The politics of simulation: actors' information system use

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THE POLITICS OF SIMULATION: ACTORS' INFORMATION SYSTEM USE

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Abstract
The dynamic, social and political nature of actors' information system use has been under explored and under appreciated within studies of organisational learning. In this paper, we use ideographic case study data of collaborative merchandising practices in the UK clothing retail industry to explore how actors learned to use ICT-based data representations to their advantage. Our findings cast doubt on any straightforward connection between the data generated by these systems and the physical realities they purport to represent. In this paper, we make diagnostic use of the concepts of 'practical meaning' and 'simulacra' to explore this phenomenon. The implications of these findings for future research are discussed.

Keywords
Information systems; Politics; Inter-organisational learning processes

1 INTRODUCTION

The implementation of information systems has been identified by some as a technique by which powerful organisational elites may rapidly institutionalise innovation through domination and discipline (Lawrence, Mauws, Dyck and Kleysen 2005). Material technologies such as information systems have been theorised as a mode of systemic power: a means of exerting both discipline (altering the costs and benefits associated with organisational actors' actions) and domination (restricting the range of actions available) (Lawrence, Mauws, Dyck and Kleysen 2005). Indeed, in their development of Crossan's '4I' organisational learning theory (Crossan, Lane and White 1999), these authors suggest that organisations in which some forms of power are under-developed may exhibit pathological learning patterns (such as: the short-lived adoption of management fads; or organisational change without innovation or institutionalisation without intuition). In addition, whilst these systems may be resisted, they are seen to limit individual choices. Thus, 'they can institutionalise innovations *in a quick and stable manner*' (our italics) (Lawrence, Winn and Jennings 2001 cited in Lawrence, Mauws, Dyck and Kleysen 2005).

Organisational learning, however, is a dynamic process (Blackler and McDonald 2000) that transcends both individual and organisational units of analysis (Antonacopoulou 2006). Technological artefacts are implicated within these processes (Gherardi 2006, Joerges and Czarniawska 1998). Yet, as we argue here, rather than the 'tunnel vision' of their designers' intentions, it is through understanding how these technological artefacts are used in particular social contexts that the full import of both their potential and their limitations are realised (Seeley-Brown and Duguid 2000). Whilst the aesthetics of information technology artefacts have been discussed elsewhere (Strati 2000), rather less attention has been paid to how actors' learn to use the material properties of these artefacts in their own interests. Our paper highlights the significance of this omission.

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Specifically, the *contested* nature of actors' information system use has been overlooked within studies of organisational learning. Politics has been recognised as an everyday feature of organising, with organisational learning a social and *political process* (Ferdinand 2004; Easterby-Smith and Araujo 1999). However, whilst the link between organisational learning and politics has been widely acknowledged, Ferdinand (2004) criticises earlier work in the organisational learning field for taking an idealist (Coopey and Burgoyne 2000) or negative view (for example; Vince 2002). Accordingly, political behaviour has been viewed as departing from techno-economic goal–orientated approaches assumed within rational models and is considered to have undesirable consequences for particular organisational actors: whether these are individuals or organisational collectives. Such political behaviours include deception (Schein 1976); information secrecy (Feldman 1988) and 'non-bureaucratic' procedures (Inzerilli 1979, Tushman 1977). Information technology development and use is known to be deeply political (Knights and Murray 1994). This paper seeks to contribute to this substantive discussion by addressing the question how Actors' learn to make political use of ICT-based artefacts.

Our argument is presented as follows. Firstly, we outline some particular characteristics of the United Kingdom retail sector that provided the setting for this study, providing brief details about the roles of merchandisers' in this sector. We draw on an ideographic case study of merchandisers' information system. Here, we present data collected during a PhD study to demonstrate how Retail and Supplier Merchandisers' learnt to use the malleable nature of data representations of physical time and space (Suchman, Blomberg, Orr and Trigg 1999) within electronic point of sales (EPOS)-driven stock replenishment systems to construct politicised models. We discuss these practices in the light of the intrinsic 'practical meanings' of material artefacts (Archer, 2000) and Baudrillard's (1993,1994) ideas about informational simulacra before elaborating on the implications of these findings for subsequent study of actors' learning in relation to the use of information system artefacts.

2 TRANSNATIONAL UNITED KINGDOM RETAIL SECTOR SUPPLY

Our research study explored inter-organisational information system use across multiple, sectors of the United Kingdom retail industry. In the face of increasing global competition, greater emphasis on inter-organisational coordination between buyers and their suppliers may be found in many sectors; however these trends are particularly evident within the United Kingdom retail sector. In contrast to production-based multi-national corporations, retailers have tended to adopt a distribution-based trans-national form (Wrigley, Coe and Currah 2005). Further, particularly within the fashion and clothing sectors, many United Kingdom retailers' have switched from selling locally-manufactured to imported goods (ONS 2006). Coordinating inter-organisational supply activities within these distinctive organisational forms would seem to present particular intra- and inter-organisational challenges; with innovation and knowledge highly dispersed across stores, distribution, logistics and sourcing operations. The retail sector is an appropriate setting for a study exploring actors' use of ICT-based representations in inter-organisational learning for several other reasons.

In the late 1990s sector wide-initiatives such as Efficient Consumer Response and Collaborative Planning Forecasting and Replenishment received widespread attention. These 'programmatic' (Mouzas and Araujo 2000) change initiatives attempted to improve the co-ordination and responsiveness between diverse organisational entities and saw dramatic and increasing interest in the exchange of Retail Sales data. For those retailers with ready access

to detailed sales data, these new initiatives offered the promise of leveraging already large-scale investments in ICT-based data processing to deliver impressive productivity, efficiency and cost improvements across retail supply networks. Indeed, some have described the way retailers used technology to 're-invent the competitive retail marketspace' as a revolution (Kumar 1997: p. 834). Industry guidelines were created to define both the practices and technologies required to support these evolving 'collaborative' relationships (Sherman 1998). Manufacturers were urged to reshape their planning methods, cost models, inventory practices, product operations and sourcing strategies (Abernathy, Dunlop, Hammond and Weil 2000).

Whilst there may be distinct operational benefits to be gained from sharing market data between supply partners, within United Kingdom retail these more collaborative practices have also raised particular policy concerns. Repeated communication and interaction between buyers and suppliers sharing current, as well as historic, market data may lead to collusion (OFT 2000). Indeed, subsequent discussion papers have singled out inter-firm information exchange as an area that has received insufficient attention to date (Grout and Sonderegger 2005). The exchange of market information beyond that of price would appear to offer at least the potential for Retailers to increase their monosopic[2] power and, in the Grocery sector, such concerns have resulted in the launch of an investigation by the Office of Fair Trading and a reference to the Competition Commission (OFT 2005, 2006). Perhaps at least as significant, concerns have also been raised over the medium to long term outlook for innovation across the sector. For example, in clothing retail, two distinct change trajectories, one based on *ad-hoc* and the other on *co-partnership* relationships have been identified.(Bruce and Moger 1999). This later relationship-type reflects the trend towards a more collaborative form of inter-organisational working noted elsewhere.

In the retail sector, merchandisers were responsible for controlling initial stock allocation and replenishment to retail stores. In our study we found that the tasks associated with these activities were variously split between merchandisers within retail organisations and their suppliers'. A variety of inter-organisational working arrangements were also evident. These ranged from collocated supplier personnel within retail head offices; regular, formal meetings between retail and supplier merchandisers' to more 'hands off' arrangements, where, once the initial sales-area had been agreed, supplier merchandisers controlled allocation and replenishment with minimum retailer involvement. In each case, merchandisers relied on geographically-disparate store sales and stock information to manage replenishment; maintain acceptable retail store and warehouse stock availabilities and to plan future production needs. In this paper we focus on one ideographic case to demonstrate how merchandisers used an information system introduced to support inter-organisational collaboration.

3 A CASE OF EPOS-DRIVEN COLLABORATIVE PLANNING

This particular inter-organisational information system (that we refer to as Stockplan) was a bespoke, web-based software development. Specified by the Retailers' central information management team, secondees from both retail buying departments and invited non-food suppliers were included in the development team. Stockplan was designed to support collaborative forward planning (of both demand and supply information) through the joint analysis of recent product sales to identify trends. Responsiveness would be improved by

[2] Where a firm, or group of firms obtain from suppliers more favourable terms that those available to other buyers or would otherwise be expected under normal competitive conditions

changes to future sales, inventory and production forecasts. The system used a pre-structured, web-based graphical user interface to present a series of views of retail sales and stock information configured for the needs of particular users. The retailer assigned user identification codes to control data viewing entry and updating; by their own and their suppliers' employees. The system collated- and provided- data from and to a range of sources, presenting a mix of user-entered, system-calculated and automatically populated-data, from other Retail management information systems.

The Stockplan system was rolled out for use across all three of the retailer's non-food buying groups and their supplier network during the early 2000s. As part of the rollout, cross-supplier meetings were held between each buying department and their suppliers. Collaborative planning milestones were incorporated into product development activities, average replenishment lead times were agreed, as were stock and availability levels. In each buying department, cross-supplier meetings were held to discuss how the system would be used for that particular range of merchandise. Retail buying teams and their respective suppliers' jointly agreed potential sales volumes, patterns and initial colour/ size breakdown on a style by style basis. Stockplan use was primarily intended to facilitate stock management of products with a relatively long selling-season (in this case greater than 12 weeks).

Across all buying groups, products expected to be in store for more than three, consecutive months were designated suitable for Collaborative Planning Forecasting and Replenishment (CPFR). The Stockplan system allowed both the retailer and their suppliers to model future store, distribution centre and finished goods stock requirements against production. Use of the Stockplan system enabled contracted suppliers to view more detailed sales information for these particular products. Once contractual details such as delivery date and quantity per colour; sizes and size ratios had been agreed and entered onto the retailers contracting systems, Stockplan gave the relevant suppliers access to additional planning and forecasting information. Detailed information on retail sales forecasts, current stock holdings and actual weekly sales were provided by designated retailer personnel. This information included visibility of the anticipated in-store display space; store launch dates and promotional calendars. Further, as sales of these particular products were made in retail stores, a weekly sales history for each style/colour/size permutation was also collated and presented. These details were uploaded and transposed from the retailers internal reporting systems, including electronic point of sale data capture. Suppliers were expected to analyse and react to any unexpected sales trends.

Suppliers' forward product plans were uploaded and revised through the Stockplan system. Suppliers' entered the timing and quantities of actual and planned production contracts. These figures were incorporated into the calculation of various system-defined ratios. Stock cover deviations were identified at style-colour-size level. As one retail employee explained, 'it kinda builds the made up stock that we have back to our targets. So as soon as you have a deficiency[3], it means that something on Stockplan isn't quite working as it should be'. These ratios were used by both retail merchandisers and their suppliers to assess whether or not current production plans were sufficient to support forecast sales and desired stock levels throughout the selling season, without generating surplus end-of-season stocks. Fields related to weekly sales forecasts and future production rates were entered by the retail and supplier

[3] 'Deficiency' was a system-generated comparison of the stock required by the Retailer against the stock predicted from the Supplier. The system took the previous week's Supplier Actual Stock or Predicted Supplier Stock (if there were no Actuals) plus any Planned Production for that week minus the Retailers' Requirement. The field was calculated in Stockplan and was read-only for all users. (Company Documentation)

merchandiser respectively. These were compared with residue stock levels through the retail distribution chain as well as existing finished goods stocks in suppliers' United Kingdom warehouses.

3.1 Retail and supplier merchandisers' use of Stockplan

We collected data on both retailer and supplier merchandisers' use of Stockplan using a combination of non-participant observation, semi-structured interviews and documentary review. Through discussion of the extracts presented below, selected from a particular case we seek to challenge and extend existing organisational learning theory. This approach to theory generalisation has been described as 'holographic', in the sense that theory ought to be able to accommodate and account for the full range of practices (Lincoln and Guba 2000).

Demonstrating Control

In this case, retail and supplier merchandisers used an EPOS-driven stock replenishment system I refer to as 'Stockplan' to agree and record future production plans in line with anticipated sales forecasts. The system automatically calculated a 'suggested production rate', the amount of stock the supplier needed to make to satisfy the retailers' in-store stock requirements and maintain agreed stocks of finished goods within supplier warehouses. Here, two supplier merchandisers described how they had learnt to construct these plans,

I tend to work, if it's something large like this, nice multiples of 25. If it's something that doesn't sell a lot, them I might want to work in units of 10 or 5, but I'm not going to put in a flow of 182. By the time you start adding figures, it's just easy when you're sense-checking information with [Retailer] and yourself, well, yes, it looks right, if it's in multiples of 5, 10, 25 or whatever

I've heard it a long time ago when I was planning in factories, when we made it all, lets declare it, lets offer it, lets get it through and there's one guy, he was the manager, and he goes if we do it gradually, 130 a week, it looks like we're in control. If you do it 200 this week, and 50 next week, goes back to 130, does it look like you're slightly out of control? Yeah. So I've learnt. I mean, I can't believe anybody sits in [Retailer] and thinks that we, on every product, ship the right amount to achieve every flow, every week [laughs]

David, Supplier Merchandiser

There was a row I had about a Children's style we do and I put it in to Stockplan's suggested production to work it, to manage it from a stock point of view. Essentially it's managing all the stock in the system for their benefit so they haven't got excessive stock or they haven't got too low stocks. So I just basically put in what was suggested and there was a 2-3-4 week gap before the next drop came in and we were sitting there and she [the Retailers' Merchandiser] said,
Look at the state of that flow,
and I said,
Look on Stockplan, the information's there, it manages your stock.
[She said] I like to see straight line flows.
[I said]OK, no problem.
So what I did was I went away and the big dollop I was getting at the front, all I did, I just divided it out by four, y'know, and split it out no problem.

Brian, Supplier Merchandiser

These extracts show how supplier merchandisers had learnt that even flows indicated you were in control and that retail merchandisers' queried uneven production rates. So, regardless of anticipated production or required stock, Stockplan flows were constructed to present a steady weekly flow. Though they might not be a close representation of production realities, maintaining steady flows and monitoring sales fluctuations seemed to provide real benefits.

Extending agency

Here, we present data related to an interaction observed between a retail merchandiser (Paul[4]) and his supplier counterpart, (David) using 'Stockplan'. This extract is interesting because it would seem to support the view that through collaborative interrogation of the simplified representations of cumulative store sales and planned production contained within the Stockplan artefact, the collective agency of these two merchandisers extended beyond their immediate physical and temporal location (a November meeting in the Retailers' London Head Office) to 'link' future cutting requirements in the suppliers' Sri Lankan factory to a historically inaccurate stock take in a particular East of England store. This apparently commonplace incident therefore yields a number of relevant insights.

This except is taken from a recording of a regular (bi-weekly) merchandisers' work meeting. David was responsible for the planning and delivery of merchandise to customer-agreed plans. Paul was responsible for managing suppliers' production and stocks to retailer-defined financial targets. The suppliers' commercial director (Kate) was also present.

Paul set the meeting agenda. Each product was discussed in turn. Stockplan data was used to identify and deal with outstanding and emerging sales and production issues, particularly any notable deviations from plan. Each merchandiser then noted the necessary adjustments that needed to be made to the sales forecast or production plan.

Figure 1: Stockplan artefact use in a bi-weekly work meeting between a retail merchandiser (Paul) and supplier merchandiser (David)

The segment of their conversation shown below starts with Paul quoting a numerical code which identifies the product that he wishes to discuss. David responds firstly by stating the additional contract quantity required to maintain production levels to meet forecast sales. After a brief pause, he queries an unanticipated sharp fall in the store stock figure he has noticed on the Stockplan system. Paul immediately provides an explanation. This is simply a

[4] All names are fictitious

mismatch between the physical store stock count and the computerised stock figure, something that Paul has known about for some time. He describes how retail store personnel have finally updated the stock on the system, causing the unexpected change noticed by David.

[Start of extract]

Paul [Product] (.) yep
David 100 dozen (…) Now one thing I did notice on this]
Paul [Yep
David [you know your store stock, two weeks ago, it was over 800 dozen
Paul yes
David and it's dropped to 470 odd
Paul Ah. Now that will be because Lincoln's store.
David Lincoln's store?
Paul It's been overstated for many a long time
Kate [Ah
Paul and they had a count in their system of about 4,500 singles, does that equate to what you've just said?
David [tapping on calculator] that would be about 375 odd dozen
Paul yep. So I think they've finally [corrected themselves
Kate [corrected themselves
David You should have said, I'm not far from Lincoln, I could have gone it and helped them count it.
Paul It was all on one size as well, how funny is that?
Kate So it was never really there?
Paul It was never there.
Kate Ah. But it doesn't affect us.
David It does
Kate It does
David because it's on the system, so it'll be on the Stockplan figures. So when you do a cut [
Kate [Oh, god
David Don't cut that size, we've got 375 dozen's worth thank you very much]
Paul [ahhh
Kate [ahhh
David So it does. When there's a big
Kate Right
Paul [unclear]
Kate It'll be the one that we're missing and that we have serious deficiency on
David Well, it says, on Stockplan, we've only got 1 dozen UFR[5]
Kate Cor, that's alright then
Paul You haven't got hardly any UFR, but it might be that down the line]
David [Yeah they haven't cut any for a number of weeks. Well, the [product]'s the one that the size 25/26 is 25% UK sale
Paul Right

[5] Unfulfilled requirement or deficiency

42 David Worldwide, its 40 odd percent. So we add a bit extra on, because it looks like
43 you've got loads of stock, but it's all offshore]
44 Paul [{unclear}]
45 David so you never have enough in the UK. (.)
46 So, umh. Might need to have another look at that one.

[End of extract]

Figure 2: Using Stockplan in a bi-weekly work meeting

Through his monitoring of the stock trend data represented within Stockplan, David identified an unexpected fluctuation in stock of which he would otherwise have been unaware. That alone was insufficient, either to identify the cause of the problem, or resolve it. However, in this joint work meeting, these two Merchandisers shared their different interpretations of this Stockplan data leading to the identification and remedy of a potential problem in *future* supply. This example demonstrates not only the practical extensibility (over time and space) Stockplan provided to these agents, but also shows that information system artefacts have a crucial role in the facilitation of collaborative inter-organisational learning. Through this collaborative use, not only was the potential and scale of the future problem bought to light, but David was able to coordinate a timely, preventative response. However, smoothed production plans and stock counting errors were not the only reasons that Stockplan representations differed from reality.

Constraining practices

As goods were received into their United Kingdom warehouses, supplier merchandisers collated stock details compared these figures with retailer-agreed plans and updated the Stockplan system with their new stock position. On occasion, supplier merchandisers included goods still in transit in these figures, showing this stock as if it had already arrived. However, these practices could lead to problems, as another supplier merchandiser explained,

I got to the stage where I'd forecasted and forecasted and forecasted. And I new exactly where I was going. And then all of a sudden, one of the vehicles was stolen with all the contents. And I'd already forecasted it, hadn't I? You think, how do I get out of this one? I think we made up every single lie that you could possible do. And then you can go for ages and ages and you're perfectly OK. I mean, it's very, very difficult. We got to the stage where we weren't supposed to forecast at all and then it slips. I mean, at the end of the day, its worse for me

Annette, Supplier Merchandiser

Last week, we had a container stolen from one of the secure haulage sites down in Southampton, supposedly secure. We had a whole container stolen, almost 200,000 hanging garments. And you write to them [the Retailer] and say to them, look, we've had a container stolen, we're going to move other deliveries around to cover that, but we may still have some size issues, for you, but quantity-wise, we'll get there. They must know we've got some comfort somewhere

David, Supplier Merchandiser

Annette made significant efforts to ensure that finished goods stock figures matched the agreed production plans held on Stockplan – even if this meant continually forecasting stock.

That she engaged in this time-consuming and somewhat perilous manipulation of the figures shows that the data within Stockplan was self-referential, i.e. it was deliberately 'matched' to the 'smoothed' plan rather than representing either the quantity of goods that had been produced, or received, that week. Further, David's comments related to a similar event, where he had been able to draw on 'undeclared' stock reserves to mitigate the crisis demonstrates not only that this manipulation of finished goods data was accepted practice, but also his belief that Retail Merchandisers were aware of these 'comforting' practices. So, whilst it would appear that there were both benefits and drawbacks to these differences in supplier-declared stock holdings, retail merchandisers had both a particular interest in and as the following extract shows, the agency to control the appearance of Stockplan data.

At a buying department level, retail merchandisers' performance was measured on their ability to maintain agreed store stock-levels, managing supplier stock commitments to management-specified targets. If sales slowed and stock backed up, retail merchandisers looked for ways to reduce their commitment,

Well, put it like this, if there was a product that was really, really slow and that we had loads of commitment on, if [retailer name] have a chance to cancel any of that, they will because it's no longer our problems and it transfers the issues back to the supplier. Obviously, the supplier doesn't like that. Um. If it was something that was ridiculously fast you see, what is the point of cancelling it?

Paul, Merchandiser

The Stockplan system enabled both retail and supplier merchandisers to monitor stock levels against actual sales. If sales slowed and contracted stock continued to build, the retail merchandiser was in danger of failing to meet his performance management targets. Consequently, he took whatever action he could to reduce stock commitments as represented on Stockplan. This point is confirmed by an extract from another meeting one of us observed, again between Paul and David.

Paul *OK. And you're not declaring the week before New Year, are you?*

David *No. Week 52 is the last week I'll declare. Hopefully I'll build up enough stock to cover it.*

Paul *OK. I might have to give you some selected lines not to declare in week 50 as well, just put it into Week 1 or something*

David Yeah, Yeah, Yeah. I haven't got a problem with that

Paul Cool. OK. Next

Initially during this brief exchange, David seems to be most concerned with meeting the required levels of stock cover. However, it soon becomes evident that Paul is more interested in holding off stock prior to the year end. Though he had the authority to decide whether or not orders were cancelled if flows weren't achieved, but clearly he was also able to withhold these punitive measures, authorising David to alter the timing of stock declarations on Stockplan without fear of reprisal.

To summarise then, collectively, merchandisers used the changing re-presentations within Stockplan to extend their agential powers. However this Stockplan data was deliberately manipulated – both separately and collaboratively - to demonstrate control. Here, retail merchandisers, whose performance targets were related to their management of product as evidenced by this Stockplan data clearly possessed greater power. However, though both these merchandisers knew their models were just that, did others know the same?

4 SYMPTOMS OF SIMULACRA

Writing from a technology-in-use perspective, Suchman, Blomberg, Orr and Trigg (1999) suggest that ICT-based artefacts reconfigure space and time. Suchman also noted that problems arose when these 'representations are either generated at a distance from the sites at which the work they represent goes on or [are] taken away from those sites and used in place of working knowledges' (Suchman 1995: 61). Baudrillard's conception of information systems as simulacra offers a conceptual explanation for these problematic effects. In this section, we discuss the preceding case study, drawing diagnostically (Best, 2000) upon these ideas as a means to distinguish between different forms of information system use.

Baudrillard argues for information systems as sign repositories, where digital bits and bytes mediate between a physical object and its assigned subject. Where the relations between the signed and signifier are dissolved, superseded by relational differences within the signified model, a simulacrum is constructed. Developing his argument from Sassaure's semiotic theory of langue, Baudrillard (1993) describes the movement from a 'classical' stage of signification, where the 'functional' dimension of value (a referential relationships between the commodity in consumption and the signifier) is meshed and coherent with the 'structural' dimension of value (how signifiers are linearly and internally related to each other) to a new era where commodity value is constituted, not by reference to the real but through self-referential binary differences. Information systems may be conceived of as systems of these object-signs: ICT-based artefacts comprised of pre-configured, rational and orderly relationships 'cast' in a digital media of bits and bytes.

The data relationships inscribed within Stockplan imposed a (socially-constructed and pre-ordained) order on the 'signs' representing stock data (for example, locating a certain quantity of stock in a particular warehouse or store at a given point in time). However, Baudrillard's work suggests that the sign-relationships within information systems may become self-referential, whilst the links between the subject (sign as expressor) and physical object-referent are dissolved. This is clearly the case here. Signed data relating to physical (past) sales and stock was juxtaposed with predicted future production figures. Further, actual warehouse and store stocks were routinely manipulated, or proved to be inaccurate. According to Baudrillard, once the functional linkages between the sign and the referent are broken, the model constructed by ICT-based artefacts such as Stockplan may be considered 'hyperreal'. A third order simulacrum was created: where the object-signs within Stockplan became de-coupled from the physical reality they purported to represent and, instead, differences within the model became the point of reference (what Baudrillard refers to as self-referentiality).

Importantly, (and here we depart from Baudrillard's thesis) these merchandisers used the 'practical meanings' (Archer, 2000) intrinsic within Stockplan to construct political simulations which, *they knew*, departed from a 'reflection' of the physical reality. As Archer

asserts, 'there are causal properties between things which cannot be reduced to the ideas maintaining between people.' (Archer 2000: 167). What is perhaps more intriguing, from an organisational learning viewpoint is that these merchandisers were, between them, able to interpret this model with a significant degree of sophistication. As the first extract from their joint work meeting demonstrates, this effectively extended their agency over physical time and space.

5 DISCUSSION

Our study suggests that, in their use of this ICT-based artefact, these agents simultaneously deployed political behaviours to achieve both organisational and personal objectives (Buchanan and Badham 1999). Within the organisational learning and information system domains, recent works theorise how political processes may be invoked within ICT co-ordinated networks have identified the potentially productive and constraining relationship between innovation and political resources, meanings and process power (Boonstra and Vries 2005, Swan and Scarbrough 2005). Here, however, by drawing diagnostically on Baudrillard's conception of information systems as simulacra, we have argued these actors' political behaviours were both extended and constrained by the intrinsic, causally efficacious practical meanings contained within the Stockplan artefact.

These ICT-based artefacts make possible a rapid; orderly; simultaneous and semi-autonomous duplication of object-signs across time and place [space] (Suchman 1995). Whilst the ordered, logical and rational internal relationships built into these models enabled knowing actors to interpret these signs, at the same time what Baudrillard refers to as the 'death'[6] of the sign meant that Stockplan replaced the real world of physical sales and stock with 'a pseudo-world through proliferating a universe of images, signs and models which appear as 'real' and are taken to be so' (Kellner 2000; p.55). For, whilst these Merchandisers knew their model was just that, Paul's comments indicated that Stockplan data was judged 'factual' by others and used in performance management targets. Our findings here would seem to cast doubt on the extent to which managerial trends such as 'management by fact' or recent exhortations to embrace the new science of winning by competing on analytics (Davenport and Harris 2007) are generalisable to dynamic, social and political settings such as we have illustrated here.

Instead, *Retail Merchandisers' political use* of this EPOS-driven sales and stock planning system created an information system that became both self-referential – (i.e. where the link between the object (stock) and its object-sign (stock data within Stockplan) was lost) *and* causally effective. This was despite (or perhaps, because of) the self-referential differences (between future sales forecasts and finished goods stock figures manipulated to be in line with an agreed, smoothed representation of production plans) that replaced any straightforward reflection of reality. For good or ill, Actors' had learnt how to use Stockplan to coordinate their inter-organisational work in a sophisticated manner. They knew how to manipulate and read the digitally-cast relationships between signs that this model contained to further their own-and their organisations' - political ends.

[6] 'Death ought never to be understood as the real event that affects a subject or a body, but as a form in which the determinacy of the subject and of value is lost' Baudrillard, J. (1993), *Symbolic Exchange and Death*, Sage, London. p.5

5.1 Implications for study of information system use

In their introduction to a recent special issue on political process, Swan and Scarbrough (2005) highlighted the centrality of political factors to the formation and co-ordination of networks. Future research, they argued, was needed into 'how people form and co-ordinate networks and how networks 'coalesce around particular interpretations' (McLoughlin and Badham 2005:835). As programmatic initiatives such as Efficient Consumer Response in United Kingdom Retail well demonstrate, inter-organisational change initiatives led by the introduction of information systems have been viewed as one of several possible mechanisms for horizontal inter-firm network integration (Grandori and Soda 1995). Yet studies that pay attention to the intrinsic characteristics of these material-artefacts in use are rare. Where information systems have been investigated, the tendency is to focus on technology *design* (see for example, (Hislop, Newell, Scarbrough and Swan 2000). So, although Hislop et al.'s (2000) study explored the politics of information system appropriation during ICT-development, 'technology in use' was not explicitly considered. Whilst 'technologies in general and information and communication technologies in particular represent complex layers of objectified intentions that embody the lessons of experience or science into various sorts of artefacts' (Kallinikos 2005: 186), researchers in other settings have found that ICT use does not emanate solely from designers' intentions, but is rather an ongoing process of negotiation between multiple actors and their technological choices within changing work and social contexts (Constatinides and Barrett 2005). The interrelationships between the extensibilities of agents' powers afforded by these material artefacts and how politically-astute actors learn to use them would appear to warrant much fuller investigation. To achieve these aims, research methods and methodologies that enable attend to be paid both to social actors; technical dynamics and the changing interrelationships between them are required. In this paper we have outlined one such potential framework.

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