation research within the framework of business management were already laid in the 1930’s by Austrian economist Joseph Alois Schumpeter with his ‘Theory of Economic Development’ (Schumpeter 1931, pp. 100). His theory perceives innovation as a discontinuous implementation of new combinations of ‘things and forces’\textsuperscript{15} – be it the manufacture of a new product hitherto unknown to the

\textsuperscript{15} With the restriction that these combinations are limited to knowledge that is already available.
consumer group\textsuperscript{16}, the development of a new sales market, the launch of a new production method, the securing of new sources of raw materials and semi-finished products or the execution of a reorganisation. Schumpeter's work understood innovation to be a determining factor of a national economy hallmarked by dynamic growth. Since that time, many authors have elaborated various approaches towards describing and defining innovation.

The word ‘innovation’ is etymologically derived from the Latin word ‘novus’, meaning ‘new’, and was further developed in the word ‘innovatio’, which more or less means innovation, a new introduction or novelty; in other words, ‘something that has not existed in this form before’ (Helm 2001, p. 47). Accordingly, the most fundamental criterion for an innovation is its novelty, although a distinction must be made between ‘innovation’ and ‘invention’ (Vahs and Burmester 2005, p. 43).

As defined by Galbraith: ‘Invention is the creation of a new idea. Innovation is the process of applying a new idea to create a new process or product’ (Galbraith 1982, p. 6). The role of the invention is thus limited to that of being the preliminary stage of innovation, i.e. the process of knowledge generation through research and development, as well as the first-time technical realisation of a new problem resolution. In contrast, the innovation is characterised by the first-time economic application of a new problem resolution (Dalichau et al. 2001, p. 11). Nevertheless, the ‘simple creation of the idea itself is not enough - sale and utilisation distinguish innovations from inventions’ (Hauschildt 1997, p. 6).

Innovation thus essentially involves the economic optimisation of the use of knowledge, as only once ‘the market launch has been achieved, or a new process has been utilised, can one refer to a product or process innovation’ (Brockhoff 1992, p. 28). Afuah understands innovation to be ‘Invention plus marketing’ (Afuah 1998, p. 13), as only in

\textsuperscript{16}Or as one would refer to today: the customers.
this way can a company profit economically from an idea. And it is precisely this point in which the meaning of the term ‘innovation’ appears to deviate in general usage. If we observe those cases in which the term ‘innovation’ is used, it becomes evident that verification of the economic success is still lacking.

To further clarify the precise meaning of ‘innovation’, the term innovation can be classified via different dimensions, types of innovation and degrees of innovation.

Based upon an analysis of a large variety of definitions of the concept of innovation in the literature, Hauschildt (1997, p. 7) highlights the complexity of the term innovation by illustrating four different dimensions of innovation:

- Content-related dimension: What is new?
- Subjective dimension: To whom is it new?
- Process-related dimension: Where does the innovation start, and where does it end?
- Normative dimension: New = Successful?

These dimensions must be regarded in every individual case in this context, as only the combination of these four dimensions allows the realisation of what is, or should be, innovative (cf. Müller and Schienstock 1978, pp. 22).

In accordance with Abernathy and Clark (1985) and Hauschildt (1997), this yields a basic definition of the term innovation in this study:

‘An innovation is the initial market introduction of a new product or process that differs noticeably from the previous status from the point of view of the observer. This novelty must be perceived by the customer and comprises the linking of purpose and means in a hitherto unknown form. This link must prove itself on the market or in internal use. It creates new markets, supports freshly articulated user needs in the new function it offers, and in practice demands new channels of distribution and aftermarket support. Simply producing the idea itself is not enough. It is the use or sale with the intent of improving own economic success that distinguishes innovation from invention.’
In addition to the dimensional levels, different types of innovation must also be considered. Innovations can involve technical, social, organisational and cultural innovations or changes (c.f. Albach 1994, p.50). These innovation types may also be interdependent, i.e. a social innovation may necessitate a technical innovation (e.g. products or production processes that need to be changed to comply with amended environmental legislation). On account of the subject of this study, an analysis of all types of innovation would not be expedient. Therefore, only technical innovations shall be covered henceforth. Technical innovations involve both ‘product’ and ‘process’ innovations (Klosterkamp 1996, p7). The Oxford Dictionary defines innovation as ‘The economic application of a new idea. Product innovation involves a new or modified product; process innovation involves a new or modified way of making a product.’ (Oxford Dictionary 1997).

Abernathy and Utterback (1978) hypothesise a dependency of the innovation types ‘Product Innovation’ and ‘Process Innovation’ on time (p. 40). Accordingly, the market launch is primarily followed by product innovations in the form of product modifications and improvements. If the product has been optimised in terms of its characteristic attributes, an enhanced process innovation is initiated with the goal of standardisation and cost reduction. Both innovation types subside with increasing maturity and the necessity of launching a new product innovation onto the market increases.

Process innovations\textsuperscript{17} are not covered in any further detail at this point, as they are a topic of production management and as such do not fall within the primary focus of innovation management and the creation of new products. Last but not least, it can be said that organisations that introduce innovative products — that is, products that perform better than existing products — win more market share (Chaney and Devinney 1992), perform better (Bauer 1997) and are more likely to survive (Banbury and Mitchell 1995).

\textsuperscript{17} Process innovation by OECD Oslo Manual (1992) is ‘the adoption of a new or significantly improved production method. This may involve changes in equipment or production organisation, or both. The methods may be intended to produce new or improved products, which cannot be produced using conventional plants or production methods, or essentially to increase the production of existing products’.
Therefore, the following section covers ‘product innovations’ in greater depth. The development of basic technologies or technical platforms is not in the focus of this research. This are covered by the term ‘technology development’ and does not represent a product in the sense of this study. Product innovations are generated / operated on the basis of basic technologies or technical platforms.

In addition to the innovation type (product or process innovation, organisational innovation, social innovation, etc.), innovations can also be classified according to their ‘degree of innovation’ (e.g. degree of novelty). One point of orientation to this end is provided by Barnett, who already established a distinction between ‘major’ and ‘minor’ innovations in 1953, although he himself was not thoroughly convinced of this distinction (Barnett 1953, p. 7). The literature analysis of Morner (1997, p. 15), which defines innovations according to their ‘degree of novelty’, illustrates a variety of different delimitations and terms. And not even an expansion of the literature analysis to cover the levels ‘degree of knowledge’ or ‘complexity of technology’ yields a clearer approach to defining the term innovation.

<table>
<thead>
<tr>
<th>Author</th>
<th>High Innovation types by „degree of novelty“</th>
<th>Low Innovation types by „degree of novelty“</th>
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</thead>
<tbody>
<tr>
<td>Barnett (1953)</td>
<td>Major Innovation</td>
<td>Minor Innovation</td>
</tr>
<tr>
<td>Knight (1967)</td>
<td>Non-Routine Innovation</td>
<td>Routine Innovation</td>
</tr>
<tr>
<td>Mensch (1975)</td>
<td>„Basic Innovation“</td>
<td>„Improving“</td>
</tr>
<tr>
<td>Hage (1980)</td>
<td>Radical Innovation</td>
<td>Incremental Innovation</td>
</tr>
<tr>
<td>Trommendorf (1990)</td>
<td>„Radical“ Innovation</td>
<td>„Incremental“</td>
</tr>
<tr>
<td>Rosenberg (1995)</td>
<td>Breakthrough Innovation</td>
<td>Incremental Innovation</td>
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<tr>
<th>Author</th>
<th>High Innovation types by „degree of new knowledge“</th>
<th>Low Innovation types by „degree of new knowledge“</th>
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<tbody>
<tr>
<td>Dewar and Dutton (1986)</td>
<td>Radical Innovation</td>
<td>Incremental-Innovation</td>
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<tr>
<th>Author</th>
<th>High Innovation types by „complexity of technology“</th>
<th>Low Innovation types by „complexity of technology“</th>
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Table Note: „“ are translated from German

Figure 4: Innovation - Overview of the Variety of Definition Approaches
The overview illustrates that no precise definitions exist, and that the definitions instead involve a relatively randomly classified continuum with ‘minor’ and ‘incremental’ innovations on the one hand, and ‘major’ and ‘radical’ / ‘breakthrough’ innovations on the other hand (Danneels and Kleinschmidt 2001, p. 357). Furthermore, Hartmann (2004, p. 3) and Garcia and Calantone (2002, p. 117) see a lack of agreement on whether or not the distinction can be made dichotomously (incremental versus radical), triadically (incremental, medium, radical), tetracategorically (2x2-matrix)\(^{18}\) or even as a hypercube (2x2xX) (c.f. Afuah and Bahram 1995). Within the scope of this study, the dichotomous distinction between ‘radical’ and ‘incremental’ innovation is chosen, as it is sufficient for the purpose of this study and particularly expedient for the subsequent classification of core functions and responsibilities of innovation promoting units (InMUs).

3.3.2 Conceptual Issues: ‘Radical vs. Incremental Innovation’

As described before, it is well known that product innovations come in varying degrees of complexity and levels of technological uncertainty (Ettlie et al. 1984). Precisely when and why innovations of a particular degree actually become manifest is evident if one envisages innovation as an iterative process throughout the entire lifecycle of a technology. If the aforementioned approach of Abernathy and Utterback (1978) is taken up, product development initially focuses on the product creation, before shifting to generation of as many product variants as possible, in order to allow customer needs to be catered to and thus achieve optimised market exploitation. Above all, process innovations can then be used to realise cost savings that become necessary in the later phase of the product lifetime in which, as a rule, greater price pressure dominates as a result of increased competition and imitation.

In terms of the terminological delimitation between incremental and radical innovation, this means the following:

\(^{18}\) e.g. Abernathy and Clark (1985); Green, Garvin et al. (1995); Henderson (1990).
Radical innovations initiate a new product lifecycle. They do not address an existing demand, but instead create new, hitherto unknown needs and represent clear departures from existing practice. They serve as catalysts for the creation or restructuring of new markets and industries (Garcia and Calantone 2002, p. 121); they transform the relationship between customers and suppliers and often create entirely new product categories. (Leifer et al. 2000, p. 12). Certain product modifications become necessary over the course of the product lifecycle. These are realised through incremental innovations based on existing technology, in order to maximise the product lifecycle. These are characterised by a variety of improvements to the product performance by means of modified technologies, improved materials, changes to (more or less non-key) details and components (Garcia and Calantone 2002, p. 117), all the way to boosting sales through new marketing concepts or expanding the service offering (see diagram below). Accordingly, incremental innovations are encountered far more frequently than radical innovations.

![Diagram: Incremental/Radical Innovation – Technology and Market Uncertainties](image)

Figure 5 : Incremental/Radical Innovation – Technology and Market Uncertainties

In accordance with the definition approaches of Hartmann (2004), radical innovations focus – as already indicated above – on the generation of new competencies and the

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19 E.g. Duchesneau, Cohn et al. (1979); Dewar and Dutton (1986); Ettlie (1983).
20 C.f. e.g. Burns and Stalker (1966); Dewar and Dutton (1986); Djellal and Gallouj (1999); Ettlie, Bridges et al. (1984); Nelson and Winter (1982); Tushman and Anderson (1986).
creation of entirely new business fields and product lines. They are characterised by a high degree of novelty and hitherto unfulfilled customer needs are addressed (Brockhoff 2000, p. 28). Characteristic features in the development of radical innovations are a long planning horizon (Arnold 2003), a high degree of uncertainty (Leifer et al. 2000, p. 23) – greater even than when developing identical processes with incremental innovations (O’Conner and Veryzer 2001, p. 232) – and at least a certain degree of randomness (Leifer et al. 2000, p. 18) occasioned by numerous unpredictable developments and obstructing variables (Sicotte and Langley 2000, p. 3). The company is consequently confronted by a greater risk than when implementing incremental improvements (Schmidt and Caltone 1998, p. 112), which in turn could account for a certain reluctance on the part of the management when it comes to driving radical innovations. Therefore, radical innovations are more likely to be implemented in the form of a project yielding a 5-10 X (or greater) performance improvement, or 30 - 50% (or greater) reduction in cost (Leifer 2003, p. 5; O’Conner and Rice 2001, p. 99).

The question arises as to why a company should engage in radical innovations when these entail such uncertainties and risks? One important reason to this end is provided by the ‘S-Curve Theory’ of Foster (1986), which can be applied to a variety of facts and circumstances. The literature shows that two key factors drive product innovation: technology (e.g. Capon and Glazer 1987) and markets (e.g. Urban et al. 1996). Therefore, the diffusion of products on the market (product lifecycle) and the development of technology (technology lifecycle) are of importance within the scope of this study. Without wishing to explore all facets of the S-Curve topic, it can be surmised that the S-Curve theory does indicate that a product should be introduced before the final diffusion

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22 The degree of novelty of the innovation is, however, difficult to ascertain insofar as an appraiser must compare ‘innovation’ with an existing product at a given time (Schlaak 1999, p. 17), which can be considered more or less subjective.

23 In the case of product lifecycles that extend over decades, investment decisions require many months or years and a focus on ‘project based organisations’. In this respect, see also the field of research: ‘complex products and systems, (CoPS); c.f. Hobday (1998).

24 I.e. organisational, resource, technological and market uncertainties.

or development phase, so as to secure success for the company, as either the technological potential is exhausted at this stage, or the market is saturated, or both (Rifkin 1994, p. 10).

The following graph illustrates this circumstance in accordance with Krubasik (1988) and Rycroft and Kash (2002):

Figure 6: S-Curve Approach - Radical Versus Incremental Innovation

In the case of radical innovations (pursuant to the aforementioned definition), a new technology spawns a new S-Curve with a new product and/or new technology line. Even if the legacy product still generates profits, it's technological or market potential may already be fully exhausted. A certain period of time passes from development to market maturity. In an ideal case, therefore, it is necessary to participate in the development and implementation of new (radical) innovations even before the end of the technology or product lifecycle, in order to be able to offer a follow-up product / technology and secure the success of the company. For the company involved, this means maximising the systematic driving of both incremental and radical innovation types.
However, radical and incremental innovations do not differ solely in terms of their ‘degree of innovation’ (or degree of novelty), but also in the form in which they are implemented. A distinction can thus be made between radical and incremental innovations on the basis of different characteristics with the same set of activities and decision points. This distinction facilitates the resultant task and role comprehension of InMUs (see section 3.4.6), which wish to (or must) drive one or both forms (radical and incremental innovations). The key differences between radical and incremental innovations – from a company perspective - are summarised in the enclosed table of Leifer et al. (2000, p. 19):

<table>
<thead>
<tr>
<th>Activity / decision point</th>
<th>Incremental Innovation</th>
<th>Radical Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project time line</td>
<td>Short term – six months to two years</td>
<td>Long term – usually ten years or more</td>
</tr>
<tr>
<td>Trajectory</td>
<td>There is a linear and continuous path from concept to commercialisation following designated steps</td>
<td>The path is marked by multiple discontinuities, or gaps, that must be bridged. The process is sporadic with many stops and starts, hibernations and revivals. Trajectory changes occur in response to unanticipated events, outcomes and discoveries</td>
</tr>
<tr>
<td>Idea generation and opportunity recognition</td>
<td>Idea generation and opportunity recognition occur at the front end; critical events are largely anticipated.</td>
<td>Idea generation and opportunity recognition occur sporadically throughout the lifecycle, often in response to discontinuities (funding, personnel, technical, market) in the project trajectory</td>
</tr>
<tr>
<td>Process</td>
<td>A formal, approved process moves from idea generation through development and commercialisation. (e.g. via stage-gate process)</td>
<td>There is a formal process for securing and keeping funding, which is treated by participants as a game, often with disdain. Uncertainty is too high to make the process relevant. The formal process has real value only when the project enters later stages of development.</td>
</tr>
<tr>
<td>Business case</td>
<td>A complete and detailed plan can be developed at the beginning of the process because of the relatively low level of uncertainty.</td>
<td>The business model evolves through discovery-based technical and market learning and the business plan must likewise evolve as uncertainty is reduced.</td>
</tr>
<tr>
<td>The players</td>
<td>Assigned to a cross-functional team, each member has a clearly specified responsibility within his or her area of expertise</td>
<td>Key players come and go during the early part of the project. Many are part of the informal network that grows up around a radical innovation project. They tend to be ‘cross-functional’ individuals.</td>
</tr>
<tr>
<td>Organisational structures</td>
<td>Typically, a cross-functional project team operates within a business unit.</td>
<td>The project often starts in R&amp;D, migrates into some sort of incubating organisation, and transitions into a goal-driven project organisation.</td>
</tr>
</tbody>
</table>
The project team has all the competencies required to complete the process. The project is subject to the standard resource allocation process for incremental projects. Creativity skills in resource and competency acquisition – from a variety of internal and external sources – are critical to the survival and success of the project.

Operating units are involved from the beginning. Informal involvement with operating units is important, but the project must avoid becoming captive to an operating unit too early.

<table>
<thead>
<tr>
<th>Resources and competencies</th>
<th>Operating and involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The project team has all the competencies required to complete the process. The project is subject to the standard resource allocation process for incremental projects.</td>
<td>Operating units are involved from the beginning.</td>
</tr>
<tr>
<td>Creativity skills in resource and competency acquisition – from a variety of internal and external sources – are critical to the survival and success of the project.</td>
<td>Informal involvement with operating units is important, but the project must avoid becoming captive to an operating unit too early.</td>
</tr>
</tbody>
</table>

Table 3: ‘Incremental’ Versus. ‘Radical’ Innovations from a Company Perspective

In addition to all of these classifications (from a company perspective), it must also be considered that innovations change their classifications over time, e.g. steam locomotives were once thought quite novel, but today, unfortunately, they are mere historical curiosities. Not only the term “radical innovation” between the company perspective (see table above) and the product perspective (c.f. table 4 on page 49), but also the distinction between radical and incremental innovations, is not one of hard and fast categories. Instead, there is a continuum of innovations that ranges from radical to incremental (Hage 1980). An innovation’s placement on this continuum depends upon the perceptions of those familiar with the degree of departure of the innovation from the state of knowledge prior to its introduction (Dewar and Dutton 1986, p.1423).

3.3.3 ‘Radical’ and ‘Incremental’ Innovation at the Product Level

The literature shows – not least due to the S-Curve approach – that a company should promote both forms of innovation, i.e. radical and incremental, in order to secure its long-term survival. However, the question remains as to whether the effort is equally expedient for all product categories, or whether a company should instead focus on special product categories – an indication relating to the possible fields of activity of InMUs. Therefore, a more in-depth classification of radical and incremental innovations on the product level is necessary.
Booz, Allen & Hamilton (1982) were already engaged in the classification of new products in 1982. Their study involved ascertaining the distribution of all new products according to the specific classes and the frequency of their distribution between those classes. In the course of their empirical studies, Booz, Allen & Hamilton (1982) separated product innovations into six different categories based upon their novelty. The following figure shows different ‘product innovation categories’ in a matrix in relation to their ‘novelty on market’ and ‘novelty for company’.

![Diagram of product innovation categories]

**Figure 7: Categorisation of New Product Developments**

Booz, Allen & Hamilton (1982, p. 8) surmised that the chanciest innovation category, New Product (lines) and Basic Innovations, represented by E and F - with a cumulative share of just 30% – generate over 60% of the successful innovations. A study by Banbury & Mitchell (1995) concluded that ‘incremental product innovation’ – represented by the innovation categories C and D - is crucially important to the business performance of firms. Johne (1995) argued that categories A and B are not separate innovation

---

26 Unfortunately, they omitted to explain in detail the criteria they considered to measure the success.
categories, as all forms of product development imply cost savings and repositioning intention. Klosterkamp (1996) admits the claim that repositioning B entails completely new branding activities, implementing new distribution channels, etc. and that the effort is comparable to that following a ‘product variation’ (category C). Additionally, criticism must be directed at the delimitation of product categories being based on an unfocussed and, in part, random delimitation of markets, not explicitly taking into account a critical factor relevant to ‘radical product innovation’, i.e. technology (Chandy and Tellis 1998, p. 7). Despite these shortcomings in category delimitation, the Booz, Allen & Hamilton approach is the most widespread and expedient approach, and will be used for further appraisals within the scope of this study.

Thus, the following further elaborated classification of ‘radical’ and ‘incremental’ innovation at the product level is yielded by Abetti (2000, p. 209), the Booz, Allen & Hamilton (1982) approach and Cooper (2005, p.26):

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
<th>Example</th>
<th>Category at product level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category F</strong>&lt;br&gt;Basic Innovations&lt;br&gt;‘New-to-the-world’</td>
<td>These new products are the first of their kind and create an entirely new market</td>
<td>Well-known examples are the Sony Walkman, Pfizer’s Viagra, Apple’s original iPod or 3M’s Post-It Notes</td>
<td>Radical</td>
</tr>
<tr>
<td><strong>Category E</strong>&lt;br&gt;New Product (lines / families)</td>
<td>These products, although not new to the market-place, nonetheless are quite new to the particular firm. They allow a company to enter an established market for the first time.</td>
<td>E.g. Canon was not the first to launch an office version of a laser printer; HP was, with the Laser Jet™.</td>
<td>Radical</td>
</tr>
<tr>
<td><strong>Category D</strong>&lt;br&gt;Product Modification / Variation</td>
<td>These are new items to the firm, but fit within an existing product line that the firm makes. They may also represent a fairly new product to the marketplace.</td>
<td>An example is HP’s introduction of the next generation or model of its laser printers. Its added features and resolution make it somewhat novel or ‘new to the market’.</td>
<td>Incremental</td>
</tr>
</tbody>
</table>

27 For the problem of market delimitation, please refer to Bauer (1989).
<table>
<thead>
<tr>
<th>Category C</th>
<th>Line Extension</th>
<th>These ‘not-so-new’ products are essentially replacements of existing products in a firm’s product line. They offer improved performance or greater perceived value over the ‘old’ product.</th>
<th>E.g. telecommunication: Introducing of a higher data bandwidth (e.g. from 64 KB up to 128 KB) within the consumer segment.</th>
<th>Incremental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category B</td>
<td>Product Relaunch/ Repositioning</td>
<td>These are essentially new applications for existing products, and often involve retargeting an old product at a new market segment or for a different application.</td>
<td>For years, Bayer’s Aspirin (or ASA) was the standard headache, pain, and fever reliever. Superseded by newer, safer compounds, Aspirin was in trouble. But new medical evidence suggested that Aspirin had other benefits. Now Aspirin is positioned, not as a headache pill, but as a blood clot, stroke and heart attack preventer.</td>
<td>Incremental</td>
</tr>
</tbody>
</table>

Table 4: ‘Radical’ and ‘Incremental’ Innovation at Product Level

The consolidated findings intend to focus the investigations within the study at the hatched area of category E and F. This area is described by ‘Basic Innovations and New Product (lines/families)’ and where the revenue and expense for the company is maximised, but also the risks and the challenge to manage is most significant from a company's point of view. Unfortunately, ‘radical’ innovation is frequently equated in common language usage with the development of new ‘technology platforms’ (see also Figure 6: S-Curve Approach on page 44). In order to avoid such misunderstandings within this thesis, the term ‘radical’ innovation corresponds to that of radical innovations at the product level (‘basic product innovations’ and ‘new products (lines/families)’, where the structure and organisation need to be most flexible concerning innovation demands and management stipulations.

Categories B, C and D correspond to ‘incremental’ innovations and are more likely to be assigned to the ‘lifecycle management’ of products, which is promoted by product management and marketing in daily business. The distinction between the ‘incremental’
and ‘radical’ innovation level is of importance in the definition and analysis of the tasks and objective (role comprehension) of InMUs, as illustrated later in Section 3.4.6.

3.3.4 ‘Radical’ Innovation in the Telecommunication Segment

Now that the previous sections have covered the concept, types and classification attributes of innovations (‘incremental’ versus ‘radical’), it is necessary within the scope of this dissertation to deal with the special aspects of innovation within the telecommunication (TC) segment. In particular, this involves appraising the types of innovation that can be found in the TC segment, and the role they play for TC companies. Such an appraisal is also necessary to allow delimitation within the task spectrum of the individual organisational units at a later stage, thus facilitating the identification of R&D units, product management units and the actual innovation management units themselves.

On a generic level, product and process innovation in telecommunications is defined by Cuilenburg and Slaa (1995) as follows: ‘Whereas process innovation in communications generally means ‘more of the same (at lower price)’, product innovation offers consumers new choices and opportunities of information and communication’ (p. 649).

Product innovations are the focus of this research. This study does not cover the subject of ‘Service Innovation’ in the closer meaning (e.g. as is necessary for banks, insurance companies, etc.), where ‘service products are predominantly processes rather than objects’ (Oke and Goffin 2001, p. 8) and in which the behaviour of the product lifecycle is an exact opposite of that of the traditional product lifecycle model.\(^{28}\)

\(^{28}\) Barras (1986) refers to this as the ‘reverse product cycle’, in which adoption of a new information technology by the service provider leads to incremental process innovations. Wartburg (2000, p. 196) notes in this context that Barras’ work is less of a theory towards explaining the service problem itself, than it is a diffusion theory of modern information and communication technologies in the service segments. Please refer to Akehurst and Gadrey (1998); Gallouj (1998); Gallouj and Weinstein (1997) and Hipp (1999) for an overview of the literature and research directions pertaining to service innovations; and Goffin and Mitchell (2005, p. 72) for an overview of the characteristics and terminology of innovation in services.
However, a definition of a ‘Telecommunication (TC) product’ is lacking, as the following is understood to be a TC product in accordance with the definition of Deutsche Telekom within the context of this study:

‘A product is that which the customer perceives or accepts as a holistic tangible element or service. Bundle products are, in turn, products’

(Deutsche Telekom 2000, p. 3)

A TC product serves to generate revenue in the form of a monthly subscription fee and per-minute charges. Within the scope of increasing convergence, additional revenue generated by added value services (e.g. content fees) is also gaining importance. Revenue generated purely by the sale of terminal devices is generally assuming a more subordinated role, serving more as a ‘vehicle’ to facilitate the customer using the TC services. The sum of these revenue sources forms the ‘APRU’ (Average Revenue Per User) and is a benchmark for success. Therefore, the generation of a high APRU in the latter instance is associated with internal efficiency in terms of the management goal. All product innovations in the TC segment ultimately have this goal.

As mentioned before, TC products are not comparable to an ‘off-the-shelf’ hardware product, i.e. they are products that combine complex product/service elements with hardware/software components (input/output devices; access points, network aspects), including process elements (administration, accounting, billing, etc.). RegTP - the Regulatory Authority for Telecommunications and Posts - goes one step further and defines

‘Innovative services as …. telecommunication services identified by a nationwide uniform service parameter. Innovative services display attributes that exclude the use of other call number spaces.’ (RegTP 1999, p. 735)

This designates a new tariff option or model that is frequently offered via new call numbers, likewise as an innovative product, regardless of whether the customer actually perceives this as such.
From the point of view of a company such as Deutsche Telekom, which offers a broad spectrum of widely varying telecommunications products, this results in practice in a particular challenge. Each division (SBU) therefore has a number of new product launches which are not necessarily a result of innovation activities within the division (e.g. due to imitation of new services from competitors), has an unclear definition between product variants and ‘real’ innovative products (at least at DT), or needs to distinguish between the division’s own developments and incorporated developments, etc. A ‘personnel intelligence’ is therefore always involved to select ‘what is innovative and what is not’. Deutsche Telekom tried to solve this problem by creating a framework of basic definitions (Deutsche Telekom 2003, p. 4) for each division to select innovative products, services and solutions (without, however, implementing a further definition as to ‘what are radical and what are incremental innovations’).

<table>
<thead>
<tr>
<th>What is innovative?</th>
<th>What is not innovative?</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ In general, if an added value exists for the customer (from customer perception point of view)</td>
<td>▪ New tariff systems or pricing strategies</td>
</tr>
<tr>
<td>▪ New product* ideas which represent a new generation</td>
<td>▪ Product incorporated through consolidations, M&amp;A and partnering</td>
</tr>
<tr>
<td>▪ Initial deployment phase of a technology to implement products</td>
<td>▪ Products delivered by suppliers or other partners</td>
</tr>
<tr>
<td>▪ Product based on new technologies</td>
<td>▪ Products with the same functionality based on new technologies, e.g. telephony over UMTS versus GSM</td>
</tr>
<tr>
<td>▪ Increasing functionality of products already implemented</td>
<td>▪ Bundling products without increasing functionality</td>
</tr>
</tbody>
</table>

* Products defined here as product, solution or service

Table 5: Basic Definition of Innovative Products at Deutsche Telekom

The further sections resolve the problem of categorising radical versus incremental innovations by introducing a continuum for categorising innovations with the value ‘radical’ in one extreme and ‘incremental’ at the other. Such an appraisal is also relevant in the TC segment for product-level classification. However, it is obvious in telecommunications that introducing digital switching technology and packet switching technology, digital mobile radio communications, satellite communications, optical fibre networks, etc. qualified as radical technology innovations. These new technologies also
enable the development and introduction of a broad range of new services and applications (Godoe 2000, p. 1036). This means that these TC products (applications or devices, including own tariff models and service aspects) which are first introduced on a new basic technology are the first of their kind, create an entirely new market, are the home base of a new product family and are so called ‘radical’ innovations in terms of this study (see Figure 6 ‘S-Curve Approach’ on page 44 and definition of ‘radical’ innovation at product level in Section 3.3.3 on page 46).

For the sake of completeness, a number of special features in terms of radical innovations in the telecommunications sector should be covered at this point. Godoe (2000) observed in his study on innovation regimes, which is based upon evidence from analysis of innovations in the telecom sector, that radical innovations in telecommunications are, instead of outcomes of unpredictable ‘mutations’ or serendipity, a result of intention by ‘innovation regimes’29 where ‘radical innovations were created on purpose – for a purpose’ (Godoe 2000, p. 1044). If radical innovations and associated novel technology within the TC sector are rational, deliberate outcomes of ‘innovation regimes’, this could possibly result in limited validity when it comes to explaining innovations in telecommunications.

However, as Godoe (2000) himself noted, considerable rivalry and competition can be determined between various technical solutions on account of the complexity of the technological platforms, e.g. as in the 1980s, as microwave radio link technology tried to ‘beat’ the influx of optical fibres to the Internet, to the initial resistance and scepticism of many telecom operating companies (p. 1043).

29 The concept of ‘Innovation Regimes’ was developed in a study by Godoe in order to explain the innovations found in analyzing R&D-based innovations in telecommunications, with the result that all of these innovations - in terms of tele-com systems, services or components, equipment and techniques - were created as results of an intimate and prolonged interaction with international networks and organisations in the telecommunications sector. (c.f. Godoe (1995).
Another argument against a possible limitation of radical innovations in the TC segment is the awareness that current Telco’s are substantially more subject to approaches of developing markets through liberalisation, globalisation and focusing on market needs and shareholder value. In this context, the EURESCOM Report (Lindberg et al. 1995) covers the aspect of the changing telecommunications environment from an economic viewpoint and determines that the current trend in PNOs (public network operators) is towards a more market-driven approach. Increased competition in telecommunications changes the attitude of PNOs towards market-driven implementations in the access network. In other words, once the PNOs are no longer subject to the statutory ‘supply mandate’30, they orient their investment decisions for basic technologies (which serve as ‘vehicles’ for new ‘radical innovations) more towards market aspects, and the pressure of innovation is displaced from the Telco’s to the systems suppliers. As a result of this waning ‘technology push’, systems suppliers - who survive from the sale of such basic technologies – must themselves further push the development of new platforms for a global market, instead of implementing only core topics on behalf of Telco’s. This leads to a drop in motivated research (e.g. basic R&D) among Telco’s themselves, with application-oriented R&D taking centre stage instead. An analysis of TC-comparable sectors, such as the pharmaceutical or biotechnology industries, shows that a consequential lower rate of (radical) innovations (Godoe 2000, p. 1045) cannot be verified in the absence of innovation regimes. Possible limitations in knowledge regarding the generation of radical innovations in the Telco sector are thus more likely to be theoretical in nature.

Along the lines of the classification logic applied within the general context of innovation at the product level (see also Table 4 on page 49), this can also be adopted for the TC segment if one disregards a more precise definition of a ‘TC sector product’ and when using a new terminology relating to ‘radical’ innovation:

30 The population of a country has the right to be supplied with new telecommunications technology.
**Radical Product Innovation** (‘radical’ innovation)

(Note: Basic Innovations / ‘New-to-the-world’; New Product (lines/families))

**Examples:** Introduction of digital technology thus replaces analog technology (ISDN / ADSL) for fixed line communication, the introduction of GPRS – or, more recently, UMTS – in the mobile communications sector; the commercialisation of the Internet through the first-time provisioning of a portal software ‘T-Online’ to enable the administration and billing of content services via Internet Protocol (IP) technology.

One feature common to all of these is the introduction of new service offerings based on a new basic technology, usually with higher bandwidths / transfer speeds and new functions (see Figure 6: S-Curve approach on page 44). In this context, the new service offering usually comprises new terminal devices, new line identification codes (range of call numbers), new tariff models and often extends all the way to a new market segmentation and the development of new sales channels. The objective of ‘radical product innovations’ is the development of new revenue potential by creating totally new products and services for new markets. This can be accompanied by the substitution of out-of-date (basic) technology and the redesign of existing processes. Therefore, the introduction of ‘radical product innovations’ is frequently preceded by a need for restructuring within the respective company, as the internal know how first has to be established or expanded and the existing support and service processes need to be realigned.

**Incremental Product Innovation** (‘incremental’ innovation)

(Note: Product Modification, Line Extension, Product Relaunch/Repositioning (including cost savings))

**Examples:** The introduction of local based services in mobile communications (identification of location and automatic provisioning of location-specific content), a relaunch of the analog C-net (mobile communication) through improving the network technology and the provisioning of new ‘smarter’ terminal devices and new tariff models (e.g. DSL flat rate).

The objective of ‘incremental product innovations’ is to maximise the degree of market exhaustion. This is achieved by modifying service offerings within the framework of product updates (lifecycle management) by adjusting to existing customer wishes and optimising existing processes (cost minimisation and boosting efficiency). The new service offerings are generally limited to new tariff models, an offer of new terminal devices and the provisioning of added value services based on existing (basic) technology. The know-how is usually already available within the respective company. The new service offerings are generated within the scope of ‘daily business’ of the existing operational unit (generally by product management) and existing support and service processes are adjusted accordingly.

Table 6: Radical & Incremental Innovation in Telecommunication
In summary, it can be ascertained that comprehension of the definition of a product in the telecommunications segment differs in some respect to that of an ‘off the shelf’ product. Yet the differences are not so serious that no degree of comparability exists any longer between the definitions in the telecommunication segment and the literature (or the definitions in the previous section). On the contrary; in the telecommunications context, for instance, we also speak of radical innovations when developing a new product lifecycle or business segment; they do not (necessarily) address an existing demand, but create new, hitherto unknown needs and represent clear departures from existing practice. Applying the terminology (incremental and radical innovation) to the TC sector simplifies a comparison or transfer of knowledge from this study to other areas and lines of business.

As will be shown by the analysis and findings, the transition from incremental to radical innovations, i.e. the area of ‘more radical innovation’ (see ‘transfer area’, Figure 20 on page 260) is of particular significance within the scope of this dissertation and deserves a corresponding definition. In addition to the product characteristics described above as a distinguishing feature, the targeted planning interval for a new product or business idea up to the time of market introduction (time to market) is also of interest.

Within the scope of this dissertation, the term ‘more radical innovation’ is understood to refer to those innovations that belong to the category of radical innovations on account of their product characteristics (e.g. new business models, see Table 6 on page 55) and have a targeted period from original idea to introduction on the market of approx. 2 to 4 years. In order to avoid confusion, for the purpose of this study the terms ‘radical innovation’ and ‘more radical innovation’ will be used synonymously.

Table 7: Definition of the Concept ‘More Radical Innovation’ in the Telco Environment
The fact that this distinction is both important and expedient, especially in the Telco context, is illustrated among other things by the comments of Aris Hadjiaslanis, senior executive of Vodafone (Odell 2005), when setting up a new business unit designed to increase product innovation:

‘In the past, is has been about short-term innovation with a time-to-market of up to one-and-a-half years where the focus is about commercialising products [Note: equivalent to incremental innovation] … Then we already have people who look at the three-to-five-year time frame in research and development who are purely technology focused [Note: equivalent to radical innovation] … I certainly haven’t seen any of the other major operators put a major focus on the 18 month to three-year time frame.’ [Note: equivalent to ‘more radical’ innovation]

- which represents the focus area of InMUs in the case organisation.

3.3.5 Summary and Conclusions

The discussion in this section has illustrated a variety of approaches towards specifying the term innovation, and it cannot be ruled out that additional dimensions will be discovered. However, it is unlikely that a single standardised definition will assert itself for such a glamorous and fascinating phenomenon as innovation. Indeed, Hauschildt (1998) rightly pleads ‘for transparency in the use of the term, as opposed to a standardisation in linguistic usage’ (p. 38). Besides these approaches to describe the term ‘innovation’, it must always be considered that innovations change their classifications over time, e.g. steam locomotives were once thought quite innovative, but today they are mere historical curiosities.

Therefore, the distinction between incremental and radical innovation is not one of hard and fast categories. Instead, a spectrum of innovations ranges from radical to incremental and ‘these should be viewed as complementary to one another, rather than alternative choices’ (Nystöm 1998, p. 193). Additionally, an innovation’s placement within this spectrum depends upon perceptions of those familiar with the degree of departure of the
innovation from the state of the art prior to its introduction (Dewar and Dutton 1986, p. 1423). It has been shown that it is important for scientists and practitioners alike to agree on precisely what they wish to designate as an innovation, and what they understand innovation to mean in their respective context. Therefore, a common understanding has been established regarding the development and significance of product innovations, especially those of a ‘more radical’ nature.

To summarise, it can be concluded (in accordance with the statements by Pfeiffer et al., 1997) that he who only pursues process innovation is in danger of ‘rationalising it to death’. With the support of studies, authors such as Christensen and Raynor (2003) pointed out that it is often entirely rational for incumbent companies to ignore disruptive or radical innovations, since they compare so poorly with existing technologies or products, and that the deceptively narrow market available for a radical innovation is often very small compared to the market for the established technology. On the other hand, however, somebody who only masters incremental innovation and ignores radical innovation is in constant danger of being overtaken by ‘fast followers’ and, ultimately, being forced out of the market. Nevertheless, this section has created transparency and a basis for comparison in the continuum of incremental and radical innovation, irrespective of Telco’s or other industries.

3.4 Managing Innovation - Innovation Management

3.4.1 Introduction

Now that transparency has been established in this study regarding the various terminological definitions of ‘innovation’ and clarifying ‘radical innovation’, this section covers the inherent features of managing innovations that are of importance within the framework of this study. However, before the conceptual and structural aspects of innovation management – and especially the management of radical innovation – can be
covered in greater detail, an appraisal of barriers as an inherent feature of innovation and approaches towards overcoming them is necessary. The focus here is on ‘internal barriers’ to developing innovation to maturity and not on ‘market barriers’ which would go beyond the scope of this study. These ‘internal barriers’ significantly influence the tasks and objectives of Innovation Management activities and thus to a decisive degree the spectrum of tasks, core functions and role comprehension of Innovation Management Units.

3.4.2 Barriers – An Inherent Feature of Innovation

The occurrence of resistance – or in other words, barriers – is closely associated with innovations. After all, innovations only occur when different ideas, perceptions and information collide with one another, not to mention being processed and evaluated in different manners (Leonhard and Strauss 1998, p. 27). Added to this is the fact that an innovation frequently only occurs as a result of the interaction of numerous people that do not share the same world views. In this connection, Rogers (1962) proposed a five-stage model for the diffusion of innovation which deals with the problem that each adopter’s willingness and ability to adopt an innovation depends on the adopter’s awareness, interest, evaluation, trial, and adoption. He points out that beyond learning about the existence and function of the innovation (“knowledge”) it is also important to become convinced of the value of the innovation (“persuasion”), committed to the adoption of the innovation (“decision”), to put it to use (“implementation”) and finally to ultimately accept (or reject) the innovation (“confirmation”).

This leads to conflicts that often develop into full-blown personal hostilities and a rupturing of the creative process. Knowledge of this resistance and barriers (Hadjimanolis 2003), as well as the ability to cope with them (Staudt 1985), are often the decisive factor in

31 For further references to market barriers: see e.g. Porter’s (1985) model of ‘five-forces’.
whether or not an idea can mature into an innovation. They represent a fundamental element of innovation management (Piatier 1984) and are thus of essential importance in the context of ‘Innovation Management Units’ (InMUs).

If in doubt, innovations are not welcome. According to Hauschildt (1997), all involved parties generally announce their willingness to embrace innovation, but that willingness is frequently little more than lip service. This is because innovation means a substantial change to regular working methods, and it is perceived as anything from a disruption and an annoyance, all the way to an upheaval or pointless turbulence (Hauschildt 1997, p. 135). Innovations represent ‘multi-personal and multi-operational decision-making processes’ (Witte 1973, p. 6), making them dependant on the willingness and capability of the respective employees and managers (Witte 1998, p. 12). Therefore, innovations must always expect to encounter resistance. This is primarily ‘person versus person’ in nature and thus often coupled with emotional responses. As Schumpeter (1934) already commented: ‘Persistent resistance against change can also be found in modern companies, not just in old ones’ (p. 108), as ‘individuals and organisations give preferred treatment to alternatives that represent continuation of present programmes over those that represent change’ (March and Simon 1958, p. 173).

According to A.D.Little (1997), a pronounced capacity for persistence in the form of ‘resistance of the established against the new’ typically occurs as a result of the following:

- The dominance of the existing business, whose revenue volume and cash flow determine the prevalent mindset;

- A functionalised workload distribution in formalised organisations that fragments the innovation process;

\[\text{Where opposition may possibly be concealed behind ‘experts’, ‘specialists’ or ‘dominant technical or scientific views’}\]

\[\text{Drucker (1994) introduces the notion of the ‘theory of the business’ and illustrates the resulting constraints to change and innovation exemplified by IBM.}\]
- Employee qualification structures that are predominantly geared towards existing technologies and services; and
- The remoteness of the upper hierarchical levels from the current needs of the customers.

Particularly strong barriers to radical innovations can often be found deeply embedded in - and closely associated with - the characteristics of the individual company (Hartmann 2004, p. 12). When it comes to radical innovation, the following is particularly applicable:

’TThe more the tasks change quantitatively and, above all, qualitatively (as a result thereof), the greater the (consequent) challenge to the organisation’
(Witte 1973, p. 17).

This makes coping with radical innovation more difficult for large enterprises than for small, more manageable structures in small and medium enterprises (SME’s). However, resistance in this context is not a one-dimensional problem (Staudt 1985, p. 355f). In principle, it can be categorised as attributable to the individual level and the institutional level (Hauschildt 1997, p. 131-145), with the term ‘barriers’ being a more fitting designation than the term ‘resistance’, as it implies an ‘impeding yet surmountable obstacle’ (Witte 1973, p. 6), thus enabling innovation through the adoption of suitable processes, structures and management.

The barriers on the individual levels can be categorised as rational and emotional in nature (c.f. Hauschildt 1997, p. 131-134). The rational cases include technological reasons, such as doubts concerning the technical functionality of the innovation, objections to premature introduction of an innovation or concerns that the environment is ‘not yet ready’ for that particular innovation. Further rational reasons include those of an economic nature, that are primarily voiced in response to a requisite innovation decision regarding the realisation of an innovation. Typical concerns in this context are that innovations result in a destruction of valuable substance, that they represent an
excessively high-risk investment and are more expensive in the event of failure than the losses that could result from continuation of the existing condition, that innovations imply an additional financial requirement/burden and, finally, that the existing conditions ‘aren't that bad after all’ – with the latter reasoning placing the onus on the innovators to justify why the present, well-organised and correctly functioning condition should be changed at all. All of these reasons are gladly fielded in light of the high risk of ‘radical’ innovations, i.e. where ‘the failure to develop and introduce breakthrough innovations puts established firms at risk of being knocked out of the game by entrepreneurial newcomers’ (Leifer et al. 2000, p. 11).

Going one step further, one encounters not only the rational barriers, but also emotional, more deeply entrenched resistance to innovations – the barriers of ‘not knowing’ and ‘not wanting’ (c.f. Hauschildt 1997, p. 135 -140). In many cases, these are more difficult to overcome than rational opposition, as they cannot be refuted through reasoning and are often only identifiable as being emotional barriers at second glance34. These barriers present ‘innovators’35 and InMUs with a particular challenge if these latter two groups wish to actively drive ‘radical’ innovation within an enterprise.

The barrier of ‘not knowing’ is relatively simple to surmount. It arises when individuals are not informed or have been overloaded with information, or when they have not been properly trained. In other words, when they are ‘genuinely or supposedly not capable of overcoming these intellectual requirements’ (Hauschildt 1997, p. 136).

These ‘capability barriers’ (‘Fähigkeitsbarrieren’) are particularly high in the case of complex innovation problems which incorporate a host of relationships and new concepts (Witte 1973, p. 8). The task of innovation management (and thus that of an InMU) in such

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34 Emotional resistance may thus be concealed behind supposedly rational reasons, i.e. although fears and emotions, etc. are involved, these are wrapped up in pseudo-technical, rational justifications.
35 Understood as that individual who wishes to realise the innovation.
a case is to provide the requisite information in a manner that caters both to the situation and the addressee, and to foster comprehension of the advantages of the innovation on the part of the involved parties by means of intense intellectual discussion. This highlights the intellectual claim that innovation promotes intense learning on the part of all participants.

In contrast, barriers of the ‘not wanting’ kind are more difficult to tackle. According to Böhnisch (1979, p. 29f), the cause of a ‘not wanting’ barrier is primarily attributable to past conditioning, attitudes and rule mechanisms and manifests in a general distrust of the person vis-à-vis the unknown and is expressed in a capacity for persistence regarding the status quo (Witte 1998, p. 13). Clinging to the status quo ‘emanates from the need to strive for security of people who prefer a familiar situation to a riskier or less attractive alternative involving change’ (Tebbe 1990, p. 248), meaning that ‘radical’ innovation with its high uncertainty and risk factor has to face up to the barrier of ‘not wanting’. Reasons against wishing to develop in a different direction from a company perspective include the fact that a company’s resources are limited and every innovation signifies foregoing other activities. These barriers become ‘visible’ through a lack of willingness to learn and deficits in the will to change, through inertia and carelessness on the part of employees, through a pronounced consensus-oriented mindset (in order to avoid discrepancies) and through polarisation (Hauschildt 1997, p. 136-140). Although this form of resistance occurs on an individual level, it is often deeply entrenched within the respective company. Especially the organisational inertia of large enterprises with

36 Conservative as a result of childhood, upbringing and orientation towards the principal care giver, with aspirations to continue that mindset and to reject the ‘new’.
37 Earlier behaviour hallmarked by dissonance in conflicts that promotes a continuation of justification and confirmation and excludes the casting of doubt on previously met, conflict-rich decisions under all circumstances.
38 Natural or learned behaviour that responds to certain stimuli with familiar reactions, as opposed to any trace of a novel reaction.
39 For further references concerning the barrier ‘uncertainty and ambiguity’, cf.: Baumard (1999); Klimecki (1997); March (1975).
40 Which can often be observed in people when they see themselves confronted with direct or indirect future opposition. If a ‘minority pursues an uncompromising line towards asserting its alternatives’, it generates (…) a counter-pressure vis-à-vis the majority oriented towards maintaining the status quo (Hauschildt 1997, p. 137).
deep-set routines is an oft-quoted barrier to ‘radical’ innovation in the literature (Chandy and Tellis 2000, p. 3).

In addition to these barriers on the individual level, barriers also exist that are ‘institutional’ in nature. These can most frequently be encountered in classic large enterprises on account of their traditionally developed organisational structures, processes, routines and management practices (Hauschildt 1991). Organisational theorists have emphasised in this regard the roles of organisational inertia (Amburgey 1993; Hannan 1984; Kelly 1991), structured routines (Nelson and Winter 1982) and absorptive capacity (Cohen 1990) as constraints to change and innovation. Structures and systems that facilitated survival in one environment can become liabilities in another environment. Or to put it in the words of Leonard-Barton (1992), core competencies can become core rigidities (see also Drucker 1994).

Thus, a hierarchical and functionally structured organisation leads to the promotion of ‘business unit thinking’, instead of a process-oriented work method, obstructing the cross-unit transfer of competence necessary for ‘radical’ innovation. As Galbraith (1982) rightly stated, ‘an organisation that is designed to do something well for the millionth time is not good at doing something for the first time’ (p. 6). And precisely this is a key reason for why such a company is rarely capable of developing anything new. Efficient routines and processes develop over the course of a company’s development, and these are securely anchored within that company. Any deviation resulting from the introduction of something new results in friction among the employees, as approval is required from a higher instance (Chandy and Tellis 2000). A strong corporate culture could likewise represent a barrier to change and innovation as members of this culture loose the ability to recognise the value of new approaches (Cook 1993).
Further barriers to innovate might arise from the performance-linked pay of managers. As addressed by Huber and Riggs Fuller (1998), in many organisations, managers may be held accountable for faster outcomes, or outcomes over which they have little or no control. So it can be assumed, that Managers are frequently reluctant to embrace ‘radical’ innovation as a personal objective as it can potentially involve personal financial losses and a change in their career path. These goal-related conflicts may lead to intensified power-political (Crozier and Friedberg 1979) and micro-political activities (Neuberger 1995) within the organisation (Hanft 1996).

The established business may be growing moderately or strongly. Peoples’ careers in the organisation have been built on a subtle understanding and long contribution to the development of the established business. Ways to improve the old may be clearly seen, while potentials in the new are much more difficult to comprehend either by the established firms or invading firms. But most importantly, ‘the established firm will tend to view the new technology simply as a substitute for the old, and it is objectively a poor substitute at first.’ (Utterback and Kim 1985, p. 127). This results in ‘unusual cases in which a dominant firm creates a radical innovation replacing its earlier product line in the absence of a major outside threat’ (Utterback and Kim 1985, p. 147), which supports the thesis of Chandy and Tellis (1998) that a key psychological factor that explains radical product innovation is a firm’s willingness to cannibalise’ (p. 15).

Financial losses represent a threat not least due to the design of incentive and bonus systems in major enterprises, which are more geared towards short-term financial success (Hauschildt 1997, p. 145). Radical innovations usually involve projects that are more long-term in nature and have a high risk of success or failure (see Section 3.3.2), meaning that even in the event of success, the manager responsible for initialising the innovation cannot expect any financial incentive. Indeed, that manager may have already left the company or – on account of the short-term nature of organisational units – have already adopted different tasks, and the success of the innovation may not even be
attributed to him due to the short-term nature of the incentive systems (Hauschildt 1997, p. 145). This explains why such long-term innovation projects are frequently not pursued, even when the prospects for success are good.

Another reason addressed by Hartmann (2004, p. 16) is the fact that the incentive systems of managers are geared towards achieving short-term success. Accounting regulations in Germany prevent a company from capitalising expenses for innovation projects as investments pursuant to the principle of prudence, realisation and imparity. This forces companies in Germany – at least in the short-term – to communicate performance data, with innovation projects merely being presented as expenses under summary items in the income statement, through which they can easily be regarded as ‘non-recoverable expenses’ (Hauschildt 1997, p. 143) without equivalent value (with the exception of a reduction of the tax burden) (Veith 1992, p. 644). Even if cost accounting disposes over certain degrees of freedom, the success of an innovation is rarely accounted as it is associated with numerous problems and causes additional expenses (Hauschildt 1997, p. 144). Innovations and their promoters are thus frequently and falsely confronted with subjective statements from their opponents, such as: ‘innovations are not economical’, ‘innovation represents a misappropriation of funds’, ‘innovation is an unnecessary luxury’ or ‘innovation is an uncontrolled waste of funds’ (p. 145) – which once again brings us to the individual level of resistance to innovation.

Short planning horizons and the fluctuation of executives must also be regarded as additional hurdles on the institutional level (Bower and Christensen 2000, p. 43). As

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41 The following principles are derived from Section 252 Para. 1 No. 4 German Commercial Code (HGB)
42 C.f. Section 248 Para. 2 German Commercial Code: Ban on the capitalisation of non-tangible assets in the fixed assets.
43 An evaluation must therefore assume pessimistic forecasts (c.f. Hax 1964, p. 643)
44 An increase in the value of assets is not taken into consideration until the increase in value is ‘confirmed and realised by performance’ (Moxter 1986, p. 39).
45 Impending losses are to be taken into consideration, but not anticipated profits.
46 Such as ‘Material costs’, ‘Wages and salaries’ or ‘Other operating expenses’ (c.f. Hauschildt 1997, p. 143).
47 However, the latter may have a positive effect, namely when executives opposed to innovation are replaced (c.f. Carley 1996).
Hartmann remarks in this respect (Hartmann 2004, p. 17), virtually no real strategic planning takes place in a German company that covers a timeframe of more than five years. And even if this is sufficient for a host of radical innovations, radical innovation projects (e.g. the introduction of a new technology platform) often require ten or more years to reach completion. This renders them strategically irrelevant from certain perspectives, even if their development is already scheduled to commence (see Figure 6: S-Curve Approach on page 44). There is also a very high probability that executives will be replaced over the course of such a timescale (O'Conner and Rice 2001, p. 111). These replacements are frequently associated with internal company changes that imply new barriers for existing innovation projects because, for instance, the project loses its ‘champion’ (Billing 2003, p. 270; c.f. Section 3.4.4). However, the aforementioned reasoning can be countered by the fact that a manager who supports or decides in favour of an innovation project today will more than likely not be considered accountable at a later date in the event of a flop for the very same reason, thus relativising that manager's own personal risk.

Another aspect arises for those companies with a large customer base (Hartmann 2004, p. 17). These companies regard the customer base as a competitive factor and, consequently, possess relative market power. This is a hurdle to radical innovation, as it is more convenient to generate a continuous stream of revenue from this customer base (via incremental innovations) than in times of crisis (Perlitz and Löbler 1985) in which (radical) innovations are granted greater opportunity through the increasing pressure to innovate. The necessity of the search for new fields of business and radical innovation is not recognised in such companies, as the development of new products is often sought in close proximity to the existing customers and the development process is derived from these needs (Bower and Christensen 2000, p. 43).
However, this success factor for incremental innovation represents a barrier for radical innovations because new products and technologies that do not correspond to the needs of existing customers are discarded and the company becomes virtually blind to new up-and-coming markets (Bower and Christensen 2000, p. 47).

Innovation management/InMUs must take all of the individual and institutional aspects derived above into consideration in their activities in a situationally compatible and company specific manner. Which gives rise to the question as to how this host of barriers can be overcome.

3.4.3 Overcoming Barriers - Drivers and Pathways to Innovate

As has already been demonstrated in multiple examples, innovations do not involve a singular creative instance, but are instead a social process of negotiation and implementation. As soon as the motto 'people make innovations' (Faulstich 2005, p. 1) is voiced, it involves not only a social context, but also – indeed always - interested parties. Innovations are integrated in promotional (or obstructive) company structures and cultures and are interpreted against the background of competing innovation concepts. It involves power within company hierarchies, career and income opportunities (e.g. through patent claims) and the security of workplaces. That which asserts itself is not necessarily the best solution, but rather that solution that has been negotiated within the framework of a conflict of interests (Crozier and Friedberg 1979). It therefore comes as no surprise when Hauschildt posits that ‘Innovations are increasingly more than merely a technologically determined industrial problem’ (Hauschildt 2002, p. 4). A host of empirical studies of innovation processes (see Section 3.5.5 ‘Lessons-Learnt from Success and Failure Research’) confirms such fundamental implementation problems.

These can be summarised as follows in accordance with Faulstich (2005, p. 5) and Scholl (2004):

68
Conflicts regarding the best path to success are normal. However, innovation conflicts sometimes escalate to the extent that the innovation process itself collapses.

Innovation projects do not progress and are not understood on account of the resistance of opposed interests. The holders of patents are conservative towards innovations as they would lose their royalties.

Promising inventions often end as failures because their diffusion takes place under an umbrella of uncertainty – the more radical the idea, the greater the uncertainty (and thus the risk).

Depending on the type of management, necessary decisions are avoided due to risks and the implied inherent potential for failure (failure versus career) – the requisite exchange of information fails to take place.

Some innovations can only be successfully concluded through a conspirative approach, i.e. against the planning and decisions of the management.

Fundamental inventions are only discovered by chance, e.g. while pursuing a totally unrelated goal.

Despite meticulous and extensive planning, innovations fail as a result of faulty estimates regarding development and implementation costs, as well as market potential.

Most innovations require much more time for their realisation than was originally planned. A twofold increase in the time requirement is almost usual.

Table 8: Generic Problems in Implementing Innovations

As Faulstich (2005) and Scholl (2004) expound in detail, the act of innovation in the company is thus dependant on the micro-political constellation of experts, promoters and organisers, as well as the inclusion of potential opponents. During times in which the implementation of innovation potential takes place to an ever increasing degree on a unit, company or cross-segment basis, innovations result ever more evidently from the competence and participation of all groups involved. Innovation is a process that is based on a division of labour because, among other reasons, the mode of operational generation of knowledge and know-how is allocated across distributed instances. Modern value-adding chains and innovation processes are increasingly dependant on inter-
organisational exchange relationships. Cooperative collaboration is the prerequisite for successful innovation activities, particularly in SME’s and high-tech lines of business (Müller 2004, p. 2). An ‘organisational diffusion’ of the innovation process takes place (Kurz 2002, p. 605). Instead of innovation cascades, in which inventions are transferred from research and development for diffusion within the scope of application (upon which the invention actually becomes an innovation), ‘innovation cultures’ – understood as a distinct coherent set of values and practices - exist and become ever stronger. And barriers to innovation can also occur within these innovation cultures in the form of ‘opponents’ if the structures of interests are not taken into consideration, or are violated.

Schein (1991) highlights that culture may be designed, but does not allow easy modification. McLaughlin et al. (2005) pointed out in a working paper based on Schein’s model that a large proportion of the existing empirical research has concentrated on incremental innovation or innovation management in general, but that little is known about the specific aspects of organisational culture that facilitates radical innovation. Cameron and Freeman (1991) stated that culture develops virtually unconsciously and only a handful of operational and applicable methods are currently proposed (De Pay 1990; Hauser 1998) that allow the implementation of such a culture in a company. 

Nevertheless, enabling an ‘innovation culture’ is an important issue for an InMU, as not only the ‘creative inventor’ is the trigger and promoter of innovation. These activities are also attributable to the entire organisation, its ‘innovation culture’ and, in particular, the competence of the personnel as a whole. Innovations are thus integrated in organisations and are therefore dependant on the constellation of interests and the opportunities for participation of various groups of persons. The role played by the right organisation in the

48 Regarding the discussion of ‘company culture’ as a barrier to change c.f. Bröder and Kötter (1999, p. 149-177); Hartmann (2004, p. 20-26) and Poole and Warner (1998, p. 237); to the aspects/attributes that enable and inhibit the development (or institutionalisation) of a radical innovation culture c.f. McLaughlin et al. (2005).
context of innovation, in addition to the way in which barriers and resistance are dealt with, thus become clear – especially in large firms (Dougherty 1992). Not only will a potential InMU encounter such aspects in its role as an ‘innovation enabler’, it must also consciously accept these aspects and minimise or eliminate them via suitable ‘instruments’ (both structural and ‘social’ in nature). The focus of this research is to find answers in the organisational context, especially regarding organisational structures that are supportive of innovation. This is why Section 3.5 covers the organisational aspects in greater depth, while the following section deals with one variable that has been strongly linked to the success of innovation: the presence of a ‘champion’.

3.4.4 The Role of Champions, Promoters and Top Management in Innovation

As demonstrated in the preceding sections, innovation normally comes up against massive resistance and barriers. The resistance stems partly from ignorance and partly from unwillingness on the part of those passively affected by, or actively engaged in, the innovation. The more radical the idea, the stronger the barriers, as the changes are correspondingly greater. Overcoming these changes requires courage (Hartmann 2004, p. 23) and only a courageous management can boost the courage of the company through corresponding actions and thus be able to dismantle the barriers to ‘radical’ innovation (Perel 2002, p. 17). A special role is played by those management personalities (particularly on the top level) that are designated in this context as ‘Champions’, ‘Innovation Leaders’ or ‘Promoters’, i.e. someone who takes a personal risk to overcome organisational obstacles to innovation (Shane 1994). Schön (1963) introduced a new term for creative individuals in 1963: ‘champion’. Howell and Higgins (1990) define a ‘champion’ as an individual who informally emerges in an organisation (Tushman and Nadler 1986) and makes a decisive contribution to the innovation by actively and enthusiastically promoting its processes through the critical organisational stages (Achilladelis, Jervis et al. 1971). In some case, a distinction is still made between ‘product champion’ and ‘executive champion’ (c.f. Maidique 1980, p. 64).

‘Innovation Leaders’ are senior executives - whatever their functions or positions – who spontaneously instigate, sponsor or steer innovation in their organisations (Deschamps 2003, p. 815), who need to feel personally secure (are unafraid to risk their credibility with top management in case of failure) and are supported by the organisation from the top. Lewis Lehr (1979), the former CEO of 3M, described the behaviour of an innovation leader very convincingly when he said ‘We learned to follow the fellow who follows a dream’. The term ‘champion’ is established for Anglo-Saxon countries, In German-speaking countries, in contrast, this term was not accepted because of slightly negative connotations (Hauschildt 1999, p. 167); Witte (1973) termed champions in Germany as ‘promoters’.

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contented that in order to overcome the indifference and resistance that major technological change and innovations provoke, a ‘champion’ is required to identify the idea as his or her own, to promote the idea actively and vigorously through informal networks and to risk his or her position and prestige to ensure the innovation success. Some (case) studies\textsuperscript{52} have found strong support for Schön’s contention that ‘the new idea either finds a promoter or dies’ (Schön 1963, p. 84) and that innovation success is closely linked with the presence of a ‘champion’\textsuperscript{53}, especially if the innovations are of a radical nature (McDermott and O’Conner 2002). And in terms of the telecommunications segment, Barczak (1995) also comes to the conclusion in his study that regardless of the firm’s new business development strategy and structure, the presence of a ‘champion’ is an important element of new product programmes in the telecommunication industry.

A host of authors and many researchers have determined that ‘promoters’ on the executive level are a prerequisite for ‘radical’ innovation, in particular, to being able to surmount internal barriers. To avoid confusion in terminology, the term ‘promoter’ is used from this point on as a collective term for ‘promoters’ and ‘champions’, as both terms have the same meaning. The ‘promoter model’ of Witte (1973), which was further elaborated by Hauschildt and Chakrabarti (1988), is well suited to assist in describing the tasks and role comprehension of innovation management (and thus InMUs) in the following sections.

In addition to the acquisition and provisioning of the requisite means (Littler and Sweeting 2001, p. 34), the ‘promoter’ has to actively protect a project from barriers in many cases, as it would otherwise fail to reach market maturity\textsuperscript{54}. Chakrabarti (1974) stated that the

\textsuperscript{52} Identification of ‘champions’ in previous studies: e.g. c.f. Green (1995); Haggblom, Calantone et al. (1995); Howell and Higgins (1990); Maidique (1980); Roure (2001).

\textsuperscript{53} E.g. Achilliadelis, Jervis et al. (1971); Ettlie, Bridges et al. (1984); Rothwell, Freeman et al. (1974).

\textsuperscript{54} O’Conner and Rice (2001) determined that seven out of twelve projects would be terminated without the support of a promoter (p. 108).
importance of the role of ‘promoters’ lies in the selling of the idea to the management and getting the management sufficiently interested in the project.

Shane (1994) indicated six valuable roles that ‘promoters’ play in the innovation process. They provide autonomy from the rules, procedures and systems of the organisation so that innovators can establish creative solutions to existing problems; they gather organisational support for the innovation by building coalitions between managers and different functional areas of the organisation; they create monitoring mechanisms that allow innovators to make creative use of organisational resources; they establish mechanisms for making consensus decisions on innovations; they use informal methods to persuade other members of the organisation to provide support for the innovation, and they protect the innovation team from interference by the organisational hierarchy.

The study of Shane (1994) provides evidence for the argument that individuals with ‘promoting’ experience are significantly more likely than individuals without it to make it possible for innovators to bypass the organisational hierarchy in developing the innovation, to make it possible for the people working on an innovation to make decisions without referring them to higher level officials, to make decisions outside the traditional hierarchy of the organisation and to avoid having to justify the innovation effort financially. He argued further that ‘promoters’ also expressed a preference for the role of increasing autonomy from organisational rules and procedures. In summary, the study of Shane (1994) suggests that the development of new business - both inside and outside established organisations - is driven by the same types of individuals who are willing to overcome obstacles to the development of new business and innovations. These findings indicate that a unit that is responsible for innovation activities (or its management staff) should, or indeed must, adopt the role of a ‘promoter’ through comprehension of the

55 The findings of Bass (1985) and Howell and Higgins (1990) suggest that it is likely that individuals who have champion potential can be identified by checking both personality characteristics and leadership behaviour with factors like: charisma, inspiration, intellectual stimulation and individualized consideration.
above-mentioned tasks, in order to lead ‘radical’ innovation to success. The question is also whether one ‘promoter’ is sufficient, or whether various, situationally different ‘promoters’ are required.

As mentioned before, innovation normally comes up against massive resistance by stimulating different types of conflict. The resistance stems partly from ignorance and partly from unwillingness on the part of those passively affected by, or actively engaged in the innovation. Based upon the ‘promoter model’ of Witte (1973), that has been around for some 30 years now and is generally accepted by both academics and practitioners. The findings of various empirical studies (e.g. Chakrabarti 1974 or Chakrabarti and O'Keefe 1977) support the case and point clearly to the existence of several promoters, whereas in half of the cases, all innovative activity is concentrated in a single key person. However, this and subsequent studies, such as that by Merkham et al. (1991), as well as a considerable number of cases, have identified only a single promoter, if any. Nevertheless, these studies and the literature unequivocally verify the hypothesis of Hauschildt (1997) that one or more ‘promoters’ are always needed when particularly complex material is to be handled and/or the innovation project is to be accomplished in a large, complex firm (e.g. Lee and Na 1994).

Following a meta-analysis of the literature and empirical studies, Chakrabarti and Hauschildt (1989) posited the hypothesis that the previous models were not sufficient to explain the complex nature of innovation projects and that different types of promoters are required for successful innovation. Kirchmann (1994), who set himself the task, for example, of subjecting the behaviour and contribution to success of promoters as described by Witte to critical investigation, showed in his empirical work, that the ‘two-person promoter model’ was just a special case of a ‘more-person promoter model’, so Hauschildt and Chakrabarti decided to expand the two-person promoter model and
developed an integrated approach, i.e. the 'promoter model' with different types of promoter who need to work as a 'troika' to stimulate and support innovation. (Hauschildt and Kirchmann 2001; Hauschildt and Gemünden 1999). The core approach here is that different kinds of resistance must be overcome by specific types of promoters – a 'power promoter' to overcome barriers of willingness/unwillingness through hierarchical potential, a 'promoter by expertise' to overcome barriers of capability through 'specialist knowledge' and the 'process promoter' who acts as a coordinator of the innovation and negotiates between the other two promoters56.

This is based on the following core theorems (in accordance with Brockhoff et al. (1999, p. 171):

- Each type of resistance has to be overcome by a specific type of energy. The barrier of unwillingness is overcome by hierarchical potential, the barrier of ignorance is overcome by the use of specific knowledge in a certain technical field (correspondency theorem).

- These types of energy are provided by different people. The ‘power promoter’ contributes resources and hierarchical potential and the ‘promoter by expertise’ or ‘technology promoter’ contributes specific (technical) knowledge to the innovation process (theorem of division of labour).

- The innovation process is successful, when the ‘power promoter’ and ‘technology promoter’ form a coalition and are well coordinated, i.e. when they really co-operate (theorem of interaction). The instance of coalition and coordination is handled by the ‘process promoter’, who is supplemented by means of a so-called ‘relationship promoter’ in cases involving interactions in networks.

The ‘power promoter’ who displays a high degree of ‘hierarchical potential’ appears in these promoter approaches, which can generally relate to all levels of management. An

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56 Hauschildt evaluated the reliability of this model by the application of his model on the findings of numerous empirical studies of other authors. The study performed by Ancona and Caldwell (1992, p. 634 ff.) for example confirmed the significance of interaction between the promoters, or Krüger (1995, page 1788 ff.), who also supported such a “troika”. For a detailed description of how Hauschildt developed and tested this “promoter-model” it is referred to Hauschildt (1997, pp 168).
analysis of studies (see: Section ‘Success and Failure Research’) yields the conclusion that the ‘Top Management’ (e.g. Gottschalk and Skirl 1998) is conceded a special role, particularly in the case of ‘radical’ innovation. For instance, Cooper (2001 and 2005) concludes that the role of top management in leading the innovation projects of a company cannot be stressed enough. This aspect proves to be one in which the best performers differ most strongly from the rest of the company.

The question that arises is which role the top management should adopt within the framework of the promoter approach, and which role should, or indeed must, consequently be realised by innovation management (or the InMU), as this will ultimately influence the task and role comprehension of InMUs. Wheelwright and Clark (1995) suggest to bring senior management in at the earliest stages to play four important roles: as team launcher, helping to establish the business charter for your project and ensuring that the right people are engaged in the effort; as energy source, driving support for the project through the organisation, validating the importance of the innovation; as commitment manager, ensuring that once the project is on its way, the resources promised by management will be made available to the project; and as promoter/coach, providing counsel to the team as needed and communicating its view of how the project is going.

Green (1995) likewise summarised that top management support is sought for two reasons. The first is to support the decision-making process (so that an innovation project is initiated in the first place), to stop termination and keeping a project alive – which is especially necessary in high-risk innovation projects (‘radical’ innovation); Second, top management and promoters presumably can help make a project successful in terms of achieving its goals – despite the variety of barriers encountered by ‘radical’ innovation.

57 Usually expressed in a relatively unspecific manner: referred to as a (direct) organisational connection to top management, the integration of top management in the innovation project, or frequently as ‘Top Management Attention’ (see also Section 3.5.5: Lessons-Learnt from Success and Failure Research).
Now that the basic idea of the promoter model and the roles of promoters and top management in overcoming barriers in the process of implementing innovation projects has been looked at, we will examine the insights in the context of InMUs, in order to obtain a clear notion of the role of an InMU in the innovation process. If both approaches, i.e. the ‘promoter approach’ and the ‘top management approach’, are thus combined, a complete overview of the interactions of ‘promoters’ and ‘top management’ in the context of innovation implementation is yielded in accordance with Gerlach (2003), allowing the identification of potential fields of action for InMUs:

<table>
<thead>
<tr>
<th>Role</th>
<th>Barriers</th>
<th>Source of power</th>
<th>Contribution to innovation</th>
<th>Role realised by</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Power promoter&quot;</td>
<td>Barriers of willingness/</td>
<td>Hierarchical potential</td>
<td>Definition of the innovation goals, provisioning of requisite resources, credible and lasting commitment to innovation, fault tolerance, creation of incentives for innovators, protection against opponents</td>
<td>Top management</td>
</tr>
<tr>
<td></td>
<td>unwillingness</td>
<td></td>
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<tr>
<td>&quot;Promoter by expertise&quot; or</td>
<td>Capability barriers of</td>
<td>Object-specific expertise</td>
<td>Generation of ideas, analysis and evaluation of novel concepts, development of alternative solution proposals, location and processing of more in-depth information and reasoning vis-à-vis proponents and opponents</td>
<td>Innovation management / InMU</td>
</tr>
<tr>
<td>&quot;Technology promoter&quot;</td>
<td>inability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Process promoter&quot;</td>
<td>Barriers of interorganisational cooperation</td>
<td>Organisational knowledge, communication capability</td>
<td>Consolidation and negotiation between expertise and power promoters, communication with the organisational members affected by the innovation, controlling of the innovation process, development of a plan of action</td>
<td>Innovation management / InMU</td>
</tr>
<tr>
<td>&quot;Relationship promoter&quot;</td>
<td>Barriers of interorganisational cooperation</td>
<td>Existing network, network capability</td>
<td>Achievement and consolidation of persons, holding dialogues, bridging intercultural, interdisciplinary or interpersonal distances, influencing social ties, moderating critical phases, proposals for conflict settlement, establishment of interorganisational teams</td>
<td>Innovation management / InMU and / or top management</td>
</tr>
</tbody>
</table>

Source: supplemented and expanded by author in accordance with Gerlach 2003

Table 9: Top Management as a “Promoter” of Innovation

As the above table illustrates, the top management assumes the role of the ‘power promoters’. Hauschildt and Kirchmann (2001, p. 48) posit that 'even if we no longer accept the classic dichotomy of ‘mechanistic' and ‘organic’ organisation culture, Burns and Stalker (1966) nevertheless show that there is a problem here: the more ‘mechanistic' an organisational culture is, the more important power promoters are - and top management involvement is thus of major significance in large (more mechanistically oriented) enterprise structures. The overview also renders it evident that the innovation
management or InMU assumes the role of enabler and intermediary as regards overcoming barriers in the innovation process\textsuperscript{58}, and that this should also be reflected in the definition of the role comprehension (Section 3.4.6).

An appraisal of this role comprehension of ‘promoters’ and ‘top management’ in the context of the innovation process\textsuperscript{59} reveals an interaction between the involved parties, which Gemünden (2002, p. 22) summarised as follows in a conceptual ‘Phase-Linkage’ model for innovation management:

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig8}
\caption{‘Phase-Linkage’ Model for Innovation Management}
\end{figure}

This phase-linkage model illustrates the contribution of the functional managers, promoters and top management towards the generic\textsuperscript{60} innovation process. The role comprehensions from Fig. 8 above and Table 9 on page 77 are thus key indicators for deriving the tasks and role comprehension of innovation management, and thus of Innovation Management Units (see Section 3.4.6). In summary, it can thus be determined that the identification of barriers and the derivation of approaches to overcoming these barriers on an individual level via the ‘promoter model’ and the ‘top management’

\textsuperscript{58} The role of innovation management regarding the aspect of communicating innovation barriers: see Englberger (2000).
\textsuperscript{59} In the context of a systematic process for progressing new products: cf. stage-gate process of Cooper (1983); Cooper and Kleinschmidt (1986); Cooper (2001); for close monitoring and evaluation at each stage c.f. Bruce (2001).
\textsuperscript{60} Regardless of whether ‘radical’ or ‘incremental’ innovation is involved.
approach allow identification of the fields of action that must be realised by innovation management (InMUs) if a ‘radical’ innovation is to have a chance to be implemented.

3.4.5 Innovation and Organisation

Now that the complex of topics regarding barriers to innovation and pathways to overcoming them has been illustrated, this section deals in detail with the organisational aspects in terms of “how to manage innovation” within an enterprise.

Since at least the work of Schumpeter in the 1930’s, the relative superiority of large, established firms in the introduction and development of innovations has been a subject of intense debate. Schumpeter (1934) initially suggested that small, entrepreneurial firms were likely to be the source of most innovations but he subsequently claimed that large established firms possessing some degree of monopolistic power were likely to be the driving force behind technical progress (Schumpeter 1942). He suggested further that their superior access to capital and skilled labour, in combination with their ability to effectively appropriate innovation, gave them considerable advantages over small firms and new entrants. Subsequent research in this field has yielded contradictory or fragile results. A review of the literature regarding the relationship between innovation and organisational characteristics reveals that organisational innovation is related to organisational size, structure and resources, whereas authors like Henderson (1993) stated that cross-sectional studies of the relationship between company size, market power and innovative activity are not generally systematic relationships at all (Cohen and Levin 1989). Theoretical work in this field has been similarly inconclusive, generating results that are extraordinarily sensitive to the core assumptions of the models employed.

Nevertheless, large, mature organisations are now faced with the dilemma of managing innovations. Large, established firms have an advantage over entrants in the pursuit of
incremental innovation as incremental innovation builds upon their existing knowledge and capabilities. However, these assets can simultaneously substantially reduce the effectiveness of their attempts to exploit radical innovation. Nelson and Winter (1982) suggested that firms develop ‘routines’ or ‘procedures’ in response to their experience, codifying the knowledge and the behaviour of organisations, while contradicting the ability to take new directions, as is necessary for ‘radical’ innovation.

Typical of this is the comment from Sharma (1999): ‘Many observers of innovation note that the bureaucracies that govern large firms suppress both the creativity necessary to generate radically new ideas and the initiative necessary to build them into business. The elaborate administrative systems and the accompanying risk-averse attitudes burden entrepreneurial initiatives with seemingly mindless procedures that dampen flexibility and responsiveness. The mechanism that facilitates predictability and order in existing operations smothers the entrepreneurial flair necessary to deal with unpredictable and disorderly innovation process…What most impedes business-building innovation inside large firms is the inability of managers to deal effectively with key dilemmas encountered in locating and seizing a creative idea and methodically navigating it through the bureaucratic maze.’ (Sharma 1999, p.146). This raises the question as to which organisational structure is more appropriate for fostering innovations - especially ‘radical’ innovations - in large organisations.

The study carried out by Burns and Stalker (1966) forty years ago on how the environment influences organisational structures is considered to be pioneering work in the field of organisation and innovation management. Their holistic concept led to a high degree of dissemination and awareness on account of its simplicity. Thus, Burns and Stalker distinguish between two principally converse types of organisation: ‘mechanistic’ and ‘organic’ management systems (‘M-O-Paradigm’).
The ‘mechanistic’ management system can be summarised as a well-organised bureaucracy that is suitable for stable environments. Its chief attributes are clearly arranged and well-defined goals, precise job descriptions, staffing that is independent of personnel, centralised decision-making on the top-tier hierarchy, vertical communication flows, orientation to the respective superior, loyalty and obedience (Hauschildt 1993). This system thus corresponds to the envisaged realm of organisational theory, which focuses on coping with repetitive processes efficiently. In line with Burns and Stalker (1966), other theorists like Galbraith (1973) and Draft (1982) have suggested that large firms in stable environments develop ‘mechanistic’ organisational structures that enable them to cope quickly and effectively with their environment.

The characteristics of the ‘organic’ approach, on the other hand, are formulated far less precisely. Organisations based on this approach are described as organisations with fuzzy goals that are not fixed for a lasting duration, with open-ended task definitions and staff placements, as ‘ad personam’ organisations that do not think in terms of rights and obligations, but instead think in terms of problem resolutions. Control, authority and communication are realised in a complex network of interactions, instead of being geared towards the respective superiors. The communication flow is lateral, i.e. it runs both horizontally and ‘diagonally’ between positions of differing hierarchical rank (Hauschildt 1993). Additionally, organic types of structure are characterised by a combination of specialised organisational divisions, as well as the requisite cooperation.

On the basis of their results, Burns and Stalker (1963) proved that there is a positive link between ‘organic’ forms of an organisational structure and success in dynamic environmental constellations. In their view, an organisational structure contingent upon a dynamic or stable environment turns into an ‘organic’ or ‘mechanistic’ organisational structure. They proceeded to set an ‘organic’ and therefore innovation-friendly type of structure against a ‘mechanistic’, administrative type of structure, which corresponds to a
large extent to the Weber ‘bureaucracy model’ (Weber 1947). The work of Burns and Stalker leads to the assumption that an ‘organic’ type of structure involves organisations with a high degree of innovative capability in dynamic environments.

The opinions of Burns and Stalker have been criticised and relativised many times (e.g. Morgan 1997, p. 381). The main subject of criticism centres on the close connection that determines success between external situation variables (environment/technology) and the organisational structure. Mintzberg (1979), for example, holds the view that effective organisational structures are not exclusively the result of conforming exactly to a specific external situation variable. On the contrary, all fundamental internal as well as external parameters (environment, technology, corporate philosophy, strategies, personnel, structure) need to accord harmoniously. An effective organisational structure can only develop through mutual coordination of the factors impacting upon it.

A further criticism levelled at the strict situational approach of Burns and Stalker is that it ignores the subjective perception of the organisational structure by members of the company (personnel, management culture…), as well as their influence on organisational reality. Authors like Hauschildt (1993) perceive a hazard in the suggested simplification tendency of the M-O-Paradigm - ‘Mechanistic organisations impede innovation, while ‘organic’ organisations promote innovation’. Every innovation is destined to transition into the state of ‘routine’ at some time. However, the M-O-Paradigm sees exclusively structural problems in innovation management, thus ignoring the process perspectives and underestimating the flexibility of mechanistic structures, especially when it comes to overcoming resistance (see Section 3.4.2). Furthermore, while large, mature companies are usually more ‘mechanically’ organised, they nevertheless have to be flexible and innovative.

It thus comes as no surprise that a host of approaches within the innovation management literature attempt to fathom out the complex problem of ‘how best to manage innovation’.
However, these assume that there is no single best way to organise⁶¹ and that any one way of organising is not equally effective (Galbraith 1973). The Burns/Stalker approach in the form of the ‘loose-tight-hypothesis’ based on Shephard (1967) and Wilson (1966) is not covered in any further detail in this study.⁶² Studies have been unable to verify their approach of systematically changing the form of management during the innovation process; indeed, a lower rate of innovation success can even be ascertained in part (Albers and Eggers 1991) and this approach is rarely put into practise (Hauschildt 1997).

Since the 1960s, an ever-increasing number of researchers and writers have tried to put together pictures of the process of generating new products and production methods and outline the activities involved in this. As Brady (1995) summarised, companies that are successful have not only taken on the message that innovation is important and have committed to the necessary resources (both human and capital), they also need to be able to manage the process of innovation. Which is why approaches have been around for a long time that are aimed at examining innovation as a creative process engaging a variety of activities, participants and interactions, with the goal of explaining how all of these parties come together and interact with an outcome which is a technological product or process (‘Models of Innovation’).

Rothwell (1992) already described different innovation models⁶³ in the early 1990s, and these have since been further supplemented by the ‘innovation milieu’ model (Mirnova and Phillimore 2003). In addition, a wide range of management tools and techniques has been developed to help to manage these innovation processes (Brady 1995). There is no doubt that managing the complexity of the innovation process is a challenging task and must take different recommendations regarding organisational design into account.

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⁶¹ E.g. Perrow (1967) who stated that there is no one best way to structure organisational tasks.
⁶² The basic assumption of the ‘loose-tight’ concept, i.e. that a lack of ideas predominates in companies and that a ‘loose’ organisational design can eliminate this deficit, has been unable to be verified in several cases. On the contrary, companies generally tend to have too many ideas, meaning that the emphasis should instead be placed on screening those ideas that are most worthy of pursuing (Albers and Eggers 1991).
⁶³ ‘Models of Innovation’ - Namely ‘black box’, ‘linear model’ (including technology push and market pull), ‘interactive models’ (including coupling and integrated model), ‘systems model’, ‘the evolutionary models’, and ‘the innovative milieu model’: see Marinova and Phillimore (2003).
It is human nature to learn from experience. Therefore, it is not surprising that a lot of research focuses on identifying determinants which are generally needed for a more effective management of innovation\textsuperscript{64}. However, all activities geared towards promoting innovations occur within structures, i.e. organisations. This presents mature organisations, which need to develop the capacity for more radical innovation, with the organisational question of how they plan on realising the requirements of ‘making resources available for new products, providing collaborative structures and processes to solve the problems creatively and connecting business with existing business’ (Dougherty and Hardy 1996, p. 1122).

Although many details remain to be articulated, the previous work of many researchers and authors has produced a good understanding of the innovative organisation, at least as an ideal type. However, organisations are especially challenged by changes in technology, environments, competition, etc. and many organisations still have difficulty with sustained product innovation, especially if they have a radical character\textsuperscript{65}. The literature also agrees that radical innovation is particularly difficult for organisations with long histories of stable operations (Dougherty and Hardy 1996), because long-stable organisations are especially challenged by changes in technology and global competition: they must become more innovative if they able to survive, but do so, they must fundamentally change how they organise (Hage 1988).

Although studies such as that by Jelinek and Schoonhoven (1990) show that frequent reorganisations can help large companies to keep their organisation flexible, allowing them to react to market changes, frequent reorganisations may nevertheless lead to the opposite effect due to employee frustration (where employees are more concerned with securing an adequate position in the impending new organisation than with medium-term

\textsuperscript{64} The subject of this study is large, mature organisations. Therefore, the aspect of ‘company size’ (small versus large enterprises) is not covered in any further detail. In addition, Henderson (1993) stated that cross-selectional studies could not provide empirical evidence of a relationship between firm size, market power and innovative activity (e.g. see also Cohen and Levin 1989).

\textsuperscript{65} E.g. Billing (2003); Christiansen (2000); Leifer, McDermott et al. (2000); Nord and Tucker (1987).
topics such as new innovations) and ‘paralysis’ of the decision-making and implementation processes (c.f. Sennet 1998; Argyris 1990; Argyris 1978). In addition, a complete organisational shift as a whole - especially in the case of a large, mature organisation - needs time and new organisational capabilities are difficult to create and costly to adjust (Nelson and Winter, 1982). Therefore, other solutions for such companies are sought in the literature.

Galbraith (1982) and others referred to meeting the challenge to be innovative without a complete organisational shift as a call for a separate innovating organisation with unique structure, information and decision making processes and reward and people-selection systems completely different to existing, operating organisations: ‘An organisation that is designed to do something well for the millionth time is not good at doing something for the first time. Therefore, organisations that want to innovate, need two organisations, an operating organisation and an innovating organisation’ (Galbraith 1982, p. 6). This approach also shows that (radical) innovations are not routine, but will become so one day.

Yet real life is often different. Against the background that the management of a company is not used to doing anything fundamentally ‘new’, it prefers instead to rely on prescribed processes with tried and proven decision-making rules. And it is precisely this mindset that suppresses radical innovation and merely produces incremental innovation, if any (Hartmann 2004, p. 26).

It is thus not surprising that although the theory for driving radical innovation calls for a strict separation of radical innovation projects from the ‘rule-based organisation’

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66 Equipped with various degrees of freedom (Billing 2003, p. 273) with the goal – as already called for by Galbraith (1982) – of creating ‘islands’ with their own substructures and cultures, own processes and incentive systems (Littler and Sweeting 2001, p. 35), so that new and more flexible remuneration structures can be implemented that are linked directly to the success of an innovation initiative, which would not be possible if integrated within the company (McRae Watt 2001, p. 27).

67 Bearing in mind that the implementation of an innovation takes place in the form of a project, the more radical the targeted innovation, the more likely it is that it will be implemented outside the framework of existing processes (as a project). For discussion on the topic of ‘Is innovation a project or a process?’: c.f. Bach and Buchholz (1997).
(Simon et al. 2003., p. 19), the observation of Dougherty and Hardy (1996) showed that ‘…unfortunately, new products are (normally) inextricably bound up with the rest of an organisation\(^68\), so avoiding the connections is not a real solution…’\(^69\) is correct. Therefore, the necessity for stability and simultaneous flexibility allows one to suppose that large companies in particular that have a high degree of innovation combine different organisational structures: on the one hand, structures with rigid tasks and areas of responsibility that adapt to changing environmental factors (market, technology etc.) by introducing reorganisation measures; on the other hand, flexible structures that are able to come up with new ways of looking at radical innovations. Furthermore, authors such as Chandy et al. (1998) ascertained in recent years that ‘Firms do not live by radical innovation alone. It is only one type of innovation a firm may undertake. Future research should examine how firms can effectively manage the mix of incremental and radical innovations’ (Chandy and Tellis 1998, p. 33), which increases the requirements on a functioning innovation management system within an enterprise.

### 3.4.6 Conceptual Issues of ‘Innovation Management’

Despite differences in definitions, authors understand that radical innovation is very different from incremental innovation (e.g. Dewar and Dutton 1986; Green et al. 1995; Ettlie et al. 1984; Vairaktarakis 1999) and that it is critical to the long term success of firms. Unfortunately, research has also shown that it is often difficult to gain support for radical projects in large firms (Dougherty and Hardy 1996), where internal cultures and economic pressures often push efforts toward lower risk incremental projects or incremental innovations, respectively. Vairaktarakis (1999) stated that, interestingly, considerably less is known about the effective management of the product development process in a radical context than in comparison with an incremental context. So the key

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\(^{68}\) Except when based upon new core competencies (not yet existing), new technology platforms and service processes.

\(^{69}\) Dougherty and Hardy (1996, p. 1222) note empirical evidence that the failure to connect internal ventures to mainstream operations is central to a division’s demise.
question is, how firms – especially large, mature organisations - can effectively manage the mix of incremental and radical innovations?

The management term itself is characterised by the fact that the management\textsuperscript{70} defines and pursues strategies and goals, makes decisions, specifies and influences the flow of information and establishes and designs social relationships with the goal of asserting its decisions (c.f. Hauschildt 1997, p. 25). The management tasks also include steering and optimising existing structures and processes, as well as setting objectives and planning the company's entrepreneurial future (Lowin 2002, p. 16). Within the context of innovations, the term 'innovation management' can thus be defined as a

\textquote{Complex of strategic, tactical and operational tasks for planning, organising and controlling innovation processes and for creating or using the existing internal or external boundary conditions required to this end\textquote}

(Pleschak and Sabisch 1996, p. 44).

However, an innovation is usually only successful when its character is not hallmarked by pure randomness, which yields the necessity of systematic preparation and the assertion of innovation-relevant tasks and processes. Innovation management is thus understood to mean the systematic planning, implementation and control of ideas in organisations. In contrast to creativity, which deals with the development of ideas, innovation management is geared towards the utilisation of ideas\textsuperscript{71}. The management of innovations is regarded as an element of the company strategy and can encompass products, services, manufacturing processes, organisational structures or management processes\textsuperscript{72}. The primary task of innovation management is thus to systematically drive the process of innovation activities within a company (Pleschak and Sabisch 1996, p. 44) and to smooth

\textsuperscript{70} Regarding the issue of 'Management' literature, please see Staehle (1999).

\textsuperscript{71} And thus conforms with the definition of the term 'innovation'.

\textsuperscript{72} see: http://de.wikipedia.org/wiki/Innovationsmanagement.
(new) ways to bring the innovation to market (Gassmann and Enkel 2006, p.137). However, it must also deal with one particular peculiarity that is inherent in innovation: the paradox of managing chaos in continuity-oriented environments. Or as Nyström expressed it: the ‘paradoxical aspect of innovation management, being both flexible and focused, committed and open-minded, technologically and market oriented’ (Nyström 1998, p.193), which renders the management of innovation so difficult, but also extremely interesting.

In addition to the classic analysis of literature on managing innovations (e.g. Hauschildt 1997, p. 25), the concrete tasks of innovation management can also be derived by using the insights gained from the requirements of organisational research into organisational structures (e.g. Klosterkamp 1996, p. 35), as well as insights from the topic of ‘resistance and barriers’ (Section 3.4.3). The instructional content of chairs for innovation management73 and – in the age of the Internet - information from innovation networks74 can also be incorporated to this end.

The following list presents the requirements and tasks for ‘innovation management’ that are yielded by all of these varied sources:

- Identification and selection of fields of innovation for the company that promise success.
- Development and specification of innovation goals and strategies consistent with the company.
- Ensuring the systematic generation of innovation options, including the promotion of creativity and ideas on the part of the staff.

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73 In doing so, it must be noted that these chairs often focus on a special topic (e.g. technology management, business administration or marketing aspects, etc.), depending on the faculty to which they are attached and who currently holds the chair. Therefore, these sources serve more to cross-check the completeness of the insights already gained.

74 E.g. www.inev.de; www.innovationsforschung.de
- Creation of organisational structures that promote innovation in order to realise the innovation options and implement efficient interface management and - if necessary - deploying pathways outside the current business.
- Ensuring the realisation of innovation options by provisioning or negotiating the resources necessary for identification, evaluation and implementation.
- Implementation of suitable measures for the planning, steering and control of innovation processes (from generation and evaluation of the idea, all the way to realisation and market launch).
- Ensuring that the decisions necessary for realising innovations are made, also in light of the economic aspects.
- Communication of innovation activities and provisioning of information as needed and taking the target group into consideration, including all persons involved in the innovation process.
- Elimination of internal barriers to innovation through active integration of promoters and top management in the innovation activities.
- Promotion of a company culture that promotes innovation.

Source: own composition: c.f. e.g. Hauschildt (1997, p.25); Pleschak and Sabisch (1996, p.44) and others.

Table 10: Tasks and Objectives of Innovation Management

In addition, the literature contains some approaches according to which the tasks and objectives of innovation management can be clustered or grouped according to different criteria.

Goffin and Pfeiffer (2000), for instance, differentiate between “five areas of innovation management” - these areas (1-5), where from their perspective, innovation management requires good performance:

1) Innovation strategy
As well as clarifying the direction in which the company should actually develop, i.e. with which products and services should it position itself on which markets, this part includes - in terms of Goffin and Pfeiffer - communication of the role of innovation within a company, deciding how to use technology and driving performance improvements through appropriate performance measures.
2) Creativity and idea management
New ideas – and therefore innovations – are no coincidence, but rather the consequence of an organisation that gives employees space to be creative while guiding their ideas along a fixed track. This typically takes place by means of a ‘stage-gate process’ approach by Cooper (2005) or ‘phase-link model’ by Gemünden (2002), for example. Managing ideas involves filtering out a large volume of the less important ideas before a stage where the real priorities need to be identified.

3) Portfolio management
Once ideas have been generated, an efficient process is needed to choose the best ones for implementation. But not all product innovations fit equally well into a company strategy or into the portfolio (e.g. danger of cannibalising existing products or ‘cash cows’). Resources are always limited and so they need to be focused on the priorities; therefore portfolio management competence and activities are necessary.

4) Project management
The capability to quickly turn ideas into new products, services and processes is fundamental. Short time-to-market, high product quality and acceptable development costs are all typical goals for companies. Typically, innovation options are implemented in projects together with other operational areas, which require corresponding coordination and controlling functions (project management competence).

5) Human resource management
Underlying all efforts of innovation management is the need to create a culture in which employees are motivated and are able to contribute to innovation. This can also include the provisioning of methods and tools (e.g. creativity techniques) or incentive mechanisms.

Table 11: Goffin / Pfeiffer’s ‘Five Key Areas of Innovation Management’

If we follow other authors, such as Tang (1998), who screened the innovation literature on aspects affecting ‘structure’, ‘processes’, ‘organisation’, ‘culture’ and ‘environment’; or Peters and Waterman (1982) with the widely-used McKinsey ‘7s’ framework for principal organisational analysis and the factors ‘skills’, ‘strategy’, ‘structure’, ‘shared values’, ‘style’, ‘staff’ and ‘systems’, etc. such activities can, in principle, be bundled and grouped in many different ways.
Regardless of the many various classification approaches and in keeping with the principle ‘there is no one way’, it is clear that the utmost goal of successful innovation management is to ensure a high degree of innovative capability. Therefore, innovation management focuses on a broad spectrum of activities that covers not only the provisioning of suitable instruments to generate, implement and steer innovation options, as well as communication, but also notably ‘soft facts’, such as the decision and assertion problem and the promotion of an innovation culture. Interestingly, an analysis of this activity spectrum - ‘What needs to be done’ - fails to identify a dedicated distinction between the promotion of incremental and radical innovations. The significance, on the one hand, and the broad spectrum of activities, on the other hand, also indicate that ‘somebody’ in the company must deal with and be accountable for the core subjects of innovation. That is where the issue ‘Innovation Management’ comes in.

Before the structural aspects of innovation management can be addressed more deeply, a clear delimitation between innovation management and other relevant management functions must be established, e.g. vis-à-vis the ‘Management of Research and Development (R&D)’, ‘Technology Management (TM)’ and ‘Product Management (PM)’. It is also imperative that a role comprehension be derived at this point.

- **Technology Management (TM):**

Grefermann and Röthlinghöfer (1974, p. 10) define Technology Management as ‘Maintenance of the technology competitiveness’ with connectional tasks concerning the role of technology within companies, such as technology portfolio, concentration on one key-technology, safeguarding technology potential through patents, systematic technology screening of new developments, benchmarking of competitors and technology evaluation, including make or buy decisions.

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75 E.g. by establishing hierarchically independent possibilities for exchange.

76 Be it an individual person or a group of persons, depending on the organisational structure.
In addition, Hauschildt (1993, p. 26) and Gemünden (2001, p. 10) note that Technology Management focuses not only on novel technologies, but also on the maintenance and development of existing technologies. Innovation Management focuses on new technologies and managing gap-problems resulting from obsolete technologies. Technology Management can be seen as an initiator, to track technological developments and change existing ones. In this respect, Technology Management defines tasks of Innovation Management. Furthermore, the alignment to the innovation process is missing within Technology Management. Whereas conceptual tasks are in the focus of Technology Management, Innovation Management refers to all kinds of innovations, comprises the overcoming of resistances against innovations in the company and in the market and handles the behavioural and assertion problems.

- **Research and Development (R&D):**

  Brockhoff (1992) cited by Hauschildt (1993, p. 25) and Gemünden (2001, p. 7) differentiate as follows:

  - R&D Management refers to scientific and technological processes. Innovation Management includes the administrative processes.
  
  - In most companies, R&D processes are realised systematically and in well-institutionalised forms, i.e. they follow specific concepts, are more regularised by time and space, mostly predictable, but are in any case re-applications. Furthermore, Innovation Management has to ensure the functionality of processes which do not have the characteristics of systematic R&D.
  
  - R&D is easier to institutionalise and organise than most of the innovation processes. The basic patterns of R&D processes are more notified and often refer to repeating processes which can be planned, controlled and coordinated reasonably well. Specialisation is possible and coordination is necessary. Moreover, Innovation Management has to manage singular and unique processes and has to control
processes across organisational borders, whereas no specialisation is reasonable or possible.

In conclusion, R&D activities are a subset of innovation activities within a company\textsuperscript{77}.

Tirole (1997) suggests that it is customary to distinguish between different stages of R&D: Basic research aimed at deriving fundamental knowledge (pursued mainly at universities and government agencies); Applied research associated with engineering and development, which brings products and processes into commercial use. If the formulation is more clearly defined, this approach illustrates a clear distinction in the form of ‘explorative research’ (R) versus ‘development in close proximity to the market’ (D):

<table>
<thead>
<tr>
<th></th>
<th>Research (R)</th>
<th>Development (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Fundamental phenomena (frequently technology push)</td>
<td>Concrete product (frequently market pull)</td>
</tr>
<tr>
<td>Utilisation</td>
<td>General</td>
<td>Company unit specific</td>
</tr>
<tr>
<td>Time to market maturity</td>
<td>Long-term to medium-term</td>
<td>Medium-term to long-term</td>
</tr>
<tr>
<td>Example</td>
<td>Research into artificial intelligence</td>
<td>Development of a gaming mobile phone</td>
</tr>
</tbody>
</table>

Table 12: Focus of Explorative Research (R) versus Development (D)

Accordingly, development activities can also be assigned to product management (see below) in the case of innovation realisation.

- **Product Management (PM) / New Product Development (NPD):**

‘Product Management’ means different things to different organisations\textsuperscript{78}. This may partly result from the broad scope of responsibility many product managers possess, and the fact that their responsibilities change given the stage they happen to be at in the product development lifecycle, or even the maturity of their given market.

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\textsuperscript{77} For insights concerning the changing role of R&D within telcos like AT&T, BT and NTT: see Fransman (1994).

\textsuperscript{78} For a deeper insight, c.f.: http://www.pdqtm.co.uk;
The terms ‘Product Lifecycle Management’\textsuperscript{79}, ‘Product Marketing’ and ‘New Product Development’\textsuperscript{80} are often used synonymously with ‘Product Management’. In general, product management is one of the four areas of marketing. The other three parts of the marketing mix\textsuperscript{81} are pricing, promotion, and distribution.

Product management deals with questions like: What products to produce and sell? What new products to add? What existing products to discontinue? How long will it take for a product to penetrate the market? How many products have to be in the product line? How to balance a product portfolio? How to introduce a product to the market?

Product managers are the ultimate champions within an organisation for a given product (or service). At a very high level, they are responsible for figuring out how to match their customers’ needs with the company’s capabilities and for seeking to grow, defend, maintain, or create business in a given market. To achieve this, product managers will often be engaged in one of these types of tasks: Market Analysis, Product Strategy Planning and Execution (taking action to execute the goals set in the previous stage). Quite often, a product manager will be focused on only one of these elements for a given product (or product line).

Disregarding the latter aspect, the objective and tasks of a product manager are extensively comparable to those of innovation management. This suggests that the tasks of innovation management in a company will be integrated within product management or assigned to a dedicated innovation management unit (InMU), assuming that one is established and trained.

In summary, it can be ascertained that ‘while research and development processes are undeniably innovation processes, the opposite is not true’ (Hauschildt 1997, p. 25). R&D processes are characterised by a strong relationship to success in the form of a clear

\textsuperscript{79} The product lifecycle refers to the succession of stages a product goes through. Product Lifecycle Management (PLM) is the succession of strategies used by management as a product goes through its lifecycle.

\textsuperscript{80} New Product Development (NPD) is a business and engineering term which describes the complete process of bringing a new product (of the right quality at a competitive cost) to market.

\textsuperscript{81} The marketing mix approach is one model of crafting and implementing marketing strategies.
formulation of the expected results. In the case of innovation processes, on the other hand, only the baseline situation is clearly defined. The actual results are uncertain. ‘Serendipity’\textsuperscript{82} is ruled out within the scope of R&D processes, but expressly desired in innovation processes. Delimitation vis-à-vis technology management is impeded by the difficulty of obtaining a clear definition of the term ‘technology management’. Within the framework of strategic management tasks, technology management deals with the ‘maintenance of technology competitiveness’\textsuperscript{83}.

Technology management thus represents a micro-level of innovation management, as it does not limit itself exclusively to new technologies. Product management subsumes many tasks of innovation management, but usually only focuses on one product and its realisation. The design of the ‘fuzzy front end’\textsuperscript{84} is the domain of innovation management, while the realisation and market implementation of an innovation is the responsibility of product management.

The above analysis shows that the literature contains no clearly defined distinguishing matrix (and thus no role comprehension) when it comes to delimiting innovation management from other management functions. This may also be attributable to the goals differing in comparison with those of other management functions, e.g. New Product Development. Reid and Brentani (2004, p. 172) compare the technology and innovation management literature (TIM) with the New Product Development literature (NPD) and come to the following conclusion:

The TIM literature, which has drawn heavily on the work of economists (Note: management literature), where industry, institutional and country aspects were viewed as

\textsuperscript{82} Serendipity = Discovering something one has not sought through chance and astuteness.

\textsuperscript{83} Grefe and Röthlinghöfer (1974, p. 10) cited by Hauschildt (1997, p. 28).

\textsuperscript{84} Reid and Brentani (2004, p. 171) note that the term was first popularised by Smith and Reinertsen (1991) and is considered to be the earliest stage of the product development process. It roughly denotes all of the time and activity spent on an idea prior to the first official meeting to discuss it, or what is referred to as ‘the start date of team alignment’. Deschamps and Nayak (1995, p. 14) define the phrase ‘fuzzy front end’ with a process they call ‘idea management’. The core activities of idea management are idea generation, collection, evaluation screening and ranking. Surviving ideas emerge from the idea management process as high-potential concepts, which then enter the organisation’s product development process.
impacting innovation; and the individual, where roles such as championing, boundary spanning and gate keeping are examined for their impact on the process of innovation.

The NPD literature (Note: descended from marketing literature), while also looking at some innovation process activities at the individual level, has primarily used an organisational perspective focussing on product, project, and company level processes that contribute to the organisation’s success in creating, developing and marketing new products.’

However, a more differentiated distinction between innovation management (InM) and other management functions is needed in order to render an InMU ‘role comprehension’ more readily apparent and to facilitate the identification of potential InMUs. Therefore, the following table differentiates according to additional aspects (activities, time horizon, etc.) based upon screening the literature:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>TM</th>
<th>R&amp;D</th>
<th>InM</th>
<th>PM/NBD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time horizon</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mid-term</td>
<td>(X)</td>
<td>X</td>
<td>X</td>
<td>(X)</td>
</tr>
<tr>
<td>Short-term</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Tasks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visionary</td>
<td></td>
<td></td>
<td>(X)</td>
<td>(X)</td>
</tr>
<tr>
<td>Conceptional</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Technological</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>(X)</td>
</tr>
<tr>
<td>Administrative</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular / Repeating</td>
<td>X</td>
<td>(X)</td>
<td>(X)</td>
<td>X</td>
</tr>
<tr>
<td>Unique / Unrepeated</td>
<td>X</td>
<td>X</td>
<td></td>
<td>(X)</td>
</tr>
<tr>
<td><strong>Activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scouting/Screening/Evaluation</td>
<td>X</td>
<td>(X)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Idea generation</td>
<td>(X)</td>
<td>(X)</td>
<td>X</td>
<td>(X)</td>
</tr>
<tr>
<td>Idea evaluation</td>
<td>(X)</td>
<td>X</td>
<td>X</td>
<td>(X)</td>
</tr>
<tr>
<td>Piloting</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Idea realisation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Prototyping</td>
<td>(X)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Product implemention</td>
<td>(X)</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Product operation</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Product execution</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Competencies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Generic</td>
<td></td>
<td></td>
<td></td>
<td>(X)</td>
</tr>
</tbody>
</table>

Table 13: Characteristics of InM in Comparison with other Management Functions
A summary of all of these insights also allows the ‘role comprehension’ of innovation management (and thus of an InMU) to be represented along the (generic) innovation process on the basis of the interaction of R&D and Marketing.

At the same time, the transformation capability of innovation management as a ‘link’ – thus placed in the role of intermediary – between R&D (and a ‘technology push’) and Marketing (with a ‘market pull’) and as a ‘trailblazer’ of Product Management (PM) becomes evident:

![Diagram of Interaction of Innovation Management vis-à-vis R&D, PM, Marketing](image)

Source: in accordance with Sabisch (1991, p.16), further elaborated by author

Figure 9: Interaction of Innovation Management vis-à-vis R&D, PM, Marketing

This also allows the field of tension to be anticipated in which innovation management finds itself in practice, i.e. developing technological visions (for radical innovation) on the one hand, while, on the other hand, systematically recognising and acting upon market

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85 ‘R&D’ in terms of aspects of ‘Technology Management’ are included.
86 Innovations as the result of scientific and technical knowledge breakthroughs that must first create an appropriate market (radical innovations).
87 Market-induced derivation of innovations (more incremental in nature).
needs (trigger for incremental innovation), developing innovation options through suitable business models and making these available to product management for implementation. This entails an immense transformation capability, being able to combine and unify the different philosophies and objectives and determining the right point for transfer to product management (while avoiding negative effects, such as the NIH syndrome), which implies the extent of the potential for conflict. This also gives rise to the question of the expedient positioning of innovation management (or an InMU) in the overall organisation, which has significant influence on the assertability of certain projects within that organisation (see barrier aspects, Section 3.4.2).

Therefore, one question posed within this study in addition to the role comprehension of InMUs in the case organisations will also involve deriving ‘lessons learnt’ for the successful implementation of an InMU and avoiding potential tension within the context of managing incremental innovation as opposed to radical innovation.

3.4.7 Summary and Conclusions

The discussion in this section has illustrated a variety of approaches towards specifying the term innovation, and it cannot be ruled out that additional dimensions will be discovered. It was also ascertained that the ability to handle resistance and barriers is a core element when dealing with innovations, especially when dealing with ‘radical’ innovation in large companies. The importance of the top management for driving innovation on the individual level was presented and the necessity of promoters derived. A transformation of the promoter and top management approach from the individual level to fields of action of Innovation Management or InMUs allows the surmounting of resistance and barriers to already be considered during the conceptual phase of InMUs. The focus now is on driving innovations in the context of organisations, all the way to

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88 Medium to long-term oriented R&D and more short-term oriented marketing.
89 ‘Not Invented Here’ syndrome: see (Katz and Allen 1982).
deriving the definitive tasks and role comprehensions of ‘Innovation Management Units’ (InMUs).

Based on a discussion of various management approaches to fathom the complex problem of ‘how best to manage innovation’ so that radical innovations will one day become routine, fundamental requirements on an organisation were derived in this context. Thus, structures with rigid tasks and areas of responsibility that adapt to changing environmental factors by introducing reorganisation measures are required on the one hand, while on the other hand, flexible structures that are able to come up with new ways of looking at radical innovations are also required. As innovation should not arise purely by chance, but in a systematic manner, the systematic preparation and assertion of innovation-relevant tasks and processes is necessary. The significance, on the one hand, and the broad spectrum of activities, on the other hand, also indicate that ‘somebody’ in the company must deal with and be accountable for the core subjects of innovation and where ‘Innovation Management’ comes in. Having identified gaps in the literature concerning innovation management activities and the demarcation from other units closely associated with innovation activities, such as R&D, PM, etc. the question now arises as to what approaches can be taken for the organisational implementation of innovation management activities within an enterprise.

3.5 InMUs - Structural Response to Innovation Management

3.5.1 Introduction

Now that we have established a common understanding regarding the purpose and objectives of innovation by means of clarifying conceptual issues, responsibilities, drivers and pathways to innovate, i.e. the ‘what’, we shall now analyse the design instruments of innovation management, i.e. the ‘how’. The prior focus of the literature review on the purpose of innovation and innovation activities was important as it represents a basic pre-
condition to clearly understand and evaluate potential design options. In principle, a more person-oriented, process-oriented and structure-oriented approach is feasible in this context. Person-oriented approaches place the importance of individuals (employees, senior managers) or groups in the focus of innovation implementation and serve to sensitise the necessity of coordinated interaction\textsuperscript{90} and communication by all participants. Process-oriented approaches with the focus essentially on aspects of minimising ‘capability barriers’ attempt to standardise innovation activities through the introduction of dedicated process stages and decision-making based on a ‘stage-gate process’ (see Cooper 1983).

On account of the objective of this study, the subsequent appraisal focuses on the structure-oriented approach as a measure to boost innovative capability by means of what Corsten (1989) refers to as ‘dismantling functional barriers’\textsuperscript{91}.

‘Organisational Structure’ can be understood as the primary driver of change since it provides the skeletal framework for all organisational decisions and processes (Wang and Ahmed 2002). In this connection, the ‘structure-oriented’ approach within this study refers to the ‘hard component’ of organisational structure plus the formal relationship between departments. The formal designation or names of such structural approaches is less important than the core functions and functionalities that are actually realised. The ‘hard component’ does not comprise the informal-structure or compositions of relations which are not explicitly demonstrated in the organisational chart, such as interaction between individual people or groups. The informal dimension of structure is based upon ‘soft components’ (Wang and Ahmed 2002, p.5) - such as emotions, relations between different hierarchical ranks, teams, individuals etc. - and represents the degree of freedom of the workforce to work beyond formal organisational structures, which is difficult to predict, measure and research.

\textsuperscript{90} What Hauschildt (1997) refers to as dismantling ‘barriers of unwillingness’.

\textsuperscript{91} Overcoming ‘barriers of unwillingness’ and ‘capability barriers’ is also covered within this study by the promoter model (Section 3.2.6) and its transformation to innovation management (see table 9, figure 8).
If one believes the argument that incremental innovation secures the revenues of today whereas radical innovation secures the future, the ability to manage the two types of innovation is crucial for the survival of a company. For this reason it is necessary as part of this study to consider how firms can effectively manage the mix of incremental and radical innovations. According to Galbraith (1982), ‘An organisation that is designed to do something well for the millionth time is not good at doing something for the first time’ (p.6); this means that the workflows of existing organisational forms geared to routine tasks must display a certain degree of flexibility when it comes to implementing radical innovations. As a rule, multiple organisational forms have to be incorporated to realise innovations (e.g. a new product). Implementing innovations involves treating them like projects (e.g. Bach and Buchholz 1997; Nightingale 2000) as if to say ‘each innovation is a project’.

The literature on organisational theory describes a variety of structural forms of organisational units (e.g. line organisation, matrix structure, project structure, teamwork, etc.) for being able to adequately tackle the demand for flexible organisational forms for innovation management.

A number of authors deal specifically with structuring alternatives for Research & Development (R&D) or New Business Development (NBD) units (e.g. Gassmann 1997), which often represent both the source and the coordinator of innovation activities. But as presented in the previous section, R&D, TM, PM etc. carry out a subset of Innovation Management activities and the tasks of an innovation management unit (InMU) go beyond the scope of such units (e.g. are ‘fuzzy front end’ activities the domain of innovation management).

The identified lack of a clear demarcation of the spectrum of tasks of InMUs is also reflected in the lack of a presentation of structuring alternatives for InMUs in the literature.

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To fill the gap, corresponding structuring approaches, such as a differentiation between corporate and divisionally aligned R&D or NBD units, are useful for describing the role comprehension of InMUs for further appraisal - ideally in the context of Telco’s.

3.5.2 Structural Approaches to Innovate with Limited Duration

In general, organisational units are arranged around tasks and activities within an enterprise. Even if much of the innovation management literature continues to search for the ‘one best way’ to innovate, it comes as no surprise that, in principle, a company has numerous organisational options for promoting innovation activities, although they are subject to a number of conditions.

Mintzberg for one, works on the assumption that a series of situational factors influences the choice of strategy (Mintzberg and Waters 1985) and corresponding structural design parameters (Mintzberg 1979). Thus his ideal configuration of organisation is based on the hypothesis that the older and the larger the organisation, the more formulised its behaviour; the larger the organisation, the more elaborate its structure; the more regulating the technical system, the more formulised the operating work and the more bureaucratic the structure of the operating core; the more dynamic the environment, the more dynamic and the more decentralised the structure; the greater the external control of the organisation, the more centralised and formalised its structure (Mintzberg 1979, p. 338).

When selecting the appropriate organisational form, it must initially be clear whether innovation is to be presented as a short-term activity with a limited duration, or as a sustainable task in the long term. Different organisational types were thus able to be identified in various empirical studies and these can be classified, for instance, according

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93 E.g. Gassmann (1997); Hauschildt (1993); Jermakowicz (1978).
94 The term “organisation” in this context designates both the procedure of structure creation for ‘goal oriented control of the activities in a social system’ with multiple members (functional organisational term and the social entity institutional organisational term), see: Laux and Liermann (1993, p.3).
95 Mintzberg’s ideal types with different coordination mechanism and degree of decentralisation are: entrepreneurial, machine, professional, innovative (‘adhocracy’), missionary and political organisation (see: Mintzberg, Quinn et al. 1998, p. 347).
to Tebbe (1990, p. 286) on the basis of comprehensible criteria such as duration (limited or lasting) and the time requirements (part-time or full-time). In this context, one structuring form that is frequently found in enterprises, i.e. project management, can be allocated "as a full-time activity to a limited duration project".

In the event of a short-term innovation activity\textsuperscript{96}, which may possibly even be understood as a one-off task (regardless of whether it is incremental or radical), an organisational form must be selected that can accommodate the requirements for rapid constitution and closure. Lowin (2002, p. 46) summarised the results of earlier work / authors on ‘Organisational forms oriented to one-off projects’ as follows:

- Specialist department model: accountability for a specific innovation project remains within the specialist department primarily affected. Project management is congruent with the respective department management. The hierarchical structures conform with the corresponding departmental structures.

- Staff model: the project management accountability is assigned to a neutral body without decision-making competence in everyday business. The tasks of such a staff body are concentrated in the fields of moderation and information.

- Project-oriented line model: this model focuses on the creation of a project group whose members are assigned to a project task on a long-term basis and commence new projects upon conclusion of the individual projects.

- ‘Task force model’: this model involves the establishment of a special-purpose group that is assigned with handling a specific project task regardless of the other activities of its members. After conclusion of the project, the members assigned from the individual company units return to their original activities.

- Matrix project management: this case involves a model that combines (project-specific) tasks with functional and divisional specialisations. It deviates from the classic model insofar that one-dimensional hierarchies are intentionally avoided, leading to a situation with at least two superiors (specialist superior and project manager) with differing fields of competence. Conflicts are consciously accepted, as the activities are generally short-term in nature (cf. Nebe (2000, p.10); Hauschildt (1997, p.86)).

\textsuperscript{96} This study does not focus on short-term, temporary approaches. Therefore, these are only briefly covered for the sake of completeness.
In the case of ‘one-off project’ approaches involving, for instance, cross-functional R&D or project teams\(^97\), it is important to bear in mind that these represent only a temporary solution to an organisational deficit and will result in a need for the present organisational structures to be revised when implementing innovation activities aimed at pushing radical innovation as a regular task – which is difficult to create and costly to adjust, especially for large companies (Nelson and Winter, 1982). Therefore, greater importance within the context of this dissertation is placed on a continuous and systematic promotion of innovation activities with radical character via innovation supporting organisational units implemented specifically for this purpose over the long term, i.e. the Innovation Management Units (InMUs).\(^98\)

### 3.5.3 InMUs - Structural Response to Innovate as a Permanent Task

The question of which types of organisations represent the optimum solution to foster innovation activities is a frequently discussed issue within organisational research, although common sense dictates that there is ‘no best way’ to organise due to the wide range of different influencing factors. A lot of principal requirements regarding an organisational structure that fosters innovation can be derived from the literature (e.g. Galbraith (1982, p.24) or Wind (1982, p.474)).

Nevertheless, when appraising structural approaches to a continuous and systematic promotion of innovation activities via innovation supporting organisational units that are not time-limited, the fundamental consideration always arises at the beginning of the search for suitable innovation structures and general structuring possibilities. As already described, two fundamental approaches towards a so-called ‘systemic view’ on

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\(^97\) Which, according to Barczak (1995), seems to be a widespread form of organising new business development efforts in the TC environment, in particular.

\(^98\) Therefore, reference is made to Gmeiner (1997), Lowin (2002); Scigliano (2003) et al. for discussions regarding project-oriented organisational forms in the innovation process.
innovation\textsuperscript{99} are represented in the literature; on the one hand, designing the overall organisation to be more innovative and, on the other hand and frequently called for in the case of radical innovation, separating the innovating organisation from the routine organisation.

In this context, the literature calls for close interaction with the routine organisation to be aspired to in the case of radical innovations (e.g. Dougherty and Hardy 1996), which, according to Chandy and Tellis (1998), also includes a ‘willingness to cannibalise’\textsuperscript{100}. This gives rise to the question, particularly for large enterprises, of how to resolve this area of conflict on the organisational level.

First of all, a strategic key question needs to be answered; whether innovation activities should be conducted with own resources, or whether they should be outsourced to specialised external service providers. Due to the high strategic importance of innovation for the success of a company, certain risks are yielded by outsourcing the innovation tasks themselves, and especially the R&D activities. The company thus assigns the option of dynamic influence within an early process-phase in the innovation process. For instance, a clear task assignment with defined expectations regarding the result must be transferred in the event of external implementation, which usually rules out any further changes. And this in a phase characterised by discontinuity, changes and high risks.

Integrating the innovation activities within a company’s own organisational structure is thus more viable both from the strategic point of view and in light of corporate policy aspects. Consequently, one key question is when should companies organise for innovation by using separating (or virtual) approaches, and when should they rely on internal organisations?

\textsuperscript{99} In addition to a systemic view on innovation (e.g. represented by the mechanistic / organic management approach of Burns and Stalker (1966), approaches can also be found that are based on an individual / ‘Hero’ approach, i.e. Greenfield / Entrepreneurship approach, respectively.
For such a decision, different aspects need to be considered. For example, Chesbrough and Teece (1996) suggest determining the organisational form depending on the innovation in question. Some innovations are autonomous – that is, they can be pursued independently of other innovations - while others are fundamentally systemic, i.e. their benefits can be realised only in conjunction with related, complementary innovations (Chesbrough and Teece 1996, p.67).

Other authors, such as Christensen and Raynor (2003, p. 204) offer a framework built on the well accepted ‘resource-based-view’ of Wernerfelt (1984) to help managers to decide when they should create or acquire current organisational capabilities and when they should create or acquire new capabilities to launch a new-growth-business.

<table>
<thead>
<tr>
<th>Organisational positioning</th>
<th>Create new organization</th>
<th>In existing organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not aligned</td>
<td>D</td>
<td>A</td>
</tr>
<tr>
<td>• Disruptive innovation,</td>
<td>• Sustaining innovation,</td>
<td>• Sustaining innovation,</td>
</tr>
<tr>
<td>organisation, values,</td>
<td>organisation and</td>
<td>organisation and</td>
</tr>
<tr>
<td>and processes</td>
<td>values</td>
<td>values</td>
</tr>
<tr>
<td>• Disruptive processes</td>
<td>• Sustaining processes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organisational values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aligned</td>
</tr>
<tr>
<td>Not aligned</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>A</td>
</tr>
</tbody>
</table>

Source: Godell (2004, p.13); inspired by Christensen and Raynor (2003)

Figure 10: Innovation Type and Fit with Organisational Capability

Depending on the factor, how the new innovation project fits within the organisation’s processes, the organisation’s values (disruptive or sustaining), the organisation’s structure (whether autonomous organisation is required, or whether mainstream organisation should be responsible) and the structure of the development teams

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Of assets or organisational processes. Internal markets, product champions, and future market focus are organisational factors that increase willingness to cannibalise. Non-innovators, however, are unwilling to cannibalise; Chandy and Tellis (1998, p.15).
(functional organisation or teams), a decision has to be made concerning the way to realise the innovation (Christensen and Raynor 2003, p.191) – in Cases A & B within the existing organisation, in Cases C & D by creating new organisations (e.g. new SBU's).

Common to all of such approaches, the chosen organisational form depends on the (existing) internal structures, procedures, processes, decision-making and reporting channels, etc. of the existing organisations and is - last but not least - a strategic decision of the management.

The assignment of sub-projects with the aforementioned closely defined freedom of action and a very limited timeframe remains unaffected in this context, and even makes sense when appraising the resource-oriented aspects alone. Sharma (1999) and others suggest that, in big firms where wholesale changes in the existing routines and systems are not possible, innovators should be quarantined in specialised parts of the firms (e.g. ‘new venture’ divisions or ‘incubators’). They work on the assumption of a separation of the operating units by breaking the firm into small autonomous pieces (see also Fairlough 1994) and imitate the action-oriented model of entrepreneurial start-ups to encourage individual initiative through greater autonomy and sharp incentives and eliminating cumbersome bureaucracy.

According to Vahs and Burmester (2005, p. 304), the advantages of such innovation management integrated in a company organisation can be found particularly in the exclusiveness of avoiding undesired diffusion of knowledge, extensive control over the entire innovation process and independence vis-à-vis third parties. At the same time, however, the disadvantages must also be managed, such as problems in balancing deficits in competence, resource limitations and possibly increased financial expenditure.

The issue of the principal design components for the structural implementation of an innovating organisation must now be addressed. It is generally accepted that ‘innovation
requires an organisation specifically designed for that purpose… (because) ... an organisation's structure, rewards and people must be combined in a special way to create an innovating organisation, one that is designed to do something for the first time’ (Galbraith 1982, p.6).

As already illustrated in the preceding sections, the literature offers a broad spectrum of aspects and, thus, potential design components for innovative organisations. In this respect, for instance, Tang (1998, 1999) identifies the elements structure, processes, organisation, culture and environment as being fundamental subject fields for improving innovation capability. Galbraith defines an innovating organisation via the tasks, structure, processes, reward systems and people (Galbraith 1982, p.10) and recognises and formalises the roles, processes and people practices that lead to innovations. However, these approaches aim at the overall structure of an enterprise and fail to provide any answers as to how the role comprehension and thus the structures within an enterprise should be designed, especially those areas that promote innovation, such as InMUs implemented expressly for that purpose.

In principle, it can be assumed that all units of the company (should) contribute to the innovative capability of the company. Added to this is the fact that organisational forms are often realised based on a ‘stage-gate approach’ (so-called process organisations), especially in the case of companies operating in a market characterised by a high degree of innovative dynamism, such as the telecommunications sector (Bach and Buchholz 1997, p. 342). In turn, this process orientation influences the preferred implementation of innovations within such organisational structures. While the stage-gate approach benefits the promotion of incremental innovations, it does not necessarily represent a tried-and-tested solution for implementing radical innovations (as already detailed in the previous sections101).

101 Analogously to Cooper (2001): the stage activities are different, the Go / Kill criteria are very different and the deliverables and knowledge certainly will be different.
Therefore, deriving suitable structuring forms for radical innovations should be based on a task appraisal instead of a process appraisal. The literature describes a model for mature organisations that aims at the coordination of those tasks that are necessary for the implementation of radical innovations, i.e. the ‘(radical) innovation hub approach’\textsuperscript{102}. Authors such as Leifer et al. (2001) stated that the greatest opportunity for enhancing the possibility of radical innovation success will be by expending energy on managerial resources and organisational uncertainties – factors which are in fact under managerial control. The idea behind the innovation hub approach is to oversee and help nurture projects by reducing uncertainty without increasing bureaucracy.

According to Leifer (2003, p. 17), a ‘radical innovation hub’ (RIH) is a natural ‘home base’ for all those who play pivotal roles in making radical innovation happen – radical innovators, idea hunters and gatherers, internal venture capitalists, members of evaluation and oversight boards and corporate entrepreneurs. The following figure is a graphic representation of a ‘radical innovation hub’ and its links.

Figure 11: Radical Innovation Hub

\textsuperscript{102} Innovation hubs are organisations with separate structure, culture, processes.
The RIH takes responsibility for ‘fuzzy-front-end’ functions and helps to foster radical projects that emerge intact from initial evaluation. In accordance with Leifer et al. (2001), the innovation hub can help to generate ideas, monitor and redirect innovation projects, can facilitate resource acquisition, can smooth the transition process, mobilise the multiple roles of promoters and champions and can be an instrument to develop a mature ‘radical-innovation capability’.\(^{103}\)

The hub is located at the interface between the individual ‘radical’ innovation project and key internal stakeholders (includes various operating units, R&D and senior management) and external stakeholders (includes early adopter partners, manufacturing, technology-development and funding-partners). If the tasks that are realised in this RIH are compared (e.g. articulating of strategic intent to modulate the level of radical innovation activities, implementing techniques for stimulating idea generation, acting as home base for hunters and gatherers and as the ‘receiver’ for radical innovations, helping champions to articulate the opportunity, conversing the evaluation panel, coordinating the idea evaluation etc. (Leifer et al. 2000, p.51), they correlate significantly with those derived from the literature for innovation management (see: Table 10 on page 89).

Responsibility for developing innovation options (e.g. innovative products) and/or promoting innovation activities is assigned to a specialised department in the majority of companies: the Innovation Management Unit (cf. Pleschak and Sabisch 1996, p. 271). An Innovation Management Unit (InMU) is synonymous for the structural implementation of such activities within an enterprise and responsible for the coordination and implementation of the innovation-related measures.

Consequently, an InMU represents the organisational realisation of a radical innovation hub (RIH) and must therefore also be suited to fostering radical innovations. It thus

\(^{103}\) Radical innovation maturity comes when an organisation has systematically implemented processes and structures for initiating, supporting, and rewarding radical innovation activities.
becomes evident that the analysis of the role comprehension of InMUs as an instrument to promoting radical and/or incremental innovations represents a contribution to current ‘innovation hub research’ within the framework of this thesis.

Now that the link between ‘innovation hub approaches’ as an instrument for radical innovations and Innovation Management Units has been established, the question must be posed as to how such InMUs can be structurally mapped within an enterprise. Practice has shown in this context that InMUs can principally have a large number of different formal ‘titles’ or names. However, how these units are ‘officially’ designated does not play a role\textsuperscript{104}. The designation as R&D, Product Management or New Business Development, etc. is irrelevant: the decisive factor is the core functions and functionalities actually realised in terms of innovation management activities (see: Table 13 on page 96; Figure 9 on page 97). These factors decide whether or not the unit involved is actually an InMU. To turn the argument on its head, this means that it is possible that units which have the term ‘innovation’ in their title are not necessarily considered as InMUs in the sense of this thesis.

The gap that still exists between the tasks and the role comprehension of innovation management also persists in the corresponding literature concerning approaches for structuring Innovation Management Units. In principle, it can be said that in the case of large companies and groups with a divisional structure, the organisational positioning of an integrated innovation management solution is most commonly found within a central unit, or a partially or completely decentralised unit. However, corresponding studies (for further references it is referred to Hauschildt (1997, p. 97) or Vahs and Burmester (2005, p. 321) reveal that pure centralisation or decentralisation approaches are rare in reality, with most concepts being realised as hybrid forms:

\textsuperscript{104} See also the discussion of the case study selection within the methodology chapter.
When integrating InMUs in divisions, a further partitioning of the InMUs within the divisions (or SBUs), e.g. corresponding to product groups, is not usually viable due to a high degree of product diversification, or because the general product characteristics do not correspond to the requirements of a clearly derivable organisational structure (Dickgreber 2002, p. 347.). It can thus be determined that although it is already known that InMUs may manifest in corporate / divisional or hybrid form, precisely which concrete core functions and role comprehensions these corporate / divisional InMUs take in terms of radical innovations remains uncertain – an aspect that will be clarified within the scope of this thesis.

3.5.4 Innovating Organisation – How to Measure Success

According to Mintzberg (1979), tackling structural approaches to innovations also includes the issue of coordinating with the help of corresponding planning and control systems. Ultimately, this also permits conclusions to be made regarding the value contribution and performance of individual activities, or indeed entire organisations. This
aspect is important because - as mentioned before - innovation is one, if not the factor for success. Some studies showed that successful innovating firms were more likely to generate growth rates of 20% or more (Kuczmarski 2000) compared with less successful ones. But when we look at innovation in companies, one question and dilemma is closely linked with it: how can the success of innovations, and the innovativeness\(^\text{105}\) of a company or an organisational unit (e.g. an InMU) be objectively determined and measured? This aspect is also of substantial importance when analysing the cases to determine the extent to which the innovation capability, or the efficacy of an organisation's innovation promoting measures (and the success of InMUs), can be assessed on the basis of corresponding criteria in practice.

Cohen and Levin (1989) stated that there exists no measure of innovation that permits readily interpretable cross-sector comparison. In other words, the context of an organisation plays a decisive role in terms of assessing the capability to innovate. This statement also correlates with the assessment of studies that cover the 'effectiveness of organisations'. According to these, it has been shown that there are obviously no objective but only socially constructed measures for quality and effectiveness of organisations.

For example, Bryman (1995, p. 233) argues that different stakeholders of the organisation, such as top managers, customers, shareholders, etc. may have different concepts or models of an organisation's goals and criteria of its effectiveness. Consequently, there is not just one concept of an 'effective organisation' and therefore not just one concept of an 'effective innovative organisation'. What might be considered as 'innovative' in one context, might not necessarily be considered as 'innovative' in another one; or what might be considered as 'innovative' from a single organisational unit

\(^\text{105}\) 'Innovativeness' is most frequently used as a measure of the degree of 'newness' of an innovation (Garcia and Calantone 2002, p.112); for a general introduction to 'Measurement of Innovativeness': see Goldsmith and Foxall (2003).
perspective, might not automatically be considered as ‘innovative’ by other organisational units.

Moreover, the value of an innovation is difficult to assess, particularly when innovation is embodied in consumer products (Griliches 1979). Despite these difficulties to find objective measures for effectiveness, a variety of measures of innovation have been employed in empirical studies. They may be broadly classified as measures of either innovative inputs or outputs. For example, ‘patent counts’ have been used most frequently as an indication of the innovative output of firms or sectors (Cohen and Levin 1989). However, there are significant problems with patent counts as a measure of innovation; for example, the great majority of patents are never exploited commercially, and only a very few are associated with major technological improvements. Most commonly, innovation effort is measured by ‘expenditure on R&D’ or by ‘personnel engaged in R&D’ (Cohen and Levin 1989), on the hypothesis that R&D is regarded as ‘the’ germ cell for innovations and that there is a causal relationship between R&D spending and innovation. But what about all the companies that simply have no formal R&D?

It seems likely that a single measure, or only a few non-specific measures that do not reflect corporate concerns, will not be sufficient to produce a valid conclusion, to say nothing of their suitability as a management tool for innovation within an organisation. It is then even harder to determine the innovative capacity of organisational units. As InMUs are involved with forward-looking issues that only show an impact after a relatively long time, this aspect of the generally short-term, operationally–oriented management of a company is especially significant. In terms of research into success factors, Billing (2003) postulates that …
‘... the causes of success [note: in relation to innovations] cannot be directly demonstrated, and investigations in this area can only help to identify possible causes of success’ (cf. also Haenecke 2002).

This means that aspects of success and failure research in promoting innovation may be useful as indicators of e.g. organisation structures liable to promote innovation (e.g. InMUs), but that they are not suitable for direct measurement of the innovativeness of a company or organisation, or even as a monitoring or management tool for innovation activities. Although the use of these indicators that are based on tried and tested tools is thus necessary for ‘operational implementation’ and for the controlling and steering of innovation activities or organisational units (such as InMUs) e.g. via Balanced Scorecards, their use is also limited to this specific application.

Due to the reasons described above, and a typical time-to-market for radical innovations of two years and upwards, as well as the fact that a number of players contribute to the realisation of radical innovation by the time of market success, it seems to be neither possible nor practicable to measure or appraise the output of an Innovation Management Unit in an objective way, e.g. in terms of delivering ‘x’ number of radical innovations. Indeed, reliable evidence of the effectiveness of InMUs as an appropriate instrument to foster radical innovation could be assumed when product ideas or business models initiated or generated by the InMUs could subsequently be discovered as innovations on the market.

The same phenomenon can be observed in the literature, where different definitions of organisational effectiveness have been proposed. Pfeffer and Salancik (1978) define the ‘effectiveness of an organisation’ as ‘the ability to create acceptable outcomes and actions…the external standard of how well an organisation is meeting the demands of the
various groups and organisations that are concerned with its activities. ...(but)...the effectiveness of an organisation is a socio-political question.\textsuperscript{106}

A definition of ‘organisational effectiveness’ as a ‘socio-political question’ then leaves open the option of basing an assessment of how effective an organisation is on the extent to which this organisational unit is still regarded as necessary, e.g. after a restructuring exercise, and whether it is carried forward into the new organisational model. However, this viewpoint alone would limit us to purely subjective arguments for the ‘success or failure’ of an organisational unit. Pfeffer und Salancik (1978) therefore also acknowledge that decisions on the ‘effectiveness of organisations’ are mostly economically motivated. Other more objective criteria for the success of an organisation must therefore be found, in order to minimise the risk of dependence on third parties – even when one has to assume that many factors can have an influence (positively or negatively) on organisational results (Redshaw 2000).

Such an approach implies considering the organisation as an active, deliberate, rational and goal-seeking system; it is then natural to argue that successful goal accomplishment is an appropriate measure of effectiveness (Perrow 1970; Steers 1975; Cameron and Whetten 1983). In his review of 17 multivariate models of organisational effectiveness, Steers (1975) concludes that little consistency in the evaluation criteria of the models was found and suggests that future work should focus on operative goals and goal optimisation. In a later study, he proposes that a success measure is only workable if it has been quantified, or at least standardised in some way (Steers 1988). The conclusion then is that objectives – and success measures - must be quantifiable (Cozijnsen et al.

\textsuperscript{106} In contrast, ‘organisational efficiency’ is defined as ‘an internal standard of performance,…and is measured by the ratio of resources utilised to output produced. Efficiency is relatively value-free and independent of the particular criteria used to evaluate input and output. Because efficiency involves doing better what the organisation is currently doing, external pressures on the organisation are often defined internally as requests for greater efficiency’. Pfeffer and Salancik (1978).
2000) – especially where one is trying to evaluate organisations like InMUs. But the question is still, how?

A study of Subramanian and Nilakanta (1996) shows that substantive relationships do exist between organisational factors, organisational innovativeness and organisational performance. However, these relationships are complex and - in their view - can only be detected if innovativeness is measured as a multidimensional construct. In addition, the results must be viewed with caution because there are some limitations due to the inherent complexity, thus rendering them not unconditionally applicable for practical use.

A further approach suggested by Rangone (1997) makes a link between ‘organisational effectiveness’, ‘key success factors’ (KSF) and ‘performance measures’ . This provides management with a framework for setting the planning and control function, and ultimately also the assessment of the performance of organisations, on a more comprehensive basis, using quantifiable factors in the form of key performance indicators (KPIs). The figure below shows the relationship between effectiveness, KSFs and KPIs.

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**Figure 13: Hierarchical Structure of the Organisational Effectiveness Problem**

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107 E.g. the reliability of instruments used to measure organisational factors must be validated instruments.

108 KSFs are those factors that are critical for the well-being and success of the company in a given industry. (Rangone 1997).

Based on this structure, it is clear that an objective assessment of ‘organisational effectiveness’ requires quantifiable criteria that can ideally also be deployed as a monitoring and control tool. It is also recognised that these indicators must be specifically tailored to the needs of the company or the organisation. If these criteria are set to reflect the needs of innovative organisational units (e.g. InMUs, NBD units etc.), it is possible to assess the ‘innovativeness of organisations’ via ‘hard factors’, such as ‘increased output from innovations’. Some innovation objectives are relatively easy to quantify, e.g. objectives like increased turnover, profits or productivity; other innovation objectives are much more difficult to quantify (e.g. atmosphere, changes in power balance, etc.).

However, all approaches need suitable parameters to enable an operationally oriented management to control or monitor innovation activities\textsuperscript{110} and ultimately to evaluate an organisation (more) objectively in terms of its innovation output. It is therefore necessary to identify and implement suitable innovation-specific indicators.

There is a German saying that tells us: ‘Nothing will happen if it hasn’t been measured.’ This is where innovation-specific indicators, the so-called ‘Innovation Key-Performance-Indicators (KPI’s)’ come in. As such indicators are sector-specific – sometimes even company-specific – it can be seen that the economic literature offers a wide range of different indicators, which are however used by some companies only, and in varying numbers and levels of detail.\textsuperscript{111} This may also reflect the fact that the literature is predominantly based on studies of innovation indicators relating to the manufacturing industry\textsuperscript{112}. Because of their set up and product range, telecommunications companies do not fall under the manufacturing industry category, but rather under ‘service providers’, where innovation indicators specific to the service provider sector are still scarce (c.f. Blind et al. 2000; Evangilista et al. 1998; Djellal and Gallouj 2001).

\textsuperscript{110} E.g. to integrate in a Balance Scorecard – as Bremser and Barsky (2004) stated ‘a very useful process and method to cascading objectives across organisational levels to promote integration and alignment’ (p.233).

\textsuperscript{111} See also e.g. Brockhoff (1999); Brown (1997); Siegwart (1998).

\textsuperscript{112} Cf. Drachsl (1999); Hännel, Radke et al. (1994); Schmelzer (1999) and / or focusing exclusively on R&D cf. e.g. Bremser and Barsky (2004); Kerssens-van Drongelen (1999); Singer (1994).
Before 2001, there was no scientifically based innovation indicator scheme for Telco’s. To close this gap, the ‘Benchmarking of Innovation Indicators’ project run by Deutsche Telekom together with the ‘Fraunhofer Institute of Systems Technology and Innovation Research’ produced an (unpublished) ‘Manual of innovation indicators’ (Deutsche Telekom 2001), which has been constantly updated and today contains corporate and division-specific innovation indicators used to control and monitor innovation output. The major innovation indicators here are ‘time-to-market’, ‘innovation rate’, ‘number of market launches’, ‘invention rate’, ‘number of patents’, ‘innovation expenditure’ and ‘new product share in revenue (1 year)’. An overview of major innovation key performance indicators for Telco’s are set out in the case analysis section 6.3.3.

As with all indicators, the logic underlying these has a number of weaknesses of a conceptual or administrative nature. For example, according to the definition, an increase in the ‘innovation rate’ – an indicator used by external analysts to assess the innovativeness of a company – may be produced by a decrease in total turnover(!).

Another problem of definition is the question of what specifically is meant by an innovative product (see also Section 3.3.4 on ‘Radical Innovation in the Field of Telecommunications’), and what proportion of turnover contributes to determining the innovation rate (at DT e.g. a monthly turnover > EUR 50,000). In order to eliminate differences of interpretation and (possibly intentional) manipulation, several indicators should therefore be defined and taken into account when making an assessment. In conducting a benchmarking exercise with other companies, it is essential to question what specific data has been incorporated in determining the indicator.

The type of data capture (automated or manual) also represents a problem for data quality and interpretability. In addition to the observations of Kerssens van Drongelen et

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\text{Innovation rate: } IR = \frac{\text{external turnover of products brought in to the market in the last 3 years}}{\text{total external turnover}} \times 100\% \text{ in percent.}
\]
al. (2000), that ‘few authors actually discuss for which functions the measurement approaches they present have been found useful, or are expected to be useful’, some indicators may also be described in theory, but be impossible to capture in practice. For example, it is possible to ascertain how much Deutsche Telekom spends on R&D, but if we wish to know how much of this is spent by internal R&D units, the question cannot be answered, as the DT internal accounting logic and IT-systems cannot provide this information. Frequent reorganisations with changes to processes, contacts, etc. also makes it difficult to derive stable indicators over longer periods of time.

Therefore, it can be concluded that the literature and research examined the organisational determinants of innovation adoptions and the effect of innovations on organisational performance and innovativeness and have delivered no conclusive findings on how innovation can be measured in an objective way. But the foregoing notes show that, at least in principle, innovation indicators do constitute a tried and tested means of determining innovation output, of monitoring and controlling innovation activities, and ultimately of producing a more objective assessment of the innovativeness of an organisation. However, they may differ in meaning between different sectors, and need to be defined at a sector-specific level. In general, when innovation indicators are used, for instance as indicators of the innovativeness of organisational units, they must be examined very carefully. In this context, the description and definition of the indicator, the scale and standard used, the data sources and changes over time all play an important role. This is especially true of benchmarking together with other companies – particularly across sectors.

As (Subramanian and Nilakanta (1996) correctly note, ‘Innovativeness, by definition, is an enduring organisational trait. Truly innovative organisations are those that exhibit innovative behaviour consistently over time. Any valid measure of innovativeness must, therefore, capture this temporal dimension of innovativeness’ (p.633).
It can therefore be assumed that the innovativeness of organisations or InMUs, which are in a volatile environment with short reorganisation cycles, cannot solely be assessed independently of the achievement of certain KPIs. However, ‘the categorisation of an organisation as innovative or non-innovative depends on the definition of innovativeness by the researcher’ (Subramanian and Nilakanta 1996, p. 632), and, in relation to a company, this means that such an assessment, however powerful, constitutes a subjective management decision and ultimately a ‘socio-political’ decision. The question that arises in connection with this study is what role such indicators have to play in InMUs. Who defines them, and are they used for decision-making, especially in relation to assessing the ‘success’ of organisational units such as InMUs? Aspects which will be investigated in the case analysis section of this work.

3.5.5 Lessons-Learned from Success and Failure (S&F) Research

Since the beginning of the 1970s, empirical research into the success of technological innovation processes (empirical innovation research) has attracted major interest, which has a tendency to grow during periods of economic weakness (c.f. Arnold 2003). Morris revealed that just 8 percent of new product projects at major companies (food industry) survived to reach the marketplace – an ‘internal mortality rate’ of 92 percent. And of the 8 percent actually rolled out, only 17 percent achieved their major objective (Morris 1993).

Unsurprisingly against this background, there have been many attempts over the last 30 years to discover the critical factors that can indicate the success or failure (S&F) of R&D, innovation projects and new product launches. According to Jensen and Harmsen (2001, p. 37), more than 200 studies have been carried out in various industries, geographical settings, and also with various methodological approaches, all sharing the objective of understanding new product success and failure and deriving normative implications for
companies, with a corresponding abundance of identified significant factors. The question within this study is if requirements result from the S&F research in the structural design (e.g. core functions, organisational connections, etc.) of such units and, if so, what requirements are they. Looking beyond these structural appraisals, insights from the S&F research can assist the identification of potential influencing parameters, as well as the design of this research, e.g. as regards the design of the interview questions, the aspects to be considered within the analytical part, etc.

As demonstrated by Lilien and Yoon (1989)\textsuperscript{114}, it is in principle possible to divide up S&F studies into approaches that analyse only determinants of successful innovations, approaches that are concentrated on unsuccessful stories and approaches that analyse the differences between successful and unsuccessful innovations and derive relevant success factors. However, based on the extensive and varied S&F literature, it can be stated that no simple conclusions or ‘if-then’ relationships can be derived using the philosophy 'If I implement these selected factors, then my company will become more innovative and successful'. The fundamental reasons for this are as follows:

First, by looking more closely at the vast amount of results from the studies\textsuperscript{115}, one rapidly encounters a problem already addressed regarding the range of the ‘flop rate’: there is no single success factor, or a few success factors, that clearly shows us what needs to be done in order to be innovative and successful – there are only indicators (no facts), which are set in a particular context and which consequently have to be viewed as such. The reason for this is obvious. Rothwell (1974) emphasised as exemplary for the outcome that successful innovation requires organisations to build and coordinate capabilities across all functions. He stated that there are no examples of successful innovators being

\textsuperscript{114} Starting with the first empirical research - the aim was to undertake a comparison between successes and failures of the English Projects SAPPHO - confer Rothwell, Freeman et al. (1974) and Canadian Project NewProd (cf. Cooper 1979).

\textsuperscript{115} For an overview of the range of possible factors c.f. meta-analyses e.g. Johne and Snelson (1998), Klosterkamp (1996), Lilien et al. (1989), Lee and Na (1994), Balachandra et al. (1997) or (Cooper 2005).
focused on a single factor. Success is a function of competence in all functions and of balance and coordination between them, instead of just doing one or two brilliant things (Cooper and Kleinschmidt, 1988).

Second, there are no clear standardised approaches according to which the S&F failure factors can be analysed and classified unambiguously. By using a somewhat different focus (innovation type, sector, company size, etc.) and different methodology, each study provides results that are useful but sometimes inconsistent with, or even contradictory to, the results of other studies\textsuperscript{116}. Due to the complexity of innovation itself, as well as the process and its environment, innovation is subject to a wide range of controllable and uncontrollable influencing factors (Billing 2003). Furthermore, the causes of successful innovations are ‘not directly provable’ according to Haenecke (2002).

Although the activities of an InMU can be viewed as important parameters that significantly influence the success of an innovation, possible success cannot be explained completely (see also section 3.5.4 ‘Innovating organisation – how to measure success’). Analyses in this respect can only identify possible causes of success, and cannot be used as conclusive findings. Some contributors, e.g. Lewis (2001), even go so far as to say that ‘exploring the proposition that it is the complex, unique ‘aspect’ of an organisation that creates long-lasting advantages suggesting that it might be theoretically inaccurate to try and identify common (i.e. across multiple firms) success factors. Likewise, because the sources of competitive advantage are often unobservable firm ‘attributes’ (i.e. complex relationships, skills, experience, etc.) it is methodologically problematic to expect large-scale survey instruments to access such fine organisational details’ (p.185).

\textsuperscript{116}E.g. Balachandra et al (1997) pointed out contradictory results in major findings; meaning that some studies attest to positive effects and some studies attest to negative effects for one and the same aspect or factor.
Finally, most of the S&F research literature and - consequently - S&F factors arise within the context of incremental innovations. As discussed in the previous sections, radical and incremental innovation approaches differ from each other, as do the implementation type and approach. A factor making the description of InMUs’ tasks more complex is that these tasks cannot be drawn upon selectively and exclusively for radical innovation approaches, and instead are also drawn upon for promoting incremental innovation approaches. For example, Gemünden critically stated in his foreword on the work of Billing (2003):

‘An abundance of success factors and recommended action for innovation management is presented in the literature. This largely relates to incremental innovations. Radical innovations occur more rarely on the whole and, because of their complexity, pose extreme challenges for companies… In this work, a whole range of current success factors is disproved, emphasising once again that experience and the success factors of incremental innovations cannot be transferred to radical innovations directly.’ (p. 2)

Hence, the findings and statements can only be applied to InMUs – which can be dealt with using radical innovations of which there are only a few of interest for InMUs.

For example, the work of Lee and Na (1994) in summary shows that critical factors affecting the technical success of new product development seem to be the existence of champions, support of top managers, availability of required resources and communication between R&D and other departments. Lee et al. pointed out that these factors may not be exhaustive, but in their view they are inclusive enough but that there is no study that threatens the characteristics of technological innovativeness (radical versus incremental improvement) as a contingency variable. The results of their studies on this aspect show that the existence of a ‘champion’ is critical if the innovativeness is radical. Another indicator is even more important when innovativeness is radical (Lee and Na 1994, p.67), which confirms the ‘barrier’ discussion and the generic problems in
implementing such innovation (see Table 8 on page 69) in Sections 3.4.2 to 3.4.4 with empirical findings.

In the face of these limitations and a multitude of potential S&F factors, the statement can be derived that the following essential factors mentioned most frequently in studies of highly innovative enterprises must be taken into account by InMUs when designing their structural approaches (selection by author):

- Lack of future-oriented perspective (lack of vision & innovation strategy)
- A lack of innovation awareness on the part of top management
- Under-developed innovation know-how regarding methods/tools/procedures for steering the overall innovation process, from the generation of the idea, all the way to market introduction.
- No active and systematic search for new concepts, products and ideas
- No strategic innovation management, i.e. no organisational units that feel responsible for innovations
- Risk aversion by the management (risk versus safe advancement/career)
- Aversion to creativity/No pronounced culture of innovation

Table 15: Requirements on InMUs From the S&F Research Perspective

In brief, as displayed above, a multitude of factors that promote innovations must be taken into account by a structural approach (InMU) designed for fostering radical innovation. Even if no ‘if-then’ relationships can be derived, the above-mentioned factors determine and influence the core tasks and role comprehension of InMUs.

3.5.6 Summary and Conclusions

As the literature review has shown, there are a lot of structural options when it comes to ‘how to innovate’. A closer appraisal of the so-called ‘systemic view’ on innovation approaches suggests two principle directions to be derived for countering this problem on an organisational basis. Some writers referred to meeting the challenge to be innovative by reorganising the existing organisational structures, while others call for an independent
organisation with unique structures, information and decision processes – a call that is expressed especially against the background of large organisations, turbulent environments and the particular challenges of radical innovations. However, these requirements for separation - all the way to a complete split from the 'parent organisation' - contradict numerous empirical findings (e.g. VDI-Nachrichten 2001), that call for close connection to the core organisation for the promotion of radical innovations. This challenge is of particular importance for large, mature organisations within the scope of the restructuring activities associated with their reorientation.

The main focus of the analysis in this chapter was a review of the literature on the organisational aspects of managing innovation and the role comprehension of innovation management and InMUs. In addition, the issue of how to measure innovation activities as well as lessons learned from the S&F research were addressed.

Based on Burns and Stalker’s (1966) pioneering work of the 1960s in the field of organisation and innovation management (“M-O”-Paradigm), there is a plethora of literature on managing innovation, which has to date tended rather to address ideal approaches to the organisational shaping of 'incremental' than 'radical' innovation approaches (e.g. Mintzberg 1979). According to these views, a company either manages to integrate the requirements essential for ‘radical’ innovation in the line organisation – although this represents a huge challenge specifically for large, mature organisations by reorganising the overall structures – or it tries to solve this dilemma using project-oriented organisational approaches. This does, however, represent more of a temporary solution over the medium term, and deep insights and thoughts regarding such ‘one-off project’ structures already exist (e.g. to innovate with teams: see Gmeiner 1997, Wheelwright and Clark 1993).
If, however, the pushing of more radical innovation in particular is to be understood as a regular function of the organisation and permanently anchored in the organisation, large, mature organisations in particular need to ask themselves what is the appropriate organisational structure. As already mentioned, the theory calls for a strict separation of radical innovation projects from the line organisation for the pushing of radical innovation (e.g. Galbraith 1982, Simon et al. 2003), although this does have disadvantages as well. Thus, Dougherty and Hardy (1996), for example, comment that new products are (normally) inextricably bound up with the rest of an organisation, so avoiding the connections is not a real solution. Therefore, the necessity for stability and simultaneous flexibility allows one to suppose that large companies, in particular, that have a high degree of innovation combine different organisational structures: on the one hand, structures with rigid tasks and areas of responsibility that adapt to changing environmental factors (market, technology etc.) by introducing reorganisation measures (which are not in the focus of this study); on the other hand, flexible structures that are able to come up with new ways of looking at (radical) innovations.

It therefore comes as no great surprise to realise that the 'innovation hub' approach has of late become the focus of interest as a generic approach for pushing radical innovation in particular, although no valid empirical statements regarding how best to organise are available yet. It has been demonstrated that considering InMUs as part of this work can also make a contribution to the ‘hub’ debate. Thus, among other things, the question of whether InMUs are appropriate for supporting the emergence of more radical innovations is critical in this context.

Analysing various different sources of literature made it possible to derive a comprehensive scope for innovation management (and hence potential InMUs), with a focus on the ‘fuzzy front-end’ of the innovation process and as a ‘mediator’ between different thought worlds of management in the area of tension between technology-push and market-pull. In addition, an ‘enabler’ function pursuant to the principle of:
'Do everything you can to ensure that the acorn has a chance to become an oak tree'

(which interestingly lacks a clear distinction in the literature in favour of either incremental or radical innovation).

This leads to the hypothesis that an InMU appears - in principle - to be ‘responsible’ and usable for both approaches, which raises the question of what the core functions and interactions of an InMU are in such an environment as a basis to clarify how InMUs (corporate and divisional) are used to foster more radical innovation in large, mature organisations. Drawing the boundaries with other management tasks (R&D, technology management, product management) made it possible to derive a role comprehension of innovation management and InMUs from the entrepreneurial viewpoint and against other management functions down to the task level. After the ‘what’, it was also possible to clarify the ‘why’ by demonstrating structuring principles for InMUs as a measure aimed at boosting the ability to innovate by reducing ‘functional barriers’.

The review of the relevant literature has shown that there is no objective way to measure the effect of innovations on organisational performance and innovativeness. In principle, however, innovation indicators (innovation KPI’s) constitute a tried and tested means of determining innovation output, of monitoring and controlling innovation activities, and ultimately of producing a more objective assessment of the innovativeness of an organisation. However, they may differ in meaning between different sectors, and need to be defined at a sector-specific level. Nevertheless, ‘the categorisation of an organisation as innovative or non-innovative depends on the definition of innovativeness by the researcher’ (Subramanian and Nilakanta 1996, p. 632), and, in relation to a company, this means that such an assessment, however powerful, constitutes a subjective management decision and ultimately a ‘socio-political’ decision.
As a key lesson learnt from the S&F research, it can be stated that due to several limitations, findings from S&F research cannot be viewed as ‘legitimate’ (if-then relation). Therefore they cannot be transferred 1:1 to other companies/contexts. However, they can be very valuable in order to derive essential factors mentioned most frequently in studies of highly innovative enterprises, which should be taken into account by InMUs when designing their structural approaches. Furthermore, these insights from the S&F research can assist the identification of potential influencing parameters, as well as the design of this research, e.g. in terms of the design of the interview questions, the aspects to be considered within the analytical part, etc.

The following section will now summarise the outcomes of the literature review and derive corresponding research questions.

### 3.6 Outcomes of Literature Review and Research Questions

In summary, the literature review showed that the innovativeness of organisations and the resultant outcomes - particularly product innovations - are generally accepted to be important to the overall success of a company. In general, various approaches on “how to manage innovation” and to foster the ability to innovate in this context can be found in the literature, including the more person-oriented, process-oriented and structure-oriented approaches. While person-oriented approaches focus on coordinating the interaction of individuals or groups (e.g. leadership, teams) and process-oriented approach focuses on minimising “capability barriers” (e.g. ‘stage-gate’ approach by Cooper 1983), structure-oriented approaches aim at “dismantling functional barriers” (Corsten 1989).

It was shown that ‘organisational structure’ can be understood as the primary driver of change by providing a framework for all organisational decisions and processes. Furthermore, authors such as Chandy and Tellis (1998) claim a need for future research into the management of the mix of incremental and radical innovation. Although there are
numerous studies (e.g. Jensen & Harmsen 2001) on success and failure factors in managing innovation, most of these have concentrated on incremental innovation aspects and only indicators could be identified with contradictory results. In a nutshell, much less is known about the effective management of product innovation in the radical context in comparison with managing incremental innovation (Variaktaris 1999). Therefore, the focus of this study is on such structure-oriented approaches to fostering radical innovation established expressly for this purpose.

Without wishing to reiterate the conclusions of the previous sections, the following key insights were gained from the literature review and certain gaps could be identified which are of conceptual significance when it comes to selecting researchable questions to be answered in the case studies:

- **Unifying innovation terminology makes results comparable.**
  The spectrum of ‘incremental’ and ‘radical’ innovation down to product level has been clarified. The introduction of the new term incremental and radical innovation in the telecommunication segment opens up the possibility of applying the insights and findings from this study to other fields or industries.

- **Organisational barriers are constraints to innovate.**
  Organisational inertia (Amburgey 1993; Hannan 1984; Kelly 1991), structured routines (Nelson and Winter 1982), absorptive capacity (Cohen 1990) and ‘persons and organizations prefer continuation’ (March and Simon 1958) are constraints to innovate and change.

- **Incremental and radical innovation needs different organisational forms.**
  Processes involving ‘doing something well for the millionth time…’ (Galbraith 1982), the need to be independent of individuals (O’Conner and Rice 2001), short-term financial orientation of management versus long-term run of radical innovation (Hauschildt 1997,
Hartmann 2004) and the ‘unwillingness to cannibalize’ (Chandy and Tellis 1998) or to replace existing products (Utterback and Kim 1995) call for different organisational forms to foster radical innovation.

- **Innovation culture - strong lever but difficult to influence operationally.**

Innovation culture (understood as a coherent set of values and practices) is a strong lever to boost the innovative capability of companies, but it is difficult to assess and actively design (Waters 2004).

- **Individuals are important to overcome organisational obstacles.**

Champions, promoters and top management, i.e. people who take a personal risk to overcome organisational obstacles to innovate (Shane 1994), are important (Schöne 1963) - especially for radical innovation (McDermott and O'Conner 2002). The importance of promoters in a Telco environment was confirmed by Barczak (1995). The tasks and role comprehension of InMUs were determined by linking the promoter approach of Witte (1973) with the innovation process (Hauschildt 1997; Gemünden 2002).

- **Innovation management function (InM) responsible for fostering innovation.**

The utmost goal of innovation management is to ensure a high degree of innovation capability by providing suitable instruments to generate, implement and steer innovation options – also called “idea management” (Deschamps/Nyak 1995) or “fuzzy front end” management (Smith and Reinertsen 1991). A set of ‘tasks and objectives’ of innovation management and ‘role comprehension’ versus other management functions was derived. This must be empirically validated.

- **Innovation Management Units (InMUs) - structural response to innovate as a permanent task.**

In general, big firms should integrate innovators – persons responsible for developing innovation options - in specialised departments (Sharma 1999), i.e. Innovation
Management Units (Pleschak and Sabisch 1996). The concrete organisational form to innovate depends on whether innovations should be realised autonomously or only in conjunction with the line organisation (Chesbourgough and Teece 1996), but they should not be completely separated from the line organisation (Dougherty and Hardy 1996; Vahs and Burmester 2005). Radical Innovation Hubs (Leifer 2001) - organisations with separate structure, culture, processes – that take responsibility for ‘fuzzy-front-end’ functions were discussed and represent a ‘role model’ approach of Innovation Management Units (InMUs). Corresponding derivable organisational structures and how they can be structurally mapped within an enterprise remain unclear. The literature indicates that pure centralisation or decentralisation approaches for InMUs are rare in reality and mainly realised in hybrid form (Hauschildt 1997; Vahs and Burmester 2005). The gap that still exists between the tasks and the role comprehension of innovation management also persists in the corresponding literature concerning approaches for structuring Innovation Management Units.

- **Impact of organisational forms on innovation performance difficult to measure.**

Innovation KPIs help to measure and control innovation promoting activities by linking ‘organisational effectiveness’, ‘key success factors’ and ‘performance measures’ (Rangone 1997). However, due to the large number of potential influencing factors, reliable evidence of the effectiveness of InMUs (organisational effectiveness) can ideally be found by indicating radical / incremental innovation initiated or generated by InMUs.

Concerning the question addressed in the introductory chapter (see section 1.2) on corresponding structural forms for fostering radical innovation in large, mature organisations implemented expressly for this purpose, it can be derived from the literature review that tasks of such ‘fuzzy-front-end’ functions and principal structural forms are described on a generic level. However, they lack a clear demarcation of the spectrum of tasks of innovation management, which is also reflected in the lack of a presentation of
structuring alternatives for such innovation management units. In addition, relatively little is known about the extent to which InMUs are used as an instrument to foster incremental and/or radical innovation in practice, and whether the task and roles actually concur with what was derived from the literature review. Therefore, with the aid of InMU case examples in Deutsche Telekom, this thesis attempts to further investigate the gaps addressed. The focus is on the following research questions:

- **What are the core functions and what is the role comprehension of InMUs?**
  The basic requirements to implement such InMUs, their core functions and behaviour, organisational approaches (such as corporate and divisional InMUs) and to what extent InMUs actually contribute to the emergence of innovations within the case organisation will be investigated. It is important to examine the role comprehension of InMUs due to the fact that InMUs cannot act without being influenced by the other organisations within an enterprise.

- **What factors foster or hinder the InMUs in achieving their tasks?**
  In this context, the objective is to identify potential tensions and contradictions arising from organisational change, driven by turbulent environments, such as long-term versus short-term orientation, controlling versus freedom to innovate etc. or how restructuring activities affect InMUs. Also, the issue of whether both approaches (corporate/divisional) are equally appropriate for fostering radical innovation in this environment will be considered.

- **How do organisational factors impact InMUs at corporate and divisional level?**
  This includes identification of the drivers and barriers that have been mentioned in the S&F research. They determine and influence the role comprehension of InMUs and comprise the identification of lessons learned and factors/strategies that have to be considered when InMUs operate in practice.

Table 16: Research Questions

Based upon this, the core cases presented in Chapter 5 of this study reveal and develop the relevant data and insights necessary to answer these questions and the analysis and synthesis in Chapter 6 brings all the strands together into a framework to answer these research questions in detail.
Chapter Four - Research Methodology

4.1 Introduction

The literature review revealed a number of aspects within the scope of this research, which are worth further investigation. Based on the previous section's review of the current literature and selection of three key research questions, the main purpose of this chapter is to present and discuss the methodological issues which arose in relation to the research of the formulated research questions. This comprises the careful consideration of some fundamental issues that exerted an important influence on the selection of an appropriate research design, as well as the presentation and assessment of the corresponding research methods selected.

This chapter starts with a discussion of major philosophical debates and discusses their relevance to the research design of this study. The strengths and weaknesses of various research methods are examined and the rationale behind the chosen research methods in relation to the collection of evidence is explained. This is followed by a discussion of how the research data were collected, analysed and how this leads to the fulfilment of the research objectives. The chapter concludes with a critical debate on the role of the researcher and a consideration of ethical issues.

4.2 Research Design and Strategy

4.2.1 Philosophical Stance

The design of any research study begins with the selection of a topic and a suitable research methodology. These initial decisions reflect assumptions about the social world, how science should be conducted, and what constitutes legitimate problems, solutions, and criteria of "proof" and a series of epistemological\textsuperscript{117} ethical, and other issues. It is

\textsuperscript{117} Epistemology is the theory or science of the method or grounds of knowledge (Blaikie 1993).
important to have an understanding of the philosophical basis that underpins the research in order to clarify the research design and to create or improve appropriate research designs (Easterby-Smith 1997, p. 21).

Two general approaches are widely recognised: The positivist or scientific, and the interpretive or phenomenological paradigm.

In accordance with Easterby-Smith (1997, p. 27), the positivist paradigm assumes that reality is objective, “out there”, and independent of the researcher. Therefore, reality is something that can be studied objectively. In the positivist paradigm, the researcher focuses on facts, looks for causalities or fundamental laws and should remain distant and independent of what is being researched. The values of the researcher do not interfere with, or become part of, the research. The positivist paradigm is often associated with quantitative methods.

In contrast, the phenomenological paradigm assumes that multiple realities exist in any given situation. These multiple perspectives are included in this study. Research is context-bound. The researcher focuses on meanings, interacts with those he studies and actively works to minimise the distance between the researcher and those being researched. The goal is to uncover and discover patterns of theories that help explain a phenomenon of interest. The phenomenological / interpretive paradigm is associated with qualitative methods (Easterby-Smith 1997).

A further approach to understanding research is to consider the purpose of research. In general, it is assumed that the purpose of research is to increase knowledge or understanding. Based on this assumption, Sekaran (2000) differentiates three kinds of research in relation to its purpose:
<table>
<thead>
<tr>
<th>Kinds of research:</th>
<th>Exploratory</th>
<th>Descriptive</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and understanding are increased through ...</td>
<td>... the acquisition and analysis of narrative data so that a problem can be better comprehended, or more deeply understood.</td>
<td>... the acquisition and analysis of numerical data</td>
<td>... the acquisition and analysis of numerical data</td>
</tr>
<tr>
<td>Typical goal of the research:</td>
<td>... build – based on the acquired data - a tentative explanation for the problem situation</td>
<td>... ascertain and describe the characteristics of the variables of interest in a given problem situation.</td>
<td>... explain the nature of observed relationships between variables. or ... establish the differences among groups or ... establish the relationship of two or more factors in a situation</td>
</tr>
<tr>
<td>Nature of the research:</td>
<td>Usually qualitative</td>
<td>Usually quantitative</td>
<td>Usually quantitative</td>
</tr>
<tr>
<td>Character of the research:</td>
<td>Inductive logic approach (= specific case leads to generalisation)</td>
<td>Deductive logic approach (= a generalisation is applied to new specific cases)</td>
<td>Deductive logic approach (= a generalisation is applied to new specific cases)</td>
</tr>
</tbody>
</table>

Source: created by author in accordance with Sekaran (2000).

Table 17: Kinds of Research in Relation to its Purpose

In theory, both paradigms and all three research purposes can play a legitimate role in innovation management research. However, as this study aims at a better understanding from multiple perspectives of the “phenomenon” Innovation Management Units, it aims at explanations rather than predictions, requires a strong involvement of the researcher and interaction with the research subjects. It furthermore puts a strong focus on context. Consequently, this study follows the interpretive paradigm and an exploratory purpose. In accordance with Easterby-Smith (1997) and Sekaran (2000) (see table above), the assignment of this thesis to the phenomenological paradigm suggests to apply a qualitative research methodology for this study.
4.2.2 Quantitative Versus Qualitative Research

The distinction between quantitative and qualitative research is important because the selection of the research approach depends on the ultimate goal of the research and the questions asked. Each research approach comprises opportunities and limitations and exerts an important influence on the methods chosen, the analyses used, and the inferences made. For the selection of an appropriate research approach and design for this study, it is therefore indispensable to discuss these two research approaches – quantitative and qualitative research - and their implications.

Whereas quantitative research is claimed to be infused with positivism, an approach that supports the application of the scientific method, qualitative research is often claimed to reflect a process of inquiry with the goal of providing a different form of knowledge. The focus here is on the people’s understanding of the nature of their social environment or a human problem (Bryman 1995; Bryman 2003). Therefore, qualitative research is conducted in a natural setting with the goal of building a complex and holistic picture of the phenomenon of interest. Both approaches – quantitative and qualitative - have strong and weak points. Whereas according to Easterby-Smith (1997), quantitative research tends – in contrast to qualitative research - not to be effective in theory-building\textsuperscript{118} and understanding processes or the significance that people attach to actions, tends to be inflexible and not future-oriented, it contains a series of strong points which led to the current situation in the field of management research. The strengths of quantitative research are “... they can provide wide coverage of the range of situations, they can be fast and economical; and, particularly when statistics are aggregated from large samples, they may be of considerable relevance to policy decisions” (Easterby-Smith 1997, p. 32).

In spite of the presented strengths of the qualitative approach, qualitative methodologies

\textsuperscript{118} This study applies Carlile’s (2005) definition of the term “theory” as a body of understanding.
have been traditionally under-represented in the field of management research and still do not have the same importance compared to quantitative studies (Bryman 1995). Based on the results of an empirical study with academic disseminators, practitioners, doctoral programme leaders and qualitative researchers, Cassell (2005) attributes this phenomenon among other things to the current research practice which ‘... was seen to be deeply affected by pressures within the current academic context including audit processes and career needs. Such pressures may work against the adoption of qualitative management research’ (Cassell 2005, p. 5).

Nevertheless, qualitative research is useful and appropriate for describing the nature of, and answering problems about the complex nature of, a phenomenon, and the distinct purpose of describing or understanding the viewpoint of the people intimately involved within the phenomenon of interest (Leedy 2001). Due to its effectiveness in theory-building and its contribution to the understanding of a phenomenon (Easterby-Smith 1997), the decision was made to pursue a qualitative research approach. This is in accordance with the formulated research objectives and questions, i.e. to contribute to the theories and knowledge of core functions, role-comprehension and behaviour of Innovation Management Units which aim at fostering radical innovation in large mature organisations that face massive change as well as drivers and barriers that go along with the establishment of Innovation Management Units in such an environment.

A series of issues and problems that are raised in relation to qualitative research had to be taken into consideration. Among those, a large variety of definitions of qualitative research, the assessment of qualitative management research and sources of research credibility need to be considered in more depth.

119 Despite a considerable growth of interest in the importance of qualitative research in recent years no significant rise of corresponding publications could be stated (Bryman 1995).
The first problem with qualitative research emanates from the large variety of definitions that are applied. As a consequence, there is no consensus about what qualitative research actually is (Denzin and Lincoln 1998) and a need to provide a corresponding definition of qualitative research for the purpose of this thesis. Following the categories proposed by Cassell (2005), this study can be characterised as “understanding’ but with reflexivity”. This entails taking an interpretivist, social constructionist (Berger and Luckmann 1966; Berger and Luckmann 1991) stance on the views of the world that subjects have. The concept of internal reflexivity requires of the qualitative researchers to ‘… critically scrutinize the impact of their field roles upon research settings so as to reduce sources of contamination and thereby preserve objectivity.’ (Cassell 2005, p. 13). This aspect will be further considered in a dedicated section on doing research as an internal (cf. section 4.6.2).

Further issues concerning qualitative research result from the debate on the quality of research - or to put it in other words: “what is good research” and “what is not good research”. Cropley (2005, 2002) points out three possible weaknesses of qualitative research which might exert an important influence on the quality of research and could strike a note with management researchers as well:

<table>
<thead>
<tr>
<th>Issue</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbitrariness</td>
<td>The dependence of qualitative research on the researcher’s creativity and ideas on research design</td>
</tr>
<tr>
<td>Lack of proof</td>
<td>The deficiency of objective and/or statistical procedures</td>
</tr>
<tr>
<td>Banality</td>
<td>Stating the obvious, repeating what common sense or common knowledge already explains.</td>
</tr>
</tbody>
</table>

Table 18: Potential Weaknesses of Qualitative Research

However, Cropley’s (2005) description of the potential weak points of qualitative research seems at least partly inaccurate. For instance, and depending on the individual views and
experience of the reader of a study (e.g. academic scholar, practitioner), the meaning of “stating the obvious” or “common sense” might vary significantly and be subjected to contentious discussions.

Cassell (2005) came to the conclusion in her empirical study on qualitative research that the assessment of quality is not only a comprehensive and contested area, but also closely related to the perceived credibility and status of the research approach. Normative criteria would be difficult to identify and the assessment of quality rather intuitive. It reveals that the issues of quality and credibility are important and need further discussion. They will therefore likewise be considered in more detail in the discussion of ‘limitations of the research design and generalisability’ (cf. section 4.3.5).

4.2.3 Theory-Building Versus Theory-Testing

The underlying orientation towards theory, i.e. whether theory or data should come first (Easterby-Smith 1997; Philipps and Pugh 1987), is a further aspect that has to be considered in the overall configuration of any piece of research. If the research aims at testing or expanding an existing theory (= theory testing), then theory must come before data. If the purpose is to generate theory (= theory building) which can particularly be exemplified by the concept of grounded theory (Glaser 1967), then data must precede theory. The orientation towards theory is in turn linked to a corresponding research logic, i.e. a deductive approach (= a generalisation is applied to new specific cases) or an inductive approach (= specific case leads to generalisation), respectively.

If the problem is not well researched or understood and the purpose of the research is exploratory in nature (compare Section 4.2.1, Table 17 on page 136) – as is the case for Innovation Management Units - a theory-building and, consequently also an inductive

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120 However, some broad areas were formulated, such as the extent to which the research makes a contribution, reflects some technical expertise, includes an element of reflexivity.
approach is more advisable in accordance with Sekaran (2005), especially if the phenomena under investigation cannot be understood apart from their social context. Therefore, a theory-building approach was applied for this study.

Analogous to the discussion on the qualitative research approach, Carlile (2005) stated the lack of a common language of scholars of management and business academics for the theory-building research process. Therefore, it is necessary here to clarify the position of this available study in that respect. In a first step, the theory-building research process that will be applied in this thesis will briefly be described. This study can then be assigned accordingly on this basis.

In accordance with Carlile (2005), theory-building occurs in two major stages: generally at first the descriptive and ultimately the normative stage. Within each of these stages, theory builders proceed in an iterative way through three steps displayed in the figure below. Step 1 corresponds to the bottom, Step 2 to the middle and Step 3 to the top of the pyramid.

Figure 14: The Process of Building Theory

The attribute-bound categories of descriptive theory correspond in Glaser & Strauss’ (1967) “grounded-theory” approach to the concept of substantive theory. The definition of normative theory that employs categories of circumstance matches their concept of formal theory.
As stated before the first stage of the theory-building research process is the descriptive stage which consists of the following three steps:

<table>
<thead>
<tr>
<th>Steps</th>
<th>Why this step is important</th>
</tr>
</thead>
</table>
| **Step 1 - Observation:**  
Careful observation, documentation and measurement of the phenomena in words and numbers. Researchers in this step often develop “constructs”. Constructs are abstractions which help to understand the essence of what the phenomena are and how they operate. | Improving theory will prove difficult if subsequent researchers cannot agree upon the descriptions of the phenomena. So this step is a necessary foundation for the work that follows. |
| **Step 2 - Classification:**  
Researchers classify the phenomena into categories. Management researchers often refer to these descriptive categorisation schemes as frameworks or typologies. | Categorisation schemes attempt to simplify and organise the world in ways that highlight possibly consequential relationships between the phenomena and the outcomes of interest. |
| **Step 3 - Defining Relationships**  
Researchers explore the association between the category-defining attributes and the outcomes observed. Often it is referred to the output of studies at this step as models. | Degree of correlation between the category-defining attributes of the phenomena and the outcomes of interest are generally able to make probabilistic statements of association representing average tendencies. |

Source: Own depiction according to Carlile (2005)

Table 19: Three Steps of Building Descriptive Theory

Due to anomalies i.e. “... an outcome for which the theory can’t account” (Carlile 2005, p. 4), descriptive theory is often accompanied by confusion and contradiction. It can be resolved when researchers move - through careful detailed fieldwork – from descriptive theory and ultimately statements of correlation to normative theory and ultimately statements of causality (see figure below):
Carlile proposed to resolve anomalies that lead to confusion and contradictions “… by developing more accurate, less ambiguous ways to define and measure the phenomena” and/or “… by revisiting the categorisation stage. Rather than using schemes based on attributes of the phenomenon, however, in building normative theory researchers categorise the different situations or circumstances in which managers find themselves” (Carlile 2005, p. 6). By means of a stronger focus on the situation and context, researchers can manage to show how and why the causal mechanism results in the different situations in a different outcome.

With regard to the present thesis, this means that this study can be assigned to the inductive process of normative theory. The comprehensive and partly contradictory research on drivers and barriers, as well as success and failure factors in innovation, for instance, indicates the need to revisit the Innovation Management Unit “construct” and to

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122 This approach corresponds to Lawrence & Lorsch’s (1967) contingency theory. They showed that the best way to organise a company depended upon the circumstances in which the company was operating.

123 So a normative theory that is built upon well-researched categories of circumstances can help a manager predict accurately what actions will and will not lead to the desired result, given the circumstance in which the manager finds himself.
focus more strongly on specific situations, such as centralised or decentralised Innovation Management Units in a large, mature organisation that faces turbulent change and which aims at fostering radical innovations by means of the establishment of such Innovation Management Units. As a consequence, one research question aims at describing more precisely the Innovation Management Unit "construct" by means of a more precise definition of the core functions and role comprehensions of InMUs. The part of this study that deals with this research question is therefore mainly descriptive in nature, which places the particular demand on the researcher of walking the narrow line between an accurate and precise description of the phenomenon on the one hand, and the risk of whatever might be considered as "stating the obvious" (compare Table 18 on page 139), on the other hand. The other research focus on specific categories of InMUs, namely centralised and decentralised InMUs and corresponding drivers and barriers that go along with the establishment of such units in a specific organisational context.

According to Eisenhardt (Eisenhardt 1989), case studies represent the main research tool for building theories. Due to the application of a theory-building, inductive approach for the present study, the case study approach will therefore be considered in more detail in the following sections. However, before that and in order to complete the discussion of the research design, the overall research process will first be presented.

4.2.4 Logical Structure of the Research Process

As Glatthorn (1998) pointed out with reference to a series of pertinent studies, the lack of structure in the dissertation process may be a key element in the failure of many students to complete their programme. Just like Miles and Huberman (1994, p. 308), for example, or Bryman (1995, p. 7), who presented a clearly arranged, logical structure of a qualitative and quantitative research process, the available study pursued a systematic approach which differentiated between different main phases of the research process. The figure below illustrates the resulting structuring of the research which proved to be very useful for the practical management of the research project. Although research is described in
the corresponding literature in most cases as a sequence of successive research phases (e.g. methodology phase, design phase, data collection phase and analysis phase) – which conforms with the philosophy of ‘what needs to be done’ - reality is usually different. Although the same terms for the principal ‘research phases’ were used to describe the research process, this research project did not apply such a sequential approach, complying with the ‘stage gate process’ on the basis of an ‘if-then’ relationship. Instead, the research process had to be understood along the lines of a ‘project flowchart’ as used in the industry for structuring project flows and which consists of a set of individual activities that are executed at the same time or interact with one another and which can therefore influence each other mutually.
This overview represents a tried and tested resource for the present researcher’s work and might also be useful for others – not just “research newcomers” – who undertake a comparable research project.

4.3 Case Study Research Design

4.3.1 Introduction

The discussion on theory-building versus theory-testing already suggested the application of a case study approach for this study. According to Yin (Yin 1994), the final selection of an appropriate research design depends on three basic conditions: the form of research question, the control over behavioural events and the focus on contemporary as opposed to historical events (see table below).

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Form of research question</th>
<th>Requires control over behavioural events?</th>
<th>Focuses on contemporary events?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, why</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who, what, where, how many, how much</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival analysis</td>
<td>Who, what, where, how many, how much</td>
<td>No</td>
<td>Yes/No</td>
</tr>
<tr>
<td>History</td>
<td>How, why</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case study</td>
<td>How, why</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: taken from Yin (1994, p.6).

Table 20: Relevant Situations for Different Research Strategies

The proposed research focuses on contemporary events and cannot be controlled by the researcher. It mainly addresses “what” questions when focussing on functions, role comprehensions and drivers and barriers of InMUs. It focuses on “how” and “why” questions when further investigating the behaviour of central versus decentralised InMUs. According to Yin (1994), ”how” and “why” questions are likely to favour the use of case studies. Based on that, it was ultimately decided to apply a case study approach.
The case study approach will now be further discussed in the following sections. After the discussion of the aims and features of case study research and the selection of a concrete case and case study design, the limitations of case study research will also be considered in more detail.

4.3.2 The Aim of Case Study Research

In order to select an appropriate case study design, it is important to clarify the objectives that are pursued by the concrete research project. The key features of the case study design, i.e. the number of cases and levels of analysis, as well as the considered period of time, have to be derived from that.

According to Eisenhardt (1989), Yin (1994) and Bryman (1995), different objectives can be pursued by a case study. In general, an organisation or a department within an organisation is considered as constituting a case (Bryman 1995). Case studies can either be of exploratory, explanatory or descriptive nature and can likewise be used for theory-testing as well as theory-building. Due to the latter point, most qualitative research is in fact a form of case study, but not all case studies consist of qualitative research.

As already stated in the previous sections, this study was based on the phenomenological stance, pursued a qualitative approach and aimed at building theory. Along the lines of categorisation by Sekaran (2005) (see Table 17 on page 136), the main purpose of this thesis is exploratory in nature, i.e. the case study aims at increasing the knowledge and understanding of InMUs through a better comprehension and deeper understanding of InMUs in a specific situation. The goal of the study is to provide a tentative explanation for how radical innovations can be enhanced by means of InMUs in large, mature organisations that deal in a fast moving environment.
Having defined the objectives of case study research, the further choices made around the design and features of the case study will be presented and discussed in the following section.

4.3.3 Design and Features of Case Study Research

In this section the main features of the case study design will be presented. The case study research design entails…

- the detailed examination of whether a single or multiple case study approach has to be carried out (e.g. industry and company; Yin 1994)
- the determination of the levels of analysis as well as
- the considered period of time for the study.

This serves to make the research topic explicit and sets the domain for which the conclusions are valid. Furthermore, it indicates the degree to which the theory has undergone falsification.

The selection of whether a single or a multiple case study approach should be carried out depends again on the formulated research objectives and questions. Yin (1994, p. 38) limits the application of a single case study as an appropriate design to a few exhaustive circumstances. He highlights a potential vulnerability of single case study designs in the event that the case subsequently turns out to not be what it was thought to be at the outset. Eisenhardt (1989) takes the view that due to the limited generalisability, it is often difficult to generate strong theory based upon studies with fewer than four cases. Pettigrew (1985) and Easterby-Smith (1997) take a different point of view by arguing that these disadvantages can be overcome by applying a long-term approach for the study. They consider the choice between single or very small sample case studies and multi-case studies as essentially the choice between cross-sectional and longitudinal design.
Another group accentuates the strengths of single case studies. Dyer and Wilkins (1991) state that ‘classic case studies’ (= single case studies) have been extremely powerful. Whereas single case studies would provide strong contextual insights and general phenomena would be described so well that others had little difficulty seeing the same phenomena in their own experience and research, multi case studies would tend to neglect the less obvious aspects of the setting under investigation which suggests a potential lower risk of ‘banality’ of multiple case studies (compare Table 18 on page 139). As a result, they would more likely provide a distorted description of the underlying case and its dynamics.

For that reason, Dyer and Wilkins (1991) evaluate single case studies as particularly strong and more powerful than multi-case studies for creating high quality theory. As a consequence, they consider the choice between the deep, single case study with strong contextual insights in a particular social setting and surface, and multi-case studies with their benefits of comparative insights, to be the most critical trade-off for the researcher.

The problem raised here is potentially a problem for a large part of business research. A lot of management research is based on in-depth case studies in one or a few companies over a long period which partly results also from the problem of gaining access. And as Raimond (1993) argued, it is simply not known if success or disaster in one company can be generalised to others. This view is supported by Wolfe (1994) who argues that it is doubtful if innovation research results can be generalised across organisational types.124 “Primary determinants of innovation diffusion (e.g. organisational characteristics, organisational networks, environmental characteristics), of organisational innovativeness (e.g. aspects of organisational structure) and of innovation processes (e.g. organisational systems and procedures) have greater homogeneity within, than across, organisational types” (p. 420). However, Schofield (Schofield 1990) argued that the careful selection of

124 According to Wolfe (1994), organisational types might be differentiated according to public – private, manufacturing - service, industry or strategy dimensions.
A second decision concerning the design of the case study is directly linked to the issue raised above. This concerns the number of units of analysis that should be involved, i.e. whether a holistic or embedded approach should be applied for the case study (Yin 1994). In a holistic approach, only the global nature of an organisation will be examined; an embedded approach is applied when either several sub-units of the organisation are investigated or different perspectives of inquiry are used within a single case, even though the starting and end point represent the comprehension of the case as a whole in the real-world context (Scholz 2002).

Eisenhardt (1989) considers having at least several mini-cases within the main case as a potential means to minimise the risk of unconvincing empirical grounding. According to Yin (1994), the strong and weak points of both approaches must again be taken into consideration. If the theory underlying the case study is itself holistic in nature, or if it is simply not possible to define reasonable sub-units, he recommends carrying out a holistic case study. However, if an embedded case study design is applied, it has to be ensured that it does not fail to return to the larger unit of analysis.

Based upon the discussion about strong and weak points of single versus multiple and holistic versus embedded case study designs, as well as the discussion on the theory-building research process (cf. section 4.2.3), it was decided to apply a single case study with different levels of analysis (embedded case study). It seemed the most promising approach in the face of the strengths of single case studies with regard to the research of phenomena in a particular social setting (cf. Dyer 1991). The partly inconsistent results of success and failure factors, as well as drivers and barriers in the innovation management research, suggested a stronger emphasis be placed on the context, together with investigation of the phenomenon for a specific social setting (in this instance, a large,
mature organisation that had and still has to cope with massive change). The selection of a large, decentralised organisation offered the opportunity to examine the phenomenon of Innovation Management Units at different levels of analysis. Deutsche Telekom was chosen as the case organisation not only due to the accessibility of data for the researcher. In some respects, the case of Deutsche Telekom is unique, as underlined by the privatisation of the company, the deregulation of highly dynamic and competitive telecommunication markets and the resulting strong need for competitive advantages resulting from innovation. In order to deal with the problem of generalisability of single case studies, it was decided to follow Pettigrew's and Easterby-Smith proposition to pursue a long-term case study. In addition, this approach has the advantage that certain patterns or effects can be observed over time. However, a series of other measures to deal with this problem were necessary and will be discussed and presented in more detail in section 4.3.5.

This section determined the case study research design. In the following section, the concrete sub-cases (main cases of the findings and analysis chapter) will be selected.

### 4.3.4 Case Study Selection

The goal of this study is to illustrate in greater depth the way in which InMUs are used to push more radical innovations operationally. As already described, the choice was made in favour of case study research, as case studies are the preferred strategy when ‘how’ and ‘why’ questions are being posed. It was furthermore decided to carry out a long-term, single case study with an embedded research design. Therefore, another important aspect of research design is selecting suitable cases of innovation management units (InMUs).
As the preceding sections showed, the potential topics and activities of an Innovation Management Unit are quite varied, ranging from strategic aspects, procedural topics (e.g. implementation and control of innovation processes) and the execution of operational tasks (e.g. the screening of markets and technologies), all the way to the implementation of product innovations. Furthermore, the literature review illustrated that larger, more mature organisations have problems in boosting innovation capability and innovation output with existing organisational structures. Managing this diversity of tasks necessitates the organisational integration of InMUs in the overall structure of the enterprise. In the same way as the structuring of InMUs according to Corporate Innovation Management Units (CIM) and Decentral or Divisional InMUs (DIM) described in Figure 12 on page 112, it can also be assumed that the same forms of InMU integration can, in principle, be found in larger enterprise constructs, such as Deutsche Telekom. Of particular interest in this thesis is the use of InMUs as integrative elements of organisational units and the roles they adopt within these units. Therefore, in case both forms will be found (CIM/DIM), they should ideally be represented when selecting suitable InMUs for the case study.

As already described in the definition of Innovation Management Units (InMUs) in Section 3.5, a number of items must therefore be considered when selecting suitable InMUs for this study:

- The potential InMU must be a self-contained organisational unit established for this purpose.
- It must realise tasks that lie within the purview of an ‘Innovation Management Unit’ (see Table 10 on page 89; Table 13 on page 96)
- It must have the goal of ramping up more radical innovations; i.e. the aim to foster new business models. Routine or incremental innovations - such as product modifications or relaunches - are integral elements of the tasks of Product Management Units, for example.
It should ideally have been implemented for more than 1 year (chance of stable business and valid results)

The Deutsche Telekom Group was screened for such units according to these definitions. In this context, units (target groups) were of particular interest in which all employees deal with the development of new technologies, products and services both in the narrower and broader sense. The following areas of activity from headquarters and the Group units are the focus of particular attention: Product Management, Product Development, R&D units, Innovation Management / New Business Development, Marketing at headquarters, divisions or Group units. If the entire time horizon since the first German Postal Reform in 1989 is appraised, it can be seen that many reorganisations have taken place within the Deutsche Telekom Group. Consequently, various organisational forms have been analysed within the 1989 – 2006 time horizon.

When screening for InMUs, it was determined that terms were employed on numerous occasions in the designation of an organisational unit that potentially indicated an InMU. However, upon closer analysis of the business activities of these units as regards their tasks and objectives, only insignificant, if any, innovation-promoting activities in line with the InMU definition were able to be ascertained. For example, the ‘Regional Innovation Centre’ (unit name) suggests a potential InMU; its actual task, however, involves the planning, realisation and management of individual customer solutions and projects and represents therefore no InMU. In contrast, a number of organisational units were identified whose designation gave no indication of a potential InMU but which, upon closer examination, nevertheless proved to realise innovative tasks (e.g. ‘Technical Service’ – TD was a predecessor organisation of a Corporate Innovation Unit and hence potentially case-relevant). The decision thus had to be made as to whether or not the criteria of an InMU unit described above were fulfilled individually or not by every individual unit.
While researching and clarifying this discrepancy between claim (official nomenclature) and reality (what tasks are really handled within this unit), the positive image of ‘being innovative’ was frequently quoted as a justification. The manager of one such potential innovation unit explained that, although the actual tasks had barely altered in comparison with those of the previous organisational form, the decision was made to exploit the positive image value associated with ‘innovation’ in terms of being new, being different and being innovative - both internally and externally. This almost inflationary use nowadays of the term ‘innovation’ in virtually all spheres thus already has an impact on the description of activities and organisational units. If we assume that this effect can also be ascertained in other companies, this aspect must also be taken into consideration, in order to prevent misinterpretations in the data stock or the results (e.g. in the case of benchmarking.)

As the name of a unit could only be evaluated as an initial indicator for a potential InMU, more than thirty potential organisational units within the DT Group were analysed in greater detail. This analysis showed that numerous potential InMUs were characterised by the fact that they carry out innovation management tasks (cf. Table 13 on page 96) with a very limited spectrum (e.g. only scouting activities) or only become active upon being contracted by a third party and serve as an operational arm for other organisational units through supply and service relationships. For instance, one of these units identified at T-Systems was ‘T-Nova/Berkom’, originally established through the bundling of various Research & Technology Centres which perform contracted application development tasks; or ‘T-Venture’, which acts as a venture capital instrument to bind deficits in (technological) know-how to the Group via divisional venture funds. Such units were thus not taken into further consideration in the InMU case selection.

The potential InMU cases ‘New Business Innovation’ (NBI) and ‘New Business Opportunities’ (NBO) at T-Mobile were eliminated on account of the rudimentary
availability of data\textsuperscript{125} and not least due to the brief duration of implementation of the units of less than 1 year (no stable business and consequently no valid data).

Reasons were found as to why potential InMUs at T-Mobile were missing. One of the unit’s product managers summarised:

‘Although at T-Mobile I have long been involved with ‘innovation’,… in a range of different tasks, the company seems to lack the sort of transparency that would make it possible to say who was really involved in this area...T-Mobile lacked, and still lacks, an explicitly defined innovation unit filled with truly creative people. All innovation activities are carried out via the company’s lines.’

Nevertheless, NBO was used as the ‘pilot case’ to test and revise the questionnaire for the semi-structured interviews (see 4.4.4).

The situation at T-Online (responsible for the online business of the DT Group) was similar to that at TMO. The story again began with a young, ambitious company in a dynamic growth market in which all products are considered ‘innovative’. Again, the company saw no need for a special InMU. For example, one influential manager of T-Online (TO) argued:

‘We do not need a separate innovation management department. It is not just our products or rates models that are innovative – our whole company is innovative; so why should we need innovation management?’

Taking all these aspects and limitations into account, the following main cases were identified as a result:

- Case ‘Value Added Service’ (VAS) - Divisional InMU Sample
- Case ‘Product Innovation’ (PI) - Divisional InMU Sample
- Case ‘Corporate Innovation’ (CI) - Corporate InMU Sample

\textsuperscript{125} Including lack of potential interview candidates. With the exception of four employees, all potential interviewees have since left the company.
The following overview presents the results of the analysis of controlling innovation activities via autonomous InMUs within the Deutsche Telekom Group. The results depict the organisational and temporal connection of those InMUs potentially suitable for a case appraisal. For reasons of simplicity, the description is based on the familiar divisional structure (Headquarters, Fixed Line = T-Com, Mobile = T-Mobile, Online = T-Online, Systems = T-Systems), which is reflected in the Group’s structure up to Summer 2006.  

Figure 17: Overview of InMU Distribution Within the Deutsche Telekom Group

These three main cases (CI, VAS, PI) are the subject of more in-depth analyses within this research. They are of particular interest as they illustrate the role of corporate and divisional InMUs and the way in which they interact.

126 Summer 2006: Merger of online business (T-Online) and fixed line business (T-Com) to the unit “T-Com”.

156
4.3.5 Research Quality and Limitations of the Research Design

The decision for a qualitative, single case study approach raised the question concerning potential risks and limitations of the research design, about what is good qualitative case study research and the corresponding strategies to maximise research quality.

Reliability, Internal and External Validity (Generalisability)

Empirical social science research, on which so much management research draws for its philosophical approach and research methodology, mainly uses the following tests to establish the quality of qualitative research: reliability and two types of validity for a theory (cf. Yin 1994), namely:

- Internal validity:

  “A theory’s *internal* validity is the extent to which: 1) its conclusions are unambiguously drawn from its premises; and 2) the researchers have ruled out all plausible alternative explanations that might link the phenomena with the outcomes of interest” (Carlile 2005, p. 15).

- External validity:

  “The *external* validity of a theory is the extent to which a relationship that was observed between phenomena and outcomes in one context can be trusted to apply in different contexts as well” (Carlile 2005, p. 16). Instead of the term external validity, the term generalisability is often used (cf. for instance Miles and Huberman (1994); Easterby-Smith (1997)).

- Reliability

  Reliability describes “… the extent to which another researcher could derive the same conclusions from the same observations” (Carlile 2005, p. 17). This means that a research instrument is considered as reliable if the results of the study can be reproduced under a similar methodology.
Due to the different nature of qualitative research (compared to quantitative research), Cassell (2005) found out in an empirical study that the assessment of qualitative management research appeared to be more of an intuitive decision-making process than an application of known and agree criteria. Judgements in these areas would often vary according to the beliefs and commitments of the individual, would be influenced by a particular context or an achieved status accomplished by presenting the research report in particular ways. And likewise, Carlile (2005) confirms that the value of data is often evaluated by its “usefulness”, i.e. its potential to contribute to a better understanding of the phenomenon. Although qualitative researchers claim to reconsider the concepts of validity and reliability with respect to qualitative research, Golafshani (2003) can be agreed with in that both quantitative and qualitative researchers need to demonstrate that their studies are credible. But credibility depends obligatorily on different aspects:

This can be attributed to the different purposes of quantitative and qualitative research. A quantitative case study has a “purpose of explaining”, and a qualitative case study the purpose to contribute to understanding. Whereas in quantitative research credibility depends therefore on the construction of the instrument, in qualitative research “… the researcher is the instrument” (Patton 2001). Consequently, the credibility of qualitative research depends on the ability and effort of the researcher. As a result, and in light of the definitions of the terms validity and reliability (see above), validity and reliability are inseparable and cannot be viewed separately in qualitative research (Golafshani 2003). Instead, two key criteria for assessing qualitative research are proposed by Guba and Lincoln (1994): trustworthiness and authenticity. Trustworthiness is likewise linked to

127 According to Guba and Lincoln (1994), trustworthiness comprises four aspects: credibility (= investigator understood correctly what was going on), transferability (= other researchers can make judgements about its possible transference to other contexts), dependability (= research process was carried out correctly), confirmability (= personal or theoretical inclinations have not caused researchers to bias the research).

128 According to Guba and Lincoln (1994), authenticity comprises fairness (= represents all viewpoints in a particular setting), ontological authenticity (= research helps to enhance understanding of the social context), educative authenticity (= helped people in the research to appreciate others' views in their setting), catalytic authenticity (= acted as an impetus to participants to change things), tactical authenticity (= empowered people in the research to change things).
generalisability. If trustworthiness can be maximised it may lead to ‘high quality qualitative research’ and thus to generalisability (Johnson 1997).

If an inquirer wants to persuade his audience that the research findings of an inquiry are worth paying attention to, they suggest that any qualitative researcher should be concerned about what corresponds in the qualitative paradigm to validity and reliability. However, "since there can be no validity without reliability, a demonstration of the former (validity) is sufficient to establish the latter (reliability)” (Lincoln and Guba 1985, p. 316)\textsuperscript{129}. Therefore, the examination of trustworthiness is crucial.

According to Bryman and Bell (2003), internal validity and the corresponding aspects of trustworthiness can be seen as a strength of qualitative research because the researcher spends so much time over a long period on observations, and so is able to ensure a high level of matching between observations and concepts. However, external validity (or generalisability) remains – even though it is claimed by some bold researchers that this is not an objective of qualitative research (Schofield 1990), and as already stated by Eisenhardt (1989) - the most important weak point and limiting factor of qualitative single case studies. Derived from a normative management theory-building process, external validity is, according to Carlile (2005), achieved when the categories of circumstance are “mutually exclusive”\textsuperscript{130} and when the defined categories of circumstance are “collectively exhaustive”\textsuperscript{131}.

**Triangulation**

Apart from a detailed description of the “categories of circumstance” and the situations for which the results can be applied, a further strategy that aims at overcoming the weakness

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\textsuperscript{129} The same: Patton (2001).

\textsuperscript{130} This means for instance that a manager can assign a certain situation unambiguously to a defined category of circumstance.

\textsuperscript{131} I.e. that all potential situations that managers might encounter with respect to the observed phenomena and results are accounted for in the theory.
of the problems described above that stem from single method, single-observer, single-
theory studies and intrinsic biases, is triangulation. Denzin (1978) differentiates between
four basic types of triangulation. They can again be combined to create multiple
triangulation\textsuperscript{132} (Miles and Huberman 1994; Patton 2001):

\begin{itemize}
\item Triangulation by data source, involving time, space, places and persons,
\item Investigator triangulation, which consist of the use of multiple, rather than single researchers,
\item Theory triangulation, which consists of using more than one theoretical scheme in the interpretation of the phenomenon,
\item Methodological triangulation, which involves using more than one method and may consist of within-method or between-method strategies
\end{itemize}

Triangulation is often used in specific contexts to obtain confirmation of findings through convergence of different perspectives (Creswell 2000). Converging perspectives are seen to represent reality. Contradictory results can provide multiple context-related explanations but likewise cast doubt on the researcher's understanding of a topic.

With regard to this available single (embedded) qualitative case study, the discussion on the limitations of the case study research design had several implications:

\begin{itemize}
\item Due to the important role of the researcher in a qualitative case study, it was decided to take targeted actions aiming at contributing to the trustworthiness of the researcher. In this instance, particularly by means of the regular discussion and reflection of the research process and results with peer students and managers who work in the field of innovation management as well as case study participants\textsuperscript{133}.
\end{itemize}

Furthermore it was decided to dedicate an important section of this thesis to the

\textsuperscript{132} This means that the researcher combines multiple observers, theoretical perspectives, sources of data, and methodologies in one investigation.

\textsuperscript{133} Hartley (2004) argues that checking the findings cannot only be a valuable part of the analysis but can likewise enhance validity (p. 330).
discussion and reflection of the role of the internal researcher and how the researcher tried to avoid - or at least minimise - bias and the risks when doing research as an internal student.

- In order to contribute to generalisability, the context of the case as well as the embedded case studies were described in detail.

- It was decided to use multiple triangulation, i.e. different sources of data and different sources of research methods, in order to maximise trustworthiness and handle the problem of limited generalisability.

4.4 Data Collection

In the last section, the limitations of the case study research design were considered. The selection and application of concrete research methods will now be presented and discussed in more detail in the following sections.

4.4.1 Preparation Phase

Before dealing with the potential and concrete research methods of collecting data, a few words are necessary regarding the preparations for collecting data and gaining access. The basis for archiving and analysing the data involved creating a case study database in electronic form. The data and insights were transferred to this database from various sources ("table shells"). This allowed the gathered data to be allocated to the individual questions, thus essentially complying with the "case study protocol" proposed by Yin (2003). The use of the "Mindmanager" tool supported the analysis of the data and derivation of the findings for the individual questions.

The topic of "gaining access" is an important aspect for gaining the requisite data, especially in the case of interviews, and is regarded in even greater depth in the section titled "doing research as an internal".
### 4.4.2 Data Collection Approaches

Following on from the philosophical stance, the nature of the research, the research design and the choice of a case study approach, a number of issues require attention concerning data collection. A host of research methods are thus available, the selection of which depends of the ‘nature’ of the research. While it was recognised from the start that multiple data collection methods were required (Eisenhardt 1989; Yin 1994; Easterby-Smith 1997) to enhance the richness of the data and increase validity through triangulation, the sheer varieties of available methods inevitably made selection difficult. For this study, research methods were identified which are (according to Bryman (1995)) typically associated with qualitative research. According to Yin (1994, p. 80), the evidence for case studies may come from six sources with typical strengths and weaknesses:

<table>
<thead>
<tr>
<th>Source of Evidence</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>▪ stable – can be reviewed repeatedly</td>
<td>▪ retrievability – can be low</td>
</tr>
<tr>
<td></td>
<td>▪ unobtrusive – not created as a result of the case study</td>
<td>▪ biased selectivity, if collection is incomplete</td>
</tr>
<tr>
<td></td>
<td>▪ exact – contains exact names, references, and details of an event</td>
<td>▪ reporting bias – reflects (unknown) bias of author</td>
</tr>
<tr>
<td></td>
<td>▪ broad coverage – long span of time, many events, and many settings</td>
<td>▪ access – may be deliberately blocked</td>
</tr>
<tr>
<td>Archival Records</td>
<td>▪ (same as above for documentation)</td>
<td>▪ (same as above for docum.)</td>
</tr>
<tr>
<td></td>
<td>▪ precise and quantitative</td>
<td>▪ accessibility due to privacy reasons</td>
</tr>
<tr>
<td>Interviews</td>
<td>▪ targeted – focuses directly on case study topic</td>
<td>▪ bias due to poorly constructed questions</td>
</tr>
<tr>
<td></td>
<td>▪ insightful – provides perceived causal inferences</td>
<td>▪ response bias</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ inaccuracies due to poor recall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ reflexivity – interviewee gives what interviewer wants to hear</td>
</tr>
<tr>
<td>Direct Observations</td>
<td>▪ reality – covers events in real time</td>
<td>▪ time-consuming</td>
</tr>
<tr>
<td></td>
<td>▪ contextual – covers context of event</td>
<td>▪ selectivity – unless broad coverage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ reflexivity – event may proceed differently because it is being observed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ cost – hours needed by human observers</td>
</tr>
<tr>
<td>Participant Observation</td>
<td>▪ (same as above for direct observations)</td>
<td>▪ (same as above for direct observations)</td>
</tr>
<tr>
<td></td>
<td>▪ insightful into interpersonal behaviour and motives</td>
<td>▪ bias due to investigator’s manipulation of events</td>
</tr>
<tr>
<td>Physical Artefacts</td>
<td>▪ insightful into cultural features</td>
<td>▪ selectivity</td>
</tr>
<tr>
<td></td>
<td>▪ insightful into technical operations</td>
<td>▪ availability</td>
</tr>
</tbody>
</table>

Table 21: Six Sources of Evidence: Strengths and Weaknesses
The objective of data collection is to gather information about a series of different issues. Because ‘people make innovation’, (Faulstich 2005) it was important to gain an understanding of the personal views of innovation managers and managers or key players who are related to such InMU activities. This suggested to use interviews for the purpose of this study as one core element of the research methodology. However, it seemed indispensable to focus not only on interviews exclusively. As described in the previous section, theory-building researchers must typically combine and apply multiple research methodologies in the study of the same phenomenon, in order to overcome weakness, intrinsic biases and the problems that come from single case studies and to deal with potential problems of interpretation. So in order to further validate the data of the interviews and compensate potential weak points, it was decided to use other sources such as documentation and archival resources, direct observation and – due to doing this research as an internal student (see 4.6.2) – participant observation (see triangulation). This was applied for all cases of this study. Each method of data collection of this study, as well as the precise application of the research method, will be described in more detail in the following sections and will be complemented by an own section (4.6) on the boundaries and limitations of the research methodology.

4.4.3 The Pilot Case

As a final preparation for data collection, Glaser and Strauss (1967) or Yin (2003), for instance, suggest conducting a pilot study to help the investigator to refine his data collection plans with respect to both the content of the data and the procedures. Here, a pilot case was used to assist the researcher to develop and modify relevant lines of questions and to clarify the research design. The ‘New Business Opportunities’ (NBO) unit at T-Mobile was selected as a potential pilot case. In principle, the unit fulfilled the formal criteria of an InMU, but this unit was eliminated as a ‘case InMU’ on account of the rudimentary availability of data and not least due to the brief duration of implementation of
the unit of less than 1 year (no stable business and consequently no valid data). NBO was used as the pilot case by interviewing several former managers of that unit to test and revise the questionnaire for the semi-structured interviews (see below). Thus, the relationship between the manager of an InMU and his own superior was included as a new aspect in the questionnaire and the structuring of the questions modified accordingly. Furthermore, interview methods and various documentation techniques (on-line protocols, tape records, etc.) were able to be practiced via the pilot case. In the end, the pilot case provided considerable insights into the subject of study and due to the ongoing review of relevant literature and reflection of theoretical issues, it was a helpful instrument in creating the final research design.

4.4.4 Interviews

Burgess (1982) summarised the importance of interviews: ‘(the interview) is... the opportunity for the researcher to probe deeply, to uncover new clues, open new dimensions of a problem and secure vivid, accurate inclusive accounts that are based on personal experience’ (p.107). He stated further that the main reason for conducting qualitative interviews is to understand ...’how individuals construct the meaning and significance of their situations... from... the complex personal framework of beliefs and values... to help explain and predict events in their world.’ (p.45).

And for case studies, interviews are one of the most important sources of data when the primary purpose of the research is to develop an understanding of the meanings interviewees attach to certain situations, or to explain and interpret certain phenomena (Yin 1994). Easterby-Smith (1997) argued that researchers must therefore be able to conduct interviews so that the opportunity is present for these insights to be gained. .. In order to be able to achieve these insights, the researcher will need to be sensitive enough and skilled enough to ensure that he not only understands the person’s views, but also,... assists individuals in exploring their own beliefs’ (p.73).
Interviews are therefore an appropriate method when it is necessary to understand constructs that the interviewee uses as a basis for his opinions and beliefs about a particular matter or situation; or to develop an understanding of the respondent’s ‘world’.

Depending on the degree of structure and the nature of interview questions, various types of interview are available. According to Jones (1985), structured interviews based on predetermined questions and a standardised schedule exist one side of the continuum. On the other side, there are ‘unstructured’ or depth interviews (Berent 1966), which are not guided by a pre-existing interview schedule. Here, the interviewer has a general area of interest and the interviewing process is determined by the flow of conversation. The advantage of ‘unstructured’ interviews is that a lot can be learned about values, motivations, perceptions, attitudes, etc. but the analysis of the results is difficult and it is not certain that the desired information can really be obtained (Bryman 1995; Easterby-Smith 1997). In the middle of the continuum, there are semi-structured interviews. They contain a clearly defined purpose with some degree of flexibility in ordering and wording of questions. In this study, the main aim was to understand role comprehension and behaviour aspects of InMUs and interpret events in this respect. Hence, yielding the advantage of flexibility (Yin 1984), semi-structured interviews were conducted to clarify the relevant issues and to find answers to the research questions.

The researcher used an interview schedule, but provided time and space for issues that might be raised by the interviewee. Open-ended questions were used (Jones 1985) in order to give the interviewee the freedom to bring up his version of things. Furthermore, the design of the questionnaire took into consideration “probing questions” to test the interviewee’s expertise, and also integrated “clarifying questions” to encourage the interviewee to provide additional information and thus gain complete answers (see the complete interview schedule in the Appendices on page 328).
The following overview presents the individual interview questions, the objective and the anticipated contribution:

<table>
<thead>
<tr>
<th>#</th>
<th>Qualitative Question</th>
<th>Objective</th>
<th>contributes to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>“Setting the scene”</strong></td>
<td></td>
<td>RQ1</td>
</tr>
<tr>
<td>1</td>
<td>What do you personally see as the meaning of “innovation”?</td>
<td>Understanding of the interviewee's experience with and comprehension of radical innovation.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Could you give some examples of „significant or radical innovations“ within DT in the last years?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Which types of innovation are most important (Rank Order) for your SBU/DT and why?</td>
<td>Clarify the importance and priority of activities to foster radical innovation in the case organisation - connections could be made between “Expectations on an InMU” and the “tasks and implemented innovations” actually realised by the InMUs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rank Order: 1=high; 6=low</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>• Basic Innovations (“novelty for the world”)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• New Product (-lines / -families)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Product modifications / -variations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Line Extensions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Product-Relaunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cost Savings</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Others</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>“Innovation and Organisation in a wider context”</strong></td>
<td></td>
<td>RQ1</td>
</tr>
<tr>
<td>4</td>
<td>What characterise “innovative companies” from your perspective?</td>
<td>Understanding of the interviewee's perception regarding innovating companies; identify potential success factors (independent of the DT case organisation).</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Do you think DT settles her claim to be an “innovative company”- if yes – why; if not – why not?</td>
<td>Identify positive / negative attitudes and possible causes; identify potential fields of activities for InMUs.</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Has DT put in place any project, processes, practices or structures in order to improve her innovativeness during the last years?</td>
<td>Identify approaches to minimise functional barriers to innovate.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Which impact have the restructuring activities on the innovativeness of your SBU/DT (Pros/Cons)?</td>
<td>Understanding of restructuring activities as an instrument to increase (or “paralyse”) the ability to innovate.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>What factors are important to foster radical Innovation within DT? Rank Order: 1=high; 9=low</td>
<td>Identify importance of InMUs / structural solution to foster radical Innovation. Identify area of activities for InMUs aiming to foster radical innovations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Project management</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Structural approaches (Hubs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sponsor at Senior Management (Promoter/Champion)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• (Innovation)-Strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• „HR policy and practice“ (recruiting policy, pay-schemes...)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Employees (Qualification/Profile)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• (Innovation) Culture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### "Characteristics of Innovation Management Unit (InMU)"

<table>
<thead>
<tr>
<th>Question</th>
<th>Task</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>9  “Units who foster radical innovations” - Which units within DT do you have particular in mind, if you think at innovative ones?</td>
<td>Validation of previously identified case InMUs and the identification of further potential case InMUs.</td>
<td>X</td>
</tr>
<tr>
<td>10 What are the core tasks and role comprehensions of such units from your perspective? [Cross-Check: Is this view shared by the board management - if not, why not?]</td>
<td>Identify and understand core tasks and role comprehension from the management perspective - connections could be made between “expectation of the management” on an InMU versus the „tasks actually realised“ by an InMU.</td>
<td>X</td>
</tr>
<tr>
<td>11 How well do you thing interact such innovating units with other units in fostering radical IN on divisional and corporate level within DT?</td>
<td>Understanding role comprehension and interaction of InMUs with other InMus / operational Management; identification of lessons learnt (positive / negative attitudes).</td>
<td>X</td>
</tr>
<tr>
<td>12 What are the factors in your SBU/DT which hinder innovations? [AND / OR] Do you have any suggestions about how the innovativeness of your SBU/DT could be improved?</td>
<td>Identify positive / negative attitudes and possible causes which could be addressed; identify potential fields of activities for InMUs. [This question is posed both positively and negatively in order to obtain maximum information.]</td>
<td>X X</td>
</tr>
<tr>
<td>13 Which factors are important for success and for survival of such Innovation Management Units in an Environment like DT?</td>
<td>Identify „success factors“ important for InMUs. Understand why and how InMUs survive (or not) a reorganisation.</td>
<td>X X</td>
</tr>
<tr>
<td>14 How important is the relationship between the head of an InMU and his direct superior for success and survive of such a unit?</td>
<td>Understand and validate the importance of the link of InMus to top management - addressed by ¾ of the interviewees of the pilot case.</td>
<td>X</td>
</tr>
<tr>
<td>15 If you were able to change DT to the most innovative company, what would be your most significant measures?</td>
<td>Identify levers to increase the ability to innovate that may have to be taken into consideration by InMus or structural solutions.</td>
<td>X</td>
</tr>
<tr>
<td>16 What are the advantages / disadvantages about doing this interview &amp; research as an “DT internal”?</td>
<td>Results are used in the methodology part 4.6.2 „Doing Research as an Internal“.</td>
<td></td>
</tr>
<tr>
<td>17 Do you have any last thoughts or comments on the previous discussed aspects or something forgot to ask?</td>
<td>Identify further aspects, which need to be addressed in the interview schedule. [e.g “Question 14” on the basis of the Pilot Case]</td>
<td>X X X</td>
</tr>
</tbody>
</table>

**Methodology Check**

**Questionnaire Check**

**Table 22: Interview Schedule - Data contribution matrix**
Access to potential interviewees was no serious problem (see also 4.6.2: ‘Doing Research as an Internal’). Sending a short description of the objectives of the interviews (see appendices: Data Instrument – Interview Schedule), generated significant interest in participating in such an interview in most cases\(^\text{134}\).

The people interviewed for each case should reflect the various parties involved in the InMU context, not least because different managers could hold different perspectives on the same issue. 31 semi-structured interviews were carried out with managers on various hierarchical levels (top managers, senior as well as functional managers) and with various business functions (managers of InMUs as well as managers of units related to InMUs, such as product management or marketing). The composition of the group of interviewees was thus as follows:

<table>
<thead>
<tr>
<th>Relation to InMU</th>
<th>Member of an InMU</th>
<th>InMU relevant business unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Manager</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>(Decides on strategies, headed the unit)</td>
<td>[E1]</td>
<td>[E2]</td>
</tr>
<tr>
<td>Functional Manager</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>(implements decisions)</td>
<td>[F1]</td>
<td>[F2]</td>
</tr>
</tbody>
</table>

Table 23: Interview Distribution in the Case Organisation

Note: The codes [E1, E2, F1, F2] specified in the table are used with the quotes in chapters five and six in order to clarify in more detail the source of the statement without allowing any conclusions to be made regarding the identity of the actual person involved. This „coding“ ensures the confidential handling of the data from the interviews that the interviewees were assured of.

\(^{134}\) Except for one board member who could only be “interviewed” in written form by sending the questionnaire to fill out and returning it to the researcher; one senior executive declined to arrange a date for the interview.
All interviews were conducted on a face-to-face basis and lasted between 60 and 90 minutes, with the exception of three interviews that lasted nearly two hours. This was mainly due to the interviewees responding to the questions in different levels of concrete detail; in some cases, not all of the questions planned were able to be addressed, despite a 90 minute duration. Nine interviews were tape recorded by agreement with the interviewees. While this had the advantage of allowing the interviewer to focus entirely on the conversation, tape recording has also some disadvantages e.g. inhibition of the interviewee and destroying the atmosphere of intimacy, etc. (c.f. Berent 1966; Easterby-Smith 1997; Yin 1994). Therefore, it was decided to carry out as many interviews as possible by two interviewers (at least nine interviews), i.e. the researcher was accompanied by a PhD peer student. Each interview was transcribed in order to bring out the important issues, quotes and observations.

The following figure sums up the timing and sequence of the semi-structured interviews:

![Interview Sequences](image)

Pilot ‘NBO': The concept for the semi-structured interviews was developed and piloted with the ‘NBO' unit of T-Mobile.

Figure 18: Timing and Sequence of Interviews

These primary data were complemented by secondary data yielded by 29 further interviews and used to support the interpretation of the collected primary data. In this context, 13 interviews were conducted between May and June 2002 within the framework of a project - called ‘Gloria’ – that was initiated by the senior management to identify ‘innovation gaps' within the Deutsche Telekom Group and in which the researcher was involved as an innovation manager. In summer 2006, within the scope of an ‘innovation audit' where the researcher was the responsible audit manager, the innovation

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See also 4.4.7 ‘Timing of Data Collection’ on page 173 and the questionnaire in the appendices on page 328.
management system of DT was investigated and an additional 16 semi-structured interviews were conducted.

4.4.5 Observation

On-site observation is a further suitable source of data to gain first-hand knowledge of social settings (Yin 1994) and to investigate or interpret social phenomena. Due to the researcher’s work role in the organisation as manager in the field of innovation, on-site observation could be chosen as a complementary data source.

In principle, a distinction can be made between direct observation and participant observation, where participant observation has been most frequently used in anthropological or ethnographical studies (Yin 1994; Easterby-Smith 1997). Participant observation represents a special form of observation in which the researcher assumes an own role and not only a passive role in the case study situation (Yin 1994).

Bryman (1995) breaks down participant observation into three further categories:

‘Covert participant’ observation, where the researcher gains entry to the organisation and observes others without anyone knowing that he/she is a researcher; ‘full participant’ observation, where the researcher is known as a researcher when negotiating entry and when undertaking research; and finally ‘indirect’ observation, where the researcher is constantly in and around the organisation but does not process a formal work role in it.

The distinction of the concrete observation type can be a matter of degree in this study. Despite a sponsorship agreement concerning the research project by DT and a working agreement with the researcher and his superior in his work role, it was assumed that most were not aware that the ‘innovation manager’ was at the same time a researcher. So at the beginning of the research, it was assumed that the researcher role was close to a ‘covert participant’ observer. But during and after the interviewing phase, the ‘innovation manager’ was also known as a researcher, which represents a ‘full participant’
observation role with a risk of ‘reactivity’, i.e. the observer might affect the normal flow of events or his presence might affect the research subjects’ behaviour (c.f. 4.6.2 doing research as an internal researcher).

Due to this and the researcher’s work role as an employee of DT in the field of innovation management during the investigated time horizon, further potential problems may arise from an active role in the organisation due to potential conflicts of interests (Bryman 1995). This is in contrast to the external observer who remains independent. This might be reflected by an excessively strong identification of the researcher with the organisation being studied, or the unconscious influencing of the investigated phenomena, so that the researcher becomes a supporter of the organisation. Conflicts of interests can also occur due to the scholastic knowledge of the researcher in his field and, due to his work role, the resulting expectation of the organisation to improve the same field. Nevertheless, the phenomenological traditions are based on the idea of the social construction of reality and claim that no researcher can be independent of the social phenomena being studied (Blaikie 1993; Easterby-Smith 1997). In order to minimise such ‘ethical issues’ (cf. 4.6.3) it was decided to use observation as a complementary method to gather information in a variety of context e.g. by attending meetings and key events (project meetings, steering boards,….) and undertaking discussions with organisational members during casual conversations, coffee breaks or lunch breaks. Furthermore, it has to be taken into account that the researcher never had the power and responsibility in his work role to make significant decisions on the relevant development and implementation of InMU activities.

Field notes were taken in connection with observations to record information primarily at the occasion of key events and the emergence of new aspects. This is because the method was not conducted on its own, but instead only played a subordinated complementary role for this research and was thus accompanied by interviewing and the
analysis and examination of documents. In that respect, this research differs from ethnographic studies, “… where researchers would live in tribal villages in faraway places attempting to understand the customs and practices of strange cultures” (Easterby-Smith at al. 1997, p. 96), and where participant observation is the main research method. Based upon the suggestion by Easterby-Smith et al. (1997) for diary methods, some structure was found necessary to give the notes focus. To assist in this, the information was structured around and integrated within the continuous data analysis process, which was supported by a software tool (see Appendices II. and III.)

4.4.6 Documentation and Archival Sources

Documentary information is relevant to every case study (Yin 1994, p.81) and includes letters, written reports, administrative documents, proposals, project descriptions, progress reports etc. as well as other studies, journals or magazine articles available in the public domain. However, the researcher must be aware that something written on paper does not necessarily reflect the complexity and reality of what happens in practice. Hence, for the purpose of data triangulation, documentation and archival sources were relevant to corroborate and argument the evidence from other data sources – in particular, the interviews and observations.

In this study, documentation was used in the first phase of data collection – all in order to identify potential case InMUs, and later on, to gain a better understanding of the historical development and the evolution of the case InMU’s role comprehension and behaviour, to verify assertions addressed in interviews as well as to verify aspects raised within the analysis phase (c.f. Figure 16: Thesis Process Map on page 145). On account of the opportunity to conduct ‘research as an internal’, his work role in the field of investigation, the official support of this research by the management of DT, associated with the relative long research period, documents from the most diverse fields and sources with varying
degrees of relevance (all the way to the minutes of high level meetings) were able to be accessed, which can be rated positively in terms of the data volume, data types and the opportunity of data analysis & triangulation. The content of documents that were labelled as ‘strictly confidential’ was only utilised within the scope of this study after prior permission of the data source (compare Section 4.6.3 Ethical Issues).

4.4.7 Timing of Data Collection

As the ‘Strategy and Techniques for Data Analysis’ section will demonstrate, one of the objectives of this thesis is to illustrate changes in the role comprehension and behaviour of InMUs. To this end, it is necessary that corresponding data be available over an extended duration. All told, data were collected over the entire duration of the fieldwork of this study within different phases between 1999 - 2006.

The first phase of data collection beginning in 1999 comprised the screening of the whole Deutsche Telekom organisation for potential InMUs. This review provided valuable insights into how DT was organised and managed in relation to innovation activities, before and after the privatisation of the group and liberalisation of the Telco market in Germany. The essential output in this respect was the identification of potential InMU cases.

In a second phase of data collection (July - September 2000), the concept for the semi-structured interviews (questionnaire) was developed and piloted with the ‘NBO’ unit of T-Mobile. The insights from this pilot case (e.g. with regard to sequence and structuring of questions, interview techniques, etc.) resulted in the questionnaire being validated (see interview schedule in the appendices) and the research design clarified.

The third phase of data collection consisted of participant observation (2000 – 2001). The researcher was involved as innovation manager in the InMU case ‘VAS’. In this phase, it
was possible to obtain deeper insights into formal and informal situations (e.g. by means of joining concept and management meetings) of the ‘VAS’ case and ‘CI’ case, as well as confidential information like draft resolutions for the board and minutes of project and management meetings – in part inaccessible for an external researcher. This information and data were further supplemented through unstructured interviews. This allowed an initial data basis to be gathered for researching the relevant questions pertaining to the ‘VAS’ and ‘CI’ case.

The fourth phase (end of 2001 - 2004) was characterised by the combination of observations and interviews. As manager of ‘Innovation Strategy’ within Product Innovation (PI case), the researcher was able to observe not only the activities of PI through ‘participant observation’, but also the corporate InMU ‘CI’. Each observation was supplemented by the analysis of documents (e.g. protocols, minutes, etc.). Furthermore, the interview partners for the further two cases were able to be identified.

In the final phase of data collection in mid-2006, the Corporate InMU (‘CI case’) and divisional InMU (‘PI case’) were reviewed anew. To this end, important data for a data comparison within the framework of a „Time-Series Analysis“ (see ‘modes of analysis’ below) were developed through document analyses, semi-structured interviews and supplemented with additional secondary data (e.g. from an audit titled ‘Innovation management systematic of DT’ ). The use of these methods allowed the identification of a change of role comprehension and behaviour of InMUs resulting from environmental change, among other things, which was included in the appraisal of the results for this thesis.

4.5 Data Analysis and Interpretation

Having presented in more detail how the data were collected, this section discusses in greater detail how the data were analysed and reported.
4.5.1 Strategy and Techniques for Data Analysis

This is a particular challenging part of the case study because, as Eisenhardt stated, “analysing data is the heart of building theory from case studies, but it is both the most difficult and the least codified part of the process” (Eisenhardt 1989, p. 539). In fact, a theory first emerges through the inductive approach of studying an empirical case. The challenge of data analysis therefore emanates from the key point that theory must be constructed before it can be validated (Patton and Appelbaum 2003). The view that the most difficult aspect of doing case studies is the analysis of case study evidence is likewise supported by Yin (1994), who therefore recommended starting every investigation with a general analytic strategy which aims at treating the evidence fairly, producing compelling analytic conclusions, and ruling out alternative interpretations Yin (1994) (similarly: Patton 2003). This overall strategy would furthermore help to make the right choices concerning analysis techniques and would thus contribute to the successful completion of the analytic phase. This strategy contributes to and renders explicit the understanding of the researcher as to how he is construing “theory”. According to Miles and Huberman (1994), this is necessary because, as analysis proceeds, that construction will – consciously or not – inevitably influence and constrain data collection, data reduction, data display and the drawing and verification of conclusions. According to Yin (2003), there are three general analytic strategies for analysing case study evidence:

- Relying on theoretical propositions
- Thinking about rival explanations
- Developing a case description

Due to the absence of a clear theoretical proposition as well as a rival explanation in the case of this study, it was decided to develop a descriptive (conceptual) framework for organising the case study which is particularly recommended in the event of complex cases. This descriptive (conceptual) framework defined the approach to data analysis and will be introduced at the beginning of the analysis chapter (Chapter 6). One lesson learnt in this connection within the scope of this thesis was that the procedure described in the
literature, according to which a conceptual framework is typically derived from theory (Glatthorn 1998, p. 87), did not lead to the desired result in this study. A definition of individual components of the framework based on different theoretical propositions resulted in the data acquired by this research not being suitable for unequivocal allocation to the individual components without overlaps. Thus, no clear structure could be identified for deriving and describing the findings in Chapter 6. The desired result could only be obtained once a conceptual framework was able to be derived on the basis of the data (i.e. as a result of ‘coding’) established within this study, guided by the relevant literature on data analysis (e.g. Miles and Huberman) and application of the subsequent analysis modes and techniques (see Table 24 below). A more detailed overview about the approach to data analysis and the coding process is provided in the Appendix III.

Based on an analytic strategy, Yin (2003) contends that any general analytic strategy can be used after data collection – for either single or multiple case studies - in practicing five specific techniques (so called dominant modes) for analysing case studies:

<table>
<thead>
<tr>
<th>Modes of analysis</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern-Matching</td>
<td>… compares an empirically based pattern with a predicted theoretical hypothesis. If the patterns coincide, a causal relationship between theory and empirical knowledge can be assumed.</td>
</tr>
<tr>
<td>Explanation-Building</td>
<td>… is a special type of pattern matching but more difficult and a result of a series of iterations. The objective of this technique is to identify causalities.</td>
</tr>
<tr>
<td>Time-Series Analysis(^{136})</td>
<td>Within the scope of a time-series analysis, several incidents are considered in temporal cohesion. The analysis is not limited to chronicles but is focused on, identifies and explains causalities.</td>
</tr>
<tr>
<td>Program Logic Models</td>
<td>… correspond to a combination of pattern-matching and time-series analysis. Incidents are presented in cause-effect chains. The empirically observable incidents are matched with the theoretically predicted effects.</td>
</tr>
<tr>
<td>Cross-case synthesis</td>
<td>… is applicable when at least two and preferably more cases are available for analysis. These cases are compared and contrasted based on a defined objective of analysis.</td>
</tr>
</tbody>
</table>

Source: depicted by author according to (Yin 2003, pp. 109 and 116-137).

Table 24: Dominant Modes of Analysis

\(^{136}\) Compare Miles & Huberman (1994, p. 434).
On top of that, Yin (1994) proposes three lesser modes of analysis\textsuperscript{137} which contain techniques that usually need to be used in conjunction with the dominant modes of analysis and which are partly only applicable for defined case study designs. For this case study, the analysis of embedded designs is particularly relevant. Nearly all relevant analytic approaches can be used. However, the larger case (here: Deutsche Telekom) remains the major interest of the study.

Against the background of the analytic strategy (i.e. conceptual framework which will be introduced in 6.1.3) for this present study, the following modes of analysis were applied:

- Pattern-matching, e.g. with regard to the validation of tasks and role comprehensions as they were derived from the literature and research
- Explanation Building in conjunction with the analysis of embedded units, e.g. to compare and contrast corporate versus divisional InMUs.
- Time-Series Analysis, e.g. to investigate the changing role comprehension and behaviour of InMUs due to environmental change (e.g. restructuring, loss of promoters)

Having presented the techniques for case study analysis, the next section will describe the whole process of data analysis.

4.5.2 The Process of Data Analysis

According to Easterby-Smith (1997), a distinction can generally be made between two main approaches to data analysis: content analysis and grounded theory. As grounded theory allows for theory development which is grounded in empirical evidence, a more

\textsuperscript{137} These are “analysing embedded units”, “making repeated observations”, and “Doing a case survey: secondary analysis across cases” (Yin 1994, p.119).
open, iterative process of data collection and analysis was applied in the case of this present study (compare Hartley 2004; Miles and Huberman 1994).

In accordance with Neuman (1997), who considers data analysis as a search for patterns in data and corresponding to the process of qualitative data analysis proposed by Miles and Huberman (1994), as well as Easterby-Smith (1997, p. 108-112) for management research, the data were read, transcribed, processed into clearly structured and compressed displays of information (mainly narrative text, tables and graphs) and entered into a computer database. They were then examined, further reduced, subsumed to a larger pattern and sorted by these categories. Examples for such tables are given in the analysis chapter, e.g. Table 29 “Core functions of InMUs in case organization” on page 247, or Figure 19 “Innovation KPIs of case organization” on page 251.

Comparisons of statements under each heading and between headings were made in order to identify overlaps and discrepancies. As a result, the categories were then redefined and recoded. In an iterative process, the empirical data were then linked to the literature in order to allow their significance for the understanding of the researched phenomenon to be recognised, as well as to infer what things mean and to identify patterns and explanations. To ensure that potential confounding and intervening variables, such as leadership or HR issues that could influence the investigated functions and organisational aspects of InMUs, could be considered, several measures were taken.

First, potential parameters which were identified in the literature (e.g. top management attention, recruiting policy, etc.) were taken into consideration by a corresponding study design (interview design, conceptual framework etc.).

Second, such aspects could be rendered explicit in data analysis, e.g. through the comparison of interview statements with documentation and vice versa. As the researcher had an active work role in the case organisation, he was aware of potential issues in this respect. He could address these issues directly in the interviews and
provide the interviewees with an account of findings for a corresponding assessment (cf. response validation: Bryman 1995, p. 164).

Finally, these variables were elaborated and taken into consideration in the analysis of this study (e.g. c.f. ‘exogenous factors’, link of ‘InMU-approach’ with the ‘Promoter-approach’) as well as the discussion of potential limitations of this study (see section 7.5).

As this present study is an embedded cases study within a single organisation, findings were first analysed individually - which helped to establish familiarity with each individual case - and after that across all cases. The different InMUs were compared in order to search for cross-case patterns. Classes of cases were made, such as centralised versus decentralised InMUs, in order to look for similarities and differences within each and between the different classes of cases. Based upon that, the analysis was re-evaluated, revised and finally completed.

4.6 Doing Research – Limitations and Opportunities

This section covers both methodological and individual, personal aspects. Thus, in addition to a full-time or part-time course of studies, both the advantages and disadvantages of 'research as an internal', etc. are appraised. This incorporates not only insights from the literature, but also personal experiences.

4.6.1 Doing Research as a Part-Timer

In contrast to a full-time student who can focus exclusively on his research, a part timer with a full-time job must take some additional factors into consideration. Studying for a PhD part time takes substantially longer than full time. Work and study activities must be reconciled over this period, generating various conflicts of which a part-timer must be aware. In addition to the regular job, a significant portion of time off must be sacrificed for
the PhD studies. This presupposes not only understanding on the part of family members - the demands of the employer must also be taken into account. On the one hand, the employer expects total dedication to the job, while on the other hand, the student (and his supervisors) wishes to successfully complete the PhD within a manageable timeframe. These different perspectives require discipline and mutual understanding. As a principle, the student should reach an agreement with his company and family and friends prior to commencing his studies as to how the various demands can be reconciled.

The personal environmental conditions must also be taken into consideration in the decision-making process. In this context, the researcher was in an enterprise that was affected by continuous reorganisation. This resulted in him finding himself in a new organisation roughly every two years, and thus a new working environment. Consequently, the agreement on supporting his PhD studies had to be renegotiated with the new employer/superior. Accordingly, he lost approx. 6 months of effective study time with each of the four changes during the entire duration of the study. Furthermore, as senior manager, his work did not involve a basic "9 to 5" job, which likewise had a negative impact on the overall study duration.

Thus, experience has shown that part-time study results in advantages and disadvantages that must be taken into consideration individually:

Advantages as a "part-timer":

- Part-time study can be advantageous regarding research methodologies (participant observation) or "gaining access to research" (typical statements "I know you and you know what you're talking about" or "anybody else wouldn't even have been given an appointment with me" (note: for the interview).
Possibly support by the employer (e.g. within the framework of management development measures) in the form of paid/unpaid leave, flexible work-time solutions or the adoption of study fees/travel expenses, etc. One's livelihood should continue to be safeguarded during the study duration.

Disadvantages as a "part-timer":

- There is no possibility of concentrating exclusively on the course of study. The employer likewise expects full commitment.

- Very time-consuming and takes longer. Study times must be brought into balance with family/partner and employer. Virtually no free time, weekends or vacations for "recuperation". It is more stressful and, therefore, greater self-motivation is required the longer it takes.

- The danger exists of a role conflict occurring in the event of the (unconscious) use of new knowledge gained from the study course in one's own working environment (influence of the study object)

Such aspects should be carefully balanced before making the decision to engage in a "full-time or part-time" course of study.

4.6.2 Doing Research as an Internal

The previous section on doing research as a part-time student already touched on some of the opportunities and risks of doing research as an internal, i.e. as a research fellow with an active work role in the organisation.

To pick up the issue of doing qualitative research as an internal addressed in the methodology section 4.2.2, a series of aspects could be identified throughout the entire
period of the study which had - from a research perspective - either an advantageous or disadvantageous effect:

<table>
<thead>
<tr>
<th>Doing research as an internal is with regard to ......</th>
<th>more of an advantage</th>
<th>more of a disadvantage</th>
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<tbody>
<tr>
<td>Getting access</td>
<td>X</td>
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<tr>
<td>Confidentiality</td>
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<td>Independence</td>
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<tr>
<td>Interpretation of data</td>
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(Depicted by author based upon interview results)

Table 25: Advantages and Disadvantages of Doing Research as an Internal

Whereas many researchers, particularly in management research (Easterby-Smith 1997), face the problem of getting access into organisations (Bryman 1995), this issue did not represent a serious problem in the present study. As a researcher with an active work-role in the investigated case organisation and temporarily in the management of innovation, the researcher had better knowledge about people, the localisation of required data (e.g. documentation, databases, etc.), had access to people and relevant material and had the opportunity to collect data over a longer period of time. It could be observed that the formal permission to undertake the research project, the sponsorship of the research project by DT, as well as a short written summary of the objectives of the research - including a short description of the practical added value of the research project that was sent by the researcher to all interviewees prior to the interviews - further facilitated access to people. It was also seen as an advantage of an internal researcher – mainly by some of the interviewed managers (compare Easterby-Smith 1997) – that the required time investment for the interviews remained limited. One interviewee stated:

„For me it is a real advantage that you directly know what I am talking about. An interview on the same issues with an external researcher would have required at least 2-3 hours which is a lot – sometimes too much.“

According to Easterby-Smith (1997), the researcher has to draw particular attention to the collection, recording, use and publishing of obtained data. Managers as research subjects
place particular demands on the trustworthiness and discretion of the researcher. They highlighted in the interviews that they tend to be more open in an interview with an internal than with an external researcher. It was viewed as a real advantage that the researcher “speaks the same language”, works for the same company and sometimes is known personally. Others, however, although no indicators could be found for that, might have hesitated to entrust something to an internal.

In accordance with Bryman (1995), a potential boundary of doing research as an internal can result from the case study approach. Mainly in case studies with a single or a small number of cases, there is a risk that the internal researcher becomes too involved in the organisation and not independent enough from the phenomenon being observed. Depending on the work role of the internal researcher there might be potential conflicts of interest between the objectives and requirements that result from the role as a researcher on the one hand, and from his professional role on the other hand. In this present study, the researcher held different positions in different functions and parts of the group (T-Mobile, T-Com, headquarters) throughout the entire period of the study, which minimised potential conflicts of interest. It might be for that reason that one of the interviewees stated:

“I had the impression I was being interviewed by an impartial researcher. This was supported by the way the questions were organised and raised, the presence of two interviewers and that you did not make comments or give feedback.”

However, some of the interviewees in this study formulated that an internal researcher might be more likely at risk to receive some “political correct” answers, to take certain things for granted, and to have some blind spots. This is why it was very important to the researcher to take time for reflection and discussion with other people (e.g. supervisors, peer students, etc.) – also from outside the organisation – in order to minimise these effects.
In spite of some potential disadvantages with regard to case studies with small samples, the advantages of doing research as an internal seem to overwhelm. An in-depth knowledge of the industry, organisation and its members was mainly viewed with regard to the interpretation of data as a real plus:

„You know the telco industry, and our company….You know the company’s history and jargon….It is much easier for you to understand what is going on and to pull everything together….And you can probe on certain matters because you have some background information.“

Overall, it therefore seems that the advantages of doing research as an internal prevailed in this study. This might be attributed to the fact that the quality of a research project on organisational units such as InMUs will always depend to a large extent on the fieldworker's understanding of the organisation and its context and how close the researcher can be to the phenomenon under investigation.

4.6.3 Ethical Issues

The wide array of recently published books and articles devoted to ethical issues of research (e.g. Christians 2000; Oliver 2003) indicates what emphasis is placed on the application of moral rules and professional codes of conduct to the collection, analysis, reporting, and publication of information about human subjects (Marshall 1998).

Ethical questions emanate from different sources. In this respect, Nixon (2003) raise the issue of positionality of the researcher, which means that each researcher wears ‘rose-tinted glasses’ to some degree due to his own position in relation to the object and subjects of the study. One important aspect of this positionality was identified by Easterby-Smith (1997) as the most frequently discussed ethical issue in management research: the responsibilities of more powerful people against those who are less powerful.
The shortcomings resulting from positionality of the researcher can – according to Nixon et al. (2003) - only be overcome by ‘deep and vigilant reflexivity’ and by being ‘attentive to the effects’ of their ‘own peripheral vision.” In order to deal with this issue, the researcher had regular meetings and discussions with his supervisors, with peer students and other people – either involved or not in the research project - who could give feedback and good advice on that issue.

A further discussion in the literature concerns what methods of data collection are ethically acceptable and how data are interpreted (cf. for instance Easterby-Smith (1997) on interviewing or participant observation; Marshall (1998) on covert observation). Or to put it another way, determining the right balance between the public right to know and the protection of the individual’s privacy and confidentiality. For that reason, a specific assurance of confidentiality was given to the interviewees that is described in Appendix I “Interview schedule” on page 328. This corresponds to what Punch (1986) calls a clash between personal and professional interests.

In order to undertake research that meets ethical requirements, Sapsford and Evans (1984) suggest that researchers should therefore ask themselves ‘Who might be harmed by my research?’ This question is likewise identified as the central theme of ethical questions in management research by Easterby-Smith (1997). They recommend that a researcher should only deceive research subjects as far as it is necessary to get by and claim to exercise due ethical responsibility with regard to the control and use of the data obtained to avoid the interests of individual informants being harmed.

A series of measures were taken by the researcher to meet the requirements of ethically acceptable research. The research project was made explicit by a sponsorship agreement with DT. The participants of the study were as far as possible fully informed about the purpose of the study and what it would involve. However, due to the active
work role in the organisation, it might be possible that not every participant of the study was aware at all times of the researcher's role – mainly when observations were made. As verbatim critical quotes could cause trouble for the quoted managers, the names of individual top managers were not disclosed. The field notes and analyses which are in the hand of the researcher will be destroyed after the completion of the research project. The risk of potential loyalty conflicts, i.e. conflicts between the role as a researcher and the internal work role, could be minimised by the fact that the researcher held different positions in different parts of the group (e.g. product management, consulting, innovation management, auditing) throughout the entire period of the study.

Not all ethical issues can be discussed in such detail here, as it would go beyond the scope of this study. The most important issues within the context of this study were considered. For further details on other ethical aspects, please refer to Miles and Huberman (1994).

4.6.4 Other Limitations and Opportunities from the Student's Perspective

"Overseas student"

An overseas student must take additional limitations into consideration that arise on account of the 'long distance'. One example of this is the contact to peer-students and the exchange with supervisors. On account of the cost of travel, ‘face to face’ communication was only possible to a limited extent and had to be supplemented through e-mail and telephone conferences. For the same reason, opportunities to participate in doctoral seminars and other 'social events’ of the university were equally limited and the knowledge that would normally be gained from such participation had to be acquired via other means.
Language

As the researcher is a “German native speaker”, German-language literature sources were able to be utilised in addition to the manifold English-language literature sources. Thus, the ‘barrier’ aspect of innovation management that receives so much attention in Germany was able to be analysed in far greater depth. On the other hand, the disadvantage of “not being an English native speaker” was that many terms in the English language can have different meanings. This potential source of error was minimised by corresponding discussion with supervisors and peer students, as well as a subsequent language check of substantial parts of the thesis by a ‘native speaker’.

Cultural issues

In addition to the language differences, a number of cultural differences also had to be overcome. On the one hand, it is beneficial to become familiar with new cultural aspects. Yet on the other hand, this also entails time and intercultural understanding until one has adjusted to the different behavioural aspects and values. In this respect, the differences between German and English culture described in the literature, such as indirectness, ‘stiff upper lip’ and the humour of British culture versus the ‘organisational’, focus-on-facts, focus-on-tasks, direct communication of German culture, were able to be experienced ‘live’, both from the perspective of the student and from that of the supervisors (for deeper insights, please refer to Hofstede (1980)\textsuperscript{138} or Gorrill (2004).

Building and Expanding Know-How

One tangible benefit of the build-up and expansion of scientific know-how realised through the PhD was the increase in requests to hold lectures at universities and amongst management circles. This allowed numerous contacts to be established and facilitated interesting debates in the research context. Last but not least, a part-time PhD

\textsuperscript{138} An extensive study of the differences in values across cultures around the world, which gives substantial insights into the relationship of culture, value and behaviour.
student, in particular, is able to pursue the promotion of management as a science: ‘It is time that managers also accept the duty of taking new knowledge into consideration’ (Pfeffer and Sutton 2006, p.46), as decisions and activities are often based on supposedly patent solutions or untested management methods. ‘In this respect, the proof of what really works is frequently already evident and simply needs to be made use of by managers.’ (p.44)

4.7 Conclusion

The main purpose of this chapter was to present and discuss the methodological issues which arose in relation to the research of the formulated research questions. In the face of the partly inconsistent results of existing research on InMUs, it was shown that a theory-building approach as proposed by Carlile (2005) would allow a better comprehension and deeper understanding of InMUs by revisiting the construct “Innovation Management Unit” and by putting a stronger focus on specific situations and context. For this reason, an embedded single case study was carried out. In order to minimise the limitations and constraints that result from a single case design - above all with regard to generalisability - a long-term approach for the study and the triangulation of data sources and data collection methods were employed. The corresponding methods, the strategy and techniques for data analysis were then briefly described. The chapter finished with a critical consideration of the researcher as a research instrument and the potential inherent opportunities and risks for the research project.
Chapter Five – Findings: The Case Organisation

5.1 Introduction

Before the findings derived from a conceptual framework for data analysis are analysed in more depth, discussed and compared with the insights of the literature with regard to the concrete research questions in Chapter 6, this chapter will describe the three main cases (InMUs) identified in the case selection (see. 4.3.4) in greater detail, in order to understand the individual cases in their specific contexts:

- Value Added Service: ‘VAS’ Case
- Product Innovation: ‘PI’ Case (both Divisional - InMU samples)
- Corporate Innovation: ‘CI’ Case (Corporate - InMU sample)

Concerning the positioning of these cases in the case organisation, please refer to the overview displayed in the case selection section in Figure 17 “Overview of InMU Distribution Within the Deutsche Telekom Group” on page 156. Further relevant key figures (e.g. number of staff, etc.) will be given in the summary of this chapter on page 224.

In order to make these case studies comparable with each other, the structure of this chapter entails a general introduction into the case (contextual overview) divided into an Introduction, Mission and a Background to the Case.

By giving a coherent account of each case in point followed by a summary and an initial analysis and evaluation on the basis of identified case specific criteria and aspects, the reader will be provided with a general understanding of the case and its characteristics in

139 “Value Added Services” (in German ‘Telekom Mehrwertdienste’): SBU of DT with focus on operator- and server-based services.
140 A short description of the distinguishing attributes of these case studies.
141 At DT, each organisational unit is lodged when founded with a so-called ‘business mission’ in which the business purpose, or the tasks and responsibilities and thus the activities of the InMU are clearly laid out.
142 If relevant and necessary - description of the case history in order to be able to understand more clearly the context and motivation behind the establishment of such a unit.
the corresponding context (case profile). These will be briefly summarised at the end of each case.

The approach to not put all the data, quotations and findings in the individual case descriptions in this chapter but to provide some complementary material at a later stage was driven by the purpose to put a strong emphasis on the cross-case consideration of the resp. findings. On the other hand, however, only once the particular features that characterise an individual case have been understood, the findings from each of the cases can be compared, analysed in more detail and discussed with the literature in Chapter 6. This will be done within a conceptual framework developed especially to this end and against the backdrop of the concrete research questions.

The advantage of this type of approach, i.e. a more in-depth analysis of the findings in a separate section rather than treating them as an integrated part of the cases in Chapter 5, is that it is easier to compare and contrast the cases and to work out and illustrate the similarities and differences in the findings with respect to the research questions. At the same time, this approach is based on the necessity already presented in the chapter concerning strategy and techniques for data analysis in 4.5.1. On account of the intense intermeshing of the individual parameters, the findings cannot be presented isolated, unequivocally and without overlaps for individual research questions. Rather, a detailed analysis of the findings is realised more on the basis of a conceptual framework in Chapter 6 which will conclude with an overview of the identified case InMU-specific characteristics.

Before moving on to the first case, the reader is reminded that quotations of interviewees will be “coded”: 
5.2 The ‘Value Added Service’ Case

5.2.1 Contextual overview

Introduction

The following case represents a divisional InMU unit (DIM). The Value Added Service Case (VAS) will show which tasks and objectives result from a well-consolidated divisional InMU concept and that a sound concept alone is no guarantee for the ‘success’ of such a unit. The case will further show which factors it is necessary to be aware of when transforming such a concept into a real, long-term operating ‘InMU Organisation’.

The case is unique as it is based upon a theoretically founded approach (so-called ‘Greenfield approach’) and a gap analysis that was carried out by external and internal consultants. Whereas the ‘Greenfield approach’ allowed an ideal organisation to be designed from scratch, the gap analysis allowed the identification of ‘areas for improvement’ within the existing unit ‘Value Added Services’ (VAS) through the comparison of the existing organisation with the ‘Greenfield approach’. The results of two approaches – the ‘Greenfield approach’ and a gap analysis – were combined to form an ‘InMU concept’ and its implementation attempted.
The data base was very profound owing to the fact that all phases of the InMU ‘VAS’ could be surveyed: from the idea of implementing such a unit, as well as the concept-phase, all the way to the implementation, running and resolution phases of the unit.

**Mission**

The formal goal of the ‘VAS’ business unit was to contribute to a significant and aggressive increase in revenues from telephone-based applications, such as penetration of operator and server-based services (e.g. voice mail, unified messaging, mass calling, operator services, telematic services, tele-learning, tele-working, etc.) and trading of content. Consequently, it could be assumed that a core aim of the InMU ‘VAS’ was to achieve these formulated objectives by means of the development of innovative products and business models.

**Case Background**

However, it would be too simple to concur on the basis of the formal description of the InMU's mission alone that these were the only - or indeed 'real' - reasons for its implementation. As will be shown, other reasons obviously finally led to the implementation of the InMU VAS. It was reported by the head of the unit ‘Telekom Mehrwertdienste’\(^{143}\) in the business segment ‘specific value-added services’ (VAS) that it was discovered in an analysis of the budget distribution that the VAS segment applied for €20 million for R&D activities in the budget planning, but in reality spent only approx. €1 million for the promotion of new and innovative products. Due to this gap, the CEO and CFO apparently questioned how such a faulty estimation of planned and actually executed innovation activities could arise. This ultimately resulted in the head of the unit ‘Telekom Mehrwertdienste’ being commissioned by the Board of that unit in mid-1998 to assume responsibility for the central coordination of R&D activities within VAS. At the beginning of February 1999, in a face-to-face meeting with the head of ‘Telekom

\(^{143}\) ‘Telekom Mehrwertdienste’ (‘Value Added Services’): SBU of DT with focus on operator and server-based services.
Mehrwertdienste’, the CEO of VAS extended this responsibility by adding [E1]: ‘You are now responsible for innovation management’. Furthermore, project monitoring to compile an overview of all current (innovation) projects and in particular the determination of ‘time to market’ was to be established. The head of ‘Telekom Mehrwertdienste’ assessed the situation in this way [E1]:

“At the beginning we [the management] did not have an overview of what was really happening in our unit as regards innovations or R&D activities – what the status of these was, which resources were used and whether these were gainfully employed. I was happy that after getting an initial overview on top of my actual activities, I now also got the official commitment from management for these tasks to be established as standard duties.”

In other words, the reason for implementing the InMU was not primarily to generate new innovations, as suggested by the official mission of the unit. Rather, it was largely intended to create transparency regarding ongoing R&D activities. Apart from the fact that the senior manager himself highlighted transparency as the initial trigger to implement the InMU VAS, several minutes of management meetings led to the same conclusion. In contrast to that, the main goal addressed in the business case of the VAS unit was to double revenue to €4 billion within 3 to 4 years by means of new, innovative value added products and services. The head of ‘Telekom Mehrwertdienste’ pointed to the (extremely high) innovation pressure on the unit when he said [E1]:

“It is virtually impossible to achieve such a goal … much greater resources would have to be invested in innovations and new business development… considering our long time to market, which results from our complex processes, we would already have to have a drawer full of business models to be able to generate such revenues in that time-frame – but we don’t”.

Therefore, in addition to creating transparency, another goal of the InMU VAS was to render a significant contribution to additional sales and the company result through innovation, regardless of the nature of that innovation.
5.2.2 The Case Profile ‘Value Added Service’

In order to specify an optimised structural approach for the VAS InMU, a Greenfield-approach and a gap analysis of the innovation-related sub-units were carried out within the scope of a project, with the aim of identifying the strong points, and above all the weak points and areas for improvement within VAS. The head of ‘Telekom Mehrwertdienste’ and leader of the re-design project argued [E1]:

“My objective was to use an in-depth gap analysis to find the most suitable lever for increasing our innovation output. We opted for internal consultants, as these know our company the best and know where the true weaknesses lie”.

The goal of this gap analysis was to design the requisite spectrum of tasks („what needs to be done“) of the new InMU VAS, taking "local conditions" into consideration. In this context, inconsistencies, low effectiveness, productivity and flexibility of the organisation with respect to project organisation (as a basis for the implementation of innovations within the area of project management), as well as ineffective resources management (avoidance of redundancy) were determined in the related project documentation. In addition, a clear technological strategy as a basis for new and innovative products and services was completely lacking, reflected in the following observation of a senior product manager [E2]:

‘I have no idea what they [InMU] really do ..... I didn’t see any paper or roadmap till now to show how we could fill the gap with new innovative products’.

This observation is supported and even complemented by the gap analysis within the project which discovered that relevant processes to promote innovation did not exist and, in particular, poor process quality was also established. The fixing of logical priorities to optimise the application of limited resources for innovative projects was lacking entirely. There was also no IT support for project control. This also led to an incomplete or even
missing project plan and documentation. In addition to process quality and effectiveness, emphasis was also given to the analysis of interfaces for deriving a role comprehension for the InMU. Numerous interfaces were identified where the responsibility of the management was not clearly defined.

This squares well with another finding. Within the scope of ‘innovation project-related aspects’, the organisation, as well as the qualification requirements of the staff and the quality of project management, were investigated. The corresponding analysis revealed weak points with regard to the organisation of innovation projects and their planning, including budgeting (e.g. no clear and comparable project definition, incomplete project staffing, incomplete business cases, unclear decision making processes, unclear project status and lacking milestones and steering mechanisms). A lack of transparency concerning the entire project portfolio was also identified. This resulted in a special Project Management Subunit (PJM) being conceptually envisaged within the InMU VAS for implementing innovation options, as operative units (product management) had no additional resources to this end. In this connection and with the absence of project controlling mechanisms, the discrepancy between the €20 million planned for innovative projects and the €1 million actually spent on them could be explained. The head of ‘Telekom Mehrwertdienste’ commented [E1]:

“I was finally able to back up my niggling feeling with some hard figures and show management [VAS] how important well-coordinated and efficient project management (control) of innovation activities is.”

He also reflected that this attracted the attention of executive management for establishing structured innovation management activities in this case by creating transparency and showing significant potential for efficiency.

Hence, the results of the gap analysis and the ‘Greenfield approach’ were bundled in a common ‘innovation management concept’ which comprised the core tasks and role
comprehension of the VAS InMU. The former head of ‘Telekom Mehrwertdienste’ and now head of the InMU expressed his satisfaction with this approach as follows [E1]:

“By combining the findings of a gap analysis and a Greenfield approach on the basis of ‘What can we do best?’, I am convinced that I have discovered the best way of structuring a functioning innovation management system”.

The following key functions to promote the innovativeness of the new segment VAS were identified by the project team in charge of the gap analysis:

- The institutionalisation of an innovation strategy, as well as the systematic generation and evaluation of ideas
- The implementation of a VAS-wide coordination function for all R&D activities and methodical, consistent and transparent innovation program/project development (portfolio management)
- Realisation of innovation projects headed by the project management subunit of the InMU
- Implementation of steering groups to coordinate all innovation activities
- Definition of quality aims (KPI's) and the installation of quality assurance

These tasks were then transferred to an organisational approach. The head of the InMU explained [E1]:

“After showing my bosses how useful a functioning innovation management system can be, I needed resources to achieve the actual goal (specifically, a significant revenue boost through innovative products) … and in a large company like Deutsche Telekom, this needs structural implementation in a corresponding organisational unit.”

It was therefore decided in September 1999 to implement a department for innovation management and a further department for project management under the umbrella of the new innovation unit ‘New Business Development’ (NBD) – which represents the InMU VAS – within the business unit ‘value-added service’.
The structural implementation of the InMU VAS gave rise to the question of how these tasks could be mapped on a human resource basis in the InMU in an environment dominated by personnel cuts. With a planned surplus in turnover through innovative new products ranging from between €1.5 – €2 billion, a significant extension of the resources basis became a necessary issue. This confronted the responsible InMU manager with the problem - to say it with his own words – of convincing his “…bosses that more resources are needed.” The requirement for additional resources, however, contradicted the targets of a current group-wide restructuring and cost cutting project geared to the bundling of business units dealing with the same - or similar – themes. The purpose was to exploit synergies and to generate additional sales, while at the same time reducing personnel. Against that background, a given, time-consuming and complex decision-making process for approving positions had to be endured, in order to be able to actually fill in practice the theoretically established posts within the InMU. In contrast, the InMU was under tremendous pressure to succeed right from the very start. Following the decision of the VAS Board (CEO and CFO) to implement the concept of the new business development unit, the CEO of VAS appeared after only a few weeks and asked the head of the InMU in a business meeting [E1]: ‘Where are your first results?’, which suggests that management is being put under a lot of pressure to obtain results (‘we need new revenues = innovation’) and the InMU is also under pressure to justify its activities (‘what are you there for then?’). The head of the InMU answered [E1]: ‘But, we haven’t got any staff!’, so that after some discussions within the management team, it was decided to obtain temporary help in setting up the unit from internal DT consultants.

In October 1999, the first eleven vacant posts were advertised internally at DT. Filling a position with external applicants was not approved owing to the attempts to reduce personnel within the Group and the ensuing recruitment stop of external experts. However, the recruitment of suitable personnel from within the Group seemed to be a
major problem (in quality and time), as can be derived from the statement of the responsible InMU manager [E1]:

‘I wonder where I am supposed to get all these internal people from… Expertise and innovation know-how are needed… The employees whose jobs have been cut elsewhere are not of much use in this respect.’

This correlates well with the corresponding recruitment list that showed that three months later, only eight of the 30 vacant posts had been filled before a new cost-cutting programme which entailed a further 34% staff reduction was initiated. As a consequence of this project, all remaining and still open positions were eliminated and the internal recruitment announcement was withdrawn. A senior manager of VAS described the situation as follows [E2]:

‘In many cases, the effect of the reorganisations fizzled out. No sooner had one reorganisation been ushered in when the next was tackled – without waiting to see what effect a new structure would have. Because we have far too many reorganisations [almost one a year], the employees have no time to get settled. They ask, ‘Are we still going to be around tomorrow?’, rather than taking time to think about innovation’.

Every intervention by the VAS board, pleading that the new ‘InMU VAS’ is still in its implementation stage and that the critical personnel cover to reach the new planned turnover had not yet been reached, was to no avail. The board had to adhere to the respective personnel restrictions resulting from the cost-cutting initiative, and had to face arguments from product management units such as ‘We are achieving sales even though we have too few people’, a comment made by a senior product manager at a management meeting [E2]. As a result of this, it therefore made sense for the board manager to cancel turnover planned for the coming fiscal year rather than to transfer personnel from turnover – achievers to think tanks, thus endangering income. This can be seen as an indicator that the management was ultimately not really convinced of the necessity of the InMU.
Having not had the possibility to achieve the critical personnel size needed to assume all planned tasks of the InMU, a new focus was set within the InMU VAS – on the realisation of ‘quick wins’. A manager of the InMU mentioned in a meeting [F1]:

> ‘We have to come to terms with the fact that we will not be able to take on any more staff in the foreseeable future…We now have to decide which tasks we can usefully perform in this situation… where we can add the most value with our limited resources’,

Once the implementation of radical innovations in the envisaged form proved to be futile, an alternative field of activity geared towards value addition was sought, ideally comprising the generation of „quick wins“.

Significant problems were already established in product management during the conceptual phase of InMU VAS. Therefore, they were now offered support in the introduction of new products. This support service was readily accepted by the product management units which is strongly indicated by the fact that all members of staff were involved in corresponding product management projects within a short period of time (e.g. in drawing up market studies or business models of incremental innovation). The ‘quick win approach’ was an attempt to gain recognition and ensure eligibility for additional resources, also in times of budget constraints.

The pressure of proving efficiency, i.e. verifying the added value of the committed resources, was increased even further by the organisational link \(^{144}\) to the Senior Executive Vice President Finance & Controlling (CFO) – and the associated lack of a direct link between the InMU and the CEO. This gave rise to a classic conflict of goals and mindsets (e.g. cost versus investment; short term results versus medium-term action, etc.). According to an innovation manager of that particular InMU [E1]:

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\(^{144}\) The S&F Research and ‘promoter-approach’ identify the need for a link to the TOP Management.
‘The link to Controlling is a killer criterion. Innovations need freedom to develop ... and controlling attempts to use cost-benefit reasoning to specify plans for concepts that are inherently non-specific. ... The success of innovations only becomes ‘visible’ in the medium to long-term ... They're far too operational in nature ... We basically have a collision of two conflicting mindsets here ... Should I ever wish to work in an Innovation Management Unit again, I'll take a good, hard look at the decision-making and reporting channels beforehand ... If they're not up to scratch, the unit has zero chance of survival.’

An explanation of this conflict can be found in the financially relevant goals for the CFO, such as compliance with budgets and cost reductions (materials, investments, human resources). This was offset by the contradictory goal of being innovative, associated with the necessity of taking risks and making investments. In this case, the situation was further aggravated by personal tensions - addressed by head of the InMU - between himself and his superior the CFO, who was opposed to granting the InMU the corresponding leeway (via power backers). This could be confirmed by an analysis of minutes of corresponding business meetings, which showed that InMU-related topics were submitted, discussed and passed by the CFO without the knowledge and inclusion of the head of the InMU.

As a further critical issue revealed the implementation of a planned ‘Innovation steering committee’ (IBC), which failed to transpire on account of the lack of resources and the focus on quick wins. Interestingly, within the scope of the interview, particularly regarding critical success factors for the survival of an InMU, the CFO commented that, in his opinion [E2]...

‘...the early installation of the ‘IBC’ would have substantially improved the value of the InMU’ [according to the motto: 'Don't hide your light under a bushel'] and the respective management attention would have been ensured throughout all areas of the VAS Business Unit’

This indicates that a functional steering mechanism could have helped to overcome other limitations (e.g. resource deficits, communication deficits, etc.). But the introduction of a committee (IBC) to control innovation activities within the business unit VAS did not come
about. The R&D project survey was initially sufficient for the CFO to act as a control instrument for innovation activities. The head of the InMU VAS pointed out [E1]:

‘As I was then excluded from senior management meetings, it became clear that innovation no longer lies within the focus of the management...We should have taken responsibility for our own marketing much earlier...From today’s point of view, I would never again accept responsibility for tasks in the area of innovation management at Telekom. You can only loose ... It simply takes too long before the fruits of your work become apparent. In an environment of constant reorganisation where one does not even wait long enough to see if it has any effect, new themes simply have no time to work.’

Just a few months later in the summer of 2001, the Executive Board of the Group decided to transfer the business unit VAS to the T-Com pillar (i.e. the fixed network line of business). In this manner, the business unit VAS was absorbed into the new organisation of T-Com after being in operation for 1½ years. Owing to these circumstances and apart from the continuation of existing measures (e.g. R&D co-ordination and monitoring), the comparison of the task-descriptions of the InMU with the tasks actually realised showed that only a few of the planned InMU tasks were put into practice within the short establishment phase of the InMU organisation (Sept. 1999 – Feb. 2001). Among these was the conception of an idea evaluation system (idea filter and intellectual property right process), as well as creativity workshops for the identification of product ideas and new business models. The implementation of the individual processes could only be completed in part. In cooperation with the project management units, individual creativity workshops were carried out, incremental product ideas generated and passed on to the board of VAS. Obviously, there was no time and commitment for the original plan to foster more radical innovation. The CFO VAS described the detrimental effects of the transfer of VAS and the high frequency of change within the case organisation DT as follows [E2]:

‘If chickens are meant to lay eggs, then they shouldn’t be constantly chased through the chicken run; they should also be permitted to sit’,
This indicates that an excessively high frequency of restructuring can have a significant negative effect, although the literature regards reorganisation as being stimulative to innovation on account of the associated departure from encrusted structures - aspects which will be analysed and discussed in more detail in Chapter 6.

5.2.3 Summary of ‘Value Added Service’

On the basis of this case InMU, it was possible to show that a profound conceptual structural approach which describes the core tasks and role comprehension of an InMU is in itself not enough to successfully implement and operate such a unit.

This was illustrated by the rise and fall of the VAS InMU which took no more than 16 months and which is summed up hereafter chronologically:

- **Mid 1998:** As a result of a corresponding decision by the VAS management, the head of ‘Telekom Mehrwertdienste’ was charged with overall responsibility for the central co-ordination of R&D activities.

- **Feb. 1999:** As a result of a complementary decision of the VAS management, the head of ‘Telekom Mehrwertdienste’ was further tasked with innovation management activities. He simultaneously initiated a project aimed at identifying strong and weak points of current innovation activities in value added services.

- **September 1999:** In order to respond to the project results and identified weak points (e.g. lacking transparency of innovation activities in value added services), the decision was made by the VAS management to implement a dedicated VAS InMU and to build up a corresponding organisation. Mission, core tasks and resources were clearly defined.
October 1999: Start of the corresponding recruitment. An initial set of eleven vacant posts was advertised internally.

January 2000: Just eight of 30 vacant posts were filled. At the same time, a cost-cutting programme was started that entailed an overall staff reduction with an order of magnitude of 34%. As a consequence, all positions of the VAS InMU that were still vacant were eliminated. The effect on the activities of the VAS InMU will be analysed in more detail in Chapter 6. In particular, these include: recruiting rules, short-termism (shift to quick-wins), the link to the top management (here: CFO), importance of steering mechanisms and frequency of organisational change.

Summer 2001: Within the scope of the implementation of a decentralised group organisation, the Executive Board of the Group decided to integrate the business unit VAS (including the InMU) to the new fixed-line business unit ‘T-Com’.

In the following section, the second InMU case will now be introduced.

5.3 The ‘Product Innovation’ (PI) Case

5.3.1 Contextual overview

Introduction

The following case addresses a further divisional InMU unit – part of the T-Com (i.e. fixed network) division of the Deutsche Telekom Group. The case is particularly interesting in light of the fact that the concept of this case is regarding the defined core functions very similar to that of the VAS case, albeit with some significant differences: e.g. there is no implementing unit (comparable with Project Management, PJM within VAS) for new product innovations.
Mission

According to corresponding documents of the organisation development department, the mission and, consequently, the objective of the ‘InMU PI’ was to draw up a concept for and prepare a market evaluation of forward-looking innovation ideas on the basis of market-related parameters and their implementation together with internal and external partners. The emphasis was to be on the transformation of technological (technology push) and market-related (demand pull) options into concrete product ideas with maximum potential. As such, 'PI' was in charge of and responsible for the fuzzy front-end function of the innovation process.

Case Background

As described in more detail in the VAS case, in the summer of 2001, the new organisation of Deutsche Telekom with its 4-pillar strategy was realised and thus the transfer of the business unit VAS into the T-Com pillar was decided by the Executive Board of the Group. Once the operational confusion regarding the restructuring and formation of the new T-Com pillar had settled somewhat, a ‘product generation’ unit (PG) was placed within the T-Com pillar under new management and tasked with new activities (focusing on project management). After just a few months, however, the new Management Board came to the conclusion that the new structure of T-Com and the product management and marketing units integrated therein were predominantly geared towards efficiency, and that nobody outside of T-Com considered that the subject ‘innovation’ (especially the ‘fuzzy front-end’ function) should also be positioned within T-Com’s purview. The new ‘product innovation unit ‘PI’ (InMU PI) was thus established, which replaced PG and was associated with the exchange of the responsible senior manager. Thus, the ‘InMU PI’ was officially established in December 2001.
5.3.2 The Case Profile, 'Product Innovation'

When establishing the InMU Product Innovation (PI), the challenge on the organisational side was to clearly define the tasks and the role of ‘PI’ to avoid any overlaps with the tasks and roles of the other operational business units. Two initial parameters were determined: the head of the PI unit (directly reporting to the board member in charge of marketing/sales) and the business purpose (see ‘Mission’ above). PI’s internal structure was therefore fixed in early 2002 and corresponding core functions were assigned. The following four areas were established:

- ‘Technology Management’ was to focus on the technology/platform-oriented aspects (technology push), i.e. identify technology trends and demonstrate their relevance for T-Com’s business, and development of demonstrators for exhibitions.

- The focus of the ‘Innovation Strategy’ sub-unit was on the consolidation of technology, market and customer aspects and transforming them into a T-Com innovation strategy.

- The sub-unit ‘Product Ideas & Knowledge Management’ concentrated on the systematic generation of product ideas (e.g. creativity workshops, implementation of evaluation tools) and coordination of bringing about realisation decisions via steering boards; implementation of a knowledge management system (e.g. T-Com-wide database for product ideas).

- ‘Innovation Management’ was dedicated to evaluating ideas in terms of market relevance (business models) and development of showcases (e.g. ‘House of Innovation’ – vision / ideas of T-Com innovations represented in a ‘future home’).

The decision in favour of implementation was followed by the structural realisation. A technology scouting team already existed in the predecessor T-Com organisation that was now simply assigned to PI in organisational terms; the same happened with the innovation management function, although this team used to perform different tasks before (project management). As a consequence, these functions were implemented
rapidly in everyday operations; what still needed to be done was to fill the vacant positions in the Strategy unit and in Product Ideas/Knowledge Management. Similarly to the VAS case, problems arose in this context in the structural implementation on account of the existing recruiting rules, with vacant posts not being able to be filled until about nine months later on the basis of internal advertisements. The PI staff were not exactly experts in their new field and first had to acquire the necessary expertise. A senior manager noted [E1]:

‘A specific skills profile was required. We were looking for employees who embrace change, who have a messianic eagerness coupled with a desire to win, and who are extremely flexible, both intellectually and with regard to their tasks.’

This is reinforced by the comments of another manager who at the same time criticises the ban on hiring external applicants [F1]:

‘The question is whether it makes sense to tackle a new topic without any external expertise … For special tasks like these we need people who know what they are doing, otherwise we loose too much time …. and the lack of know-how causes us to make the same mistakes from which others have already learned their lesson.’

In terms of the role comprehension, it was interesting to note that at this stage of the process, neither the nature of the product innovations to be generated - more incremental and/or more radical? - nor the issue of the operational implementation of innovation options was clearly addressed. A senior manager commenting on the last aspect [E1]:

‘In the design phase, an implementing unit was deliberately not planned within PI because the people responsible for the organisational structure felt that implementation was a Product Management task. They thought that we should agree with the product managers on which ideas are good enough

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145 The Group’s employment freeze made it impossible to look for external applicants.

146 The organisational design of new units is supported within DT by a special organisation development unit (OG). This unit aims to ensure that the tasks/responsibilities are formulated without overlaps. Furthermore it stipulates the number of positions for this unit as well as the titles of the corresponding functions. The unit also defines the pay grades, i.e., the financial framework for the function in question together with the HR department.
to be implemented… After all, there already was such a unit within Product Management which supported Product Management in launching or piloting new products’.

This suggests that the point of transfer (i.e. the point at which an innovation option is transferred for further implementation from the InMU to Product Management) will be of importance as to whether or not an innovation is ultimately launched onto the market. As a matter of fact, obstacles were identified in this respect when it came to implementing innovation options (product ideas). Although a ‘generic innovation process’ (called PRIMA) was established within T-Com and the point where the product ideas were delivered to Product Management was clearly defined (“transfer point”), a problem of lacking resources was identified that was apparently due to a low level of willingness to provide resources from the Product Management Units for the implementation of concrete innovation projects. As one senior manager from a Product Management Unit commented [E2]:

‘We have to continuously cut more and more staff, while still meeting identical or even elevated sales expectations … It's only logical that we're unable to provide much in the way of resources [human/budgetary] for implementing new and unplanned innovation projects that won't reap any benefits for another year or so.’

This could likewise be illustrated by the decision-making body (Product Board) which was installed at Gate 1, i.e. at that stage when decisions on the further realisation of product ideas that have potential for success are made through the Product Management/Marketing).

The product ideas were presented to this board, which comprised representatives of Product Management/Marketing and Innovation Management (InMU PI), who then decided whether an idea would move into next phase of the innovation process (i.e.
evaluation of product ideas) and thus into the responsibility of Product Management / Marketing.

By analysing corresponding minutes and decision papers it proved that in many cases the Product Board did not decide in favour of the idea at Gate 1. When looking for the causes of this, some managers complained that the potential of the product ideas could not yet be put into figures (although the process provided for the figures to be quantified at the following stage), or product ideas were often rejected on the grounds that the product idea cannibalised the existing business; it was said that the idea was so new that there was no product management for it as yet, or Product Management claimed that they had too much work to do and only limited resources. A senior manager of this board noted [E2]:

‘What should I do? We are only a small group of people and have projects up to our ears… PI arrives with new ideas that I am supposed to implement, but I lack the resources for all this… On top of this, we are in the middle of drastically cutting back our project portfolio because we have too many products on the market.’

As no suitable resources for project implementation were available, either in the InMU or in Product Management, and this deficit impeded the decisions for further implementation, PI started trying to simplify the Board of Management’s decision. This was achieved by pushing the further development (including the development of a ‘demonstrator’) by sub-contracting to third parties. The ‘demonstrator’ - to which a crucial role was attributed in the interviews, especially by representatives of InMUs - was then presented by the InMU to the management of the corresponding decision boards. One manager explained the importance of prototypes or ‘demonstrators’ of more radical innovation in the decision-making process as follows [F1]:
‘It is amazing to see how enthusiastic management can get about something that they can play with … it makes it much easier to sell them a vision and to get approval to continue working on the idea.’

These findings suggest that a possible expansion of the classic spectrum of tasks of an InMU (fuzzy front-end management) all the way to the demonstrator/piloting phase should be investigated more closely within the framework of the analysis in chapter 6.

In this connection, a positive side-effect of demonstrator/piloting with regard to the self-marketing of the InMU – an aspect which was partly neglected in the VAS case - should be mentioned. Aided by his extroverted demeanour, the head of PI endeavoured to position the topic of innovation in the relevant executive committees, thus creating awareness of this issue. To this end, the head of PI focused on generating ‘quick wins’ for management from the outset, e.g. by preparing analyses and concepts at short notice for business meetings and strategy meetings or by constructing prototypes for the T-Com Board of Management, trade fairs and exhibitions, etc. According to one manager from the unit [E2]:

‘He is excellent in selling. He knows how to turn the spotlight on us – or rather, himself – and keeps weaving the topic of innovation into the conversation… I think that this is the only chance for us to persist in the next round of rationalisation.’

This argument was not unfounded given the constant restructuring at T-Com, accompanied by job losses of around 10% per year.

Within the context of innovation projects, costs were one of management’s top priorities in the newly established T-Com pillar from the very beginning. For example, there was resistance in budgetary matters from the start, as a senior manager commented in an annual budget-planning meeting [E1] – ‘You certainly want to know whether it’s going to be worth it or not’ – with the result that there was never a separate innovation budget for
more radical innovation. Instead, it could be observed that the financial resources for radical innovation resulted mainly from budgets dedicated to (incremental) product development projects, consulting projects, market research, trade fairs etc. According to some managers, this situation did not change even though the value added by the ‘InMU PI’ was repeatedly demonstrated through intensive communication of the unit head in executive meetings, and the necessity to drive forward more radical innovation was also clearly addressed in the T-Com strategy.

In light of the limited resources and a non-functional steering committee (Product Board) within the context of radical innovation, a new discussion and decision-making platform was needed, and so the 'Innovation Board' (DIC: Divisional Innovation Committee) was implemented. The main goals of the DIC were to establish a steering committee for T-Com's innovation program, to ensure (and, if necessary, to push) strategic innovation activities and to consolidate necessary innovation activities. The DIC was broken down into a working group (DIC working group) comprising managers from the first reporting level – Marketing, Technology, Strategy, Processes, International, and Production. A senior manager described this initiative as follows [E1]:

‘In the Product Board, no one listened to us when we talked about things that had a medium-term focus or a strong technological focus… the issues were simply too far removed from day-to-day operations… The DIC was different in this respect…. Here, technological or strategic topics could be discussed… It was just a pity that after only a few DIC meetings it became increasingly difficult to set a date on which everyone would be able to or wanted to attend.’

This gave rise to the problem that after just a short time, this hierarchy-based board failed. This became evident in that the meetings were increasingly attended by deputies only and after a short time, the committee was no longer able to make decisions. This indicates that steering mechanisms and committees should likewise be subject to closer appraisal in Chapter 6.
During the next round of restructuring in T-Com in early 2003, the change in priorities within the InMU PI was also reflected in the organisation. The significance of knowledge management was downgraded, for example, and the resources tied up in this area were used to drive forward activities in the area of product idea generation. Innovation management is supposed to increasingly focus on generation/evaluation of business models and was renamed accordingly. Now that the focus was more on business models with more radical character, in contrast to the original ‘fostering product ideas’ mission, a greater need arose for an innovation budget used exclusively for implementing innovation options (at least up to the pilot phase) by sub-contracting third parties. Concepts were drawn up for this, but a separate innovation budget was not made available in the period under review for innovations with more radical character on account of the constant reorganisations and changes in decision-making channels. One manager summarised this with the following words [F1]:

‘For innovations, we need to move away from this planning and justification policy … The best thing would be for T-Com to say ‘We will finance innovation’ … and earmark €x million for it. When someone has a good idea, he will get the funds to further develop or implement this idea on his own… If we discover later that the money was not used properly, this individual will face the consequences.’

This opinion illustrates a conflict arising from short-term goals.

As a result of PI’s experience in relation to the constraints in implementing the InMU, awareness grew that integration in such an environment for promoting radical innovations is not conducive to goal attainment and separation from the operational management should be aimed for instead. Therefore, in the final months of the period under review, an innovation hub concept was developed that was designed to facilitate the implementation of innovation concepts with more radical character as a by-pass to the existing T-Com structure. While these efforts were welcomed by the areas of Strategy, Human Resources, and Organisation, no decision on their implementation was made during the
period under review. In Summer 2006, this hub approach was realised within the scope of a restructuring of T-Com.

5.3.3 Summary of 'Product Innovation'

The Product Innovation case showed again that a sound concept alone is no guarantee for the ‘success’ of such a unit which is summed up hereafter chronologically:

- Summer 2001: The ‘fixed-line business’ pillar (T-Com) was formed. Simultaneously, the sub-unit ‘product generation’ (PG) focusing on project management was placed within the pillar. A few months later, the Management Board recognised that product management and marketing units within T-Com were predominantly geared towards efficiency, and that nobody was accountable for ‘innovation’.

- Dec. 2001: The ‘Product Innovation’ unit (InMU PI) was officially established to be in charge of ‘innovation’ (especially the ‘fuzzy front-end’ activities) within the pillar.

- Early 2002: InMU PI’s internal structure (Technology Management, Innovation Strategy, Product Ideas & Knowledge Management and Innovation Management) was fixed and corresponding core functions were assigned; start of the corresponding internal recruitment process – staffing completed 9 months later.

- Early 2003: A steering board (Divisional Innovation Committee) was installed to coordinate innovation activity and resources within the pillar; InMU resources originally planned for knowledge management activities were reallocated to amplify product idea generating activities.

- Begin 2006: In the final months of the period under review, based upon the InMU experiences in relation to the constraints in promoting radical innovations, an ‘innovation hub’ concept was developed to facilitate the implementation of innovation concepts with a more radical character as a by-pass to the existing T-Com structure.
In Summer 2006, this hub approach was realised within the scope of a further restructuring of T-Com.

It is interesting to note that the case InMU ‘PI’ concept is very similar to that of the VAS case as regards core functions, albeit with a significant difference: there was no implementing unit (comparable with Project Management, PJM within VAS) for new product innovations. However, numerous identical and different aspects arose in this case InMU that must be taken into account in the analysis chapter 6. In particular, these include: recruiting rules, funding principles of innovation projects, effects of reorganisation, steering mechanisms, the “transfer point”, core tasks (idea generation up to the piloting/ demonstrator phase) and integration versus separation of InMU’s to foster radical innovation. Beforehand, however, the next section will introduce the last of the three case InMUs.

5.4 The ‘Corporate Innovation’ Case

5.4.1 Contextual overview

Introduction

The following case applies to a Corporate Innovation Management Unit and is unique because the Corporate InMU was a singular entity within a company / group of companies, and the data presented cover a relatively long period of running business. Some interesting effects could be identified within the scope of the interaction of the corporate InMU with the divisions aiming at providing added value. In addition, due to a virtually complete replacement of staff and a new management team during a further reorganisation, an altered task structure geared more towards incremental innovation activities could be identified.
**Mission**

According to the formal definition of its mission, the Corporate Innovation Management ‘CI’ was supposed to coordinate the Group-wide R&D activities (incl. budgets) at an aggregated level (in contrast to DIM’s and their SBU-specific focus) and to provide innovation transparency inside the Group and – also from a later point in time – implementing a world-wide network of universities and industry partners in order to strengthen its position as an ‘architect for innovation’ inside the DT Group. Other goals of the InMU ‘CI’ also comprised the implementation of a Group-wide innovation/technology strategy, the identification and leveraging of cross-SBU synergies through cross-pillar, integrated business models with a focus on new markets (radical innovation), as well as the generation of intellectual property rights excellence.

**Case Background**

Initially established as a central department in DT’s headquarters with the organisational implementation of a decentralised group-organisation (the so-called ‘four-pillar strategy’147), it was also necessary to reorganise the positioning and tasks of Central Innovation Management – at this stage called ‘Information and Innovation Management’. The declared goal of the Group's reorganisation was to achieve a new competence structure in the parent company (Headquarters) and four Divisions (T-Mobile, T-Online, T-Systems and T-Com). The aim for the Divisions was to have more autonomy in the design of the marketing-mix and to pursue a consequent growth strategy. As far as innovation activities were concerned this strategic change naturally entailed the redistribution of corresponding tasks between Headquarters and the now restructured Divisions.

It could be derived from draft resolutions for the board on strategic issues, internal and external presentations (e.g. for employees, shareholders, etc.) and informal interviews

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147 I.e. the implementation of a decentralised formal organisation consisting of four divisions: fixed-line, mobile, Internet, systems business.
with members of the strategy and organisation departments that, from the perspective of Headquarters, ‘technology leadership’ was still the professed Group goal. Due to the continuing liberalisation of the T.I.M.E.S. markets – accompanied by increasing competition – it was also necessary to respond adequately to the increased innovation pressure on the Deutsche Telekom Group. In addition, tapping the full synergy potential between the Divisions was another clear goal of the four-pillar strategy (convergence). These developments meant that the tasks of a central innovation management unit had to be rethought. The design and formation of the new corporate innovation management (CI) had to represent added value for the Divisions and had to have a cross-divisional character, which could not be experienced by the Divisions themselves. The general distribution of tasks was defined in interviews as well as in draft resolutions proposed by CI in the following way: CI ought to undertake and centrally administer a forward-thinking outlook with an effect on the whole Group, whereas the Divisions ought to undertake pillar-specific innovation activities with a direct impact on the markets.

5.4.2 The Case Profile ‘Corporate Innovation’

Early 2001 finally saw the implementation of the Corporate Innovation Management department within the scope of the implementation of the ‘four-pillar-strategy’, directly subordinated to the Board of Management member with responsibility for Technology and Services. The goal was the efficient management of innovation activities. For this, the following sub-units were implemented within Corporate Innovation ‘CI’:

First, the ‘Innovation Strategy’ department was – according to its formally defined objective as specified in relevant documentation of the group’s OD department - supposed to develop a Group-wide innovation and technology strategy, create transparency, and implement this strategy in coordination with the divisions. Activities

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148 Over time, the Innovation Management department changed its abbreviation from ‘INM’ and ‘ZBI’ to ‘I’ and ‘T&I’ then to ‘IFE’ (current abbreviation); in the interests of standardization, ‘CI’ will also be used in the quotes as a synonym.
also focused on the guidance of venture activities and the definition of project goals for corporate R&D. Coupled to this were the issues of innovation reporting and relationship management with the goal of pushing networks, spin-offs, marketplaces and communication, i.e. the hitherto formally defined tasks of the innovation strategy sub-unit. In practice the Management stressed the need for optimisation under divisional and corporate aspects. A senior manager of Innovation Strategy put it this way [E1]:

‘What I was trying to do was to combine all the strategies under the Group strategy. I never succeeded. It was partly due to the people involved... I could never relate to them ... for some reason, we [head of CI, head of Group Strategy and he] just had nothing in common ... or it was a hierarchy thing... Today I would put more energy into maintaining contact with Group and Division Strategy much earlier on.’

This suggests that in a hybrid approach, the interaction of the Corporate InMU with the Divisions represents an important aspect in the role comprehension and goal attainment of InMUs. This appraisal is supported on the divisional side by the following comment of a senior manager on innovation strategy at T-Com [F1]:

‘The innovation strategy developed by CI was all well and good, but they’re sitting in an ivory tower...they need to go down to the divisions more often, integrate them and deliver added value ... We came to the same conclusions as them, but we go one step further and develop concrete measures for operations... I don’t tell them everything we do, so that they don’t turn around and sell the issues as their findings.’

This is an attitude that was also said to having had implications for the efficient reporting of the Group-wide innovation activities and was stated as one of the main reasons why an intranet marketplace\(^{149}\) for innovation petered out.

A further sub-unit was the ‘R&D’ unit which controlled and monitored the R&D program in the Group. Using the ’mega projects identified, basic concepts for projects were initiated

\(^{149}\) An intranet link where people could exchange ideas for innovations and possible products internally.
and implemented – ideally in co-operation with the divisions. The integration of the divisions was classified by nearly every interviewee from the InMUs as in need of improvement given the different objectives and granulation of the project results in some cases. One senior manager of a divisional InMU argued that:

‘CI has a lot of money to drive a lot of nice projects but their time focus is much too far ahead in the future for me to be able to use the results immediately … In some matters we will continue up to the point where we can generate added value from them without investing too much of our own resources [manpower] in them.’

A further divisional manager commented:

‘Sometimes I wonder where ‘CI’ adds value … they have a huge budget, which is ultimately distributed among the divisions as overhead costs and then they get TS/T-Nova to do the actual work … ‘From the divisions’ perspective, I feel that little value is added,’

The issue of potential for improvement of interaction was thus addressed again in terms of implementing innovation projects. Furthermore, it is evident that the funding of innovation projects is another important aspect in this context that requires closer appraisal. In contrast to the two previous divisional cases, this corporate InMU had its own annual innovation budget of an order of magnitude of several tens of millions of euros, which was available for the sole purpose of driving forward innovation activities with a radical character.

The third sub-unit, the ‘PRIMA’ department, was supposed to ensure systematic product lifecycle management in the Group by introducing support software (named PRIMA). For this purpose, DT’s generic innovation management process was mapped in a SAP software application developed to this end. The Group-wide introduction of this software

150 Mega projects were projects with a long-term focus (3-5 years). They were cross-division projects with a strong technology orientation. The decision to implement a project was made by a central innovation committee. The project was headed by the Corporate InMU and usually completed with the construction of a demonstrator or pilot.
was aimed at accompanying the management and members through the entire innovation process, from the decision of product realisation and the launch of the product on the market, all the way to the product exit. As the divisions had a certain degree of autonomy, this software has only been bindingly installed in T-Com so far. In comments which echoed the reasons for this poor acceptance at operational level, one product manager criticised the effort/benefit aspect saying [F2],

‘The PRIMA tool cost a lot of money and product managers cannot really see what value it will add… I have to enter a whole load of data to have the next Gate level approved … it is a whole lot more work than in the past.’

However, the PRIMA tool was also implemented to deduce Innovation KPI's. After all, the managers within the case organisations were managed by means of target agreements (Balanced Scorecard), and a significant portion of their bonus was tied into these agreements. The BSC also includes the quadrant ‘Innovation’ that featured the innovation KPI ‘Innovation Rate’\(^\text{151}\) for the first time in 2004, but which was not applied consistently across all divisions and based on past performance. This can be derived from the fact that not all BSC’s of the divisions and individual objectives of senior managers contained this KPI. Reasons for this were considered by many managers to be the data quality and, therefore, the added value and the informative value of the KPIs generated were considered to be in need of improvement. In addition, this KPI, according to the manager responsible for the target-setting process, was only assigned to managers of InMUs though. The reason being that the other (operational) managers had already been given multiple targets (like turnover, EBITDA, customer satisfaction, etc.). The upshot: senior managers that interact directly with InMUs (e.g. from product management / marketing) or with a significant impact on the innovation activities (e.g. potential promoters) had no direct innovation targets and were ultimately not rewarded (in monetary terms) for tackling

\[ \text{Innovation rate: } IR = \frac{\text{external turnover of products brought in to the market in the last 3 years}}{\text{total external turnover}} \times 100\% \text{ in percent.} \]
innovation topics with increased risk focussing on the medium/long term, or for supporting InMUs in their work. It thus became clear that innovation KPIs and their anchoring in corresponding target agreement systems require closer appraisal in Chapter 6.

A further interesting aspect emerged within the scope of this case. In the interviews, the CI managers highlighted the importance of board members as champions and promoters of innovation. At the beginning, the member of the Group’s Board of Management responsible for Technology and Services was in charge of CI. This individual had the reputation of ‘always coming up with new, crazy ideas’ and was given the title of ‘innovation manager’ by the rest of the Board. What this meant for CI was attention at the top management level and a strong promoter of innovation in the Board of Management. After some time, the responsibility switched to a different area of the Board and a different Board member.

As a result, the pressure on CI to justify its actions increased substantially. The increasing pressure was addressed by several InMU managers; e.g. the head of CI [E1] noted:

‘I once calculated that 60-70% of the developments presented at international press events or CeBit\(^\text{152}\) came from the R&D area, which in effect are not yet real products. On the other hand, people moan and groan about how expensive R&D is and ask what it is actually good for.’

The manager went on to say:

‘Recently, we had to do a profitability analysis for the planning of the R&D project budget. For example, an internal rate of return had to be calculated and the budget was only approved if this exceeded x%.’

A senior manager from one division added [E2]:

‘When I look at the R&D projects at CI, I scratch my head and wonder how they arrive at such figures…. How can I state a ‘Return on Investment’ for a business model which may not be market-ready for another five years …

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\(^{152}\) CeBit: one of the largest annual TC/IT trade fairs at which the latest developments and trends are presented.
Hoard of controllers must be busy twiddling their thumbs for the R&D projects until they get them right.'

This demonstrates the importance of a Board member as a promoter of an InMU in terms of the degree of freedom granted that InMU. At the same time, it is evident that the loss of such a promoter increases an InMU's pressure to justify its actions.

This was obviously not the only consequence of the loss of a powerful promoter. In connection with the implementation of a decentralised group organisation (four-pillar strategy), it revealed that the claim of ‘technology leadership', which still had to be achieved by means of ‘technology push' activities (such as R&D and more radical innovation), was eclipsed and the implementation of incremental innovations with a short ‘time to market' and lower risks became the focus of top management. This is supported by the corresponding individual goals formulated by top managers. Therefore, there was obviously a certain discrepancy between 'rhetoric' on the one hand (official statements) and reality, i.e. what could be found in daily business practice, on the other hand.

In terms of the performance of, or actual perception of, the tasks of the InMU, a number of aspects became visible that result from the direct integration of the InMU within a company (regulatory framework). This primarily includes the role of the central organisational design, which was responsible for the operational design of organisations within the Group. A senior manager of CI made the following criticism in this connection [E1]:

‘The structural specifications of the Organisation department left us with our hands tied. This wasn't so critical when the specifications were identical to our own tasks. But as soon as a flexible response was required, the fixed structures became a hindrance … Given the high targets and the lack of manpower, we just about managed to get things done … we were forced to sub-contract TS/T-NOVA to carry out a large number of tasks. This in turn caused discontent in the divisions.'
Thus, on account of the restrictions imposed by the regulatory framework, CI lacked the requisite degree of freedom to implement its activities in terms of pushing radical innovations in an optimum fashion.

A second aspect touched on in the context of the organisational implementation of InMUs was the selection of staff. In contrast to the divisional InMUs, the corporate InMU had greater options in this respect. On the one hand, it was granted a higher external recruitment ratio despite a freeze in recruitment for the Group, while on the other hand, comparable functions in the divisional InMUs were remunerated at lower rates. Hiring in CI was helped by the fact that these positions were not only attractive as regards a high level of management attention; they also came with a high grading (and therefore a good salary). A senior manager from a division [E2]:

‘It’s no wonder we were at a disadvantage when it came to hiring suitable staff … The same job is graded at least one level higher in CI … It’s not logical or clear why, but people at headquarters have always been paid better.’

Compared to the divisional InMUs, the corporate InMU had far fewer problems filling in vacant positions with adequate staff. Therefore, the recruiting rules appear to represent an important aspect in the implementation of an InMU in an organisational context and will be analysed in more detail in chapter 6.

At the beginning of 2003, the InMU ‘CI’ was assigned to the head of Group Strategy after the ‘Technology and Services department’ was dropped as part of a reorganisation of the Group’s Board of Management. By the end of the year, the unit was placed under new management and almost all the staff in the InMU had been replaced. However, no clear reasons could be found out for that.

The mission and objectives remained more or less the same. The ‘PRIMA’ sub-unit was disbanded and the responsibility for IT-based controlling of the ‘product lifecycle’ was transferred to the Divisions.
At the beginning of 2005, the InMU CI was combined with Group-Wide Technology and Platform Management and came under new management once again. In this respect, the tasks of the 'CI' InMU were modified. The field of R&D coordination was expanded through the establishment of a further sub-unit, the 'T-Lab'. The goal of the T-Lab was to transform research results by means of projects generated in close cooperation with universities (and the establishment of foundation chairs) into concrete business models with cross-divisional character and an envisaged time-to-market of 2 to 3 years, which represented the same time-frame that the divisions (InMUs) focus on. The resultant conflicts between centralised versus decentralised innovation activities are covered in closer detail in Chapter 6.

During the same period, a further InMU sub-unit was implemented - the T-Gallery – with responsibility for managing the exhibition space used for the presentation of the communication worlds of the future and the current innovations of DT to the public, partners, experts and employees.

5.4.3 Summary of 'Corporate Innovation'

This case clarifies the principal tasks of a corporate InMU focussing on Group innovation activities. Just as the other cases, the CI case was characterised by lots of turmoil which is illustrated hereafter by the chronological summary of its development:

- Early 2001: Together with the organisational implementation of the ‘four-pillar strategy’, the Corporate Innovation Management department\(^{153}\) was directly subordinated to the Board of Management member with responsibility for Technology and Services. The InMU CI comprised three sub-units: ‘Innovation Strategy’ to develop and implement a Group-wide innovation and technology strategy, as well as the guidance of venture activities, ‘R&D’ to control and monitor the R&D program of

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\(^{153}\) Over time, the Innovation Management department changed its abbreviation from ‘INM’ and ‘ZBI’ to ‘I’ and ‘T&I’ then to ‘IFE’ (current abbreviation); in the interests of standardization, ‘CI’ will also be used in the quotes as a synonym.
the Group and ‘PRIMA’ to ensure systematic product lifecycle management in the Group.

- **Begin 2003**: The InMU ‘CI’ was assigned to the head of Group Strategy after the ‘Technology and Services department’ was dropped as part of a reorganisation of the Group’s Board of Management.

- **End 2003**: Almost all the staff in the InMU had been replaced and the unit was placed under new management. The ’PRIMA’ sub-unit was disbanded and responsibility for IT-based controlling of the ’product lifecycle’ was transferred to the Divisions.

- **Begin 2005**: The InMU CI was combined with Group-Wide Technology and Platform Management and came under new management once again. In this respect, the tasks of the ’CI’ InMU were modified. The field of R&D coordination was expanded through the establishment of a further sub-unit, the ’T-Lab’ – responsible for transforming research results into concrete business models with a cross-divisional character and an envisaged time-to-market of 2 to 3 years, which represented the same timeframe that the divisions (InMUs) focused on. In addition, a further InMU sub-unit was implemented - the T-Gallery – as an exclusive multimedia showroom for customer, partners, guests and employees devoted to the companies’ current innovations and future visions.

The CI case indicated that a power-promotor could contribute to stabilise innovation activities in a turbulent environment. In addition to the raised issues that already occurred in the instance of the divisional case InMUs, some further aspects set particular challenges and need to be considered within a hybrid, corporate / divisional Innovation Management approach: the interaction of corporate/divisional innovation activities, funding principles of innovation projects, innovation KPIs and regulatory framework such as recruiting rules and reward systems. These will be considered more closely in the analysis chapter 6.
5.5 Conclusion

In a nutshell, the following case InMU-specific characteristics were identified:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Divisional Case InMU</th>
<th>Corporate Case InMU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key activities and contributions</strong></td>
<td>Establishment of transparency regarding R&amp;D/innovation activities of the corresponding business unit. Development of primary incremental as well as some radical innovation (business models) Development and implementation of innovation management tools (e.g. creativity workshops, evaluation metrics)</td>
<td>Development of innovation strategy and of innovation management tools (e.g. creativity workshops, evaluation metrics and innovation KPIs) Implementation of innovation steering boards Design of a large number of radical as well as some incremental innovation ideas and incorporation of the innovation ideas for implementation decision Development of demonstrators for showcases and exhibitions</td>
</tr>
<tr>
<td><strong>Structural approach of the case InMU</strong></td>
<td>New unit based upon a Greenfield approach and a gap analysis. InMU sub-structure: - Innovation management (16)* - Project Management (26)</td>
<td>Merger of different operational units within the framework of founding a new division. InMU sub-structure: - Technology management (9) - Innovation strategy (4) - Product Idea Management (7) - Innovation management (6)</td>
</tr>
<tr>
<td><strong>Addressed case specific issues</strong></td>
<td>• Mission / core tasks • Link to top management • Steering mechanisms • &quot;Quick-wins&quot; • Recruiting rules • Frequency of reorganisation</td>
<td>• Mission / core tasks • Steering mechanisms • &quot;Transfer point&quot; • Funding principles • Recruiting rules • Frequency of reorganisation • Integration versus separation</td>
</tr>
</tbody>
</table>

*(x)* = average number of FTE (Full time equivalent) of this unit

Table 26: Case Specific InMU Characteristics

Now that the InMU cases and their main characteristics have been described, the following chapter will go into more detail and analyse the findings from the cases in relation to a conceptual framework, the research questions and link it with the literature.
Chapter six – Case Analysis & synthesis

6.1 Introduction

As an aid to the reader, this section of the dissertation restates the research objective and reviews the major methods used in this study in brief. The major parts of this chapter are dedicated to the analysis of the findings by referring to a conceptual framework and link them with the literature.

As already mentioned in the methodology chapter (see section 4.5.2), the conceptual framework of this thesis was derived from data and is thus a result of the data analysis process. For that reason, the key findings of this thesis are arranged around this conceptual framework and are simultaneously linked and discussed with the literature within this one common chapter. In a first step, after having presented the conceptual framework, the findings relating to each component of this conceptual framework are analysed and discussed. The analysis comprises case specific as well as cross case specific aspects. The key findings of all components are summarised at the end of this chapter in section 6.6, in order to provide a comprehensive overview of the findings of this study. In the last section of this chapter, the synthesis of explanations of these patterns and the interrelationships between the different constituent parts of the conceptual framework will be provided.

The discussion of the implications, limitations and suggestions concerning further research will be treated in Chapter 7.

6.1.1 Statement of the Objective

As already clearly illustrated by the literature review, ‘radical’ innovation within an organisation is very different from ‘incremental’ innovation and ‘radical’ innovations are
especially critical to the long-term success\textsuperscript{154}. Despite the importance of radical innovations for a company, interestingly we know considerably less about the effective management of realisation in the radical compared to the incremental context – especially if this is to be understood as a standard, regular task of an organisation and not just as a series of temporary projects via interdisciplinary teams\textsuperscript{155}.

Although the literature on organisational theory describes a variety of structural forms for organisational units (e.g. line organisation, matrix structure, project structure, teamwork, etc.) and design components for innovating organisations to be able to adequately tackle the demand for flexible organisational forms for managing innovation and these approaches show how an overall organisation can be designed to be more innovative, this is nonetheless possible and expedient for large organisations to a limited degree on account of the effort and expenditure involved (time and money).

As fundamental activities that are understood to be regular tasks within an enterprise, so-called 'Innovation Management Units (InMUs)', i.e. units that are responsible for fostering the innovation activities, are of specific interest to companies as a potential organisational instrument to cover the demand for more radical innovation. In order to implement these units as an organisational tool, the task and role comprehension of such InMUs is of particular significance. However, deficits in the literature regarding the definition of the scope of innovation management activities also revealed the lack of a clearly defined task and role comprehension for corresponding structural solutions (InMUs). In addition to the question of why such innovation units should ultimately be used and precisely what tasks these units can – or should – realise, statements are still lacking in terms of the "how", i.e.

\textsuperscript{154} It should be remembered that the literature places particular emphasis on radical innovations as a success factor. A more precise distinction is made within the scope of this dissertation, according to which "radical innovation" is understood to mean those innovations that belong to the category of radical innovations on account of their product characteristics (e.g. by means of new business models) and which have a targeted period from original idea to market introduction of approx. 2 to 4 years.

\textsuperscript{155} Therefore, this study does not focus on temporary organisational forms (e.g. project organisations) and approaches in which companies realise innovation as part of an external network (e.g. cooperation in research and development).
which structural approaches of InMUs should be used to foster more radical innovation in large, mature organisations, and what are the critical design components for increasing the chances of successful implementation and running of such units.

Therefore, the primary focus and emphasis of this research is on how a large, mature organisation can tackle the challenge of fostering innovation activities – especially of a radical nature - through the use of ‘Innovation Management Units’ (InMUs) as an organisational tool, established expressly for this purpose.

Derived from this main question, the key research questions that this study attempts to answer with the aid of InMU case examples of Deutsche Telekom are: what are the core functions and role comprehension of InMUs; how do organisational factors impact InMUs at corporate and divisional level and, last but not at least, what factors support or hinder the InMUs in achieving their tasks? Consequently, this research seeks to contribute to the theories and understanding on organising and fostering innovation activities, especially of a radical nature, through innovation supporting organisational structures (InMUs), implemented expressly for this purpose and within a large organisation that operates in turbulent markets.

6.1.2 Review of the Methodology

As explained in Chapter 4, the study is based on case studies embedded within a single, large mature organisation, acting in a turbulent environment that sought to foster more radical innovation activities by means of dedicated organisational units (InMUs). The objective of this study was to build theory which is grounded in empirical evidence and to allow a better comprehension and deeper understanding of InMUs by revisiting the construct “Innovation Management Unit” and by putting a stronger focus on specific situations and context. As a long term case study, it was carried out by an internal
researcher with an active work-role in the case organisation. The research primarily used a qualitative perspective by clarifying ‘why and how questions’, attempting to understand the activities and role comprehension of Innovation Management Units in the ‘more radical’ innovation context. The embedded single case study relied chiefly on observation of three Innovation Management Units (InMUs) – one at corporate and two at divisional level. Each observation was supplemented by the analysis of documents (e.g. protocols, minutes etc.) and interviews. A multitude of semi-structured interviews were carried out with managers on various hierarchical levels and with various roles by means of a specially developed questionnaire. Within the scope of an iterative process of data analysis, common patterns have been identified, explanations have been built and answers to the raised research questions have thus been derived.

The strategic approach to data analysis will now be presented in the following section on the conceptual framework of the study from which the organisation of the analysis chapter is derived.

6.1.3 The Conceptual Framework of this Study

As described in the methodology chapter, theory building relies on a few general constructs that subsume a mountain of particulars. As Miles & Huberman (1994) and other authors (e.g. Yin 2003) suggest, a conceptual framework helps to explain, either graphically or in narrative form, the main things to be studied – the key factors, constructs or variables – and presumes relationships among them. It thus helps to organise the analysis and makes explicit how the researcher is construing theory (Yin 2003). Frameworks can be rudimentary or elaborate, theory driven or commonsensical, descriptive or causal’ (Miles and Huberman 1994, p. 18). Typically, they consist of ‘bins’, labelled as discrete events, settings, processes, or theoretical constructs and they simply represent the current version of the researcher’s map of the territory being investigated.
The research questions – derived from the literature review – begin to operationalise the conceptual framework, so that research questions and conceptual frameworks – either implicit / emergent or pre-specified – affect each other. In addition, linking the framework with the methodology stance – and here in particular the theory building research process in Chapter 4 - allows the ‘right research questions to be asked at the right time’ of the analysis. Ultimately, the conceptual framework describes the focus, or ‘heart’, of the study and by that defines the boundaries of the study, i.e. also that which will not be studied, or as Aristotle stated: ‘Defining the problem is half of the solution’.

A variety of models can be found in the literature about ways to map up organisational context (e.g. Tang 1998). The conceptual framework of this study was not derived from the literature on account of the numerous complex explanations, but instead by means of coding from the entire collected data (for further details on coding it is referred to the Appendix III ‘Approach to Data Analysis - Coding Qualitative Data’ on page 333) and served as a basis for the organisation of data analysis. It comprises 4 core elements, to which the analysed data (findings) were assigned and which determine the organisational and structural context of InMUs, as well as creates a link between them. When deriving these four core elements, maximum care was taken as described in Section 4.5.1 to ensure that these did not overlap and that the ‘structural factors’ were disentangled from other confounding variables, such as leadership, group working relations, etc. These elements or ‘bins’ of the framework, as well as the underlying assumptions of this framework, will now be briefly described.

In principle, the first element “strategy” describes the goal that an organisation wishes to achieve and serves as a basis for the subsequent operational design of activities. Strategy as identified by this study refers to espoused as well as realised strategy. Thus, it comprises the formulated understanding and value proposition of innovation and what
the case organisation wishes to achieve in terms of innovation, on the one hand, and the real role that InMUs played in this context on the other hand.

The structure of an organisation can be understood as the pattern of relationships between roles in an organisation and its different parts (compare e.g. Mabey, Salaman and Storey 2001). In this study, the structural dimension of InMUs is determined to comprise the two components “functions” and “organisation”.

The “functions” component refers to the areas of activities that were able to be identified by the InMUs in the innovation context within the framework of this study. In addition to idea generation and validation, the development and diffusion of innovation approaches are also covered, thus reflecting the mission, core tasks and objectives of the InMUs. Monitoring mechanisms and the performance of InMUs will also be analysed.

The “organisation” parameter deals with the formal organisation that was ascertained. In this respect, a basic understanding is established of the identified internal structure of InMUs, the central versus decentral functions of InMUs, as well as the connection and interfaces and steering mechanisms employed. This allows clarification of the roles of InMUs in a specific innovation context.

The last constituent “environment” is used to address contextual findings. As InMUs are integrated in an overall organisation, ‘exogenous factors’ – such factors that are outside the control of InMUs - are addressed here. These include „regulatory factors“, such as recruiting or rewarding systems. Furthermore, those aspects that influence the behaviour of InMUs in the face of shifting boundary conditions are also addressed here, e.g. frequent reorganisations and the impact thereof on InMUs.
The structure of the following analysis is derived from this conceptual framework. It analyses the research questions which were identified as an outcome of the literature review (compare 3.6). The section of the analysis chapter on ‘strategy’ (6.2) will provide further insights into why InMUs are implemented. An in-depth understanding of the “mission” of an InMU represents a basic precondition for the understanding of the core functions and role of an InMU. The outcome of the second section on ‘functions’ (6.3) refers to the core functions of InMUs. The ‘organisation’ part (6.4) clarifies the InMU’s organisation, connections and interfaces. Finally, the section on “environment” (6.5) concentrates on the exogenous factors that foster or hinder the InMUs in achieving their tasks, so that all research questions of this study are covered by the conceptual framework.

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Strategy</th>
<th>Functions</th>
<th>Organisation</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the core functions and role comprehensions of InMUs?</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>What factors foster or hinder the InMUs in achieving their tasks?</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>How do organisational factors impact InMUs at corporate and divisional level?</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 27: Correlation Map - Research Questions Vis-à-Vis Conceptual Framework

In all sections on the constituents of the conceptual framework, drivers and barriers will be identified. This is due to the fact that the four „InMU design components“ can be separated for analytical reasons only, but are in fact highly interconnected (see Figure 22 on page 297). The dynamic interrelationships between the elements are therefore highlighted in section 6.6.

6.2 Strategy

“Structure follows strategy” – a generally widespread statement that makes it clear that the strategy is closely connected with the operational activities and the question of “what
needs to be done” and „how is it to be done”. For instance, Mintzberg and Waters (1985) speak of „strategy as ‘a pattern in a stream of decisions” to ‘operationalise’ the strategy in organisations. In the context of innovations, the literature demonstrates that the strategy of a company also has a decisive co-determining effect on its field of activities, i.e. whether the focus is more on ‘radical’ or ‘incremental’ innovation (c.f. Griffin and Page 1996; Cooper 2005). The label strategy is used to clarify the value proposition of innovation in the case organisation and was to be achieved through the use of InMUs (leadership plans and intentions). This serves as a baseline for analysis of the other “bins” and the question of what the organisation actually did in terms of innovations. The knowledge of strategies, including predominant mindsets in this case organisation, is also an indicator for the classification of the insights gained against this specific backdrop, and needs to be taken into account when the findings of this study are applied to other cases with different environments.

6.2.1 Value Proposition of Innovation

The importance of innovations also decisively determines the nature of innovation-promoting activities (be they incremental and/or radical in nature) in an organisation. As the literature review showed, ‘people make innovations’ (Faulstich 2005) and it involves more than just doing one or two brilliant things (Cooper and Kleinschmidt 1988), i.e. innovations are not only generated by people, but decisions, organisations and realisation are also influenced by people. As Storey and Salaman noted in their book about how managers think and talk about innovation:

‘Managers are vitally important: Even if they themselves are not necessarily the prime ‘innovators’, their attitudes and actions largely determine the degree, nature and impact of innovative activity ... They set the priorities and the strategies for organisations; they control the allocation of resources; they filter ideas, information and theories ... Managers’ sense-making repertoires set the tone of much of the discussion and action in organisations’ (Storey and Salaman 2004, viii).
The literature has shown that innovations are integrated in promotional (or obstructive) company structures and cultures and are therefore dependant on the configuration of interests and mindsets of various groups of persons.

In this present study, the case organisation officially appears to adopt a clear position regarding innovation. In his formulation of the vision of DT, Dr. Sommer (former CEO of DT) already stated in 2001 that:

“We will make DT the most customer friendly, best liked and most successful company in our industry and continue to set new standards around the world in the information society”.

Sommer’s successor, the CEO Kai Uwe Ricke, also emphasised this claim in that he is often quoted as saying

“Innovations form the basis of our corporate activities and the crucial prerequisite for our entrepreneurial success.”\textsuperscript{156}

and also positions DT as the “Innovation Leader” in its segment. This claim is also supported by statements in the so-called “Excellence Project”\textsuperscript{157}, in which the case organisation is referred to “As the leading service company in the telecommunications and information technology industry” with the claim of “With top quality, efficiency and innovation, for the benefit of our customers. In every respect.”

These findings suggest the conclusion that the top management awards “innovation” significant importance in the organisation and should be regarded as a substantial driving force behind the activities of the enterprise.

In reality, however, it could be observed that the practice differed altogether from the official statements. A lack of common understanding was already predominant amongst the management with regards both to the definition of innovation and to its value proposition. Managers who were directly responsible for innovation described the term

\textsuperscript{156} Corporate Innovation Strategy, 3 June 2005.
\textsuperscript{157} A DT program in 04-05, with the goal to become the fastest growing integrated telecommunications company in Europe.
‘innovation’ in much the same way as in the literature. On the other end of the scale where the managers were not directly involved in innovation activities (e.g. from the areas of Finance, Organisational Design, etc.), a rather more abstract explanation of this term was given:

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Member of an InMU</th>
<th>InMU relevant business unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executive Manager</strong></td>
<td>• ‘Innovation is the most important factor in a competitive environment.’</td>
<td>• ‘Everything that a customer thinks is great’</td>
</tr>
<tr>
<td>(Decides on strategies, headed</td>
<td>• ‘I define innovations as services and products successfully positioned on the</td>
<td>• ‘Everything that is new and produces added value’</td>
</tr>
<tr>
<td>the unit)</td>
<td>market whose newness is very visible to customers’</td>
<td>• ‘Innovation is a patent’</td>
</tr>
<tr>
<td></td>
<td>• ‘Innovation is an idea turned into reality that covers a new customer need and is</td>
<td>• ‘Innovation is a realised invention’</td>
</tr>
<tr>
<td></td>
<td>successfull on the market’</td>
<td>• ‘Innovation is a business model’</td>
</tr>
<tr>
<td></td>
<td>• ‘Innovation is not restricted to just products and networks; it encompasses</td>
<td>• ‘Innovation is a marketed development’</td>
</tr>
<tr>
<td></td>
<td>everything such as processes and organisations’</td>
<td>• ‘Innovation is a view in the future’</td>
</tr>
<tr>
<td></td>
<td>• ‘Innovation is the further development of business models within the framework</td>
<td>• ‘Innovation is something new’</td>
</tr>
<tr>
<td></td>
<td>of technological and procedural improvements’</td>
<td>• Innovation is a new tariff that is better than the competition’.</td>
</tr>
<tr>
<td><strong>Functional Manager</strong></td>
<td>• Innovations are products, tariffs and business models that have been</td>
<td></td>
</tr>
<tr>
<td>(implements decisions)</td>
<td>successfully launched onto the market and whose novelty is apparent to the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>customer.’</td>
<td></td>
</tr>
</tbody>
</table>

Table 28: Views on Innovation by Different Parts of Management

In addition to the observed lack of a mutual basic understanding of the actual nature of innovations, a disparate picture regarding the significance of different types of innovation for the case company was also revealed. It became clear that the managers responsible for innovation activities, basic innovation and new product families – which are, after all, among the more radical innovations – regarded these as extremely important for a company. By contrast, managers who are charged with the implementation of innovations in operations (e.g. in product management), were more likely to give a higher ranking to the aspects of product modification/variation, line extensions and product re-launches –
which corresponds more to incremental innovations.\textsuperscript{158} And that despite the fact that WLAN, UMTS and peer-to-peer communication etc., which are doubtless radical innovations (with a strong focus on a new technical platform), were specified exclusively in this context as concrete examples for innovations. Reasons given for these examples were the significance of aspects such as ‘market potential’, ‘market dominance’, ‘high customer awareness’, ‘revenues’, ‘competitive edge’ and ‘image’.

These findings contradicted the rankings of the managers, who considered more incremental innovation to be particularly important, indicating that the innovation context and consequently the related activities were unclear and not fixed in the mindset of the management.

 Significant agreement was identified in the study regarding the appraisal that the case organisation (DT) does not meet the demands of an innovative company and that there exists a massive need for action regarding increasing the innovative capability. Typical reasons were often cited:

‘We bring products onto the market that anyone could come up with’... ‘Our organisational structures are too rigid and our setup is not innovative enough’... ‘T-Com is the persisting unit in the Group’... ‘DT focuses too much on cost-cutting’... ‘The innovations are usually new tariff models and are really just pouring old wine into new bottles’... ‘We [DT] have no growth story’.

A number of managers commented that the external view based on judgements from customer contacts or press reports might differ from this:

‘Seen from the outside, Telekom is more innovative than it appears from the inside – we know the shortcomings better’... ‘We have an immense market share and growth in new branches - so we are innovative, aren’t we?’

\textsuperscript{158} Incidentally, product re-launches (also incremental Innovations) were ranked by all managers as the least important aspect. When asked to state reasons for this, they said that re-launches should be considered as marketing activities and that there are few known (successful) examples of re-launches.
However, this seems to be a subjective appraisal that was unable to be verified either by the results of market research studies or through external rankings\textsuperscript{159}.

In reality, it could be seen in the study that the case organisation was perceived neither internally nor externally to embody the role of innovation leader that it (or the top management) claimed. As a result, the unambiguous view that ‘DT is not innovative’ indicates on the one hand that there was a mutual basic understanding in the management that the (internally and externally perceived) innovation capability was in need of significant improvement. On the other hand, it is evident that no clearly defined strategy was anchored in the management regarding the concrete activities required and whether more radical or more incremental innovation options should be fostered. Against the background that the importance of “cost savings” was raised by all interviewees, it must be assumed that approaches to foster radical innovations were particularly challenged in the case environments which were dominated by “cost cutting” mindsets.

6.2.2 InMU Aspiration and Strategy

The previous section illustrated that there was no common, shared understanding of innovation in all three cases. The findings have demonstrated the inability to identify either an unequivocal understanding amongst management as to „what“ steps must be taken to achieve the requisite increase in innovative capability, or an unequivocal statement regarding the "how". Instead, the pertinent response in the interviews often comprised a reference to [E1,F1]:

„\textit{We need a better culture of innovation}“, which was in turn described with the demands for „\textit{better communication}“, „\textit{greater freedom}“, „\textit{greater willingness to take risks}“ and „\textit{more sponsors for innovations}“.

\textsuperscript{159} E.g. Ranking “Fortune Global Most Admired Companies”, 2006; Place 11 out of 16 in the category “Innovation”.
However, the pure claim for 'a better innovation culture’ does not substitute the need for a clear strategy to innovate (i.e. the “what” and “how”). On top of that, as DePay (1990) and Hauser (1998) showed, only a handful of operational and applicable methods are currently known of that allow the implementation of such a culture in a company. Large, mature organisations, in particular, therefore continue to search for possibilities of driving and improving innovation capability via structural and organisational measures, especially in relation to product innovations (Morner 1997). In principle, innovative capability can be increased by modifying the existing organisational structure – either by means of the reorganisation of the existing organisational structure or by complementing the operational organisation with an ‘innovating’ one.

Corsten et al. (1989) suggests to apply a structure oriented approach as a measure to boost innovative capability by means of ‘dismantling functional barriers’. In practical terms, this approach is closely connected with reorganisation measures. Numerous reorganisations could be identified in all cases. These were justified in the interviews by the necessary transformation of the case organisation from ‘technology push’, via ‘market pull’ to a ‘customer oriented company’ within just a few years (see also Table 2 on page 23), combined with continuous workforce reduction (about 10% on average every year) and the necessity of introducing more efficient processes. In no instance was an increase in innovative capability seen as the trigger for such reorganisations.

The senior manager responsible for the design of Org-structures noted [E2]:

“In recent years, no targeted measures were taken to boost the innovative capability of DT ... When implementing reorganisation measures, we attempt to cater to the particular needs of innovating departments, but freedom for manoeuvre in this respect is severely limited by the integration in the line organisation."

In correlation with the suggestion in the literature, the reorganisation of large, mature organisations such as the case organisation is not an appropriate instrument. A complete
organisational shift as a whole - especially of large, mature organisations – to increase its innovativeness needs time and new organisational capabilities are difficult to create and costly to adjust (Nelson and Winter, 1982). Not least for this reason, a number of authors, such as Leifer et al. (2003), claim that large, mature organisations who need to be more innovative, require an ‘innovating organisation’ parallel to the operational organisation. The call for a strict separation is particularly applicable to the pushing of radical innovation (Simon et al. 2003). It seems that in this study, the case organisation aims at improving its innovativeness by means of more radical innovation and that this goal could not be achieved using the measures hitherto employed, such as reorganisations. This suggests the conclusion that the use of units implemented for precisely this reason (InMUs), referred to by Leifer (2003) as ‘Innovation Hubs’, represents the only possible instrument for achieving the goals of this case organisation. And especially as it has not yet been possible to provision the requisite freedom for manoeuvre within the line organisation. On the other hand, however, only a part of the management - namely those managers already engaged in innovation activities within their own areas of responsibility and experienced in the innovation context – recognised the necessity to find structural solutions to increase innovation capability. This can be illustrated, for example, by the establishment of the T-Lab, which was initiated by the InMU CI and served among other things to intensify cooperation with external universities and institutes. Furthermore, this finding is supported by the continuous attempts of the InMU PI to attract the interest of other departments, such as Strategy, Human Resources and Organisation, in a new ‘innovation hub’ concept aimed at facilitating the implementation of innovation concepts with a more radical character as a by-pass to the existing T-Com structure.

As illustrated in Section 4.3.4 ‘Case Study Selection’, three of such dedicated ‘Innovation Hubs’ were able to be identified in case organisation. All of these InMUs were used as an instrument for minimising ‘functional barriers’ and to increase innovative capability in the case organisation through the utilisation of innovating organisations parallel to the
operating organisation. However, there is a danger in this interpretation if we do not clarify the reason as to why such InMUs were implemented. According to Mintzberg’s suggestions on different types of strategies, the use of such InMUs may transpire either as a result of a conscious, i.e. deliberate strategy\(^\text{160}\) (Mintzberg and Waters 1985), or result unintentionally from a specific development, corresponding to what Mintzberg calls an "emergent" strategy. The reasons for the implementation influence the ,task and objectives’, as well as the role comprehension of such InMUs.

Relevant documentation was provided - and managers themselves expressed reasons for the implementation of InMUs that closely mirror Mintzberg’s notion of deliberate or "emergent" strategies.

In one case of this study, for instance, the reasons for establishing an InMU (PI) were able to be identified with a clear claim regarding boosting the innovative capability with more radical innovation. This InMU’s mission was to draw up concepts for and prepare a market evaluation of forward-looking innovation ideas on the basis of market-related parameters and their implementation together with internal and external partners. It could be seen that the emphasis was to be on the transformation of technological (technology push) and market-related (demand pull) options into concrete product ideas with maximum potential. This suggests that this InMU was deliberately implemented by the management as an instrument for driving innovative capability via radical innovations. The reason given to this end was that the existing organisation was restructured first upon establishing the SBU and it was not determined until several months later that nobody had actually accepted responsibility for the topic of innovation and that the fuzzy-front-end functionalities of the product lifecycle process were thus not fully mapped on the organisational level.

\(^{160}\) I.e. the management has a clear plan or intention.
In the case of the other two InMUs (VAS, CI), it was evident that the implementation was not primarily justified by a desire to boost innovative capability through radical innovations intended to be yielded by the InMUs themselves. Indeed, the focus in this respect was obviously far more on a coordinating function and the establishment of transparency in the innovation environment; further activities for driving radical innovations (e.g. the development of business models) were only of secondary importance. In one case, it was even observed that the identification of synergistic effects was the primary focus [E2]:

„We did not have an overview of what was really happening in our unit regarding innovations or R&D activities.”

Furthermore, an additional focal point was evidently [E1]…

“…coordination of international R&D activities and preparation of innovation reports for the Group Board of Management with key figures and benchmarks”.

However, the necessity of the implementation of the InMU VAS as a new organisational solution could also be derived from a decision which was made by the Board of Directors. They apparently saw a need to massively boost the sales of this division and the senior management was convinced that this massive increase in sales could not be achieved with the existing product management. So a senior manager noted [E1]:

“We felt we needed something new - new ideas, business models and revenues ….but we didn’t think that product management would be able to manage it”. A further manager commented [E2]: “We don’t have anyone who is responsible for the ‘fuzzy front-end’ functionality, but we need someone for this”.

The InMU CI was likewise able to be identified against the background of a primary coordination and support function, with the need for systematic generation of innovation options of a radical nature only being of secondary importance. Thus, the motivating factor behind establishing a corporate InMU was obviously the coordination of the Group-
wide R&D activities in interaction with the divisional R&D units. This InMU was supposed to provide innovation transparency inside the Group and generate intellectual property rights & research excellence. Later on, the identification and leveraging of cross-SBU synergies through cross-pillar, integrated business models (focus on new markets, medium to long term), and thus radical innovation as well as the implementation of a world-wide network of universities and industry partners in order to strengthen its position as an ‘architect for innovation’ inside the case organisation, came on the agenda.

The comparison of the three InMU cases has shown that the reason to implement an InMU does not necessarily correspond directly with the aim to (exclusively) foster radical innovation. Furthermore, this finding supports Mintzberg (1985), according to whom a combined „deliberate“ and „emergent“ strategy – in this case in relation to innovate with InMU’s - can frequently be encountered in unstable and unpredictable environments.

6.2.3 Summary Component “Strategy”

It could be found throughout the entire period of the study that the case organisation – represented e.g. by its CEO’s - had clearly formulated and communicated its claim to be an “innovation leader” and „leading service company“. However, this blatantly contradicted the actions of the management. Neither a clear strategy as to whether innovation was to be increased by means of incremental and/or radical innovation, nor as to how the goal was to be achieved, could be observed. Although it was possible to identify an InMU that was employed by top management as a strategic instrument to boost innovative capability via radical innovations, two other InMUs were also in place that had primarily been established to realise a coordination and monitoring function for innovation activities and which only began generating radical innovations themselves within their scope of activity over the course of time. These findings support Mintzberg
(1985), according to whom a „deliberate“ and „emergent“ strategy can frequently be encountered in combination in unstable and unpredictable environments.

If Cooper’s approach is then also pursued, according to which the strategy of a company also has a decisive co-determining effect on its field of activities – i.e. whether the focus is actually on ‘radical’ or ‘incremental’ innovation (Cooper 2005) – InMUs are primarily employed to drive radical innovations – and not incremental innovations - in the case organisation.

In general, the literature does not specify the reasons for implementing InMUs in any greater detail. One simply assumes that they are generally intended to increase innovative capabilities. However, the findings of this study show that familiarity with the concrete intentions pursued with the implementation of the InMUs is essential to the understanding and design of InMUs. Only on this basis can one understand which tasks, role comprehensions and structures the InMUs have in the overall system, what expectations are placed on them by the management and how their performance can be measured on the basis of KPIs. However, if this strategic appraisal is neglected in a comparison of InMUs, the danger arises of insights from this and other studies on InMUs or Innovation Hubs not being applied to other cases correctly.

Furthermore, there is empirical evidence that innovation is not considered as important within the case organisation as it should actually be, according both to the strategy and the manner in which it has been proclaimed outside of the organisation. ‘Innovation culture’ – understood here as a distinct coherent set of values and practices – is not characterised in the case organisation. Indeed, the interviewees themselves even called for a better innovation culture. These findings suggest that ‘dismantling barriers’ is a central issue of InMUs in driving innovations in the case organisation.
6.3 Functions

The ‘functions’ differentiate or separate the innovating organisation’s activities from those of the operating organisation. Although the literature makes a distinction between the innovation process for implementing radical and incremental innovations in terms of procedural sequences (e.g. Cooper 2001), the core functions, tasks and objectives that are perceived from the generation of the idea all the way to the implementation of an innovation are generally identical (Hauschildt 1997; Leifer et al. 2000). This section examines these areas of activities in the case InMUs.

As illustrated in the literature review, agreement is largely predominant regarding the fundamental objective of an innovation organisation (3.5). Ideas for new innovations and their implementation should not occur by happenstance. Rather, they should (ideally) occur systematically and continuously. Although there is a basic understanding of the activities of innovation management in this context, an understanding of the core tasks and functions of the operational structuring of innovation management in the form of InMUs is lacking. Therefore, these are analysed in greater detail in the following section.

6.3.1 Innovation Strategy

As already derived from the literature review in 3.4.6, the identification and selection of fields of innovation that promise success, as well as the specification of innovation goals and corresponding strategies consistent with the company (see Table 10 on page 89), belong to the core tasks of innovation management. This leads to the assumption that this field of activities – generally also referred to as innovation strategy – should also be identifiable in case InMUs.

In the interviews the InMU members indicated that they used the “innovation strategy” as an important instrument to describe where innovation potential is evident, in order to be able to generate corresponding market shares and sales through new business models.
and to derive concrete product ideas. It could be seen that the innovation strategy of two case InMUs in this respect principally comprised the identification of so-called "innovation fields", i.e. a description of those fields in which the case organisation wishes to participate actively in the medium to long term, which relevant changes can be expected from the point of view of the customer, the market and the technology and what impact this will have on the R&D activities (innovation projects) on the corporate and divisional levels.

The innovation strategy was thus regarded by the interviewees as the fundamental instrument for legitimising the InMU activities in the case organisation and as an internal instrument for communication with other operational units (e.g. strategy unit, product management) to coordinate the (cross-divisional) innovation activities and with the senior management to minimise the 'So what are you there for at all?' attitude. Externally, it could be observed that the innovation strategy was used for discussion with partners and suppliers and for analysts and capital investors to identify a "story line for business growth". Ultimately, the specification of the innovation strategy determines the working programme of the InMU and the operational units that interact with it.

The interviewees stressed that the prompt development of an innovation strategy could not be valued highly enough when establishing an InMU. This is because the innovation strategy represents the working basis and legitimisation for the InMU in a volatile environment. This appraisal correlates with the findings in the literature, according to which it is “… doubtless that ‘radical’ innovations produce more failures than successes, and the magnitude and timing of results are highly unpredictable.” Faced with this double-barred negative, it would not be surprising that executives would feel more comfortable in other approaches to future growth, "sticking to their knitting" so to speak, i.e. gaining access to innovative technologies through acquisitions, or being a "fast follower" as new concepts enter the "competitive arena" (Leifer et al. 2000, p. 12.). Therefore, an innovation strategy is ultimately also an instrument for imparting medium to long-term
topics a certain legitimisation and significance, also from the perspective of a management geared more towards the short-term. This suggests that the implementation of corresponding (innovation) KPIs in the goal agreement systems of the operational management can only be justified with great difficulty – if at all - without an innovation strategy approved by the senior management (c.f. 'steering mechanisms' below).

However, the question arises as to why no dedicated ‘innovation strategy’ was able to be identified in the VAS InMU case. The reason posited in this context was that the VAS InMU was primarily installed as a coordination instrument and the focus was initially placed on generating ‘added value’ for the organisation in the form of support services for product management / marketing on account of resource bottlenecks and the recruiting rules (see 6.5.1). Thus, in contrast to the VAS InMU, the interviewees of the other two InMUs, ‘PI’ and ‘CI’ - which had explicit innovation strategies right from the start - admitted that many discussions along the lines of "So what are you there for at all?" could be avoided with a concrete action plan (‘innovation strategy’) for the planned innovation activities derived from the business strategy and approved by the senior management.

The findings show that the development and implementation of an innovation strategy represents one of the fundamental tasks of an InMU and thus its scope of activities, but also determines the area of responsibility for radical innovations within the enterprise. Furthermore, it could be observed that the innovation strategy was used both internally and externally as a communication and steering instrument. Without this, it seems more likely that a higher frequency of legitimisation problems occurs vis-à-vis opponents of InMUs.

6.3.2 Core Tasks and Functions of InMUs

One of the key questions of the study was to identify the perceived core tasks and functions of InMUs, especially those intended to produce radical innovation. An initial
derivation of which core functions InMUs should or must realise, has already been carried out in the literature review on the basis of the extensive literature regarding innovation management (Tables 10 (p.87), 13 (p.95) and Figs. 9 (p. 95), 11 (p.107)).

The core tasks and functions of the case InMUs were able to be identified on the basis of the analysis of the corresponding, written ‘business mission’ where the business purpose, or the tasks and responsibilities and thus the activities of the InMU are clearly laid out. They were compared with the real activities identified in the interviews, as well as the analysis of other documentation, such as draft resolutions, decision papers and minutes of steering board meetings, etc. To summarise, all InMUs realised tasks which are similar to that which Smith et al. (1991) call "Fuzzy front end management" of a ‘generic’ innovation process. They dealt with aspects of the (innovation) strategy, reporting and controlling mechanisms, as well as the coordination and realisation of innovation activities – or as a senior manager stated [E1]:

"Innovation management units are units whose role is to think ahead… they should develop visions, grab the attention of top management and create room for innovations to be implemented."

In a nutshell, apart from ‘operational activities’, they also fulfilled a ‘mediator function’ (due to coordination activities) between different mindsets in the management which obviously resulted from the tension between the short term orientation of the operating management versus the medium to long term activities of InMUs. On top of that, they apparently had an ‘enabler’ function (e.g. providing methods / tools).

The following table presents a summarised overview of these functions identified per case InMU:
<table>
<thead>
<tr>
<th>Area of activity:</th>
<th>Core functions:</th>
<th>Case InMU:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 (VAS)</td>
</tr>
<tr>
<td><strong>Innovation Strategy</strong></td>
<td>Create medium/long-term innovation and technology strategies for products, services and networks from Group perspective.</td>
<td>(X)</td>
</tr>
<tr>
<td></td>
<td>Provide technology and market early warning system (focus medium/long-term).</td>
<td>(X)</td>
</tr>
<tr>
<td></td>
<td>Design and detail market developments.</td>
<td>X</td>
</tr>
<tr>
<td><strong>Methods / Tools</strong></td>
<td>Develop and implement idea generation and evaluation methods and tools.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Undertake technology and market-scouting and screening functions</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Develop and evaluate concrete product ideas or business models of a radical nature. (idea generation/evaluation)</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Develop and evaluate concrete product ideas of an incremental nature (idea generation/evaluation)</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Execute and control product development of radical innovation (‘evaluation’ up to ‘piloting’)</td>
<td>(X)</td>
</tr>
<tr>
<td></td>
<td>Execute and control product development of incremental innovation (‘evaluation’ up to ‘piloting’)</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Execute and control idea realisation / implementation of innovation</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Set up and coordinate a committee system to control and coordinate innovation activities.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Control implementation and execution of R&amp;D projects via third parties (‘open innovation’ approach) or subcontractors.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Reconcile and homogenise innovation management processes (incl. system. support and data structure for innovation management process).</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Pushing spin-offs / Innovation Hub approaches as major elements to tap additional value-addition and increase the rate of innovation.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Coordinate the contextual prerequisites for product and production planning (data structure, infrastructure …).</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Coordinate international R&amp;D cooperation.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Set up innovation networks at various levels (internal / external)</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Communicate internally / externally the company’s innovations and visions (e.g. demonstrators at trade fairs, showcases, etc.)</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Coordinate Intellectual Property Rights Management (IPR) together with legal department and manage patent portfolio.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Coordinate integration of venture affiliates to increase benefit for the Group.</td>
<td>X</td>
</tr>
<tr>
<td><strong>Measurement &amp; Reporting</strong></td>
<td>Develop Innovation KPIs (in accordance with divisions) in order to steer and monitor innovation activities of the Group.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Prepare innovation reports for Board of Management with key figures and benchmarks (internal/external).</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Monitor innovation portfolio.</td>
<td>X</td>
</tr>
<tr>
<td><strong>TK specific activities</strong></td>
<td>Coordinate pre-competition standardisation activities.</td>
<td>X</td>
</tr>
</tbody>
</table>

X: Task realised by InMU.
(X): Activity was planned in 2nd step but could no longer be implemented on account of the InMU being disbanded.

Table 29: Core Functions of InMUs in Case Organisation
It could be seen that differences in the scope of functions of the individual InMUs probably arose from the different objectives (missions) of the respective InMUs, i.e. whether the InMU embodied more of a coordination oriented function, or a more generation and implementation oriented function for radical innovations, and whether the InMU involved a divisional InMU (with strong ties to the operational units, resulting in the realisation of incremental innovation activities), or a corporate InMU (with a more strategic mission orientation). The table clearly illustrates that no InMU embodied the role of "execution and control of idea realisation / implementation of innovation". This function was assigned to the domain of product management / marketing. The findings suggest that radical innovations were handed over to operational management for implementation ('transfer point'), which the further analysis in this study will reveal to be a critical factor.

If these findings are compared with the tasks and objectives of innovation management in the literature, one sees that the core tasks and functions of the InMUs cover the requisite scope of functions described in the literature review for the successful management of innovations with radical and incremental nature. This confirms therefore the theory that InMUs represent the structural design of innovation management within a company. The functions realised also correlate with those functions prescribed by Leifer (2003) for a "Radical Innovation Hub" approach (radical innovator, idea hunter and gatherer; Fig. 11 on page 109), thus likewise verifying the theory in the literature review that InMUs represent a structural implementation of an innovation hub approach. However, one important deviation in this study becomes apparent in the detailed analysis of the scope of tasks of InMUs. In the literature, the scope of tasks is regarded as ranging from innovation management all the way to 'idea evaluation' (see Table 13 on page 96) – and not up to the point of "idea realisation" or "product execution", as taken for granted by numerous operational managers in this study.
Yet an analysis of all case InMUs in this study shows that it is imperative that the scope of tasks of an InMU should extend all the way to the 'piloting' phase. The reasons for this can obviously be found in the "transfer point" described in a different section, i.e. that point at which the preliminary work of an InMU is handed over to the (operational) unit that will carry on with the work / implement it. In the present study, this transfer proved to be particularly critical to the success of the implementation of radical innovations, as also became evident in the interviews. This mirrors Galbraith's call for a corresponding transition process for radical innovations:

"If the ideas produced by the innovating organisation are to be implemented by the operating organisation, they need a transition process to transfer ideas from the innovating organisation to the operating organisation" (Galbraith, 1982, p.6).

However, the particular importance of this interface has yet to be identified and addressed in the literature. This interface appears to be of decisive importance within a company for the further "go / no-go" of a radical innovation. Indeed, it could be seen in the study that several examples of radical innovation that failed upon being transferred from the "idea evaluation" phase to the "operational implementation" phase were able to be ascertained in two of the case InMUs. The NIH syndrome (= not invented here) was specified as the reason for these failures, which correlates with the necessity of convincing the operational (risk averse) management that should adopt and implement the innovation to reprioritise its limited resources, thus gaining a promoter for an innovation project. However, the findings of the study suggest that this approach can only be promising if the functionality and market acceptance of the innovation can be verified by means of a 'demonstrator'\textsuperscript{161}. If this is not the case, the problem might be encountered that the resource problem is quickly cited as the reason for rejecting an innovative idea.

\textsuperscript{161} Demonstrators' are often used at trade fairs, allowing technical functionalities to be simulated; 'piloting' involves the product-near realisation on the 'true' system components and testing under realistic conditions.
One senior manager of the InMU PI [E1]:

"We have to motivate our colleagues to embrace and implement this new idea ... In times of resource scarcity, this can only be achieved by reprioritising his activities ... But we can only succeed in doing so if the outstanding questions we are repeatedly asked can be answered and verified by means of a 'pilot' [Note: e.g. does the technology work, will the customers accept it, etc.]. It's not enough to just build a demonstrator and present that at CeBit\textsuperscript{162}."

It could be seen that this justification – from the divisional perspective – was repeated unisono from the corporate InMU perspective, albeit with the demand for own piloting options, in order to increase the willingness of the divisions to adopt corporate R&D activities e.g. convergent business model (see also Figs. 20 and 21 on page 260, 270).

These findings suggest that the scope of tasks of InMUs (innovation management), especially in terms of the "correct time of innovation handover", has not been sufficiently appreciated in the literature, but is indeed critical to the success of an InMU's activities. Therefore, the findings of this study suggest that the scope of tasks of InMUs hitherto described in the innovation management literature (Table 13 on page 96) should be supplemented with 'piloting' in comparable contexts as regards the implementation of radical innovations.

6.3.3 Monitoring Mechanisms

The literature review (3.5.4) established the link between ‘organisational effectiveness’, ‘key success factors’ (KSF) and ‘performance measures’ on the basis of Rangone’s approach (1997; see: Fig. 13). The relevant further discussion and the conclusive findings raised the question of what role such indicators have to play in the context of InMUs.

\textsuperscript{162} CeBIT is an important industry fair.
It could be seen in the case organisation that a top down approach was used in order to measure and monitor the innovation activities. In this respect, the corporate InMU developed and implemented a concept for innovation KPIs. These KPIs were used for the group-wide monitoring of radical innovation activities. They were also intended to serve as a control instrument by being anchored in the objectives of the Balanced Score Card (BSC) of the case organisation management. The role of the InMUs in this context was obviously to ensure the definition, implementation and recording of the KPIs, which were then summarised in a quarterly "innovation report" on a division-specific and group-specific basis. This "innovation report" also presented fundamental development trends and planned measures in the R&D context, thus summarising the important radical innovation activities for the board of management of the division and the overall board of management.

The following innovation KPIs were able to be identified in the case organisation:

<table>
<thead>
<tr>
<th>KPI: Innovation rate (INR)</th>
<th>Calculation:</th>
<th>Item:</th>
<th>Period:</th>
<th>Measurement objects:</th>
<th>BSC goal:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenues of innovative products + 100</td>
<td>%</td>
<td>quarterly</td>
<td>Innovation-performance</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Group revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation Project Portfolio (IPP)</td>
<td>Cumulated planned revenues of Divisions' top-innovation projects</td>
<td>€</td>
<td>quarterly</td>
<td>Innovation-potential</td>
<td>✓</td>
</tr>
<tr>
<td>R&amp;D-Intensity</td>
<td>R&amp;D expenditure + 100</td>
<td>%</td>
<td>quarterly</td>
<td>Innovation-power</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Group revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invention rate</td>
<td>No. of inventions</td>
<td>No./ 100 E.</td>
<td>p.a.</td>
<td>Innovation-culture</td>
<td>–</td>
</tr>
</tbody>
</table>

Legend:
- Product: this term includes solution and service offerings.
- Innovative Products: A product is innovative if its launch was less than 3 years ago and if it offers an additional value from a customer’s perspective.
- Project: Future product
- R&D spending: Defined correspondently to the definition of Frascati-manual (OECD Reporting Standard)
- Invention: Suggestions for improvement and patent applications
- BSC: Balanced Score Card.

Figure 19: Innovation-KPIs of Case Organisation

It has been observed that the use of these KPIs as an active control instrument was only of limited practical utility. On the one hand, it took a long time (more than a year) to
actually define and implement the KPIs with the divisions. In fact, one division apparently opposed the introduction of the KPIs until a resolution was passed by the board of management, as its IT systems were often incapable of mapping the KPIs directly (thus necessitating manual entry) and the KPIs did not match its operational control logic. On the other hand, the objective of anchoring the KPIs in the BSC of the top management was obviously only able to be achieved to a limited extent. The reason being that the (operational) managers had already been given multiple targets (like turnover, EBITDA, customer satisfaction, etc.), resulting in the senior marketing managers, for instance, not anchoring any innovation KPIs (and thus innovation goals) as monetary components in the objectives, despite the fact that they were responsible for product management and sales activities, on which the innovation KPIs are substantially dependent by definition.

This failure to anchor the innovation KPIs in the goal agreement system might also be evaluated as one of the reasons why the management of the case organisation was more interested in shorter term successes than in longer term topics such as radical innovations.

In other cases, it could be observed that the internal DT implementation rulings for the BSC resulted in the situation that innovation KPIs were anchored with some senior managers who were unable to directly influence those KPIs through their activities, with the evident consequence that the acceptance of the use of such innovation KPIs in the BSC proved to be unconducive. One senior manager commented on this as follows [E2]:

"What am I supposed to do with the "innovation rate" in my targets? If I turn a screw, it will take 2 to 3 years until my measures are reflected by a deflection of the needle for the performance indicator".

This situation resulted in long-term performance indicators, such as "innovation rate (INR)" also being transformed over time into project targets (Innovation Project Portfolio - IPP) with a duration of less than one year. However, it could be seen that an internal audit
report of the Group revision ascertained at the end of 2005 that the innovation KPIs (defined in 2003) were still not sufficiently anchored with top management and that obviously no adequate control of innovation activities was ensured via the goal agreement system and the BSC.

The innovation KPIs thus appear to be basically suitable in the case organisation and a proven instrument for monitoring innovation activities with a radical character. The logical consequence of also using KPIs as a control instrument was only able to be achieved to a limited degree on account of internal DT restrictions regarding the implementation of the BSC.

These findings could serve as a possible explanation of why the "strategy" element of the "innovation leadership claim" was determined to clearly contradict the statements and actions of the management. Furthermore, they clarify the importance of innovation activities (transformed into corresponding KPIs) also being anchored in the personal goals of the responsible senior management and monitored on a regular basis. The findings indicate that the fundamental elements to this end (e.g. KPIs, targets, etc.) must be made available by the InMUs. It is recommended that this already take place directly after implementation of the InMU. Otherwise, it could result in the InMU being exposed to a constant pressure to justify its existence, as illustrated in this study (i.e. “What are you actually good for?” attitude).

6.3.4 Performance of InMUs

Now that the core functions and KPIs (with which the innovative capability of an organisation can be measured and controlled) have been appraised, it is time to move onto the question of the performance of InMUs, i.e. what contribution do InMUs actually make towards promoting radical (or incremental) innovations and how can such a contribution be verified. In this context, Billing (2003) and others postulated that
The literature review illustrated that the tasks of innovation management are fundamentally regarded as being conducive to radical / incremental innovations (3.4). If these innovation management tasks can be identified as core tasks in the case InMUs, it would be logical to assume that InMUs represent an instrument for promoting radical and incremental innovations. Indeed, reliable evidence in this context could be assumed if product ideas/business models initiated or generated by the InMUs themselves could subsequently be discovered as innovations on the market. However, it must be noted for this study that the case InMUs only existed in part for a few years in a volatile environment.

Analysis of the pertinent documents and the interviews allowed the identification of concrete examples of radical innovation for all three InMUs. In an initial step, the interviewees were asked to provide concrete examples of significant or radical innovations (compare also the interview schedule on page 167). This provided the basis for a further analysis of the corresponding documentation. Efforts were undertaken to confirm whether or not the example really represented a radical innovation according to the definition applied for this thesis and, secondly, whether this radical innovation was initiated or generated by an InMU or not. Based upon this approach, it was determined that one InMU initiated the development of the product T-Pay – an E-payment service in which purchases can be paid via the telephone bill or on a "pay per call" basis. It could be observed that five years after the basic business idea was developed, this product has positioned itself as the second-largest micro-payment service in Germany. In another InMU, numerous radical innovations were able to be identified in a database in which all business models/product ideas were managed and archived. The analysis of this „idea database“ showed that of 426 product ideas (status: start of 2006) in the period from
2002 to 2006, approx. 50 product ideas of a radical nature resulted in an implementation decision and 13 of these were launched onto the market as innovative products. One of these products was launched onto the market in early 2006 under the product name “T-One” - using the fixed line and mobile platform functionalities within one device; another example is “Voice Ident” – a „speech trust centre“ aimed at replacing manual PIN entry, for instance, via voice recognition (automatic voice identification and verification), thus enabling a variety of new services (e.g. Tele-Banking, mobile-internet avatar, etc.). In the case of the third InMU, a business model is just short of a spin-off as it is not within the core business of the case organisation, but is being co-financed by corporate venture capitalists as a promising business model.

All of these examples have one thing in common: they all correspond to the criteria of radical innovations. Furthermore, a host of examples from the divisional InMUs were able to be identified in connection with the above-mentioned research. These were conceived for or with product management/marketing and correspond to the criteria for incremental innovations.

If one takes into account the fact that only a fragment of the myriad of ideas is ultimately launched onto the market, as well as the difficulty - if not impossibility in other case organisations – of being able to trace the origin of an idea for a successful product to a single person or unit, the examples described above should at least be weighted as empirical proof – and at the very least as a strong indicator – of the direct contribution of the InMUs to radical innovations - and in the case of divisional InMUs, also to incremental innovation.

However, ‘the categorisation of an organisation as innovative or non-innovative depends on the definition of innovativeness by the researcher’ (Subramanian and Nilakanta 1996, p. 632), and, in relation to an organisation like an InMU, this means that such an assessment, however powerful, constitutes a subjective management decision and
ultimately a ‘socio-political’ decision. It therefore comes as no further surprise that the main decision-making criteria identified in the interviews for continuing an InMU approach after a reorganisation involved the close interaction with the top management (Who is the sponsor?) and not the value contribution towards the overall organisation and the performance of the InMU. This is in contrast to what could be expected from the intention and use of Innovation KPIs (compare Section 3.5.4).

6.3.5 Summary Component “Functions”

In this section the research question concerning core functions of InMUs was analysed. It was thus shown that the innovation strategy is a tool of the InMUs which specifies the tasks and responsibilities of radical innovations, is used as a communication instrument with operational management and also as the basis for deriving innovative KPIs to monitor and control innovation activities. It should thus be adopted by the top management from the beginning of implementing an InMU.

Empirical evidence was found that InMUs fulfil the core functions derived in the literature review which Smith et al. (1991) called “Fuzzy front end management”. They deal with aspects of the (innovation) strategy, reporting and controlling mechanisms, as well as the coordination and realisation of innovation activities – or as a senior manager argued [E1]:

“Innovation management units are units whose role is to think ahead… they should develop visions, grab the attention of top management and create room for innovations to be implemented.”

In a nutshell, apart from ‘operational activities’ they also have a ‘mediator function’ (due to coordination activities) between different mindsets in management resulting from the tension between technology push and market pull, as well as an ‘enabler’ function (e.g. providing methods/tools, innovation realisation). An important finding of this study in this context was the fact that the range of duties specified in the literature for innovation
management has to be extended to piloting if an InMU is to be successful in such a context – a requirement that will be emphasised again in the subsequent “structure” section.

In addition to the analysis of the activities of the InMU, which indicates that radical innovations are generated by the InMU, direct empirical evidence was also able to be established for radical innovations that clearly originated in InMUs. This contradicts Haenecke (2002) and others, who claimed that the causes of success (in relation to innovations) cannot be directly demonstrated.

To measure innovation activities and for controlling, several innovation KPIs were identified in the study. It was shown that usage as a control instrument only seems sensible if they are integrated into the management’s target tracking systems. Otherwise, no motivation of the short-term oriented, operational management was detected to deal with long-term targets. An increase in acceptance by transforming innovation targets into project targets lasting less than one year could be achieved. This transfer capacity should also be considered in the range of duties of InMUs.

It was also shown that the “transfer” (described as such in the literature by Galbraith 1982) to the operational units or of corporate InMUs to divisional InMUs seems to be the critical interface when implementing radical innovations and thus their management must be taken into greater account in the literature. It also revealed that InMUs comply with the criteria of the "radical innovation hub" based on roles according to Leifer (2003) and thus findings in this environment also seem to be applicable to InMUs - and vice versa. Finally, a differentiation often found in the practice of the core functions of divisional and corporate InMUs could be derived for the hybrid approach of InMUs according to Hauschildt (1997).
6.4 Organisation

This parameter deals with the formal organisation as it is primarily reflected in the organisational chart and its interfaces identified in the organisation by which the organisational separation of the innovating organisation (InMUs) is defined. It furthermore comprises the consideration of the interaction with the operating organisation and the implemented steering instruments. Key findings on the role comprehension of InMUs can thus be derived in the innovation context.

6.4.1 Centralised Versus Decentralised InMU Approach

As already illustrated by the case selection, one corporate InMU and several divisional InMUs were able to be identified in the case organisation (see 4.3.4), which is what Hauschildt (1997) or Vahs and Burmester (2005) - see Fig. 12 on page 112- call the hybrid approach. As many large, mature organisations have a similar (divisional/decentralised) organisational approach as the case organisation, a benchmark study of Deutsche Telekom (2002) gives rise to the assumption that a hybrid approach can often be encountered in practice. On account of the above-mentioned lack of an analysis to date in the literature of the core functions and role comprehension of InMUs in general and the lack of an analysis of the relevant similarities and differences between corporate and divisional InMUs, in particular, the results of this study - especially regarding the corporate/divisional InMU approach - should prove to be of particular interest to such companies.

The study revealed that aside from a broad, similar spectrum of tasks (see Table 29 on page 247), fundamental differences could be discovered between the CIM/DIM approach. This included a rather operational alignment of the divisional InMU approaches – with the development and evaluation of methods and tools as well as of concrete product ideas or business models etc. In contrast to that, the corporate InMU approach apparently emphasised the execution of more strategic (coordination) activities (e.g. push of spin-
offs, coordination of international R&D and standardisation activities). This might be attributed to the fact that divisional InMUs mainly interact with operational management, which gives rise to friction and interaction problems (see "connection and interfaces" below), whereas corporate InMUs operate mainly self-contained as an interface between divisional innovation units and board management.

These considerations are also reflected by the following statement of a senior manager of the corporate strategy department [E2]:

‘The headquarters should develop visions and highlight scope for action, while the divisions are responsible for innovations … of course, that also has effects on the distribution of tasks of corporate and divisional InMUs’

Another senior manager of the InMU ‘CI’ also put it this way [E1]:

‘At the corporate level, the Board of Management will have an "innovation-monitoring and controlling” function and technology push innovation… whereas the divisions will concentrate on the business model-oriented innovation development from a customer perspective [outside-in]’.

In addition to the already identified differences above, it could be seen that the different role comprehensions of InMUs became most apparent when the parameter 'different time horizons' was analysed. A senior manager of corporate innovation described the differences between CIM and DIM in the following way [E1]:

‘We at Corporate Innovation have a totally different time frame. The head of CI always focuses on the time frame of 4 to 10 years, not 2 to 4 years, until the products are marketable. 2 to 4 years was more the focus of the divisions … I wasn’t very happy with that because the marketing departments of the divisions were right when they said, ‘What you are doing there is much too far ahead in the future… It’s of no use to us’. On the other hand, ISDN wouldn’t have been such a success for us had we not come to grips with it ten years ago.’

This removal from operational business also resulted in justification pressure on CIM, with this being emphasised time and again. Concerning the implementation of concrete innovation (R&D) projects with shared responsibility between corporate and divisional
InMUs, it could be seen how roles were divided up in practice. This approach seemed to be helpful to some extent because the other activities of an InMU are relatively free of overlaps and can be implemented autonomously by the InMU, i.e. under its own responsibility.

It was found that the implementation of joint R&D projects required the most important interaction and coordination effort between corporate and divisional InMUs. For instance, in an internal audit report and in the interviews, this area (see: "Transfer" area, figure below) was regarded as one of the critical areas for the strict, enterprise-wide control of innovation activities. This area obviously decides on the direct utilisation of the insights and project results of the corporate InMU by the divisions and is characterised by interaction and coordination problems between the corporate / divisional InMUs and divisional innovation organisations. Yet managers from the divisional InMUs complained apparently that they were not asked to agree on the selected topics. On top of that, it could be seen that the time horizon and ‘granulation’ of the corporate InMU project results were not viewed as specific enough for use in the divisions. The diagram below shows how InMUs were largely perceived with regard to the implementation of concrete R&D projects and reflects the recent role comprehension of InMUs amongst themselves.

![Diagram](source: adapted from Claus (2000; board paper; unpublished), further elaborated by author.)

**Figure 20: Task Assignment of Corporate InMU versus Divisional InMU**
It could be seen that the corporate InMU (CIM) concentrated on processing issues (and R&D projects) with a more long-term focus, which were mainly 'technology push'-oriented and cross-divisional in nature. The divisional InMU focused on the topics with a more short-term orientation and a strong market pull. As described before in the analysis of the cases, the area designated ‘Transfer’ turned out to be the critical point for role comprehension and the interaction between corporate and divisional InMUs. This transfer problem from the corporate to the divisional level can be associated with the same problem that has already been described on multiple occasions as the critical “transfer point”, in which the preliminary work of an InMU (divisional InMU) is handed over to the operational unit to carry on implementing the innovation approach. It is obviously at this particular point that the decision is made as to whether or not the results/groundwork regarding radical innovations are actually adopted and further implemented. By means of the "Innovation Council" board (see 'steering mechanisms'), the Corporate InMU attempted to avoid frictional losses in this area with the help of more intensive coordination with the Divisions/InMUs.

6.4.2 Connection and Interfaces

The literature requires a top management commitment to innovations of a radical nature (see 3.4.4). In addition, Littler et al. (2001), for example, call for a direct report of innovative decision-making units to top management as an essential feature for radical innovation in mature companies. This suggests that InMUs should ideally also be directly linked to top management. It could be seen that this requirement was only structurally fulfilled in part with the case InMUs.

All case InMUs of the upper management level (Board of Management/Departmental Board, Managing Board) were subordinated as direct reporting units. However, there were discrepancies in the assumed area of responsibility, i.e. the department to which the
InMUs were assigned. This could be seen as directly reflected in the expectation of the Executive Manager responsible for the InMUs (e.g. Member of the Board of Management, Departmental Board, Managing Board) with regard to the core functions to be assumed, which indirectly affected the role comprehension of the respective InMUs.

The corporate InMU was initially assigned to the "Technology and Innovation" Departmental Board, which apparently gave it a high level of freedom and attention with regard to radical innovations. As will be seen below in Section 6.5.3, a subsequent transfer of the direct reporting relationship of the corporate InMU to a hierarchically lower level caused a greater need for justification with regard to its value contribution.

An additional divisional InMU reported directly to the Marketing Board (to which the product management area was also assigned), initially causing a relatively high degree of attention for radical innovation in the Departmental Board. Increasing operational pressure and massive sales reductions, however, evidently caused a continuous decrease in attention over time, which was reflected for instance by the significant reduction of the amount of coordination meetings on innovation activities of the Board.

A senior manager stated [E1]:

'We are now focused solely on projects, which means that all resources are tied up in implementing product ideas as far as possible ...if necessary, even up to market maturity ... the subject of innovation strategy and the generation of new product ideas is fading further and further into the background... it makes you wonder where the ideas for new business models and product ideas are supposed to come from as of next year if no one is dealing with them now... and that was actually the reason why we were formed... fitting into the hectic operative environment that is surrounding us in view of the massive drop in profits may help to increase output in the short term and draw strong attention to our work [authors note: in the hope of getting off lightly in staff cuts] ... in the medium term, however, this development is catastrophic... and no one in top management thinks so far ahead and does anything to avert this... everyone, even the new Innovation Board of
Management it would seem, is looking only as far as the short-term successes.’

Another divisional InMU was directly linked to the Managing Board, albeit to the Finance department in this instance. It was observed that the CFO of this InMU mainly demanded the creation of transparency for R&D activities and only in a second instance the generation of radical innovations. One senior manager of that divisional InMU, who directly reported to the CFO, summed this up as follows [E1]:

‘The link to Controlling is a killer criterion. Innovations need freedom to develop ... and controlling attempts to use cost-benefit reasoning to specify plans for concepts that are inherently non-specific ... The success of innovations only becomes ‘visible’ in the medium to long-term ... They're far too operational in nature ... We basically have a collision of two conflicting mindsets here.’

Consequently, it could be seen that every (innovation) project had to be justified, including a statement on the expected financial outcome [E1].

“How can I express market success in financial terms for a market that doesn't even exist yet and whose players, market assessment, cost structures, etc. I don't know exactly’, ‘They’re trying to make us believe in some kind of precision that doesn't exist at all,’ ‘...at the end of the day nobody checks whether the forecast figures have actually been met years down the line ... not least because someone else will have long since taken over the helm’.

These findings suggest that the top management link according to Litter et al. (2001) is a necessary but inadequate criterion with which the InMUs should comply. It seems to be important that the linkage should occur directly to such a member of the Board of Management or the Managing Board, where there are no such conflicts of interests (operational versus innovative needs), or where they are decided on by one person. In the event of doubt, this is probably the case, for instance, with the CEO, or as described above with the CTO. In addition, these findings suggest that InMUs that are primarily
designed to support radical innovations need a promoter themselves along the lines of radical innovations. If not, i.e. if an InMU does not have a promoter ("power promoter", Table 9 on page 77), there is a risk that the freedom levels of the InMU are determined by the operational environment and are thus set too low. A further finding of this study is that the ‘Innovation management vis-à-vis product management/marketing’ interface seems to be of particular importance – this, according to the generic innovation process, is where the ‘implementation decision’ will be made. The (limited) innovation performance of the case organisation was often comprehended by referring to this interaction [E1]:

‘When I arrive with my new innovation projects that – bad enough – have a medium- to long-term focus or – even worse – are not directly related to their [Product management’s] area of activity, I am unlikely to get any support from their already strained resources… Charity begins at home, as they say.’

Or as another product manager put it [E2],

‘I am not interested in the goings on of manager xy, I make my product the way I like.’

Statements of this type indicate that here, the (divisional) InMU is obviously seen more as a disruptive factor in its own work, existing processes and workflows, than as a necessary contribution to safeguard the future. This effect was strengthened further by the fact that the case organisation was affected by continuous workforce reduction [E1]:

‘We have to continuously cut more and more staff, while still meeting identical or even elevated sales expectations ... It's only logical that we're unable to provide much in the way of resources [human/budgetary] for implementing new and unplanned innovation projects that won't reap any benefits for another year or so.’

Or as one of his senior colleagues observed [E2]:

‘What should I do? We are only a small group of people and have an awful lot of projects on our plate … Product Innovation arrives with new ideas that I am supposed to implement, but I lack the resources for all this.’
However, this seems to contradict what Galbraith (1982) considers as a functioning interface between the innovating organisation (in this case: InMU) and Operational Management (product management / marketing), which is of particular significance in implementing innovations of a radical nature. The above findings illustrate that the failure of radical innovation approaches cannot necessarily be attributed to the quality of an innovation idea, but is more often the result of a lack of resources on the part of the operational unit.

These findings, considered together with the issues addressed above, also support the theory that InMUs should be placed outside of the operational business so that they can optimally assume the intended core functions (see Table 10 on page 89) and role comprehension. In other words, it seems advisable that the InMU be bale to act self-sufficiently, i.e. it is not guided by the management of the operational business, but is in a separate board department or in a legally independent subsidiary of the organisation which is mainly independent from operative business. This coincides with Leifer’s requirement for handling radical innovations in mature companies: „there needs to be a separate initiative so as to avoid the problems of inertia and resistance that may be encountered in the main business, and to avoid the progress of the innovation being burdened with rigid and inappropriate procedures“ (Leifer 2001, p. 36). This suggests that what applies for implementing innovation projects with radical character also seems to apply to InMUs themselves.

6.4.3 Budgeting Mechanisms and Funding Principles

Budgeting mechanisms (i.e. allocation of funds for innovations) and funding principles (financing specific innovation projects) are, according to Mintzberg (1979), a constituent part of the structuring of an organisation. In the literature on innovation management, no approaches were found which address a budgeting problem in such a context. Probably
because budgeting mechanisms of InMUs and especially of hybrid approaches were not given any special attention so far. But the findings of this study suggest that the budget mechanisms and funding principles are an important issue which should be in the scope of InMUs, as they also have to guarantee the financing of the innovation activities and otherwise cannot fulfil their tasks (Table 29 on page 247). Unfortunately, as a rule, resources in a company are limited in most cases.

When managing the case organisation, it could be observed that the need to increase the innovation capacity (see 6.2) – among other things through innovations of a radical nature – became particularly apparent and the respective organisational units had to have the necessary resources available – also to finance the requisite activities (i.e. scouting and screening functionalities, R&D projects, etc.). However, the findings of this study show that budgeting innovations (innovation projects), regarded as self-evident in theory, causes problems in practice which must be taken into account, especially with hybrid InMU approaches. A key lesson learned from this case study is that an increase in the ability to innovate requires a funding procedure explicitly earmarked for the innovating organisation.

**Budgeting mechanisms**

It could be observed that there was no central fund in the case organisation from which all innovation activities were financed. The basic principle of budget allocation within the case organisation was obviously an annual planning process in which all funds – as well as the R&D budgets which covered the innovation activities – were planned and approved by division. All divisions could plan funds in all cost types – as well as R&D. It could be seen that R&D budgets were available to divisions which did not focus on innovation activities in the narrower sense. These budgets were used, for instance, to finance IT adjustments such as “software updates” in Telco systems. This meant that the R&D budgets accounted on the basis of diluted cost planning could not give any
information as to what was really spent on forcing radical innovations in the case organisation. Thus, no correlation between the amount of R&D expenses and the consequent innovative effect (e.g. new sales) could be derived, which would have been helpful in the context of the performance discussion of InMUs (see 6.3.4).

Obviously, the planned budgets were regularly subject to a cost-cutting process of less than one year, which demanded saving "x% of capex/opex" globally. This apparently caused the senior management, to which the innovative units were linked (divisional InMUs), to also cut costs with the innovation activities to achieve the targeted saving potential. As a consequence, numerous innovation projects could be identified which were either stopped, limited in content (and thus received reduced funding) or postponed. As a result some managers of the divisional InMUs demanded another budget mechanism to be applied [F1]:

‘For innovations, we need to move away from this planning and justification policy … The best thing would be to say ‘We will finance innovation’ … and earmark € x million for it. When someone has a good idea, he will get the funds to further develop or implement this idea on his own… If we discover later that the money was not used properly, this individual will face the consequences.’

With regard to the entire R&D expenses, these findings have an even greater significance. A significant gap between planned and actual R&D budget expenditure was identified in some divisions when analysing the quarterly innovation reports. Up to 20-25% less R&D funds/division were spent than originally planned - a contradiction to the budget cuts and the consequently prevented implementation of innovation projects. The discrepancy was justified by the corporate InMU with the described allocation logic of the R&D budget in the case organisation. It was apparently assumed that parts of this budget were used to cut costs, so other funds for the operational business could be saved. This suggests that the R&D budgets were allocated sub-optimally in the case organisation.
Despite cuts, there were, on the one hand and from a Group perspective, enough R&D budgets for radical and incremental innovation activities available, but on the other hand, they were obviously not fully used to increase the innovation capacity provided by InMUs.

It could be seen that contrary to the divisional InMUs, the corporate InMU had a practically constant eight-figure budget over the years. This served to coordinate and carry out innovation projects of a radical nature. Linking this InMU to the Headquarters Strategy Division meant it was not subject to operational business and thus to the “innovation or inventory consolidation” conflict to the above stated extent.

In practice, this differentiation mentioned between corporate and divisional InMUs resulted in tensions, which caused a kind of competitive situation between the InMUs. Due to the lack of own innovation budgets - especially for more radical innovations - the divisions were almost forced to join in corporate innovation management projects. This enabled divisional InMUs to implement innovations with a more radical character without having to use their own budget. In view of the need for a “transition process” according to Galbraith (1982), on the one hand, and the frequently addressed “transfer problem” on the other hand, the pressure for cooperation might be rated as a positive side effect due to the shortage of financial resources. However, the results of this study suggest that the kind of interaction and cooperation in a hybrid approach corporate/divisional InMU can be of decisive significance. According to the statements of divisional InMU managers, for instance, the results of the joint projects were then sold to top management as the results of the corporate InMU. This naturally led to conflicts in the further cooperation and interaction between divisional InMUs and the corporate InMU. One senior manager expressed his frustration as follows [E1]:

‘We [divisional InMU] had to more or less co-finance the central innovation department’s budget… What they do there does not benefit us in the slightest
… Our own projects would at least produce a demonstrator that we can then
present at trade fairs... And what have they got to show for their efforts? Nothing ... they just burn a lot of cash .... and at the end of joint projects they then sell our work and results to the top management as their success... we have learned from this and think very carefully in each case about whether and how we use this “offer”.

This conflict obviously caused reservation regarding cooperation in the divisional/corporate InMUs (see ‘in-house competition’ in 6.5.4 on page 290).

**Funding principles**

On the basis of the findings of Hauschildt (1997) and internal DT benchmarking (Deutsche Telekom 2002), it can be assumed that hybrid approaches of InMUs can be found more often in practice, especially within larger companies. The findings of this study on the role of corporate and divisional InMUs in innovation indicate, among other things, that project structure and funding principles are of particular importance. This problem, however, does not seem to have been dealt with in detail in the literature, as hybrid approaches of InMUs have been theoretically derived in the innovation management literature, e.g. Hauschildt (1997) or Vahs and Burmester (2005), but not analysed as regards efficiency.

Based upon the empirical findings regarding the interactions and transfer problem of innovative ideas of a radical character between the corporate InMU and the divisional InMU, the approach presented below will describe the identified interaction of corporate and divisional InMUs at the innovation project level, which might assist understanding the interaction and role comprehension of InMUs within hybrid approaches.
This approach concerning project structure and project funding principles (see figure above) illustrates what kind of innovation projects were to be managed by the InMUs within the case organisation on the basis of different targets and time windows. Cross-divisional innovation projects in the sense of optimal resource expenditure proved to be significant for the case InMUs, as did achieving the transfer commitment. The latter was regarded as the critical success factor in the case organisation for further implementation of a specific radical innovation project.

On the basis of analysis of the project types and applied funding principles, it could be derived that there was no co-funding (see figure above) for cross-divisional innovation projects due to the resource shortages within divisional InMUs. If at all, it was limited to a contribution of resources in the form of manpower. This could be one of the reasons for the lack of commitment bemoaned by corporate InMU to assume cross-divisional project results. A senior manager [E1]:

“I have to convince the divisions that what we do works and provides the divisions with added value. There is often a lack of commitment to continue our projects… I get the feeling they think I’ll let them [CIM] have a go and we’ll see what I can use of it for myself [DIM].”
To “prove efficiency” and to increase the chances for radical innovation to become reality, the corporate InMU identified the need to conduct projects up to the piloting phase under their own responsibility. In addition, a proposal was made in order to increase commitment to use the project results of corporate projects on the divisional level by, for example, co-funding from the divisions, which creates an interest in “increasing added value with self-applied funds”. The divisions, however, criticised the project results of corporate InMUs regarding the selection of topics, time schedule, expected results and thus their added value and the ability to implement them. As a consequence, both sides started an attempt to solve the “missing commitment to implement” and “interaction” problem by reshaping the “innovation council approach” (see below), as well as by rethinking the funding procedures of the innovation projects. The results were still open when the study was completed.

6.4.4 Steering Mechanisms

Not least because ‘people make innovation’ (Faulstich 2005), innovation is the result of many targeted activities and not the result of one single act (Cooper and Kleinschmidt 1988). Indeed, the interaction of numerous people with different competencies – and, from a business perspective, from different areas of responsibility – is necessary. This process has to be coordinated and controlled. This should as such not be a problem, if it were not about allocating limited resources in a company: „In any organisation, there are hundreds of ideas being promoted at one time...“ Galbraith (19982, p.10). For this reason, a promoter is understood as a prerequisite according to the generally accepted promoter approach of Hauschildt (1997) or Galbraith (1982), especially for implementing radical innovations. The same promoter is not necessarily required for all phases of implementation163. Mostly, an innovation needs various promoters (types) (see Figure 8 on page 78) according to the implementation phase and environment. Here, control

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163 Except a top manager, for instance, who fosters “his” innovation as „Power Promotor“ from the idea phase up to market implementation.
mechanisms for InMUs are necessary to guarantee adequate communication with the key players and requisite resources - or to allocate the promoter required for the next step.

Because InMUs are - as already illustrated - responsible for the implementation of innovations (at least to a certain stage), it can be assumed that it is also their duty to develop, implement and apply appropriate control mechanisms of innovation discovery and implementation. This requirement could be confirmed in this study for all case InMUs. Regardless of whether these Boards were called “Divisional Innovation Board”, “Product Board” or “Innovation Council” in the case organisation, certain basic functionalities could be observed throughout all these “Innovation Committees” (IC). All “ICs” had the following basic tasks:

- Communication platform for exchange of current and planned innovation activities
- Resource allocation (project approval, provision of manpower, sometimes budget approval) for the innovation projects
- Go/no-go decisions at specific gates and guarantee of a commitment to continuation by the respective responsible manager
- Escalation instrument to resolve conflicts / barriers.

The pure description of the basic tasks, however, says little about whether these tasks were accomplished in practice. This was confirmed by the results of the interviews and corresponding documentation (e.g. minutes of the meetings, etc.) which showed that IC meetings regularly took place at the beginning, so that there was a real exchange on ongoing innovation activities. Yet after just a short period of time, less importance was attached to the meetings of these steering committees. This can be derived from the fact, that they were generally chaired by senior managers at the beginning, then by their deputies later on, then the steering committee meetings were postponed more and more often or the IC was unable to make a decision, and finally the IC was abandoned altogether.
One important finding of the study in this context is that the correct appointment of the board is obviously an important role for its intended efficiency – and ultimately whether or not an innovation idea becomes reality. Evidence could be found that basically all “innovation councils” which worked according to the “top management attention” principle as required in the literature were - as described above - failures. It was thus apparent that only after a few months, by virtue of increasing pressure on short-term operative results, top management attention decreased as well as the interest to attend the meetings of these steering boards. Apparently, deputies were sent to this IC ever more often until finally a decision barrier was reached and the Boards were discontinued approx. 6 to 9 months after their implementation. A reason unanimously stated was that the topics discussed there with a medium and long-term time frame on these managers’ “activities radar” – as one participant called it – were not provided with a high priority anymore due to the current operational control needs.

Attempts to continue such boards with representatives (middle management level) revealed not only the lack of direct decision-making competence, but also new problems. For example, one of the reasons mentioned in a case InMU for only approx. 6% of the ideas actually receiving a decision from the responsible board/committee in favour of implementation was the defensive attitude vis-à-vis new innovation projects on the part of a number of board members. The InMU suspected that these board members would also have been responsible for the operational implementation of the ideas up to the point of market launch in the event of approval, and would not have wished to take on any new innovation projects on account of a lack of own resources.

A senior manager of such a board noted [E2]:

“What should I do? We are only a small group of people and have projects up to our ears… PL [Note: the InMU] arrives with new ideas that I am supposed

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164 60 out of 900 ideas received a decision in favour of implementation (see 6.3.4).
to implement, but I lack the resources for all this… On top of this, we are in
the middle of drastically cutting back our project portfolio because we have
too many products on the market.’

As well as these division-internal control problems, a similar effect obviously occurred for
cross-division control activities. An insufficient adoption commitment on the part of the
divisions for corporate InMU activities was bemoaned by numerous interviewees, the
effect of which corresponds to the limited adoption willingness of divisional InMU activities
and the product manager described above. This again is related to a functioning transfer
mechanism which was already addressed by Galbraith (1982). The findings confirm the
requirement for InMUs to be able to act self-sufficiently as long as possible by acquiring
their own (project) resources, in order to further implement innovation ideas, at least up to
the piloting stage (also addressed in 6.3.2.).

A potential exit from this dilemma of inefficient steering boards was described by a senior
executive of the corporate InMU in the context of the discussion on the problem of the
lack of adoption commitment. He recommended in the face of the positive experience he
had made as responsible Senior Executive in other companies [E1]:

‘A limitation of activities via timelines [authors’ note: Divisions: focus 1-3
years, corporate: 3-10 years] led to interface discussions with affected areas
[InMUs], which are counterproductive…. We are more concerned with
“differentiation” than with the question of what the corporate or divisional
InMU could contribute to topic xy in order to generate the maximum added
value from a company perspective… The differentiation discussion should
become an efficiency discussion: which unit [authors’ note: InMU] can and
wants to contribute? This is why we need people on such a Board who are,
regardless of their hierarchic level, capable of promoting good ideas”.

The idea of this senior manager to fill the board with people who are capable of promoting
good ideas mirrors Hauschildt’s (1992) or Gerlach’s (2003) promoter concept (Power,
Process, or Relationship Promoter, etc.) - see Table 9 on page 77 and Figure 8 on page
and might be seen as a promising approach. The findings on controlling innovation activities via corresponding Boards already showed that their effectiveness is decisive for the adoption commitment to continue innovations with a radical nature – and thus whether they are implemented at all. It could be seen in this study that an appointment solely and entirely on the basis of hierarchies does not represent a success criterion. Rather, it suggests that the capacity to promote good ideas should be significant for the decision criterion for appointing an “innovation council”.

6.4.5 Summary Component “Organisation”

As observed above, a common basic understanding with regard to central versus divisional innovation activities was identified, which a senior manager summarised as follows [E2]:

‘Corporate Innovation ought to undertake and centrally administer a forward-thinking outlook with an effect on the whole Group, whereas the divisions ought to undertake pillar-specific innovation activities with a direct impact on the markets’.

The observation showed that the tasks of the corporate and divisional InMUs were carried out in a very similar way, even though their alignment was different: corporate InMUs with a focus on the group level; divisional InMUs with a scope covering the division’s interests. In general, both InMUs focused on the ‘fuzzy front-end’ activities of the innovation process.

Differences in the interaction with the environments to which they were linked could be derived for the role comprehension of InMUs.

The corporate InMU represented itself as a self-contained unit supporting two interfaces. On the one hand, to management which they were linked to, and on the other hand to the divisional units, to transfer the results of their innovation projects for further development.
and implementation. This relatively high degree of autonomy meant radical innovations could be developed and implemented undisturbed up to a certain stage of maturity (piloting) by the divisional InMU or operational management. Transfer to the divisions/DIMs was identified as critical (see Figure 20 “Transfer” area on page 260).

In contrast, the divisional InMUs were linked to the operational line organisation and had to support an extra interface. Apart from interaction with the management (and their expectation of also assuming incremental innovation duties, including the risk of increased disinterest in the InMU activities due to increasing operational pressure) and the corporate InMUs (continuing with the expectations of their project results), the interface to product management/marketing was also focused on. Here, the divisional InMU’s target was to transfer the radical innovations for further implementation to the line, which also turned out to be a critical interface. Due to limited resources and a focus on more incremental innovation of the operating management, it was viewed as important to create a certain independence from the existing Product Management/Marketing entities, as required by Galbraith (1992) and others.

Furthermore, the findings of this study on the role of InMUs indicate, among other things, that project structure, budgeting and funding principles, as well as steering mechanisms and interfaces, were of particular importance for InMUs. It was possible, for instance, to derive from these findings that linkage to the top management – as required by Litter (2001) and others – or appointing control committees solely and entirely on the basis of hierarchies, represents a necessary but inadequate criterion. The findings suggest that the promoter approach ("power", "process", or "relationship" promoter) of Hauschildt (1992) or Gerlach (2003) – see Table 9 on page 77 and Figure 8 on page 78 – as a significant decision-making criterion should be crucial for linking InMUs to management and appointing an “innovative council”, if a radical innovation is to have a chance to be implemented.
6.5 Environment

As InMUs are integrated in an overall organisation and their respective environment, a closer look will now be taken at those factors that represent "exogenous factors", i.e. factors 'beyond the control' of InMUs. In addition to factors related to the "regulatory framework", those elements will also be appraised that influenced the behaviour of InMUs against the background of defining boundary conditions. Additional drivers and barriers were able to be identified here in the InMU context.

6.5.1 Regulatory Framework

The results of studies such as those by Galbraith and other researchers recommend dedicated recruiting rules and evaluation and payment systems for innovating organisations that differ from those of the operational organisation. Although it has been clarified that aspects of the role of individuals in creating innovations and related areas of individual efforts and institutionalised mechanisms (creativity, knowledge and learning etc.) are beyond the scope of this study (see 1.2), all case InMUs were integrated in the same line organisation within the same “regulatory framework” (HR systems). For instance, the problem of recruiting adequate personnel was addressed in virtually all case InMUs. The extent to which such a ‘closed system’ (here: case organisation) has an impact on InMUs will be assessed in this section.

Recruiting Rules

It could be observed that the continuous workforce reduction (on average about 10% every year) within the case organisation resulted in a limited annual recruitment rate. In order to be able to participate in this rate, and in accordance with the requirements of German labour law, all vacant positions first had to be posted internally (without success, it must be noted). The recruitment procedure of the case organisation also included a specific job description, on the basis of which the requisite qualifications profile was
derived. Employees of the case organisation were given priority when it came to filling vacant positions over external personnel. External applications were not permitted until no adequate employees applied for the internal posts, or the applicant did not fulfil the requirements and the procedure had been repeated twice. The works council, tasked with representing the interests of the employees, monitored compliance with these rules and had to approve every recruitment. In this context, it was also checked whether and to what extent the internal applicants could be qualified for the new task by means of appropriate training.

One critical lesson that emerged from the analysis was that in the face of freeze in recruitment these recruiting rules only allowed the InMUs to realise their envisaged tasks and objectives as described before just to a limited extent - at least for two out of the three InMUs (VAS and PI). As the job requirements in the InMU primarily covered special know how, e.g. in the context of strategy development, innovation management, marketing and product management or knowledge management, the group of potential employees from the case organisation was limited and only the corporate InMU was granted a higher external recruitment ratio.

The findings showed that these fixed recruiting rules that are not geared to the requirements of InMUs represent a massive threat to InMUs, both in terms of the 'ready to operate' time dimension and as regards the required competencies. This supports the call of Galbraith (1982), for instance, to separate the innovating organisation (here InMUs) from the routine organisation, even though Dougherty and Hardy (1996) simultaneously derive the following conclusion from their studies: ‘… unfortunately, new products are (normally) inextricably bound up with the rest of an organisation and therefore avoiding the connections is not a real solution …’ (p. 1222).
However, one of the lessons learned from this case study is that when launching an InMU, it must be ensured that the top management is unequivocally committed, in order to rapidly fill the vacant positions, even by issuing corresponding exceptional rulings if necessary. It seems that this represents a problem that can only be solved on a case-by-case basis.

At the third (corporate) InMU, the problem of finding suitably qualified staff for new positions was not encountered to the same extent. As already mentioned, this was probably attributable to a higher external recruitment rate and higher grading of the jobs – graded on average one level above those in the divisional InMUs. As one manager noted strikingly, this resulted in an internal "war for talents" between the InMUs. On the one hand, it was observed that the InMUs attempted to motivate identically qualified employee groups to change to their unit, while on the other hand, the employees themselves were more likely to attempt to change from operational units or InMUs to the corporate InMU on account of the higher job grading and thus higher salary. The higher job grading and higher salary likewise appeared to have been more attractive to external applicants in this context, resulting in better qualified employees being able to be recruited for the corporate InMU.

This was reflected in comparison with the divisional InMUs by a higher level of formal education (e.g. greater number of graduate applicants) and relevant (external) vocational experience from the field of consulting or other industries, for example. As a point of interest, it could be seen that virtually nobody had specific know-how regarding innovation management, neither from the central nor from the divisional InMUs. Thus, despite a broad array of study options already being available (in Germany) in the field of innovation management, only two InMU employees held a pertinent degree in this field. The backgrounds of the other employees covered several years of vocational experience in R&D, product management or marketing; the external staff, usually also younger
employees, were preferably recruited from consulting, and particularly from the strategy consulting environment, with extensively less relevant vocational experience.

This lack of innovation know-how became manifest in repeated discussions on the significance and procedure of innovation measures (e.g. the definition of innovation KPIs, the type and manner of steering committees, the design of innovation processes, etc.), or repeated benchmarking activities for the most diverse units, in order to identify best practices in the innovation environment. Additional measures were evidently initiated in order to avoid the potentially negative effects of such restrictions on the efficiency of the structure - and thus the performance – of InMUs.

In order to balance the deficits in employee quantity and quality in the divisional InMUs yet to nevertheless be able to realise the targeted spectrum of tasks (e.g. deriving new business models, etc.), activities were subcontracted to third parties, such as T-Nova/Berkom – former R&D units of DT - or consulting companies, in the form of consulting contracts or projects, correlating to what Chesbrough (2002) or Gassmann and Enkel (2006) call the ‘open innovation approach’\textsuperscript{165}. Thus, the innovation managers within the InMUs also assumed the role of project managers and coordinators and were thus able to compensate for a lack of own know-how and resource capacities. However, this could be realised to a limited extent on account of budgetary restrictions and manpower in the InMUs. This resulted in a reprioritisation of tasks and subjects aimed at presenting maximum added value towards the operational units and the management, which became reflected in more short-term project goals of an incremental nature.

\textsuperscript{165} ‘Open Innovation’ consists of three core processes (outside-in, inside-out and coupled) to enrich the own company’s knowledge base through the integration of supplier, customer and other externals for increasing a company’s innovativeness. But it needs to be considered that the biggest challenge to ‘Open Innovation’ is to overcome the ‘NIH’ syndrome.
These findings suggest that inappropriate recruiting rules can negatively influence the capability of InMUs, as the structural approaches of InMUs were unable to be fully implemented on the operational level in some cases.

On the other hand, the findings suggest that resource bottlenecks may lead – more unintentionally than deliberately – to the application of the principle of "open innovation" derived by Gassmann and Enkel (2006) in empirical findings. The conclusion that this approach – regarded by the case InMUs as being conducive to innovation - appears to be more unintentional than planned can be derived from the statement of one particular manager [F1]:

"The scarcity of resources leaves me no other option than to subcontract consultants or to employ student interns for projects on a selective basis … Otherwise, with the resources at my disposal, I would be spending all my time using all of the interfaces in the enterprise and the operational output of my unit would be very limited."

It seems that resource bottlenecks can thus have a certain stimulating effect on innovation, in this instance by using an 'open innovation approach'. Thus, the negative effects of the prevailing recruiting rules were obviously partly compensated by the management through the acquisition of external knowledge and expertise, even if only for a defined period of time.

However, the fact that deliberate use of this approach has also taken place could be verified on the basis of the corporate InMU and its "T-Lab approach". In this context, the utilisation for the case organisation of insights from science (e.g. universities and research institutes), as well as from other companies, was deliberately aspired to within the framework of corresponding projects and coordinated by a dedicated InMU sub-unit T-Lab (‘Telekom laboratories’) in order to develop new technology approaches and business models (radical innovation) for the enterprise.
A further critical limiting factor was addressed in the context of limited resources. In particular, the divisional InMUs complained of the lack of the option to implement new business ideas (radical innovation) through interdisciplinary project teams that were not included in the scope of the case organisation, or which required new processes. In addition to the statement from the interviews, corresponding documents and reports (e.g. in an internal audit report) also showed that it was not possible to provide employees from the "home organisation" to adopt a limited project task (e.g. for more than ½ year) as the "work positions" would otherwise have remained vacant and the relinquishing organisational unit would have blocked such HR provisioning.

The reason given by InMU managers for this was unclarified organisational/HR issues that the HR department had failed to solve over all those years. This evidently led to the realisation of some InMU executives that an InMU requires its own project management resources (to push an idea up to the piloting phase; see 6.3.2), on the one hand, while radical innovations can only be implemented to a limited extent within the line organisation, on the other hand, thus necessitating an "innovation-hub" approach (e.g. see Fig. 11: 'Radical Innovation Hub' on page 109) for the realisation of new business models beyond the regular organisation166.

The findings suggest that the potential negative effects of recruiting can be minimised by means of mechanisms, such as utilisation of the "open-innovation" approach (see e.g. Chesbrough 2002), or an innovation-hub approach (e.g. pursuant to Leifer 2003). However, this renders it necessary for the InMUs to be granted additional room for manoeuvre, especially when it comes to the allocation and expenditure of financial budgets.

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166 Note: this approach was realised after approx. 2 years of internal discussion for the first time in T-Com shortly after the accomplishment of the fieldwork of this study.
Reward Systems

No remuneration systems - or reward systems / incentive schemes (e.g. bonus system via the balanced scorecard) – could be identified in the case InMUs that deviated from the customary remuneration systems in the line organisation. It could be seen that the employees with the InMUs were subjected to the same standardised grading and remuneration system as that of the case organisation, although it was evident that the corporate InMU positions were graded higher in the event of similar job descriptions in comparison with those in decentral InMUs with the same tasks. This was justified by the responsible management with the higher requirements on qualification and the complexity of the tasks. It could be seen in the interviews that the motivation of the employees in the InMUs and the appeal of working in such an organisational unit was primarily derived from the nature and content of the InMU activities and the resulting degrees of individual freedom and opportunities, i.e. from what Herzberg called intrinsic motivation factors (cf. Herzberg 1968, p.57). In this respect, the typical motivating factors specified for wanting to work in an InMU were [E1,E2,F1]

"implementation of own creativity", "putting own ideas into action", "I work on interesting topics here", "you have your finger on the pulse here" or "this is about the future – not about staff reductions like the rest of the company".

The fact that the remuneration and thus the flexible reward systems themselves represented an appealing factor in gaining qualified employees has already been illustrated within the scope of the recruiting rules.

It could be observed in this study on the basis of the results of internal 'contests', that the "incentive schemes" called for in the literature (see 3.5.5 S&F Research) can have a stimulating effect within the environment of innovation activities. Many employees participated in these 'contests' with innovative ideas of a rather radical nature (e.g. new business models). Participation was especially high if particular incentives were announced as the prize. For instance, one contest had the aim of finding new business
models in order to determine new employment opportunities for employees threatened by job cuts. The best ideas were rewarded by providing the opportunity to implement the actual ideas themselves. This was realised via the sponsoring of resources and also by releasing the originator of the idea from his/her former activities.

The participants in the contests justified their interest in such contests with the opportunity of being able to implement their own ideas without the full entrepreneurial risk. In the event of a flop, they would have been able to return to the case organisation. Furthermore, the provisioning of corresponding know-how (e.g. regarding the design of business models) and resources, as well as the high degree of attention from the management, were also specified as reasons. The latter reason made it evident that senior managers adopted the role of patron or guardian over the contest.

It must be taken into consideration in this connection that the originator of an idea could also have proposed that idea directly to an InMU without such contests. This gives rise to the assumption that either the opportunities to this end were unknown, or the originator of the idea would not have been personally involved in the implementation and potential success of his idea to such an extent. The findings of this study support the latter assumption.

Interestingly, these contests were not initiated or held by the InMUs themselves. Only in one case did an InMU provide support in selecting a suitable business model. This could be due to the InMUs not experiencing a shortage of ideas for radical innovations and these contests being more or less attributable to the safeguarding of jobs in particular fields.

Furthermore, motivation of a primarily financial nature was able to be observed amongst participants in the case of "Idea Management" (operating proposal procedure) and patent
application. In this context, the amount of the monetary reward is dependant on the verification of utility\textsuperscript{167} or, in the case of industrial copyrights, a pro-rata share of the value of the application or the sale thereof within the framework of intellectual property right measures for which the corporate InMU was responsible. Thus, successful ideas and patents were regularly presented via internal media, in order to deliberately stimulate the number of submissions according to statements by those responsible.

The findings suggest that reward systems – deviating from the necessity addressed by Galbraith in his model for special "reward systems" or "incentive schemes" – do not represent any decisive motivating factor for the staff of an InMU itself and therefore have no further innovation-stimulating effect for the InMU. However, the findings suggest that a more flexible reward system than that in the case organisation can promote the acquisition of suitable employees. In addition, empirical evidence could be found that flexible reward systems yield an innovation-stimulating effect in terms of leveraging additional innovation potential from the operational organisation. It can be derived from this that an InMU should also deal with the implementation of alternative reward or incentive systems as an instrument to foster radical innovation, depending on the environmental conditions (e.g. lack of ideas).

Ultimately, this study confirms the assumption formulated by Albers and Eggers (1991) that there was "no lack of ideas" - rather, the InMUs faced an "implementation problem" in the case of innovations of a radical nature.

6.5.2 Frequency of Reorganisation

Studies by Jelinek and Schoonhoven (1990) showed, that frequent reorganisations can help large companies to keep their organisation flexible to react to market changes. The

\textsuperscript{167} Analyses in the case organisation showed that the topics submitted mainly involved cost savings potential or process improvements. In the period examined, not one example was able to be found of this instrument actually leading to a product innovation.
literature addresses reorganisation as an instrument to boost innovative capability by means of dismantling functional barriers (Corsten 1989). However, the findings of this study suggest (cf. 6.2.2) that reorganisation to boost the innovative capability must also be initiated to this end in the first place, as the focus would otherwise remain on continuous workforce reductions and increasing the efficiency and effectiveness of the operating organisation. In addition, a critical lesson emerges from the analysis of the frequent reorganisations of the case organisation.

For instance, extensive elements of the T-Com SBU were reorganised more than 15 times within just a few years. In parallel to this high number of reorganisations, comprehension increased amongst the management that these reorganisations were not conducive to boosting the innovative capability of the case organisation in addition to increasing efficiency. A senior Manager of the OD department commented that [F1]:

‘The number of reorganisations is mad! While one reorganisation was still being implemented, the bosses were already thinking about a new one. And that on a scale – and I mean the scale of the changes involved – that was unheard of in any other enterprise. Not at Siemens, not at Volkswagen etc. ..’

This expressed criticism of the frequent restructuring activities in the Group without the previous restructuring measures being given enough time to take effect. This corresponds to what Sennet (1998) and Argyris (1990) call an excessively high frequency of change, which leads to frustration of the employees and lethargy in terms of decision and implementation processes in the organisation.

The fact that reorganisation taking place roughly every 2 years is likely to already have reached an excessively high frequency of change in the case organisation is not only verified by an internal Group audit report, but has also been observed in a behavioural change on the part of InMUs. In this context, two InMUs shifted their spectrum of activities from more long-term oriented activities (e.g. the development of new business models) to
the more short-term oriented generation of "quick wins" against the background of indications of renewed restructuring. The analysis of documents and protocols revealed that support by Product Management was able to be gained for the performance of market studies for incremental innovations or the performance of idea generation workshops on behalf of Marketing, in order to identify new (incremental) innovations. The motivation behind shifting the spectrum of activity was seen as the fear that medium to long-term topics as represented by radical innovation approaches would not meet with acceptance on the part of management in a more short-term oriented and risk-averse environment. This mirrors Hauschildt's (1997) and Hartmann's (2004) suggestions, according to which major enterprises are often more geared towards short-term financial success. A senior manager of one InMU [E1]:

‘We had to face the facts. We were given no time or resources to organise ourselves as was necessary. And they [Board of Management] think: my shirt is near, but my skin is closer and thus the short term given to achieve personal sales targets is more important than thinking of possible sales of the future...I constantly received digs enquiring as to what I would think I would be good for.’

A further senior manager responsible for technology platforms summarised the situation as follows [F1]:

‘Too much importance is currently attached to cost savings when introducing a new product. In fact, many business cases and new products are no longer realised on account of the requisite investments. There is a clear competition for investment budgets in this context – usually at the cost of long-term innovation projects and R&D... If we'd already had four pillars earlier and people had looked at the figures, ISDN for example would never have been realised.’

Due to the strong focus of InMUs on radical innovation (high-risk, long term activities), it was feared that the value contribution of the InMU would no longer be recognised in the

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168 ISDN: Integrated Services Digital Network = radical innovation in Telco environment.
next bout of reorganisations and that the InMU would therefore be disbanded – a fear that proved to be justified in both InMUs despite the realignment of their scope of activities towards more incremental innovations. This gives rise to the suspicion that even a short-term reorientation of activities towards incremental innovation does not represent a guarantee of survival for an InMU in a volatile environment. On the contrary, it appears that an InMU loses any further right to exist if no promoter can be found for an innovative product, much along the lines of the promoter approach of Hauschildt (1997). This shows that similar "game rules" (promoter approach) apply to InMUs as to the implementation of a radical product – along the lines of Schumpeter (1934), according to whom innovations are unwelcome in the event of doubt.

The existence of the third InMU - corporate InMU – was apparently not exposed to the same degree of danger as a result of such reorganisation cycles. Here, no indicators could be identified that cast doubt on the necessity of the corporate InMU, and especially the corporate R&D coordination and monitoring function.

6.5.3 Sponsorship - Board Member as Promoter

The significance of the promoter for radical innovations has already been addressed in the literature review. In contrast, the extent to which the promoter or champion approach also influences the tasks or role comprehension of InMUs has not yet been described in the literature. However, it emerges as a critical lesson from the analysis that the loss of the promoter of an InMU can have a significant impact on the tasks and role comprehension of that InMU.

As already described, the corporate InMU was initially linked directly to a board member "responsible" for technology and innovation. During this time, the topic of "innovation" could be frequently found on the agenda of board meetings. For the corporate InMU, this meant that its activities to promote innovativeness were highly visible and were followed
with great attention by the board of management of the case organisation. The tasks of
the corporate InMU focused not only on corporate R&D coordination and monitoring, but
also on formulating and coordinating the group innovation strategy and, in part, on
cooporation with the divisions in the execution of projects aimed at identifying and
validating radical innovation options (so-called "mega-topics").

During the course of reorganisation of the Group Headquarters as a result of further
decentralisation of the group and strengthening of the self-responsibility of the divisions,
the board member responsible for technology and innovation left the case company and
the board of management resolved to no longer continue this board function in that form.
Although the corporate InMU was now assigned to the CEO as a direct consequence of
this action, this assignment was no longer as a directly reporting unit but as a subunit of
group strategy/development. This had numerous effects. From then on, the topic of
innovation was no longer as present amongst the board of management and the visibility
and importance of the corporate InMU and its activities also decreased.

The senior manager of the InMU [E1]:

"What is missing is top management commitment. E.g. on international
conferences or CeBit our CEO underpins the innovativeness of DT. I
analysed, that approx. 60 – 70% of the examples mentioned are coming from
R&D – activities that are not products on the market at that moment. On the
other hand, the senior management complains of how expensive R&D is and
asks what is the contribution of R&D – and by that I mean my unit directly.
They don’t take the long term view of R&D and our activities into
consideration like before."

Furthermore, Controlling now demanded a cost effectiveness analysis for the approval of
the annual budget for R&D projects. The senior manager noted further [E1]

"All of a sudden, I had to verify an internal rate of return for my projects. This
entailed an incredible amount of work and we were faced with the problem of
delivering sales forecasts for topics that wouldn’t be hitting the market for
another 4 years or more – simply unrealistic".
Consequently, a change in the spectrum of tasks of the InMU was able to be observed in the subsequent reorganisation. The topic of "executing projects in cooperation with the divisions" continued to be included in the list of tasks, but no change could be observed in the actual role comprehension. A corresponding strategy paper shifted the planning intervals to 1 to 2 years (and mainly market pull innovation) for the divisions and 2 to 5 years (and mainly technology push innovation) for the corporate InMU (see Fig. 19). In practice, this resulted in a competitive situation of sorts and tensions arose between the InMUs (overlapping area of responsibilities). As they lacked their own innovation budgets, especially for more radical (product) innovations, the divisions were left virtually no choice than to participate in corporate innovation management projects (see 6.4.3 - budgeting mechanisms).

The illustrated loss of a board member who acted as a promoter for innovations (and the corporate InMU) on the board level in the case organisation shows that the pressure on this InMU resulting from the 'So what are you there for at all?' attitude increased, leading to a shift towards more medium and short term oriented activities. However, overlaps in the spectrum of tasks resulted in additional conflicts in the interaction between corporate and divisional InMUs already identified as a substantial element in the successful implementation of hybrid InMU approaches. If an organisation lacks a distinct innovation culture, an InMU without an influential promoter (corresponding to a "power promoter" as defined by Hauschildt et al. (1999) is exposed to increased pressure of justification, particularly in the lead up to a further reorganisation.

### 6.5.4 “In-House” Competition

The literature describes open communication between units as a success factor for achieving an environment that stimulates and promotes innovation (see 3.5.5). Section
2.2.3 illustrated that - within the scope of increasing convergence - SBUs in the Telco segment with their own profit & loss responsibility increasingly asked the question of how they could maximise their revenue in their own business segments, which explains the manifestation of "in-house competition" in the present case between the fixed SBUs and the mobile SBUs. Evidence was found in the case study that this situation resulted in an obstruction to internal communication in the innovative context, leading to negative effects in the communication of innovations.

Within the framework of a meeting on the cross-divisional exchange between the SBU managers responsible for innovation activities, one of the SBUs presented a product idea. An executive manager of the fixed-line-SBU presented a business model called "Musical call tone" (principle: any desirable song is played over the connection until the called party accepts the call). Some months later, the same product concept was launched onto the market under the name "sound logo" by the mobile SBU as an innovative product – with significant success, it should be noted. It has been reported that the product manager admitted that the initial trigger for this product was the aforementioned concept presentation by the fixed-line unit in the meeting. However, this unit did not launch "its" product onto the market until more than 9 months later and was unable to achieve the same degree of novelty and business success. The late launch was attributed to the arduous decision-making and implementation processes.

It could be seen that from the corporate perspective, the aspect that the original idea stemmed from another SBU was classed as non-problematic with the following reason: "The main factor is that somebody implemented the idea before our competitors". However, reservation on the part of the original "idea provider" was consequently observed when it came to exchanging information on new innovative topics in the case organisation. He noted [E1]:


"At the next meeting, I'll hold back on our idea and won't attempt to position it elsewhere until I know for certain that we won't be implementing it ... we did all of the work while others get the praise."

This attitude ultimately harbours the danger of cross-SBU ideas not (or not any longer) being discussed openly and innovative product approaches thus possibly not being implemented. This example supports the assumption in 3.4.2 that barriers are an inherent feature of innovation. According to Hadjimanolis (2003), one must be aware of such barriers as well as being able to cope with them (Staudt 1985), because they are often the decisive factors in whether or not an idea can mature into an innovation. Barriers represent a fundamental element of innovation management (Piatier 1984) and are thus of essential importance for InMUs.

The "Innovation Council" established by the corporate InMU at the end of 2005 must be viewed in this connection. This involves a cross-divisional board with the goal of establishing cross-divisional transparency, promoting communication and strengthening cross-SBU interaction on innovative topics of a radical nature. However, the findings of the above example suggest that the "board approach" probably fails to represent an adequate solution to the above-mentioned problem field. The findings suggest that the corporate InMU assumes a higher level of competitive pressure within the group in the face of increasing convergence and that its own activities must take into account an increase in cross-SBU interaction to establish a "win-win" environment. This mirrors Hauschildt's (1997) definition of barriers of an 'emotional nature'. These must be taken into greater consideration in the spectrum of activities of InMUs. This is especially true if such barriers become manifest on the individual level amongst 'innovators'\textsuperscript{169}. In such a case, the activities of InMUs alone are no longer sufficient for dismantling functional or rational barriers.

\textsuperscript{169} Understood as that individual who wishes to realise the innovation.
6.5.5 Summary Component “Environment”

This section focused on deriving organisational factors that foster or hinder InMUs in achieving their tasks. The contribution of this section is the insight that such exogenous factors can have a decisive influence on whether or not an InMU is even up to its envisaged role of realising radical innovation activities. The integration of an InMU in a line organisation subjects that InMU to the same regulatory framework as the operational units, although it requires special degrees of freedom in comparison to the other operational units on account of its tasks and function.

Empirical evidence could be found in this study that adequate personnel were not available in time in an environment characterised by continuous reorganisation, coupled with continuous staff reductions as a result of unsuitable recruiting rules. This not only impacted the "ready to operate" status negatively, but also became manifest in a tendency to focus on more incremental innovation activities.

The literature proposes separation of an InMU from the operational organisation, but this also produces a new problem, namely the requisite linking with the operational organisation (see Galbraith 1997). Radical innovation approaches must be transferred to this operational organisation for the purpose of implementation and mapped in corresponding processes and structures, unless they are implemented as spin-offs on the external market. It has been possible in this study to show that a resource bottleneck can alternatively be compensated for by means of "open innovation". In this context, the own company's knowledge base is enriched through the integration of third parties. However, this also necessitates room for manoeuvre regarding budget allocations and expenditure on the part of the InMU. Furthermore, the inadequate "project management opportunities" caused by a lack of interdisciplinary project teams for implementing radical innovations in the line organisation have also been addressed. This gave rise to the call for innovation hub approaches outside the line organisation.
In the case of the reward systems, no innovation-stimulating effect on the InMU itself was able to be derived. This can be attributed to the case InMU having an "implementation problem", and not an "idea problem". For cases in which a "lack of ideas" problem does exist in contrast to the assumption of Eggert and Albers, the study was able to ascertain an innovation-stimulating effect through specific incentive schemes for idea generation. Therefore, their use by InMUs seems to be advisable.

The frequency of reorganisation (in this case approx. every 2 years) was also identified as a negative, even crippling influencing factor. Although the literature proposes reorganisation as a potential instrument for increasing innovative capability by unblocking processes and rules, etc. that have become bogged down, this study has nevertheless shown that such reorganisation measures must then be explicitly initiated with such a result as the goal. If this is not the case, a pure focus on boosting the efficiency of the operating units can be observed, despite the need for increasing the innovative capability. Consequently, the InMUs do not have sufficient time to present their added value in terms of the management of radical innovation. On the one hand, this increases pressure in the vein of "What are you actually good for?", while on the other hand, it harbours the danger of focusing on more incremental innovations in order "to please and demonstrate added value". This suggests the conclusion that promoters (power promoters) are just as important for InMUs as for radical innovations.

This assessment was confirmed by the analysis of the top management attention and, in this case, particularly in terms of its promoter function for InMUs. The loss of the promoter resulted in restrictions on the freedom of the InMU, which in turn led to InMUs being controlled in a similar fashion to other operational units (cue "analysis of economic effectiveness for radical innovations"). Ultimately, this resulted in the spectrum of tasks being refocused on shorter-term topics, leading to task overlap conflicts (cue: "planning interval) in the event of an InMU-hybrid approach (see Hauschildt). This confirms the previous assumption that, as in the case of radical innovations, an InMU also needs a
promoter in the form of a "power promoter" at an early stage in order to safeguard the requisite degree of freedom. If this is not the case, it cannot be ensured in a volatile environment – in which InMUs are most likely to be used in order to drive innovative topics of a radical nature and thus contribute to the medium-term success of the company – that the InMU can even live up to the role envisaged for it in the first place.

Last but not least, the study was able to identify cross-divisional competition as another negative influencing factor – with an impact on the spectrum of tasks and the role comprehension of InMUs – in companies with convergent product structures. In this respect, the competitive situation of innovating units amongst one another displayed negative effects in the internal exchange of innovation information. In contrast, the literature as well as other sections of the analysis have demonstrated that intensive communication with operational organisational units and senior management (e.g. for implementation decisions) is required. This conflict between ‘confidentiality’ on the one hand, and the ‘need to communicate’ and the associated repercussions on the other hand, was not least also largely determined by the room for manoeuvre granted to an InMU (and its role comprehension), as well as by the extent to which the organisation was integrated in the overall organisation. This shows that InMUs not only have to dismantle functional barriers, but also have to deal with emotional barriers.

6.6 Summary of key findings

Now that the cases have been analysed in detail, the following table summarises the key findings and their sources of empirical evidence. It illustrates the systematic use of triangulation of different methods and data. However, it would go beyond the scope of this thesis to describe the detailed process of obtaining empirical evidence for each finding. Reference is therefore made to the appendices where this is exemplified by one concrete example (see appendix III on page 333).
Research Method /Source of Data

<table>
<thead>
<tr>
<th>Key-Finding*</th>
<th>Interview</th>
<th>Documentation</th>
<th>Observation</th>
<th>Others**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy:</strong> InMUs were not employed expressly for the purpose of boosting radical innovation.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Functions:</strong> Core tasks of InMUs identified in the literature empirically confirmed; spectrum of tasks and role comprehension defined more precisely.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>To foster radical innovation, the core tasks need to be expanded up to „demonstrator / piloting’ level.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>InMUs are the source and initiator of radical and incremental innovation and thus really respond to their mission.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organisation:</strong> Tasks and role comprehension of InMUs differ depending on their organisational integration (corporate / divisional).</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Effective and efficient management of the ‘transfer point’ (e.g. interfaces, funding principles, steering mechanisms) is crucial for the realisation of a radical innovation option.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Environment:</strong> It depends decisively on exogenous factors whether InMUs are appropriate or not to drive radical innovations.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

* arranged around the components of the conceptual framework.

** secondary data as addressed in the methodology chapter in the data collection section on page 169.

Table 30: Key Findings and their Sources of Empirical Evidence

Before these key findings are considered from a theoretical, practical and methodological viewpoint, the next section summarises the interrelationships between the constituent parts of the conceptual framework (specifically InMU design components).

### 6.7 Interrelationships between InMU organisational design components

The analysis of the findings of this study has shown the parts each of these four core components played in the identification and promotion of innovation potential of a radical and incremental nature by InMUs. It has been illustrated that these four "InMU design components" could be separated for analytic reasons, but in fact they are highly interconnected. The previous discussions help to understand how InMUs should be designed, and how these components are interwoven with each other.

The derived interactions are presented in graphic form below:
These four elements thus influence one another by interacting and establishing a dynamic interrelationship, i.e. specifications or changes in one element have an effect on the other elements. The analysis has shown that the ‘strategy’ formulates and defines the innovation goal of an organisation, thus co-determining through specifications the implementation (the “what”) and the structural components of InMU’s (the “how”). The design of an innovating organisation (here: InMU) encompasses the ‘process’ element that differentiates or separates the innovating organisation’s activities from those of the operating organisation and specifies the tasks and objectives of InMUs. The ‘structure’ of the organisation describes the role comprehension of InMUs, by which the separation of the innovating organisation (InMUs) occurs organisationally and defines the interaction with the operational organisation. Furthermore, the study was able to reveal the significant influence of the ‘environment’ on the ‘process and structure’ that must also be taken into consideration when designing an ‘innovative organisation’ via InMUs.

In the following chapter, a detailed account of the theoretical and managerial contributions of this study will be presented. Furthermore, limitations of this study and recommendations for potential future research are indicated.
Chapter seven – Results, Conclusions and Implications

7.1 Introduction

The debate in this study is based upon a critical examination of the current management literature in the area of ‘innovation management’ and centres on the need for different structural forms for fostering radical innovation by implementing organisational units expressly for this purpose - so-called Innovation Hubs.

As already elaborated, there is a more generic description of structural approaches of Innovation Hubs in the literature. This study extends the theory and understanding of how to organise innovation activities through supporting structures that foster radical innovation and discusses ‘Innovation Hubs’ in accordance with Leifer (2003) and Galbraith (1982) and whether such units should be separated from, or integrated in, the operational organisation.

This research has focused on structures known as Innovation Management Units (InMUs) as a solution to foster radical innovation by overcoming functional barriers. To do this, the research empirically investigated the core tasks and role comprehension of such InMUs in a large mature organisation that acts in a fast changing environment. Three comparative cases embedded within a single organisation were used to explore the similarities and differences between InMU approaches. These led to a number of compelling findings, culminating in the conclusion that Innovation Management Units represent an appropriate instrument for systematically generating and fostering innovations in a company, particularly those that are radical in nature.

In this chapter, the overall research findings will be integrated into a coherent theory. First, the major theoretical contributions will be outlined, followed by a discussion on the theoretical implications. Then, practical implications are taken into account. The
conceptual framework developed in this study, which comprises “InMU design components” (see Figure 22 on page 297), will be used in this chapter to derive and present the implications and contributions of this study both to theory and to practice. This concept is thus not only suitable for use as an instrument for the analysis of the findings (Chapter 6). The respective core contributions of this study are briefly summarised at the end of the section on theoretical and practical contribution.

Finally, the contributions to methodology and major limitations of the research, with suggested future research directions, are outlined.

7.2 Theoretical Contributions and Implications

Theory on managing radical innovation in firms as a regular task has predicted a certain organisational independence of the innovation organisation from the operating organisation. Two fundamental approaches towards a so-called ‘systemic view’ on innovation\(^{170}\) are discussed in the literature. On the one hand, there are the proponents of the design of an overall, more innovative organisation which strives for a flexible, non-hierarchical structure (e.g. Kanter 1990; Mintzberg 1979; etc.), although this is only possible to a limited extent for large, mature organisations.

On the other hand there is – especially with regards to radical innovation – the call for the separation of the innovating unit from the ‘rule-based’ or ‘routine’ organisation (e.g. Sharma 1999, Fairlough 1994).

Such separation approaches – so-called „Innovation Hub“ approaches (e.g. Leifer 2003) – range from strong integration (e.g. Vahs and Burmester 2005) all the way to complete separation from the line organisation (e.g. Galbraith 1982). However, as new products are (normally) inextricably bound up with the rest of an organisation, especially in large

\(^{170}\) E.g. represented by the mechanistic / organic management approach of Burns and Stalker (1966).
enterprises (e.g. within DT, all new products have to be linked to the billing processes),
avoiding the connections (or complete separation) is not a real solution (Dougherty and
Hardy 1996).

Although tasks performed by organisational units that realise innovation management
activities are described in principle (e.g. Pleschak and Sabisch 1996; Hauschildt 1997;
etc.), in the context of large companies, corresponding literature (e.g. Hauschildt 1997 or
Vahs and Burmester 2005) reveal that pure centralisation or decentralisation approaches
are rare in reality and predominantly hybrid forms are realised. Yet it remains uncertain
which specific core functions and role comprehension these corporate / divisional
approaches assume in terms of radical innovations.

Consequently, as will be shown in the following section, the present study contributes
through the analysis of the core functions and role comprehension of InMUs as an
instrument to promote radical innovations to both the current ‘innovation hub’ theory, as
well as to the discussion of whether InMUs should be integrated or separated from the
operating organisation.

The study ties together the “promoter approach” of Witte (1973) et al. and the InMU
approach, through which the effectiveness and efficiency of InMU approaches were able
to be increased by rendering them more independent of the willingness and capability of
the respective employees and managers.

Furthermore, due to the insights derived from the divisional InMUs, this study
accommodates the demand of Chandy and Tellis (1998), for example, that future
research should examine how firms can effectively manage the mix of incremental and
radical innovations, which increases the requirements on a functioning innovation
management system within an enterprise.
7.2.1 InMU Core Tasks and Role Comprehension

Reflecting on previous discussions, Chapter 3 critically examined the current literature focussing mainly on the areas of managing radical innovation on the product level. Statements regarding the concrete „what and how“ are addressed in various streams of the literature (e.g. R&D Management, New Business Development, Innovation Management, etc.). In turn, these induced various solution approaches of a person-oriented, process-oriented or structure-oriented nature to foster incremental or radical innovation. However, the review of current literature showed that the concrete recommendations regarding „what is to do“ within the context of radical innovation for large, mature organisations – see innovation hub discussion (Leifer 2003) – are positioned more on a generic level. Context-related and thus normative-theoretical statements (see Chapter 4) regarding „how“ radical innovations are to be specifically designed in large, mature organisations via „innovating organisations“ (InMUs) and which core tasks and functions, as well as role comprehension, these units should adopt within a company were hitherto not in the focus of the appraisal. Although the tasks of units that realise innovation management activities are described in principle (e.g. Pleschak and Sabisch 1996 or Hauschildt 1997), no further distinction is made between radical or incremental innovation activities, not to mention the specific contexts thereof. This suggests that implicitly different concepts of, and hypotheses about, InMUs are applied, which could explain the partially inconsistent results of research in this field. In this context, Senge (1990, p.213) discusses so-called „mental models“, i.e. deeply rooted mental conceptions of the nature of things that must be driven to the surface in order to achieve a systematic mode of appraisal. A contribution to the normative theory was achieved in multiple stages in this respect within the framework of this study.

This was initially realised by a systematic analysis of the existing literature and the elaboration of the core tasks (Table 10 on page 89, Table 13 on page 96) and role comprehension (Figure 9 on page 97) of innovation management versus other...
management functions within a company in the literature review. This derivation served to establish a common comprehension regarding the core tasks and role comprehension of innovation management units – regardless of whether radical or incremental innovations were (to be) pushed - and thus rendered the classification of innovation management in the literature more precise as regards other literature streams (e.g. R&D, NBD). It became clear in this context that, in contrast to widespread perceptions, innovation management is not actually responsible for an innovation up to the point of its launch onto the market, let alone the management of new products on the market.

A second stage of this study involved providing verification that these core functions and role comprehensions (Figure 9 on page 97), which Smith and Reinertsen (1991) or Deschamps and Nyak (1995) called “fuzzy front end management”, are actually realised by the InMUs in the case organisation. Furthermore, this study was able to identify differences in the spectrum of tasks of InMUs, depending on whether they promoted radical or incremental innovations (Table 29 on page 247). The knowledge in the literature on innovation management regarding the tasks to be realised – depending on the respective objectives – was thus able to be expanded upon and a contribution rendered within the context of Chandy and Tellis (1998), in that future research – as covered in this study - should examine how firms can effectively manage the mix of incremental and radical innovations which increase the requirements on a functioning innovation management system within an enterprise.

In this context, one important finding generated by this study suggests the extension of the activities and core functions addressed in the innovation management literature to beyond the idea evaluation phase, all the way up to „piloting“. This means that the testing of the product idea or business model is necessary prior to an implementation decision and transfer to the line organisation by means of a demonstrator to generate valid functional and customer acceptance and should be placed within the sphere of
responsibility of the InMU. The need for such an extension mainly results from difficulties in the approval of the project and resources by the (operational) management – especially when the InMU is integrated in the line organisation - and the transfer problem of innovation options for further realisation in operational units and the implementation commitment required to this end.

Hanecker (2002) and others claim that the causes of success (in relation to innovations) cannot be demonstrated directly. If this opinion is accepted, it is ultimately uncertain whether the comprehension of the tasks illustrated in the innovation management literature for boosting the innovative capability of the output in the form of more innovations is really increased.

The empirical verification in this study that InMUs were the cause and origin of radical as well as incremental innovation was able to empirically support the theoretical approach of the innovation management literature, i.e. realisation of the proclaimed innovation management tasks by special units increases the innovative capability of an organisation (here specifically: more innovative products), and the efficacy of the InMU approach in fostering (radical) innovation.

7.2.2 Holistic InMU Organisation Model

The structure of an organisation – in this instance an InMU – can be understood as the pattern of relationships between roles in an organisation and its different parts (cf. for example, Mabey, Salaman and Storey (Mabey et al. 2001)). In this study the structural dimension of InMUs is reflected as consisting of the two components “functions” and “organisation” (see conceptual framework, Figure 22 on page 297). The section above derived the theoretical contribution to, and implications for, the core functions and role comprehension (InMU versus other operational units). In order to completely map the
“structure of InMUs”, this section covers the organisational components of InMUs that can be derived from this study.

If the identified InMU tasks that must be realised (see Table 10 on page 89) and the requisite competencies in the corresponding departments are consolidated thematically, an ideal-typical or "holistic" structural model can be derived for InMUs and thus a contribution rendered to the theory of the formal structural solution of innovating units within an organisation, which Sharma (1999) refers to as an ‘incubator’, or which Leifer (2003) calls the „Radical Innovation Hub“. The analysis of the case InMUs showed that they were all very similar with regard to their formal organisation, allowing an ideal-typical structure of InMUs to be derived on the basis of the analysis:

Figure 23: Holistic InMU Organisational Model

The figure shows two main areas of activity that could be identified under the management of the InMU: areas where Innovation Management (InMU) activities and areas where Project Management (PJM) activities to elaborate innovation product ideas

\[171\] Means in this context that all important functions for promoting innovation activities of a radical nature are bundled in one unit.
up to maturity ("piloting") were bundled. All activities were controlled by an "Innovation Committee" (IC) as the steering instrument in this context (see 6.4.4).

This holistic InMU approach, derived from the identified core functions and organisational structures of the case InMUs identified in Section 6.3.2, thus also covers the core functions and role comprehension derived in the literature (see Tables 10, 13 and Fig. 9) and can thus serve as a starting point for the structural design of innovation activities within an enterprise. This approach also contributes to the suggestions in the literature of areas where innovation management requires good performance. Thus, Goffin and Pfeifer's (2000) "five areas of innovation management" (Table 11 on page 90) are covered and under the responsibility of the InMU within this holistic InMU approach, with the exception of some human resource management issues.

7.2.3 InMU Hybrid Approach

Within the context of large companies, however, corresponding studies (e.g. Hauschildt 1997 or Vahs and Burmester 2005) reveal that pure centralisation or decentralisation approaches are rare in reality and that most concepts are realised as hybrid forms (Figure 12 on page 112). However, precisely which concrete core functions and role comprehension these corporate/divisional approaches take in terms of radical innovations remains uncertain.

The findings of this study extend the previous insights regarding hybrid approaches in the literature (illustrated in this study by corporate and divisional InMU approaches) by deriving a concrete division of tasks (see Table 29 on page 247) and defining the interaction of such InMUs with one another (see Figure 20 on page 260), which a senior manager summarised as follows [E2]:

‘Corporate Innovation ought to undertake and centrally administer a forward-thinking outlook with an effect on the whole Group, whereas the divisions
ought to undertake pillar-specific innovation activities with a direct impact on the markets’.

The findings of this study suggest the use of central or decentral InMUs, or the combination of both InMU approaches (hybrid approach), depending on the respective objective:

The findings show that corporate InMUs focus mainly on mid/long-term and mainly ‘technology push’ innovation activities and fosters radical innovation. They provide coordination and monitoring functionalities from the corporate perspective (see Figure 20 on page 260) and they mainly operate in a self-contained manner as an interface between divisional innovation units and the management of the board.

In contrast to the corporate InMUs, the findings of this study indicate that divisional InMUs focus mainly on short/mid-term and largely ‘market pull’ activities from the divisional perspective, which tend to be more incremental innovation activities. Additionally, divisional InMUs are mainly integrated and interact with operational management, which is also reflected in a different set of innovation activities in the sense of supporting the operational management (e.g. with tools and methods). As the findings of the study also showed, the close integration and linking to the operational management causes friction and interaction problems as regards radical innovation and the requisite degree of freedom is more difficult to grant. Nevertheless, the study was able to show that divisional InMUs can also push radical innovations if certain prerequisites (e.g. addressed in the following sections) are taken into consideration.

The findings of the study also suggest that a combination of both approaches (hybrid form) can push both radical and incremental innovations.

In this context a further theoretical contribution of this study relates to authors such as Christensen et al. (2003) who proposed a framework based upon the ‘resource-based view’ (Wernerfelt 1984), which helps managers to decide when they should create or
acquire current or new organisational capabilities to launch new businesses, depending on how the innovation matches the organisation’s values, structure and capabilities (Figure 10 on page 106). The findings of this study confirm Christensen’s ‘decision-making metrics’ insofar as his recommendations can also be applied to InMUs. In other words, if a large, mature organisation wishes to drive radical innovations, it is preferable to aim for a corporate InMU approach (Figure 10: Case D: create new organisation not aligned with operational organisation). If an InMU is integrated in a line organisation (Case C: create new organisation aligned with operational organisation), it must be anticipated that more incremental innovations will be driven instead.

7.2.4 ‘InMU Approach’ and the ‘Promoter Approach’

It is generally accepted within the innovation community that successful innovators do more than just one or two brilliant things (Cooper and Kleinschmidt, 1988) or focus on a single factor (Rothwell, 1974). In light of this, it comes as no surprise that there is no single common theory which allows a connection to be established between the consolidated findings of research in this field and a general theory or concept. Against the background of this study regarding the ‘role of InMUs in radical innovation’, the question thus arises of whether the structural approach investigated in this study of dismantling functional barriers through the implementation of InMUs is, by itself, actually sufficient, or whether other approaches also exert a significant influence on this approach and must also be taken into consideration.

The literature contains various approaches in which the ‘champion’, or rather ‘promoter-approach’\(^\text{172}\), based on Witte (1973) and further developed by Hauschildt (1999), Gemünden (2002) and Gerlach (2003) (see Table 9 on page 77 and Figure 8 on page 78), which decisively contributes to overcoming the most diverse barriers, particularly

\(^{172}\) The term ‘champion’ is established for Anglo-Saxon countries, in German-speaking countries, in contrast, this term was not accepted because of slightly negative connotations ((Hauschildt 1999) p. 167); Witte (Witte 1973) termed ‘champions’ in Germany as ‘promoters’.
when it comes to pushing radical innovation, is used to boost the innovative capabilities of an organisation. For instance, the 'Radical Innovation Hub' approach of Leifer (2001) is based on a "role approach" (gatherer, hunter, gatekeeper) to coordinate the necessary activities to foster radical innovation without increasing bureaucracy – an approach that would appear to be inconceivable in an "innovation-hostile" environment without the 'promoter approach'. Furthermore, Shane (1994) proposes an approach to bypass organisational hierarchy by increasing autonomy from organisational rules and procedures, which is likewise inefficient without the more or less pronounced use of "promoters". Therefore, it is only logical that the findings of this study indicate that the investigated approach of fostering radical innovation by dismantling functional barriers via structural solutions implemented expressly for this purpose (InMUs) also cannot attain the desired result, or at least not adequately, without taking into consideration and applying the "promoter approach" (see Table 9 on page 77 and Figure 8 on page 78). The promoter approach boosts the effectiveness and efficiency of the InMU approach by rendering it more independent of the willingness and capability of the respective employees and managers.

In this respect, the findings showed that the top management link called for in the literature, e.g. Littler and Sweeting (2001), is a necessary but inadequate criterion that the InMUs should comply with. It was possible to ascertain that a direct link must be established to a member of the board of management or the company management who is either not subject to a conflict of interests (operational versus innovative needs), or is in a position to decide on any such conflict himself. According to the theory formulated here, if this is not possible, InMUs must be positioned separate to the operational business, in order for them to be able to optimally realise their envisaged core functions and role comprehension within the context of radical innovation.
This theory of combining the „InMU approach and promoter approach“ could be further supported by two additional findings: the linking of an InMU directly to a CFO and not being able to dispense with a promoter on the board level. In both cases, this results in an increased pressure of justification on the part of the InMU vis-à-vis the management (‘So what are you there for at all?’ attitude), which resulted in the case of the divisional InMU focussing on more incremental innovations and the generation of so-called „quick wins“. When the hybrid approach was adopted, the corporate InMU displayed a displacement of the activities towards more short-term oriented issues, which resulted in an increase in task overlaps with the divisional innovation units and intensification of the „transfer problem“.

Based on the findings of this study, the theory can be derived that the structuring approaches of innovation management activities illustrated in the literature (e.g. by Hauschildt 1997 or Vahs and Burmester 2005), as well as the holistic InMU approach derived above, which is primarily designed to support radical innovations, need a promoter themselves along the lines of radical innovations. If not, i.e. if an InMU does not have a “power promoter” for its activities, there is a significant risk that the levels of freedom of the InMU are determined by the operative environment and that they will consequently tend towards more incremental innovations and quick wins, rather than continuing to be a proven means of generating radical innovation.

Furthermore, the findings also indicate that InMUs can only be promisingly integrated in the line organisation as a structural instrument for driving radical innovations in a risk-averse, more short-term oriented environment if the promoter approach is also applied in the structural design of the InMU (e.g. when implementing steering mechanisms, linking the InMU to the top management, provisioning resources, etc.). If this is not possible, or is not realised to a sufficient extent, the structural separation of the InMU from the line organisation should be aimed for.
This thesis thus not only contributes to the “Innovation Hub” theory of Galbraith (1982) or Leifer et al. (2001) etc. on driving radical innovations by means of structural solutions implemented expressly for this purpose, it also contributes to expanding the insights and discussion regarding “integration versus separation” of the innovating organisation from the operating organisation, e.g. Sharma (1999), Galbraith (1982) or Fairlough (1994), who promote separation, versus Vahs and Burmeister (2005) or Pleschak and Sabisch (1996), who advocate integration.

7.2.5 Summary of the Theoretical Contributions

To sum up, this study was able to generate the following theoretical contributions:

- The spectrum of tasks and role comprehension of InMUs were defined more precisely according to the normative approach in the literature review in comparison with the innovation management literature and were empirically confirmed by the study (“fuzzy front end management”).

- Differences in the core tasks of InMUs were able to be illustrated in considerably greater detail according to the objective (radical or incremental innovation) and organisational integration (corporate or divisional) (see Table 29 on page 247)

- The necessity was derived that the spectrum of tasks of InMUs aiming to foster radical innovation (both in single or in hybrid approaches) needs to go beyond the tasks hitherto addressed in the innovation management literature (all the way to ‘piloting’).

- The efficacy of the ‘InMU approaches’ within this study, as a structural solution to fostering radical innovation, was able to be confirmed empirically.
Definitive structuring rules were able to be derived concerning when - depending on objective\textsuperscript{173} - an InMU should be separated from the operational organisation or integrated within it.

A formal structuring approach in the form of a ‘holistic InMU organisational model’ was derived by bundling the identified core functions and role comprehension of the case InMUs.

By linking the ‘InMU approach’\textsuperscript{174} with the ‘promoter approach’\textsuperscript{175}, the effectiveness and efficiency of the InMU approach were able to be increased by rendering the approach more independent of the willingness and capability of the respective employees and managers.

7.3 Implications for Practice

According to Jensen and Harmsen (2001), several hundred studies have been carried out in various industries, geographical settings, and also with various methodological approaches, all sharing the objective of understanding implications for companies to innovate, but with a wide variation in magnitude of significance and contradictory findings (see S&F discussion).

Although a single case study cannot provide a sound basis for the derivation of reliable ‘if-then’ relationships, this study would suggest that the factors identified below determine and influence the role comprehension and behaviour of InMUs and are of significance for the promising use of InMUs in a similar context. Although it might be difficult to be certain on the basis of this study alone, the insights derived from this study regarding drivers and barriers can also be important for a manager or practitioner and helpful in estimating the concrete application case. Critics amongst the practitioners could claim that a number of

\textsuperscript{173} Fostering more radical or incremental innovation or managing the mix of incremental and radical innovations.
\textsuperscript{174} To foster radical innovation by dismantling “functional barriers”.
\textsuperscript{175} To foster innovation process activities by dismantling the barrier of “not wanting” (c.f. Witte (1973), et al.).
the following aspects are merely “stating the obvious” or a representation of “common sense”, which is a potential weak point of qualitative research (Cropley, 2005). However, such a claim can be countered by the fact that it depends on the individual views and experience of the reader (e.g. academic scholar, practitioner). Furthermore, Pfeffer and Sutton (2006) have already indicated the necessity of gearing practical approaches more closely towards scientific insights, instead of basing decisions and activities on supposedly patent solutions or untested management methods. ‘In this respect, the proof of what really works is frequently already evident and simply needs to be made use of by managers’ (Pfeffer and Sutton 2006, p.44). The fact that this aspect is not always adequately taken into consideration was also able to be observed in the case organisation, in which the same mistakes (e.g. the failure of steering boards) were repeated a number of times.

7.3.1 Predominant Approach to Innovate

The understanding in the case organisation formulated regarding the strategy of “innovation leader” and „leading service company” evidently conflicted with the statements and actions of the management. This leads to the conclusion that the existence in the case organisation of a pronounced “innovation culture” - understood here as a distinct and coherent set of values and practices – could not be assumed. It therefore came as no surprise that the expectations of the management regarding the use of divisional InMUs were not primarily oriented towards the promotion of radical innovations, but more towards establishing transparency for R&D activities and (incremental) quick wins. The generation of radical innovations was only of secondary importance in this context.

This was in turn reflected in the degree of freedom granted to the management of these InMUs in terms of driving radical innovations and, over the course of time, their activities were adjusted to match these expectations. It is thus clear that Storey and Salaman
(2004) are completely right when they reason that managers are vitally important in this respect. Even if they are not necessarily the prime 'innovators' themselves, their attitudes and actions largely determine the degree, nature and impact of innovative activity. On the basis of this study’s findings, precise knowledge of the environmental conditions in which an InMU is active – or is intended to be active – is of fundamental importance. After all, it is this environment that ultimately co-determines the core functions and role comprehension of an InMU and its operational structuring, depending on the objective, i.e. a more integrative, divisional approach in the line organisation when driving incremental innovations, versus a more separate/corporate approach when focusing on driving radical innovations. This objective – expressed in the core tasks and role comprehension of the InMU – must be clearly formulated in an InMU’s mission or strategy and approved by the top management, as it serves as a basis for the further operational structuring.

7.3.2 Environmental Issues

In addition to the environmental conditions (see above) in which a potential InMU has been, or will be, embedded, the following “environmental” factors also influence the structural design of InMUs. The lessons learned in this study should therefore also be integrated in corresponding organisational decisions.

Regulatory Effects

The InMUs in the case organisation involved elements of a closed system insofar as the InMUs were subject to the same boundary conditions as the operational units. In this respect, the possibilities of external recruitment were limited and staff had to be recruited in-house. One of the most negative effects of this was the manifestation of a delayed „ready to operate“ status, coupled with an increased focus on incremental innovation activities (quick wins). Therefore, the resource question (qualification, recruiting policy,
etc.) must be clarified prior to implementing an InMU approach and, if necessary, a deviation from the specified rules and procedures be approved by means of a senior management decision. If this is not possible, the findings of this study indicate that it would be advisable to dispense with the implementation of an InMU. Instead, other mechanisms should be considered for driving radical innovations (e.g. structural approaches with a limited duration as described in 3.5.2).

**Frequency of Reorganisation**

Although Jelinek and Schoonhoven’s (1990) theory would have predicted that frequent reorganisations can help large companies to keep their organisation flexible and allow them to react to market changes, which can generally be regarded as a stimulus for innovation, the findings of this study confirm Sennet’s (1998) or Argyris’s (1990) warnings that an excessively high frequency of reorganisation (albeit without being able to conclusively define the limit) can lead to the opposite effect. In such cases, a 'paralysis' of the decision-making and implementation processes and 'employee frustration' can be assumed. This study confirms such fears insofar as the high frequency of reorganisation cycles resulted in increased “incrementalism” of the InMU activities. In such a short-term oriented environment, the InMUs were no longer capable of positioning themselves accordingly and efficiently implementing subjects with a medium to long-term character (radical innovation). This insight leads to the conclusion that the freedom for pushing radical innovations within the line-organisation is far too restricted in such an environment. It would therefore appear advisable to conceptually envisage an organisational separation of the innovation organisation (InMU) from the line-organisation right from the start.
7.3.3 Structural Issues

Innovation KPIs

According to Rangone (1997) or Subramanian and Nilkanta (1996), innovation KPIs serve to establish a link between ‘organisational innovativeness’ and ‘performance measures’. Thus, in addition to the definition of the mission, innovation KPIs must also be implemented for controlling and monitoring the innovation activities. The KPIs and concrete planning of measures for up to one year should also be utilised in this context as a communication instrument for boosting acceptance and the transformation of „visions“ and long-term/medium-term activities in the conception of the operational management. This minimises the ‘So what are you there for at all?’ attitude and improves the link with the top management, which has been identified as one of the most fundamental aspects for the „survival“ of an InMU in the event of an impending reorganisation.

Based on the findings of this study, the conclusion can thus be derived that such innovation KPIs should be introduced early on as a central task of InMUs (and not long after the InMU implementation, as happened in the case organisation) and should be regularly communicated to the top management.

Furthermore, the findings show that implementation of the KPIs in the goal agreement system (e.g. Balanced Score Card) should also be aimed at, as failure to anchor the innovation KPIs was evaluated as one of the reasons why the management of the case organisation was more interested in short-term successes than in long-term topics such as radical innovations.

Steering Mechanisms

An important finding of this study is that the ‘transfer point’, where the preliminary work of an InMU is handed over to the operational management for implementation, must be assessed as particularly critical. Not least because InMUs need to extend their core tasks up to the piloting phase. Nevertheless, the time must come for radical innovations (with the exception of spin-offs) to be transferred to the operating organisation (e.g. for billing,
sales, after sales processes, etc.). It has been shown in this respect that the appropriate appointment of corresponding boards obviously plays an important role. Not only necessary decisions are made in this context, e.g. the allocation of resources, but also the transfer to the operating units is also dependant on this factor. Ultimately, this also determines whether or not an innovation idea becomes reality. All "innovation councils" that worked according to the “top management attention” principle as called for by Litter (2001) and others, failed within this study. This indicates the conclusion that the appointment of such "control committees" solely and entirely on the basis of hierarchies represents a necessary but insufficient criterion. Rather, the promoter approach according to Witte (1973), Hauschildt (1992) etc. – see Table 9 on page 77 and Figure 8 on page 78 – appears to be more promising as a decision-making criterion for appointing an „Innovation Council“. However, as only one statement from a senior manager and his positive experiences in other companies were available in this respect, additional future research is needed on this issue. However, the recommendation can already be made on the basis of this study that particular attention should be given to a functional „board structure“ (steering mechanisms), especially when adopting an integrated InMU approach.

**Corporate Project Funding Principles**

Empirical findings, e.g. by Hauschildt (1997) or Vahs and Burmester (2005), indicate that hybrid approaches can be most frequently found in large companies. This means that the corporate/divisional transfer point already identified as being a critical factor is of particular importance in large companies. The findings of the study illustrate that in addition to the steering mechanisms, the funding principles are also of particular importance in practice. Especially in the case of corporate projects, the selection of topics, time schedule, expected results and thus their added value and the ability to implement them can be criticised. In order to increase commitment to use the project results, a co-funding approach was aspired to (Figure 21 on page 270), which creates an
interest in “increasing added value with self-applied funds”. However, as this only involved a „declaration of intent“ and empirical verification of the efficacy was unable to be determined in this study, it is likewise a potential issue for future research. Nevertheless, the funding principle proposed in this thesis could represent an option for avoiding or minimising a transfer problem in the case of radical innovation options.

7.3.4 Summary of Implications for Practice

In addition to the theoretical contributions, certain critical practical implications for the structuring of the „InMU design components’ were also able to be identified:

- The environment (exogenous factors and senior management) determines InMU’s primary goals and structural settings and must be clarified in advance. The options for subsequent adaptation of the orientation (e.g. driving radical innovation instead of incremental innovation) are limited and increase the risk of failure for the InMU.

- The regulatory framework (resources, recruiting policy, etc.) must be clarified prior to implementing an InMU approach and, if necessary, a deviation from the specified rules and procedures needs to be approved by means of a senior management decision. If this is not possible, it would be advisable to dispense with the implementation of an InMU and other mechanisms should instead be considered for driving radical innovations (e.g. structural approaches with a limited duration).

- Reorganisation can generally be regarded as a stimulus for innovation. However, an excessively high frequency of reorganisation can lead to the opposite effect with a ‘paralysis’ of the decision-making and implementation processes and „employee frustration“. The frequency of reorganisation cycles in this study (< 2 years) resulted in increased ‘incrementalisation’ of the InMU activities. In such environments, an organisational separation of the innovation organisation (InMU) from the line-organisation right from the start is recommended.
- Innovation KPIs and concrete planning of measures for up to one year must be implemented for controlling and monitoring the innovation activities and as a communication instrument for boosting acceptance and transformation of „visions“ and long-term/medium-term activities in the conception of the operational management. Innovation KPIs need to be introduced directly from the start and implemented in the goal agreement system (e.g. Balanced Score Card) of the management. Otherwise, the ‘So what are you there for at all?’ attitude prevails and the InMU activities fizzle out.

- Steering mechanisms: the ‘Transfer point’, where the preliminary work of an InMU is handed over to the operational management for implementation, must be assessed as particularly critical. All “innovation councils” that worked according to the “top management attention” principle failed within this study. The appointment of such “control committees” solely and entirely on the basis of hierarchies represents a necessary but insufficient criterion. Applying the ‘promoter-approach’ in staffing the ‘innovation council’ structures appears to be a promising approach – otherwise, the lack of functioning steering mechanisms significantly reduces the chance of realising an innovation option.

- In the case of hybrid InMU approaches: the ‘Transfer point’ from the corporate to the divisional level has already been identified as a critical factor. In the case of corporate-projects, the selection of topics, time schedule, expected results and thus their added value and the ability to implement were criticised. In addition to appropriate steering mechanisms (see above) to increase commitment to use the project results, a co-funding approach is aspired to, which creates an interest in “increasing added value with self-applied funds”.
7.4 Methodological Contribution and Implications

Beyond the theory and practice, the present study makes a methodological contribution resulting from the research design and approach. As presented in the previous chapters and mainly the methodology chapter (see Chapter 4), the main purpose of this study was to build theory.

7.4.1 Conceptual Framework – The “InMU Design Components”

The partially inconsistent findings of previous empirical studies on how to manage innovation and numerous complex explanations in the literature suggested that the phenomena under investigation could not be understood outside their specific reference context. Therefore, a theory-building approach as described by Carlile (2005) was applied. This need to focus more strongly on the situation and the context of the study became particularly obvious in the approach of the researcher to data analysis. An initially defined conceptual framework which was derived from the literature (theory) did not prove to be an appropriate approach (see 4.5.1), despite the use of corresponding data analysis techniques (compare e.g. Miles & Huberman, Yin or Bryman). Research questions and findings could not be clearly assigned to the constituent parts of the framework, which is why the researcher had to return to data and relevant methodological literature. Based upon the application of adequate modes and techniques of analysis, the new conceptual framework was designed as proposed in 6.1.3. In addition to the “Thesis Process Map” (Figure 16 on page 145) already presented in the Methodology chapter, other researchers might also find the “InMU design components” (Figure 22 on page 297) useful for their own comparable research projects in the field of Innovation Hubs or InMUs in large, mature organisations. However, the use of that framework in different situations and contexts other than the one described in this study might confront other researchers with the same problems that were encountered by the researcher in the present study.
7.4.2 Researcher in an Active Work-Role in the Case Unit

It seems to be comparatively rare to see empirical studies stating problems the researcher was facing during the fieldwork. In contrast to ethnographic research and anthropology, which study the interaction of cultural and mental processes with the “the researcher attempting to immerse himself or herself in a setting and become part of the group under study in order to understand the meanings and significances that people put upon their own behaviour and that of others” (Easterby-Smith et.al. 1997, p. 38), the researcher in this study interacted with the organisation as a full member of that organisation and had in-depth knowledge about the organisation based on experience shared only by members of the organisation. For further details on the role of the researcher in ethnographic studies, please refer to Agar (1986) and Clifford (1999).

Apart from the strong points and the issue raised above, there were challenges in the research project that emanated from the particular role of the researcher. Due to the strong focus on context, a single case-study design with an active work-role of the researcher in the organisation was applied which allowed very strong insights into the organisation to be gained. However, there are limitations and risks in such a research design that do not only comprise the fact that it is not possible for every researcher to get hold of an active work-role in the organisation to be studied. It could be seen that there are potential important risks for a researcher who has an active work-role in the organisation. Mainly long-term studies, which are viewed as a means to overcome the weaknesses of single case-studies, might be difficult to manage and “survive” in (fast) changing organisations as the researcher is a full member of the organisation and is thus himself subject to company decisions and changes.

The researcher might be personally affected by restructuring, sometimes even facing the risk of losing his job (e.g. within the scope of the implementation of comprehensive
redundancy plans, as was the case in the study). A temporary additional workload for a part-time student might also result from restructuring and require a potential extension of the study period. It might also mean that sponsorship agreements on the research project need to be renegotiated with the potential new superiors. Just as in this study, this might be a very time-intensive and resource-consuming undertaking. Based upon the experience gained during this study, it therefore seems advisable for comparable future research projects to have a discussion paper available for these negotiations that clearly defines the added value of the study from a managerial or practical point of view. Furthermore, it proved to be very useful to arrange a clear and written sponsorship agreement with the employer right from the start of the research project that ideally covers the entire duration of the study period.

Secondly, certain company decisions and restructuring measures harbour the risk that the number of potential (embedded) case studies might decrease or – as in the present study – be unable to be completely exploited because InMUs do not get enough time to fully develop (compare Figure 17 on page 156 and Table 29 on page 247). With very few exceptions (e.g. Dalton 1964), relatively little mention is made in the literature and research about the researcher having an active work-role in an organisation and the associated risks. In the face of the strengths of that specific role of the researcher with regards to the generation of normative theory (see Carlile 2005), this seems to be a promising field of activity for further exploration.

7.5 Limitations of this research

Although this research has made significant theoretical and practical contributions, like any other study, it has limitations highlighted in this section.
First, the literature on managing innovation extends across multiple theoretical boundaries. In terms of the way in which the current literature is reviewed, it is clear that this study primarily emphasised the innovation management literature that concentrates on how a large, mature organisation can tackle the challenge of fostering more radical innovation through formal structural approaches established expressly for this purpose. Though other related literature - such as the literature on the role of individuals in creating innovations, including related areas such as individual efforts and institutionalised mechanisms to facilitate creativity, knowledge and learning, etc. - has been discussed in this thesis, the review thereof was not the main thrust and was therefore less than extensive. The ample literature on the implementation of innovations by means of temporary organisational forms (e.g. project organisations) and approaches in which companies realise innovation as part of an external network (e.g. cooperation in research and development) was also not appraised within the scope of this study. Likewise, the literature on informal organisation or on the role and impact of CEOs and board members who initiate and promote radical innovation projects by virtue of their drive for self-actualisation but without a formally defined corresponding role or responsibility, was not incorporated into the study. This limitation can be explained by the focus of this study, which aims to make specific contributions in the field of formal structural approaches to the management of radical innovation.

The second limitation results from the research design. In order to explore a problem that is not well researched or understood, especially if the phenomenon under investigation cannot be understood outside its social context, a theory-building approach was applied that allowed strong contextual insights to be gained. This was achieved by conducting a single case study in which the researcher held an active work-role. One limitation that results from this single case study design is that it remains uncertain how and to what

\[176\text{In general, organisation charts give information about such formal approaches.}\]
extent specific characteristics of a single organisation exert an influence on InMUs. In the present study, there was very restricted access to the external labour market, for instance, which limited the vesting of the organisation and InMUs with corresponding (expert) knowledge. Given that ‘people make innovations’ (Faulstich 2005, p. 1), it is impossible to estimate the extent to which access to the external labour market (to which the case organisation was limited due to the freeze in recruitment) has an impact on the efficacy and efficiency of InMUs. It seems that it has an impact given that the same problems occurred several times (e.g. KPI definition, staffing steering boards, etc.), but the effects of these characteristics could not be analysed in detail within the scope of this study.

Since specific characteristics of organisations, such as environmental constraints, group structures and cultures, could influence the effectiveness and efficiency of InMUs in different ways, future research on the impact of these characteristics seems recommendable.

The third limitation of this study results from the design of the study as a qualitative single case study. The study mainly aimed at identifying principle causalities and finding explanations for these causalities in a specific organisational setting. In order to extend the value of the research findings of this study, it therefore seems advisable to validate this study by further qualitative and quantitative research. A multi-stage procedure is proposed to this end.

The analysis covered the structural approach towards innovation (InMUs) and the research design implied that the study was carried out by a researcher who held an active work-role in the case organisation. This not only permitted deep insights into the respective InMUs and their integration in the organisational context, but also raised the question of reliability. A series of precautions were taken in order to minimise bias on the part of the researcher, including ongoing consideration of potential ethical issues (see
4.6.3 on page 184) and a continuous discussion of the research process and results with his supervisors, peer students, external academics and experts in the field. In this context, internal validation was achieved by pursuing a rigorous and systematic data analysis process (see Appendix III on page 333), allowing the reader to follow the “trail of evidence” and triangulation of data sources and methods (see Methodology Chapter, section 4.3.5 on page 157).

The experience of this single case study cannot be extrapolated to all other kinds of organisations. This means that the findings may, to a certain extent, have limited general applicability (i.e. external validity). It is suggested that future research could attempt to replicate this study in different organisational settings, or to conduct similar studies in more diverse settings in order to extend the value of the research findings.

In an initial step, this might include studies in comparable organisational settings and the same industry, i.e. in large, mature telecommunication organisations.

In a second step, this might comprise studies in other industries and other types of organisations, such as large, mature organisations, different types of innovation (e.g. service innovation), as well as comparative studies between different industries, different types of organisations and types of innovation. In this context, it has to be taken into consideration that, according to the logic of building normative theory and according to authors such as Wolfe (1994), it is recommended not to mix organisational dimensions with other dimensions, as this would confound research results and thus not permit the development of distinguishable theories of innovation. In accordance with Wolfe (1994), determinants of organisational innovativeness - such as structural dimensions as they are discussed in this study - have namely greater homogeneity within, than across, organisational types.

As far as qualitative studies in the field are concerned, a promising approach might be to apply the same conceptual framework and the corresponding InMU design components as they are proposed by the thesis.
7.6 Recommendations for Future Research

Some recommendations for future research arising from the limitations of this study were already addressed in the previous section, particularly those resulting from the research design. On account of the limited general applicability of single case study approaches, it was recommended to conduct similar studies in more diverse settings in order to extend the value of the research findings.

In addition to the recommendation arising from the limitations and research design of this study, additional approaches have been yielded for future research:

With the 'InMU approach', this study explored some, but by no means all, of the challenges confronting firms in their desire to successfully manage innovation, and particularly radical innovation. In dealing with these challenges, the key innovation management task can be defined as creating and reinforcing structural approaches and designing and implementing instruments that ideally permit a mix of radical and incremental innovation to flourish in a short-term environment. Once the firm has mastered the basic requirements of such innovative formal structural approaches and instruments, another question that is frequently raised in the literature and which also emerged within the scope of this study is how innovation capability can be boosted, particularly through the promotion of an ‘innovation-friendly corporate culture’ – or as Bessant (Bessant 2003) calls ‘innovation routines’. However, only a handful of operational and applicable methods seem to be currently proposed (De Pay 1990, Hauser 1998) that allow the implementation of such a culture in a company. This calls for more studies on potential and applicable instruments that InMUs can deliberately use and combine with structural InMU approaches to promote an ‘innovation-friendly culture’, as well as the use or even active influence of informal structural approaches within the enterprise.

Furthermore, this study revealed that the transfer, i.e. the stage when the innovation option is handed over from the InMU to another organisational unit, is a critical stage in
the innovation cycle, especially due to the limitation of resources or the not-invented-here-syndrome etc. Due to the increasing practical importance of innovation in general, and radical innovation in particular, this ‘transfer issue’ merits further intense scientific discussion and research. As it was impossible to empirically verify the efficacy of ‘corporate project funding principles’ (Figure 21 on page 270) as well as the appointment of “innovation control committees” on the basis the promoter approach (Witte 1973, Hauschildt 1992, etc.) instead of solely and entirely on the basis of hierarchies, further research is needed on the design of such steering and funding mechanisms. This will contribute to maximise the chance that radical innovation can be realised on the market.

Within the scope of this study, one question which regularly emerges from the implementation of a structural approach to innovate (InMU) could not be empirically verified, namely the question concerning the right “profile” (e.g. relevant knowledge, functional background, formal education, leadership skills, etc.) of managers and employees. Accordingly, further research is recommended to investigate whether the profile of the people matters and, if so, what influence it exerts on the efficacy and efficiency of InMUs.

Finally, it could be shown that InMUs are, in principle, a source and initiator of radical innovation, which represents a qualitative statement, but no precise measurement was given concerning the ‘effectiveness’ of InMUs (e.g. in terms of x% budget of InMUs produce y% radical innovation or EBITDA, etc.). The findings of this study indicate that, managerial decisions on the launch of an InMU initiative are generally closely linked with an estimated “pay back” of such an investment. This suggests that there might be a strong need for further research in this area (input – output correlation) from a practical perspective.
7.7 Final Summary

In conclusion this thesis has explored how to organise innovation activities through supporting structures that foster radical innovation (InMUs) as well as has explored the similarities and differences between core functions and the role comprehension of such InMU approaches – here especially between InMU’s at corporate and divisional level. In a nutshell, InMUs can represent a stabilising element for promoting radical innovation in an environment characterised by turbulence and turmoil through a certain independence from the "rules of play" of the rest of the operational organisation. As has been illustrated in this study, the success of an InMU is absolutely dependent on compliance with certain prerequisites. Otherwise, to overcome organisational constraints and a lack of innovative capability via InMUs is limited and rather incremental innovations will be achieved. In looking at very recent research in this field, this thesis does not only confirm findings of O'Connor's (2006) empirical study on structural aspects of managing radical innovation in large firms, but also responds to her call for more research on the interface among and between such organisational structures and the mainstream organisation. In addition this study has been able to offer some practical suggestions by providing a conceptual framework based upon 'InMU design components’ and by identifying lessons learnt that are critical to success. Finally reflecting on the personal experience of conducting this research as a researcher with an active workrole in the organisation, which is comparatively rare to see in empirical studies, the study has been able to offer some methodological insights that can be useful for future researchers.
Appendices

I. Interview schedule

This section presents the interview request and the concrete interview schedule used within the interviews as presented and discussed in the methodology chapter.

Request for an interview

Dear Mr. X,

in addition to my original work within Deutsche Telekom, as a part time student I am now in the empirical phase of my PhD activities. This PhD - promoted by Deutsche Telekom – focuses on investigating the core functions and role comprehensions of Innovation Management Units - so called InMUs - in radical innovation. The identification of structural factors, as well as the drivers and barriers of such units, are a central issue of this research. For this investigation, I am conducting interviews in several units and at various hierarchical levels within the Deutsche Telekom Group. In order to safeguard personal rights and data protection, the statements made in said interviews are treated confidentially and used anonymously in my thesis.

I would be very pleased if I could conduct such an interview with you as director/manager xx, in order to get to know your personal experience and attitude regarding this topic. No preparation is necessary on your party for this bilateral discussion.

Assuming your agreement, I will contact you some time over the next few days in order to arrange an interview date.

Yours sincerely

Thomas Bungartz

Interview Schedule

Note: The Questionnaire includes notes – marked by [ ] – which gave additional guidance throughout the interviews.

Dear Mr. X – Thank you very much giving me the opportunity for this interview.

First of all let me tell you a bit about my research interests.

Since Postreform I, DT is in a tremendous transforming phase from a public authority to a global player. My focus is to investigate the aspect of promoting radical Innovation with structural approaches within such an environment.

- First of all I’m interested in your personal views concerning innovation. I don’t want you to answer on behalf of the organisation, but rather in your personal capacity. I’m interested in what core tasks and role you see for Innovating Units (InMUs) in this
organisation/DT and what sort or types of innovation are encouraged (significant examples).

- Second, I’m keen to learn how well, in your view, this organisation cope with innovations. What factors helps or hinder in this regard from your perspective (e.g. overwriting rules and procedures vs. freedom to innovate).

- Finally, I want to learn, If you are/were able to change something within your organisation or related environment to foster innovations - what factors need to change (potential success / failure factors ; lessons learnt)

[Note: Clearly commitment to use the data and quotes in the thesis; repeat confidentially statement given in the invitation to this interview]

Let’s start with a short description of your organisation (context, tasks, objectives) and what is your role in this organisation – can you tell me a little about this?

[If not known prior to the interview: Check his area of responsibility and relationships of his organisation to other innovating units/InMUs in the SBU/DT]

1) Please describe in one sentence: What do you personally see as the meaning of innovation?

[Check the priority “innovation” has alongside other activities; Top management priorities? Innovation related to e.g. financial management/acquisitions/cost control?]

2) Could you give some examples of “significant or radical innovations” within DT in the last years?

[Further clarifying by asking Sub-Questions:
- Why is this example a major Innovation from your perspective?
- Could you describe the factors which helped x to come out?
  [Note: policies, structures, processes, management attention / Driver, Team effects, modest risk to fail...]
- Describe the aspects of you or your organisation/SBU which encouraged innovation x to come out?
  [Note: If not already apparent, look at separate formal factors e.g. policies, structures, processes, procedures and informal factors which encouraged / impeded x]
- Do you think other people in your organisation would tell me the same story?
  [Note: Probe by asking Who would and How would someone tell it differently?]

3) If you look to this different types of innovation. Which types are most important (Rank Order) for your SBU/DT and why?

[Rank Order 1=high, 6=low ; Show 7 cards with following terms:]
- Basic Innovations (novelty for the world)
- New Product (-lines / -families)
- Product modifications / -variations
- Line Extensions
- Product-Relaunch
- Cost Savings
- Others

[Require statement including a short explanation; Probe the answer by asking: To what extent do you think the “Board of senior management team” share the same views? and How do you think your view compares with the way others in you organisation/SBU/DT see it?]

4) What characterise “innovative companies” from your perspective?

[List 5 key issues; clarify if DT fulfill this demand - If not, Why not?]

5) Do you think DT settles her claim to be an “innovative company”: if yes – why; if not – why not?
6) Has your SBU/DT put in place any project, processes, practices or structures in order to improve her innovativeness during the last years? (If so: What do you think of these?)
   [Seek examples on structures (e.g. Innovation-Hubs) or processes etc. and if they have worked or not]

7) Which impact have the restructuring activities on the innovativeness of your SBU/DT (Pros/Cons)?

8) What factors are important to foster radical Innovation within DT?
   Rank Order: 1= high; 9=low
   - Processes
   - Project management
   - Structural approaches (Hubs)
   - Sponsor at Senior Management (Promotor/Champion)
   - (Innovation)-Strategie
   - "HR policy and practice" (recruiting policy, pay-schemes...)
   - Employees (Qualification/Profile)
   - Communication
   - (Innovation) Culture
   - Others

9) “Units who foster radical innovations” - Which units within DT do you have particular in mind, if you think at innovative ones?
   [check also in which respect the interviewee work together with such units]

10) What are the core tasks and role comprehensions of such units from your perspective?
    [Cross-Check if his view shared by the senior management / board of management - if not, why not?]

11) How well do you thing interact such innovating units with other units in fostering radical IN on divisional and corporate level within DT?
    [Clarify: What works well, and where are areas for improvement]

12) What are the factors in your SBU/DT which hinder innovations? [And/or asking:]
    Do you have any suggestions about how the innovativeness of your SBU/DT could be improved?
    [Be aware of the possibility, that a formal commitment to innovation by management not necessarily be supported by organisational structures or functional practice]

13) Which factors are important for success and for survival of such Innovation Management Units in an environments like DT?

14) How important is the relationship between the head of an InMU and his direct superior for success and survive of such a unit?
    [In times of continues change?]

15) If you were able to change DT to the most innovative company, what would be your most significant measures?
    [Note: at least 3 success factors / levers]

16) What are the advantages / disadvantages about doing this interview & research as an “DT internal”?

17) Finally, do you have any last thoughts or comments on the previous discussed aspects or something forget to ask? (Final statement)

Thank you very much for this interview!
II. Tools for Data Analysis: Mind Maps and MindManager®

The following section briefly considers the potential tools for facilitating qualitative data analysis, the approach chosen in this study and how it supports the data analysing process.

Wainwright noted in “Can Sociological Research Be Qualitative, Critical and Valid?” (1997) that ‘... the identification of themes and the selection of quotations to illustrate them also raises a fundamental issue about the validity of qualitative research’ (p. 11). For example, he refers to Harvey (1990) concerning data analysis and states that specialist software is available to facilitate this process.

Miles and Huberman (1994) provide an overview of 22 different professional packages available for qualitative analysis (table A.1, p. 316) and remark that choosing the right software depends on your own level of work with computers, on the particular project you have in mind and on the type of analysis you expect to do. In this connection, it could be seen that each software tool has advantages and disadvantages which need to be considered in their application. Welsh (2002), for example, reaches the following conclusion in her comparison of manual techniques in the qualitative data analysis of interview transcripts with the use of ‘Nvivo’: ‘It is important that researchers recognize the value of both manual and electronic tools in qualitative data analysis and management and do not reify one over the other but instead remain open to, and make use of, the advantages of each’ (p. 6). Harvey (1990) even argued that the simple 'cut and paste' utility of a word-processor is likely to be adequate. Wainwright (1997) comes to the conclusion that (qualitative research) software is useful and will help, but is not a basic prerequisite.

Therefore, it is not the software used that is the decisive factor for the quality of analysis. Rather, the researcher must decide on the basis of the goals he pursues, his own abilities and also his own possibilities (access / licence) whether to use software solutions.
in support of the analysis process and, if so, which ones. Within the framework of this study, MindMap\textsuperscript{177} and the software packages “MindManager®” were used as a tool to support a qualitative data analysis process\textsuperscript{178}. On account of the strengths of the tool when it comes to the comprehensible and structured presentation of connections, the ease of integration of new insights from various data sources (notes, interviews, etc.), its ease of use and the researcher's long experience with the tool in comparable fields of application, MindManager was used to support the data analysing and coding process of this thesis.

\textsuperscript{177} The use of the term “Mind Maps” is trade-marked by The Buzan Organisation, Ltd. in the UK and the USA. For further information on mind maps and corresponding software tools, please refer to http://www.mind-mapping.co.uk.

\textsuperscript{178} MindMaps are an image-centered diagram that represents semantic or other connections between portions of information by presenting these connections in a radial, non-linear graphical manner. Some typical uses of mind maps are taking notes, generating ideas and thinking creatively, as well as organising and tracking progress or solving problems.
III. Approach to Data Analysis - Coding Qualitative Data

After a brief introduction to the coding objective, this section presents how the coding as a part of the sense-making process was carried out in practice within this study. The initial coding, which represents the line-by-line analysis of data (in this case, interview statements), is introduced using a specific example (real data of this thesis). There then follows a demonstration of how focused coding was carried out. Focused coding represents the review of the initial coding, whereby the initial codes were collated according to topics / categories based on their significance. The further processing of these focused codes then finally led to the individual bins of the conceptual framework of this study.

Coding Objective:

As mentioned in the methodology chapter (see also 4.5.2 "The Process of Data Analysis" on page 177), data analysis can be considered as a search for patterns and aims to learn more about the phenomenon under investigation. Primary and secondary data will raise questions that seem important to be analysed and ideas that might be generalisable across respondents. In order to utilise such data obtained by interviews, documentation, observation etc, it is essential to engage in the process of coding data. By organising and coding qualitative data, a researcher can compare responses among interviewees or among responses and variables.

Coding is not merely intended to label all the parts of documents about a topic, but rather to bring them together so they can be reviewed, and the researcher's thinking about the topic can develop. Coding thus enables the researcher to organise large amounts of text and to discover patterns that would be difficult to detect by reading alone.

Glaser et al. (2004) argued that coding helps to make sense of qualitative data, such as responses to open-ended interview questions (see section 4.4.4 "Interviews" on page
by using labels to classify and assign meaning to pieces of information and looking for patterns and contrasts. These then become the theory that explains what is happening in the data. Codes answer the questions, "What do I see going on here?", "What is interesting / important about that?" or "How do I categorise the information?", so that coding, as a part of the sense-making process in data analysis process helps to clarify "What does it add to my understanding of the topic I am researching?" and includes interpretation of meaning and data reduction.

In general, the coding process is a continuous, iterative process consisting of three step cycles within this thesis:

- General reading of research material (interviewer notes, transcripts, etc.).
- Initial coding in a line-by-line fashion.
- Focused coding - Intensive analysis of codes in terms of their meaning and frequency and clustering into categories. This is followed by response validation and further reading of research material for triangulation.

**Initial coding:**

Literature on coding\(^{179}\) suggests starting the coding process with the research aims and questions or key readings from the relevant literature as part of the ‘start-up codes’. A potentially multitude variety of categories at this stage is no constraint, because codes are not always mutually exclusive and one item of information might be assigned to several codes.

Within this thesis a first set of potential codes or categories\(^{180}\) was derived from the research aims and research questions (see 3.6 "Outcomes of Literature Review and

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179 For the handling of qualitative data analysis in practice, see Richards (2006), for example.
180 Most researchers talk about ‘categories’ they created and where they filed all the material coded in these categories in folders. By using software to support data analysis such category places are needed as ‘objects’ to move and arrange them and explore the relationships of data coded in more than one of such categories. However, qualitative data analysis software is only a tool. It does not relieve the researcher of the craft aspect of data analysis and synthesis.
Research Questions” on page 129). These start-up codes gave a first idea of categories 'What I'm looking for' when analysing data in detail by means of line by line analysis of interview statements (called here initial coding). It should be reiterated at this point that different parts of the interview schedule of the semi-structured interviews, which represented the primary source of data of the study, were assigned to the particular areas of interest (see Table 22: "Interview Schedule - Data contribution matrix" on page 167).

After a first set of interviews had been carried out and transcribed, the statements of every individual interviewee were entered in an Excel-based analysis sheet.

A separate sheet was created for each interview question181 and structured as follows:

- Column 1: name of interviewee
- Column 2: transcript of the interviewee’s response(s) to this particular question
- Column 3: identified codes/categories
- Column 4: memo note. This 'memo' comprises first ideas or hypotheses of the researcher based upon the statement of the interviewee and particularly about assumed relationships between categories (to develop arguments and theory later on). It served also as a kind of memory jogger ('Spickzettel') and reminded the researcher which aspects required further validation or which further data were required.

**Example of initial coding:** (Excerpt of responses to a specific interview question):

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Response</th>
<th>'Initial Codes'</th>
<th>Memos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. T*. Q*</td>
<td>“It is good when the relationship works. Innovation has to have an impact on other areas. If an innovation unit generates successes, it makes its boss strong and powerful. I therefore don’t think this aspect is an absolutely decisive argument. Maybe the relationship is good. Relationship not a decisive factor.”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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181 Listing on a separate sheet for each interview question had the advantage that it was possible to bundle all relevant statements relating to a specific aspect, set them against one another and analyse them.
<table>
<thead>
<tr>
<th>Mr. A* S*</th>
<th>“Very high; but this is generally the case. I think the key word here is &quot;sponsor&quot;. If the relationship isn't right, it's difficult to communicate the successes and there is a danger of objective problems turning into personal problems.”</th>
<th>Relationship is of decisive importance.</th>
<th>Value contribution of InMU important.</th>
<th>Superior plays decisive role in the external portrayal of the InMU.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. F* C*</td>
<td>“I don't think this is a relevant factor; good interpersonal relationships always help with the achievement of targets – it's important to get along. There are different manners of getting along across hierarchical levels (&quot;sycophancy&quot;) or as a team player. The relationship between the Head of IN and his superior is of no great relevance for launching innovative products on the market. It is more a question of a shared understanding of the goals of an InMU and how they are measured.”</td>
<td>Relationship not a decisive factor.</td>
<td>Superior in different promoter roles.</td>
<td>Clarify how InMUs measure and communicate their success (verified by documents, KPIs, innovation reports, BSC ...).</td>
</tr>
<tr>
<td>Mr. W* B*</td>
<td>“This is a really critical point as it is THE interface; the boss knows what topics are currently being worked on and he represents the interface to top management. It is also important therefore where InMU is in the organisation. He's the one who has to sell our successes in terms of content and justify which ideas are to be pursued”</td>
<td>Relationship decisive factor.</td>
<td>InMU link to top management important.</td>
<td>Theory: Hierarchical linking of InMU important (power &amp; process promoter).</td>
</tr>
</tbody>
</table>

Clarify how InMUs measure and communicate their success (verified by documents, KPIs, innovation reports, BSC ...). When are InMUs viewed as value-contributing units? Identify characteristics of a promoter.
further, and he has to keep us covered – always remembering that there are no short-term results with innovation. So the relationship has to work, otherwise that makes for a bad starting point for the innovation unit – There are a lot of people out there who don’t want us to succeed.”

<table>
<thead>
<tr>
<th>Value contribution of InMU long term oriented.</th>
<th>Theory: Long term oriented activities of InMUs contradict short term success expectations of management. This could cause conflicts concerning output of InMUs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect of ‘not invented here’ syndrome.</td>
<td></td>
</tr>
</tbody>
</table>

Having listed the statements from the interviews (see example above) for each individual interview question, it was possible to identify new ideas, repeating ideas or different arguments to the same addressed aspect.

It has to be mentioned at this point that two tools were used during the initial coding in order to help to minimise potential interpretation problems and to ensure reliability (consistency of findings) and validity (accuracy of information): Response validation and triangulation. In the first case the researcher takes findings and analysis back to the interviewees and asks them to provide feedback on some of the findings. In the latter case as described in section 4.3.5 on triangulation on page 159, the data coming from the interviews were compared and contrasted with other sources of data, such as is shown above by documentation (see examples above for initial coding, column memo) or observation.

As the above example shows, the initial coding sometimes also revealed contradictory statements (in this case, for example, ‘Relationship is of decisive importance’ vs. ‘Relationship is not of decisive importance’). In these cases, a closer look was taken at how credible the statement was to be considered and what role or motivation had potentially moved the interviewee to make the statement. In the case described here, it was found that those members of an InMU who were directly dependent upon such a relationship generally considered it important, whereas the statement ‘Relationship is not of decisive importance’ was mostly made by outsiders, i.e., non-members of an InMU.
who by their own admission had not personal experience and could only speculate. Greater significance in this case was therefore attached to statements made by members of an InMU, which led to the conclusion that the working relationship between the superior and the head of an InMU was a decisive factor for InMUs, which was then analysed correspondingly in the analysis chapter\textsuperscript{182}. Other contradictory statements were dealt with in a similar way.

**Focused coding:**

After the initial coding, in a next step it was helpful to review codes and eliminate less useful ones, combine smaller categories into larger ones, or if a very large number of responses have been assigned to the same code, subdivide that category or organise codes into larger themes that connect different codes. This corresponds to what Easterby-Smith et al. (1997) called 'laddering', i.e. concepts were beginning to be enlarged, collapsed, or redefined as a result of critical probing. This means that in coding responses to a particular question, the researcher might begin, for example, with a list of 5 categories, then realise that 8 would be better, then realise that it would be better to combine categories 1 and 5 into a single category …etc. and finally use a total of 4 categories like in this thesis, which will serve as the basis for the conceptual framework (see page 228). The software tool Mindmaps was used for the practical implementation of the analysis process described here (see Appendix II above).

The coding scheme table of this thesis (see below) shows how the individual initial codes as part of the focused coding are structured and assigned to themes. This approach is not just to provide summary headings for groups of codes and thus a further step in the direction of data reduction (which entails the risk of losing details). Rather, in the later

\[182\] E.g. section 6.4.2 "Connection and interfaces": negative effects due to the assignment of an InMU to a CFO or section 6.5.3 "Sponsorship – board member as promoter": increasing pressure 'So what are you there for at all?' attitude towards an InMU after the loss of the responsible board member.
process of data analysis and interpretation it made it possible to return to the relevant
details (original statements, general information on the interviewee …) to subject them to
a renewed evaluation against the background of a newly included aspect, for example.

It was then possible to collate individual themes as core categories which represent the
bins of the conceptual framework (see ‘coding scheme table’ below). When deriving these
core categories (or bins of the conceptual framework), maximum care was taken as
described in section 4.5.1 on strategy and techniques for data analysis (see page 175), to
ensure that the coding scheme (set of codes/categories) did not overlap and that they
were disentangled from other confounding variables. This resulted as described in the
conceptual framework section 6.1.3 on page 228 in the following logic:

- The The core category "strategy" implies all codes dealing with the formulated
understanding and value proposition of innovation as well as the reasons given for
implementing InMUs.

- The “functions” category refers to the areas of activities that were able to be identified
by the InMUs in the innovation context within the framework of this study. In addition
to idea generation and validation, the development and diffusion of innovation
approaches are also covered, thus reflecting the mission, core tasks and objectives of
the InMUs 183. Monitoring mechanisms and the performance of InMUs are also
assigned to this core category.

- The “organisation” category deals with the formal organisation that was ascertained.
In this respect, a basic understanding is established of the identified internal structure
of InMUs, the central versus decentral functions of InMUs, as well as the connection

183 E.g. the identified theme “innovation strategy” is an important instrument to describe where innovation potential is evident,
in order to be able to generate corresponding market shares and sales through new business models and to derive
concrete product ideas. Therefore “innovation strategy” represents a core task of an InMU and so was assigned to the
core category “functions” rather than “strategy”.

339
and interfaces and steering mechanisms employed. This allows clarification of the roles of InMUs in a specific innovation context.

- The last category “environment” is used to address contextual findings. As InMUs are integrated in an overall organisation, ‘exogenous factors’ – such factors that are outside the control of InMUs - are addressed here. These include „regulatory factors“, such as recruiting or rewarding systems. Furthermore, those aspects that influence the behaviour of InMUs in the face of shifting boundary conditions are also addressed here, e.g. frequent reorganisations and the impact thereof on InMUs.

Coding scheme table:

The following excerpt of the coding-scheme is drawn from a preliminary analysis of interview data collected for this study:

<table>
<thead>
<tr>
<th>Excerpt of the 'initial coding' (result of 'line by line' analysis)</th>
<th>Identified ‘themes’ via ‘focused coding’ (after ‘initial code’ reviewing)</th>
<th>‘Themes’ clustered to ‘core categories’ (‘bins’ of conceptual framework)</th>
</tr>
</thead>
</table>
| - Lack of understanding of the concept of “innovation”  
- Innovation not seen as a value contribution  
- Focus on incremental rather than radical innovation … | Value proposition of innovation | Strategy: Innovation aims and purpose of implementing InMUs. |
| - No innovation goals determined  
- Limited understanding of how to innovate  
- Reason given for InMU implementation … | InMU aspiration and strategy | |
| - Fields of activities clearly formulated  
- Strategy used as instrument to justify activities  
- Goals transformed in innovation KPIs … | Innovation strategy | |
| - Mission statement of InMU  
- Task of InMU  
- Template for innovation process developed … | Core tasks and functions of InMUs | Functions: Assessment of core functions of InMUs. |
| - Determined innovation KPIs  
- Responsibility for Innovation report  
- Innovation KPI in BSC determined … | Monitoring mechanisms | |
| - Output example (demonstrator; business model …)  
- Data base for innovation ideas installed  
- Value contribution of InMU is important … | Performance of InMUs | |
### 'Discussion of results'

Having gone through the described coding process for all collected data, the findings were analysed and discussed in more detail in the ‘Case Analysis and Synthesis’ chapter six (see page 225 ff.).
References


