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#### How to cite:

Gooch, Daniel; Kelly, Ryan; Stiver, Alexandra; van der Linden, Janet; Petre, Marian; Richards, Michael; Klis-Davies, Anna; MacKinnon, Jessica; Macpherson, Robbie and Walton, Clare (2020). The benefits and challenges of using crowdfunding to facilitate community-led projects in the context of digital civics. *International Journal of Human-Computer Studies*, 134 pp. 33–43.

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Version: Accepted Manuscript

Link(s) to article on publisher's website:  
<http://dx.doi.org/doi:10.1016/j.ijhcs.2019.10.005>

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# The Benefits and Challenges of Using Crowdfunding to Facilitate Community-led Projects in the Context of Digital Civics

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## Abstract

Digital technology is increasingly being used to bring citizens and communities together to address local concerns. While a variety of approaches have been developed that allow citizens and communities to improve their local communities, these approaches are often financially unsustainable. In this paper, we describe our exploration of crowdfunding as an alternative approach to funding community-led projects in the context of digital civics. Through our analysis of four community-led crowdfunding projects, we demonstrate that crowdfunding can a) provide an alternative funding mechanism suitable for financing community-led projects, b) create a sense of empowerment and ownership for project leaders, and c) increase community awareness of a project. By reflecting on our experiences, we identify four key challenges to utilising crowdfunding to support community-led projects in the context digital civics, namely 1) the benefits gained versus the time invested, 2) a reliance on existing social networks, 3) the need for glamorous projects and 4) issues of exclusiveness and marginalisation. We also provide advice specific to crowdfunding in the context of digital civics, before discussing the role of

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<sup>1</sup>The published version of this article is available through IJHCS at <https://doi.org/10.1016/j.ijhcs.2019.10.005>. Released under Creative Commons CC-BY-NC-ND license.

crowdfunding within digital civics. By addressing these challenges, we will be able to better support community groups crowdfund for the public good.

*Keywords:* Crowdfunding, Participatory Design, Digital Civics

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## 1. Introduction

The field of Human-Computer Interaction has a long history of research into how technology supports, limits, constrains and changes the way public services are run and how local communities can effect change (e.g., [1, 2]). More recently, this has coalesced into an interest in *Digital Civics*, which “aims to support citizens becoming agents of democracy with and through technologies and in dialogue with the institutions that can actualize public will.” [3].

Community-level change can come about through many different initiatives. These include short term initiatives (e.g. hackathons [4]), schemes that develop a shared sense of direction (e.g. crowdsourcing citizens’ ideas [5]), programs for developing a community’s shared identity (e.g. the travelling suitcase project [6]) or activities that focus on collecting data to promote local change (e.g. [7]). There have also been attempts to create action-oriented, community led innovation schemes that involve citizens in a participatory manner [8]. Other approaches have emphasised the technological aspect over the social focus. For example, the App Movement platform enables community members to propose the development of an app that is then automatically generated based on design features selected by the community as a whole [9].

However, all of these varying initiatives share a common problem - sustainability. While questions of sustainability can include factors such as immature technology, developing community skills and retaining ongoing relationships [10], financial sustainability is essential for the long-term viability of initiatives that support community-centric digital civic projects.

To date, the majority of digital civic initiatives have been financed through businesses looking for market opportunities, universities interested in the research angle, or civic authorities seeking immediate improvements in efficiency. As such, the funding tends to occur as one-off payments for a fixed time period. This set of funding conditions means that there are few, if any, community-centric schemes which have been maintained in the long-term beyond specific research or industry projects as the funding is not suitable

for sustaining projects [8, 9, 10, 11]. Thus, the question arises as to how community-led projects can be initiated and funded in the longer term without the involvement or funding of large-scale digital civic initiatives.

In this paper we describe our exploration of crowdfunding as an alternative approach to funding digital civic community-led projects. Crowdfunding involves gathering online donations from a large number of people to support a specific project and is an established approach for generating funding in the absence of major financial investment from business or government [12]. We worked with four grassroots community organisations in raising financial capital for community-led projects, using an online crowdfunding portal to establish each organisation’s funding campaign. Drawing on the outcomes of these campaigns and interviews with project leaders, we contribute the first study to holistically explore the benefits and challenges of crowdfunding to support digital civic community-led projects, and the first to proffer advice as to how to successfully crowdfund digital civics community-led projects.

## 2. Background

Cities are becoming the places where the majority of people live, work and play. The UN estimates that 66% of the world’s population will reside in an urban area by 2050 [13]. With this shift in populations, it is crucial to consider how urban areas can create sustainable infrastructures for the long term, particularly as resources become increasingly scarce. This challenge has contributed to a recent surge of interest in digital civics, the use of technology to enhance the quality of collaboration between citizens and government [14].

Enabling communities to achieve positive change in local areas is essential for the success of the community, particularly with regards to digital civic projects. Morally, we can argue that communities have a right to be involved in the design of systems which will affect their daily lives. Pragmatically, we recognise that input from citizens may increase the likely success of designed artefacts and services, in terms of meeting the users’ needs and encouraging user acceptance and use [15].

More recently, researchers have started considering how the scope of these activities can be scaled to involve citizens at an urban scale. Balestrini et al. discuss their efforts to assist citizens in developing a data collection tool (based around assessing the level of damp in domestic properties) that could be used to influence housing providers [11]. Gooch et al. explored mechanisms to expand the scale of participation by engaging with large numbers of

citizens both online and face-to-face to develop citizen-led projects [8]. These projects ranged from a midwife developing an app to support breastfeeding to a visually impaired volunteer promoting the use of navigational technology. Gooch et al.’s work showed that by integrating a systematic approach to facilitating community innovation within the city, communities can be empowered to address hyper-local concerns and lobby for changes that address the real problems they are currently facing.

However, one of the major limitations of these initiatives is that they tend to be resource-intensive, both in terms of financing and staff-time. For example, the aforementioned project by Gooch et al. was supported by a major research grant from a national funding body and had multiple researchers and staff assigned to support the day-to-day management of the citizen-led projects it fostered. The initiative also had the support of a third-party community outreach organization [8]. These resources would not necessarily be available to community groups, particularly those that begin at a grassroots level through the efforts of a single individual. In turn, this lack of funding may make it difficult to sustain any kind of community-centric digital civics initiative beyond a specific research- or industry-funded grant, particularly when many local authorities are facing a challenging financial landscape.

### *2.1. Participatory Budgeting*

Given the challenging financial landscape, many local authorities are experimenting with novel solutions to financing community activities. The most prominent is participatory budgeting. Participatory budgeting is a process “in which residents develop proposals for a predetermined portion of the annual budget and vote on the ones they want the city to implement” [16, p. 123]. Participatory budgeting has a long history in South America [17], where it was born out of a need to address inequalities. As a concept, it is now gaining popularity around the world [18].

The implementation of participatory budgeting varies dramatically between locations. Factors that impact how initiatives work include “the level of funds being considered, the extent of control and mode of involvement of local citizens, the relationship with local government, the degree of institutionalization and the sustainability of the process” [19, p. 27].

There are benefits to this form of funding: communities gain a more democratic involvement in decision-making processes, it increases transparency and accountability of local governments, and it can remove barriers around hierarchy and power structures. Research continues to explore how to best

design the voting mechanisms for participatory budgeting [20] and how to best support citizen-to-citizen collaboration [16].

While participatory budgeting re-frames the conversation between civic authorities and citizens, such initiatives are not without limitations. Foremost among these is who retains power of the process. This can vary dramatically from location to location with some local areas making use of representatives rather than direct voting, and some cities having more input into the process (e.g. the local authority in Paris runs a feasibility study on each proposal and residents vote on a shortlist) [16].

Such power structures limit the ability of communities and community groups to retain control over the changes they want to make to improve their local areas. This is particularly the case given that research has shown that participation in such initiatives tends to disenfranchise certain segments of the population [21, 22].

Furthermore, a fundamental problem remains - participatory budgeting still relies on funding being released by local authorities from civic taxes. This is not always viable, and the financial pressures local authorities are under has led to a notable decrease in the uptake of participatory budgeting [23].

## *2.2. Crowdfunding*

One possible solution to financing community-led projects is through the use of crowdfunding, a topic that has attracted some interest in the HCI community. Crowdfunding involves gathering donations from a large number of people to support a specific project [12]. It is not a new concept; the classic example is New York city's Statue of Liberty, which was part-funded from public subscription<sup>2</sup>. What has changed is the ease of setting up a crowdfunding campaign, with a variety of platforms available online that simplify and streamline the crowdfunding process. The large audience these platforms can reach has made online crowdfunding a major success. For example, Kickstarter has raised \$3 billion for over 140,000 projects, backed by 14 million people<sup>3</sup>.

There is a substantial body of work in the HCI literature focusing on entrepreneurial crowdfunding; that is, crowdfunding campaigns which solicit

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<sup>2</sup><https://www.nps.gov/stli/learn/historyculture/joseph-pulitzer.htm>

<sup>3</sup><https://www.kickstarter.com/help/stats>

money in exchange for a business venture’s art, products, or services [24]. Previous research has sought to understand factors that influence the likelihood of campaigns being funded successfully, particularly in the USA using Kickstarter. For example, Greenberg et al. developed a classifier which, after training on a dataset of 13,000 Kickstarter project pages, can predict whether a project will be successful or not with approximately 68% accuracy. Their study identified 13 attributes that predict success, including the size of the funding goal; a set of proxies relating to promotion (e.g. number of twitter followers); the length of the funding project; and the number of rewards available [25]. Focussing more on the content of the funding pages, Mitra and Gilbert demonstrated that the language used in the project description can account for around 58% of the variance in successful funding [26]. Phrases such as “project will be” and “we can afford” were associated with funded projects while phrases like “not been able” and “new form of” were associated with unfunded projects. Other work has examined the influence of social media on crowdfunding campaigns (e.g. [27]), the impact of trust in delayed projects (e.g. [28]), the role of updates (e.g. [29]) and the varying roles of updates in a projects lifecycle (e.g. [4]).

In recent years there has been a broadening of understanding in the role that crowdfunding can play in other spheres of life. This has led to the development of platforms whose concern is not focussed on the development of business ventures but on raising finance for projects that support the public good. This type of crowdfunding has been termed “civic crowdfunding” [30, 31, 12, 32, 33].

### *2.3. Civic Crowdfunding*

To date, much of the research on civic crowdfunding has focussed on the elements required to make civic crowdfunding projects successful. Much of this work highlights that the success of a crowdfunding project extends beyond the amount of money donated. Kim et al. [34] found that in the context of crowdfunding for medical support, the benefits for project instigators extend far beyond financial donations. Based on interviews with beneficiaries and project supporters, they argue that crowdfunding can garner a variety of types of support, including assistance in creating the campaigns, promoting campaigns, offers of practical assistance (e.g., helping complete chores, or facilitating social visits) and organising external fundraising events [34]. Both Hui et al. [35] and Light & Briggs [12] have highlighted the necessity

for successful projects to build a network of social support based on a shared goal.

Davies [30] examined the records of seven crowdfunding platforms and extracted details of 1,224 civic crowdfunding projects including location, project funding goal, amount raised, number of funders and the summary text. His analysis found that successfully funded projects are heavily concentrated in major cities and tend to skew towards green-space related projects, noting that “there is an emerging typical crowdfunding project, which tends to be a small-scale garden or park project in a large city that produces a public good for an underserved community” [30]. He also observes that there are steep inequalities in the size of successful projects which raises concerns regarding the lack of the democratising effect anticipated from civic crowdfunding.

Balestrini et al. have explored the benefits and disadvantages of citizens crowdfunding environmental sensing platforms [36]. They conclude that while the initiative was successful in generating sufficient income, the crowdfunding campaign did not translate into active participation in the sensing initiative, particularly when compared to initiatives involving local champions. This appears to be due to crowdfunding being more transactional – receiving the sensors as a result of crowdfunding – compared to the social connectedness facilitated by local champions.

These key elements of civic crowdfunding - generating both financial capital and social support [37] - are essential for the success of developing community-led projects. These elements guided our approach to supporting the projects we engaged with, assisting them in developing their campaigns in order to meet their funding target.

There are a variety of crowdfunding platforms that focus on social good, as can be seen in Table 1. They share many of the same properties, generally using an ‘all or nothing’ model where projects are only funded if they reach their funding target. They also tend to have similar fee structures, taking a percentage of the money raised and charging a fee which goes to the payment provider (e.g. PayPal). Indeed, if comparing against entrepreneurial crowdfunding (see Table 2), other than the nature of the projects being hosted and the scale of funds raised, the actual business models of the platforms are very similar. All of the civic crowdfunding platforms listed, with the exception of Chuffed, have governmental and business partners that will contribute to projects that fit with their objectives.



Table 1: Comparison of civic crowdfunding platforms

<b>Name</b>	<b>Founding Location</b>	<b>Funding Model</b>	<b>Total Fee<sup>5</sup></b>	<b>Amount raised</b>
SpaceHive	UK	all or nothing	~ 8%	£13 million
Growfunding	Belgium	all or nothing rewards based selected by staff	€1 per donation	£1.2 million
La Ruche	Canada	all or nothing	4% + tax	£2.5 million
Voor Je buurt	The Netherlands	all or nothing <sup>6</sup>	5%	£3.8 million
Patronicity	USA	all or nothing or keep what you get	~ 8%	Unknown
Chuffed	Australia	Keep what you get	Optional donations	£13 million

Table 2: Comparison of entrepreneurial crowdfunding platforms

<b>Name</b>	<b>Founding Location</b>	<b>Funding Model</b>	<b>Total Fee<sup>7</sup></b>	<b>Amount raised</b>
Kickstarter	USA	all or nothing rewards based	~ 10%	£2.4 billion
Indiegogo	USA	keep what you get rewards based	~ 8%	Unknown

Crowdfunding has the potential to fund community-led projects in the context of digital civics. However, there is limited understanding of its value as an approach to instigating projects in the context of digital civics. We offer the first exploration of the benefits and challenges of crowdfunding to support community-led projects in the context of digital civics.

In the remainder of the paper we outline the four projects we worked with before discussing the results of the four campaigns, demonstrating that crowdfunding can provide an opportunity for individuals and communities to create local change. We conclude with a discussion of the challenges the

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<sup>5</sup>includes transaction fee

<sup>6</sup>at %80 can propose an alternative plan

<sup>7</sup>includes transaction fee

projects faced and reflect on what those challenges mean for other cities interested in supporting community-led projects.

### 3. Research context

The present research occurred within the context of a smart city initiative, MK:Smart<sup>4</sup>, based in Milton Keynes, one of the fastest growing cities in the United Kingdom. ‘Smart cities’ can be contextualised as a particular lens into digital civics, focussed on urban areas.

Within this initiative we had developed a successful community engagement and innovation programme, based around finding, funding and supporting a set of citizen innovation projects [8]. This community engagement work was the result of a collaboration between The Open University and Community Action:MK (CAMK), a charity whose purpose is to foster and support the voluntary and community sector in the city and who were interested in the project’s potential to create change within local communities. The Open University was interested in exploring methodologies for supporting urban-scale participatory design in the context of digital civics.

Broadly, our citizen innovation scheme was successful, funding 13 projects that created substantial change across Milton Keynes [8]. Every project was bottom-up, being led and enacted by local citizens. Our role was to support these projects financially, with allotted staff time, and to create connections with other third parties (such as our contacts in local government).

However, one of the key limitations of the work was the unsustainable nature of the MK:Smart initiative. Funded through a major research grant, the initiative could not continue beyond its allotted timeframe without further investment in staff time and financial capital. Our official involvement with the citizen-led projects was thus severed once the research project ended. This raised the question of how projects like these could be funded in an ongoing manner without major, one-time injections of capital from research or government funding bodies. We thus decided to explore the feasibility of using crowdfunding to fund similar community-led projects in the context of digital civics.

We decided to study this issue through a longitudinal approach. Our decision was based around a desire to develop relationships with community

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<sup>4</sup><http://www.mksmart.org>

organisations seeking funding for digital civic concepts to provide us with greater insights into the experiences and challenges those organisations faced. While surveying projects would have provided scale, we would have lacked the depth of understanding we have developed.

### *3.1. Crowdfunding Process*

We used Spacehive<sup>5</sup> as our crowdfunding platform. SpaceHive is a UK-based civic crowdfunding platform that focusses on funding projects that are designed to improve local communities. SpaceHive is representative of the general approach taken to civic crowdfunding (see Table 1). Backers can donate money by creating an account with Spacehive, joining through Facebook, or by donating anonymously. Spacehive operates an all-or-nothing model in which projects either reach (or surpass) their funding target and receive all of the money donated, or do not reach the target and receive nothing. Spacehive generates an income by charging a fee to projects that successfully reach their funding target.

We created a Spacehive page and linked to it from our pre-existing website<sup>6</sup>. Through our citizen innovation initiative, we had already established relationships with four organisations that we had not been able to support through our earlier citizen innovation work. When we discussed our new crowdfunding initiative with these organisations, all four were keen to take part. None of these organisations had previously run crowdfunding campaigns. As is common in crowdfunding campaigns, we agreed to match fund the projects up to £1000 from the aforementioned research grant. Many organisations match-fund community projects through Spacehive<sup>7</sup>.

Each project had a pre-defined goal for their crowdfunding campaign alongside an associated funding target, described as follows:

**Learning Tree Tipi and Super Storage.** This project was based around an outdoor learning project at an Urban Farm. While various technocentric projects were discussed, the group decided to try to secure funding for the building of a traditional tipi as a sheltered outdoor classroom and the installation of a secure equipment storage container. Their funding target was £4,284.

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<sup>5</sup><https://www.spacehive.com>

<sup>6</sup>[www.ourmk.org](http://www.ourmk.org)

<sup>7</sup><https://www.spacehive.com/partner>

**Community Fridge.** This project aimed to provide a communal set of fridges and freezers in a local community centre. The fridges enable residents and businesses to share surplus food, and for members of the public to help themselves to quality food that would otherwise be wasted. They wanted to fund the development of a website, purchase a variety of cool-boxes and food thermometers, and develop some promotional material. Their target was £1,609.

**The Green Oasis.** Having recently suffered from a theft, a local allotment site (consisting of 35,000 square metres of land split into 221 plots) wanted to fund the cost of replacing equipment and the installation of a high-tech security system. Their target was £2,130.

**Lifesaving Defibrillators at Camphill Communities.** Camphill is a residential site for people with learning disabilities. A large number of community groups also use the organisations site for events. Due to the population residing at Camphill, a large amount of medical technology is needed and they required the installation of some defibrillators. Their target was £2,915.

The four projects thus have a combined target of £10,938, including the £1,000 per project we could match fund. While these funding targets may appear small, they are significant in the context of the work of these community groups, allowing them to undertake activities that they could not otherwise afford to do.

Each project was led by an individual (referred to as the “project leader”). With the exception of the Community Fridge, all of the projects drew on expertise from across their organisation, including expertise on advertising, social media and funding campaigns. Our main contact was with the project leaders.

While these projects are not techno-centric, they are commensurate with previous research in digital civics which demonstrates that citizens are primarily interested in using existing technology to address hyper-local concerns [8, 38]. Each of these projects uses an existing technology (farming equipment and a tipi; a web platform; security cameras; defibrilators) that is novel to the community group and addresses a current need. The projects use far more technology than the ‘typical’ civic crowdfunded project [30].

Given our relationship with the community projects, we also provided a sounding board for advice and help. Each project was given a contact point at CAMK who could be contacted to provide help, with the first author of this paper overseeing all four projects. This help ranged from CAMK’s typi-

cal assistance - including advice on media strategy and networking - through to technical support in uploading each project's content onto Spacehive. We also helped the community groups develop a video for each of the projects, given the importance of videos in the success of crowdfunding campaigns [39]. We spoke to the projects frequently, at least once a week throughout the preparation of the campaigns and the eight-week funding period. Sometimes this contact lasted a few minutes, just to make contact, while at other times - such as during the video production - this would last for a few hours. CAMK also invited the community groups to pitch their projects at networking events across the city. By developing this relationship with the community groups, we gained a deep insight into their experience of crowdfunding.

#### **4. Methodology**

Our aim in this research was to explore the strengths and weaknesses of using crowdfunding to fund community-led projects. To this end, we adopted a data-led approach that allowed us to understand the experiences of our project leaders, both in terms of their exposure to community-led civic crowdfunding and in terms of the practical challenges that they encountered in bringing their projects to life. All procedures were undertaken with approval from the Open University institutional human research ethics committee.

To understand the success of the crowdfunding campaigns, we collected information about each project from Spacehive. This comprised the total amount donated and whether each campaign was successfully funded. We also collected anonymized information about the backers of each project, including the number of backers, how much each backer donated, and how many other projects on Spacehive each backer had supported. By tabulating and graphing this data, we can provide an understanding of the characteristics of donors to the campaigns, providing a baseline against which we can compare and contrast our community groups' experiences.

Additionally, we interviewed all four project leaders two weeks after their funding campaigns had ended. The purpose of these interviews was to understand the project leaders' initial expectations of crowdfunding, how they had found the experience, and the challenges they had faced in making their campaigns work. Each of these interviews was conducted on Skype by the third author. We then conducted follow-up interviews six months later to

explore these issues more deeply, once the project leaders had had time to reflect and see the benefits the funding had provided for their organisation. These interviews were conducted face-to-face by the first and seventh author. The interviews lasted between 27 to 56 minutes (*Mean* = 43 minutes).

An inductive open coding approach was used to identify concepts and themes within the interview transcripts [40]. The transcripts were subjected to a line-by-line analysis in which concepts were identified and labelled within the data. These codes were subsequently categorised into unifying themes. No codes or themes existed prior to the analysis; they were created through constant comparison of the data and the application of labels to the text. In our Results section below, quotations are marked as [FI] or [SI] to indicate whether they are from the initial first interviews ([FI]) or the follow-up second interviews ([SI]).

The purpose of our analysis was to understand the effectiveness of crowdfunding as a method for financing citizen-led projects, and to identify issues that would need to be taken into account if the approach were to be used again in the future. We first describe the data from Spacehive to develop an understanding of the project supporters. We then detail findings from the interviews with project leaders to better understand their experiences.

## 5. Results of the Crowdfunding Campaigns

All four of the projects we supported met their funding targets over the course of the eight-week funding period (see Table 3). The projects raised £8,245 in addition to the £4,000 match-funding that we donated, resulting in a total amount raised of £12,245. While none of the projects would have achieved their funding goal without the matched-funding, the projects were aware of the matched-funding prior to setting their targets and thus took this into account when going about their fundraising activities.

### 5.1. Characteristics of the Project Supporters

From the Spacehive platform, we have data about the backers of each of the projects. There were a total of 171 pledges from 165 unique backers (some backers donated money more than once). In analysing this data, we first wanted to examine the distribution of donations, in terms of their overall size, so as to understand how the projects achieved their funding targets. As Figure 1 demonstrates, the majority of donations (82%) were £30 or less. However, Table 4 shows that all of the projects were heavily dependent on

Table 3: Funding results for each of the projects.

	<b>Community Fridge</b>	<b>The Green Oasis</b>	<b>Learning Tree Tipi</b>	<b>Defibrillators in Camphill</b>
<b>Amount sought</b>	£1,609	£2,130	£4,284	£2,863
<b>Amount raised</b>	£1,540	£1,133	£3,657	£1,915
<b>Match funded</b>	£1,000	£1,000	£1,000	£1,000
<b>Number of pledges</b>	18 pledges 18 backers	37 pledges 32 backers	95 pledges 93 backers	17 pledges 17 backers

larger donations to achieve their success. The percentage of the total amount raised for each project from donations of over £200 was very high, indicating that while smaller donations were important, none of the projects would have been funded without these larger, yet less common, donations.

Table 4: The percentage of the total amount raised in donations of over £200, listed by project.

	<b>Community Fridge</b>	<b>The Green Oasis</b>	<b>Learning Tree Tipi</b>	<b>Defibrillators in Camphill</b>
<b>Percentage of total amount raised from donations of £200 or more</b>	78%	13%	53%	89%

Our analysis of the literature highlighted how important social support is to the success of crowdfunding campaigns. Both Hui et al. [35] and Light & Briggs [12] have highlighted the necessity for successful projects to build a network of support based on a shared goal. As such, we wanted to examine how many other projects on Spacehive each of the backers had supported. This provides an indication as to whether the campaigns were successful in reaching people beyond the social network of the organisation, or whether donations came from existing contacts. We assume that since the project instigators were new to Spacehive and crowdfunding in general, contacts within their immediate social network might also be in the same position. Table 5

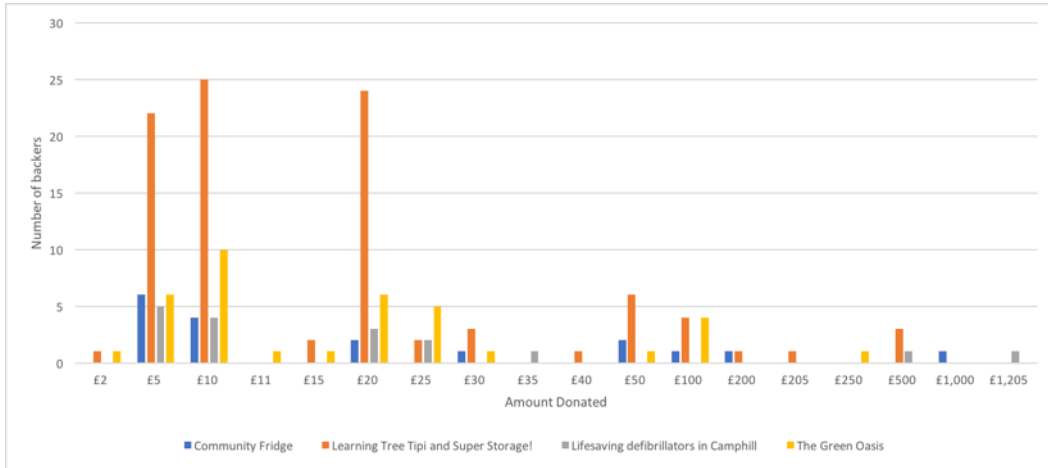


Figure 1: The amount donated plotted against the number of backers for each project.

outlines how many Spacehive projects each backer had supported, together with the average size of their donations (excluding staff). Anonymous backers have no information associated with their support, meaning that it is not possible to know how many other projects they have supported. We have excluded authors of this paper and Spacehive staff who donated to the projects from this analysis. Staff donated to all of the projects as follows: Community Fridge (£20), The Green Oasis (£20), Learning Tree Tipi (£15) and Defibrillators in Camphill (£10).

Table 5: The donation profile of the backers for each project (excluding staff).

Number of projects each backer had previously supported on Spacehive	Number of backers (average donation)			
	Community Fridge	The Green Oasis	Learning Tree Tipi	Defibrillators in Camphill
0	5 (£68)	71 (£35)	10 (£186)	24 (£36)
1	4 (£31.25)	3 (£43)		
Unknown	5 (£211)	16 (£105)	5 (£9)	6 (£14)



The data in Table 5 shows that the vast majority of backers for whom we have data had not backed other projects on Spacehive. Excluding anonymous backers, only seven out of 117 people had previously backed another project. This suggests that few of the projects gained support from people who regularly donate through Spacehive, and could indicate that the projects were reliant on their existing social networks to reach their funding targets.

Having outlined the main characteristics of the project supporters, we now move on to the findings from the interviews that we conducted with the project leaders to explore their experiences with civic crowdfunding.

## 6. Project Leader Experiences

The interviews were structured to explore the project leaders' experiences and challenges of running crowdfunding campaigns to understand the potential for using crowdfunding to support community-led projects. The first step in understanding the potential is to explore the benefits the campaigns brought to the organisations using them, both in financial and non-financial terms.

### 6.1. Benefits of Receiving the Funding

All of the projects used their acquired funding in the manner that they had initially anticipated. The Urban Farm installed their learning tipi, giving them the ability to run sessions over the winter months and expanding their current provision for educating young people: *“with the tipi, definitely it’s made life a lot easier... by September we had the tipi up and running and it’s been great because it’s allowed... the forest school sessions to keep running throughout the winter”* [SI]. Furthermore, the purchase of an additional storage unit allowed the farm to purchase essential equipment such as grass trimmers and wheelbarrows, expanding the number of people the farm could assist and train.

For the Community Fridge, the main benefits were from funding marketing activities and developing the project website. While the broader Community Fridge project was initiated around the same time as our crowdfunding research, the physical fridges were not installed in the community centre until mid-way through the crowdfunding campaign. As such, the Community Fridge website<sup>8</sup>, funded through the crowdfunding campaign, was an

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<sup>8</sup><http://www.mkcommunityfridge.org>

essential element to the project, giving the project an online presence that could be used to engage potential beneficiaries of the fridges, especially since there was nowhere else to obtain information about the project. Since the end of the crowdfunding campaign, the Community Fridge has collected approximately 5.8 tonnes of food, with around 1.2 tonnes being collected per month. About a fifth is donated from households, with the rest coming from companies and other organisations. Only around 1% goes to food waste.

The Green Oasis allotment society have replaced the equipment that was stolen, allowing them to continue working the allotment plots more effectively. The installation of security cameras to prevent similar thefts has proven to be more complicated. To protect the rear gate from being a weak point, a trench needs to be dug for the installation of electrical ducting to cross the site as there is currently electricity at one part of the site. Once the cameras are installed, the hope is that the allotments will not experience further thefts.

The Camphill community has successfully installed two new defibrillators and staff have been trained in their use. The devices have not yet been needed, but the safety of all residents and users of the site has been improved through their installation.

All four of the projects stated that the money acquired through crowdfunding has benefitted their organisation, and that they would consider running campaigns again in the future.

## 6.2. *Benefits Beyond Funding*

Beyond the positive developments that arose from securing the financial capital, each of the projects highlighted additional benefits. First, both the Urban Farm and Camphill noted that securing funding through crowdfunding had created a sense of empowerment and ownership over the results: *“people can look to the outcome and say ‘I had a part in that’”* [Camphill SI]. This development stands in contrast to the many digital civic projects that can disempower citizens and communities [41]. As highlighted by the feminist HCI agenda, such an approach helps in breaking down institutionalised pre-conceptions about what citizens need and supports them in shaping their own solutions [42]. This also compares favorably with crowdfunding city sensing platforms which did not result in active participation from citizens [36].

While the majority of the funding was obtained from people already connected to the projects, both the Urban Farm and the Community Fridge

noted that they appreciated the publicity and increase in community awareness about their projects, even if this did not always translate into financial pledges. As the Urban Farm stated, *“It was good to be able to share it with people... I would definitely say we had more people aware of us because so many people shared our posts...”* [SI]. The promotional video made as part of the crowdfunding campaign was particularly beneficial for this project, with the viewer-figures for the video stating that it was seen by over 18,000 people and shared over 200 times, further highlighting the importance of videos in crowdfunding campaigns [39]. Similarly, for the Community Fridge, the marketing campaign *“created an audience for us before we’d even started, we’d already had 19 people tuned in to what we were doing... and were happy to champion it”* [SI]. In addition to raising awareness, the crowdfunding campaigns also forced the four projects to develop marketing materials and social media strategies, which are continuing to see use beyond the live campaign itself.

The Green Oasis allotment society is an active member of the UK National Allotment Society. Their experience of crowdfunding has led them to becoming an important point of contact for this group as they evangelise the benefits of crowdfunding: *“they are all very interested in it [crowdfunding]. There’s about 24 of us who attend this quarterly meeting and at least 9 or 10 of them have asked for details about Spacehive because they are looking for other community successes. Some of them are as far up as Great Yarmouth, and some go down to North London”* [FI]. This increase in social capital raises the organisation’s profile in the national association and may lead to collaborative initiatives in the future.

The Urban Farm project leaders observed that crowdfunding would be particularly useful for organisations that have no legal structure. This is because many funding schemes require applicants to have some kind of legal standing (generally to be registered as a charity): *“that again is harder if you are not a charity... it [crowdfunding] is a great way of raising money if you’re not a registered charity...”* [Urban Farm, SI]. If the organisation is new, or is simply a community organisation without legal recognition, these funding schemes are not available, making crowdfunding perhaps the only route to securing funding. While this restriction did not apply to any of the organisations we worked with, it is of importance in the broader context of community-led projects operating within digital civic contexts, many of which may not be constituted as formal organisations (e.g. the projects in [8]).

### 6.3. Challenges of Crowdfunding

In addition to the benefits that crowdfunding brought, our analysis of the interviews also identified four challenges from the project leaders' reflections of taking part in a crowdfunding campaign. Despite the huge differences between both the organisations and project areas, these challenges appear across each of the four projects. This indicates that these issues are important irrespective of what the project involves.

#### 6.3.1. Challenge One - Time versus Benefit

All of the projects commented on how crowdfunding required significantly more time and work than anticipated at the start of the process. The combination of being active on social media, generating publicity, and attempting to turn these activities into financial contributions throughout the campaign required significant effort: *"I don't think we were really sure at the beginning how much work this would be... in terms of the amount of funding that it generated, that we probably put more time in than I would have hoped to do"* [Urban Farm, FI]. However, project leaders felt that while the time investment was substantial, the crowdfunding campaign did raise more money than their usual approaches: *"When we do our events, our open days, those we class as a fundraiser... but we might take anything between £1k and £1.5k in a day... but we only do those events 2 or 3 times a year so it would... have taken us longer to build up..."* [Urban Farm, SI].

The Community Fridge project expressed similar views, with the time investment regarded as high but necessary for the amount of money raised: *"it's massively time consuming... it is really time consuming"* [FI] *"I hadn't really realised that it would need that amount of time and input... it would have been challenging to raise those funds any other way... be realistic about the amount of time it takes... if you want to make it a success, you have to put a lot into it"* [SI]. The Community Fridge project was unique in that it was run by an individual rather than by an organisation; the project leader indicated that running a crowdfunding campaign as a group would help with the time pressure, as well as expanding the number of contacts that could be leveraged for funding.

This concern regarding the large amount of time invested was exacerbated by the all or nothing model used by the Spacehive platform, creating a feeling that even with all of the time invested, the return may be essentially nothing: *"the fact that if we hadn't met the target we wouldn't have gotten anything at all brought some real added pressure"* [Urban Farm, FI].

Finally, the fees charged by both the crowdfunding platform and the payment providers were seen as problematic. As the Urban Farm argued, when margins are small (as they often are for community groups), the fees charged are taking away money that is being donated: *“we were surprised about how much the fee was, plus then the [payment] fees... all in all that came to around 10%”*. This was exacerbated when factoring in that Gift Aid (a form of tax relief in the UK on charitable donations) was not applied automatically, requiring additional effort from the project leaders to ensure their financial gains were maximised. Given our analysis of civic crowdfunding platforms (see Table 1), this appears to be a systemic issue across many crowdfunding sites.

### *6.3.2. Challenge Two - Reliance on Existing Social Networks*

Based on the list of donors, none of the projects found that they received donations from an expanded network of contacts as a result of the crowdfunding. This corresponds with our analysis of the logged data from Spacehive: *“I’m not sure that we got a lot of new followers through the process... The campaign’s momentum helped us to reach a couple of [previous donors] who made big donations”* [Camphill, SI]. This indicates that the crowdfunding campaigns may have been reliant on existing support, rather than expanding the number of people in the network. While it is possible to make such campaigns ‘go viral’ (as the ALS/MND Ice Bucket Challenge did), such campaigns are notable for their rarity (as the ALS association notes<sup>9</sup>). Most campaigns do not become viral.

This is a major challenge as it dramatically limits the power of crowdfunding, particularly with regards to repeat funding. It is perhaps unreasonable to keep asking the same people for more money, and this may cause people to stop donating: *“there wasn’t really anyone that I didn’t already know already locally that pledged money”* [Community Fridge, FI], *“there’s only so many times you can ask people for money... it’s quite a hard thing to do, to say, can you fund this...”* [Community Fridge, SI].

This challenge raises concerns regarding the nature of projects that might be supported through crowdfunding. Previous work has highlighted the challenges associated with engaging socio-economically deprived communities in digital civic initiatives [8]. If the success of community projects rests on

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<sup>9</sup><http://www.alsa.org/fight-als/edau/ibc-history-infographic.html>

funding from existing contacts, questions arise as to how crowdfunding can support projects in communities where disposable income is scarce. Other funding mechanisms - such as charitable trusts - may be more appropriate.

Similarly, it may be difficult to fund projects which are starting and need support to grow. Without an existing network, it appears that crowdfunding is unlikely to be a route for them to generate funding. A strong social network may be a precursor to crowdfunding success as part of a longer process; it appears challenging to develop the social network alongside a crowdfunding campaign.

### *6.3.3. Challenge Three - The Need for Glamorous Topics*

We found that project leaders tended to focus on framing their projects in such a way as to make them appear glamorous and ‘marketable’ to the general public. While this may have increased their zeitgeist qualities, it meant that the technological aspects of the projects were downplayed or minimised, partially due to expertise and cost, but also due to a feeling that the technology was not exciting enough to capture the public mood. All of the project leaders discussed the process of selecting their project idea: *“Pick something inspiring and, as I’ve said, the tipi, lots of people were interested in and got behind - if it had just been for the container, people wouldn’t have bothered...”* [Urban Farm, SI]; *“something that they can quantify and summarise into a nice little project... they work quite well for that I think, it has to be a good idea... like I wouldn’t do another one for ongoing costs”* [Community Fridge, SI]; *“You’ve got to find a worthwhile project for it”* [Allotment society, SI]; *“we were looking for one particularly that would appeal to the public... making sure that it hits lots and lots of different social media touchpoints and has some real world connections as well”* [Camphill, FI].

Selecting the right project is important - it has to appeal to the public, hit the zeitgeist and motivate people sufficiently for them to donate money. This may help organisations by requiring them to think through their plans, but it also limits the nature, scope and scale of the projects that can be funded through crowdfunding. Furthermore, any project that does not have community appeal, or which speaks to a minority interest, is unlikely to be funded, restricting the ability of crowdfunding to create community-level change.

#### 6.3.4. Challenge Four - Exclusiveness and Marginalisation

The nature of crowdfunding through online platforms means that organisations must have sufficient technical skills to run the campaign. As the Community Fridge organiser noted *“you do need to be quite IT literate, to be able to set the website up... social media, marketing skills, its quite specific skills that you need to be able to do that”* [SI]. In carrying out the present research, we had to provide a great deal of technical assistance to the Allotment Society to ensure that they could create their online campaign, since very few people in their team were confident with digital technology. This technical barrier may deter some organisations from attempting to source funds through crowdfunding. An additional barrier is the apparent novelty of crowdfunding, which may make it an unknown quantity and therefore potentially risky. As the leader of the Camphill project stated, crowdfunding is *“much easier once you’ve done it... [it appeared] so much more daunting than it was in practice... it looked more complex than it really was”* [SI].

There are also factors which marginalise certain segments of the population from donating. In challenge two, we discussed the need for the network of potential benefactors to have access to disposable income. Beyond this, three of the projects noted that running the campaigns exclusively online did deter some from donating: *“People didn’t like having to set up Spacehive accounts to donate... [this was a] barrier to donation”* [Urban Farm, SI]; *“for some people that don’t go online, there isn’t another way of promoting it... so you’d reach a much wider audience... so that you could promote it other than online”* [Community Fridge, SI]. Therefore, although crowdfunding has the potential to tap new audiences and a wider network of benefactors, our study draws attention to the problem of reaching out to and engaging with this network without excluding existing contacts who may be willing to donate but cannot do so via the crowdfunding platform.

This reluctance to participate was particularly pronounced at the Allotment Society: *“people were reluctant to donate online with their personal details”* [FI]. In many cases, the older and less technically-skilled members had to donate through an intermediary, with the Allotment Society having to take cash from these donors and convert it into an online donation themselves. This barrier to donating also likely reduced the number of donations taken, with people offering verbal promises to donate and then failing to follow these promises through. This skills barrier does appear to marginalize groups soliciting donations and potential donors, reducing the overall amount

donated.

## 7. Discussion

Our goal was to explore crowdfunding as a potential approach to funding community-led projects in the context of digital civics. Through analysing the results of four community-led crowdfunding projects, we have demonstrated that crowdfunding can a) provide an alternative funding mechanism suitable for financing some community-led projects, b) create a sense of empowerment and ownership for project leaders, and c) increase community awareness of a project, irrespective of whether this leads to donations. This is provided that the project leaders have sufficient time, technical skills, and access to existing networks of contacts from which to leverage funding.

Our analysis of the projects corresponds broadly with previous cases in the literature, in terms of the project funding goals being relatively modest, an inability to fund ongoing costs, and the need for the project aims to capture people’s imagination [25, 12, 32].

Our findings also highlighted that the majority of support came from the projects’ existing social network, that the donations were from one-time (rather than prolific) donors and that the projects were overly reliant on high-value donations from a small number of donations. This behaviour has not been noted in other explorations of civic crowdfunding. While it may be anticipated in entrepreneurial crowdfunding (where high-value donations receive more valued rewards), it is unanticipated in this context. While other civic crowdfunding research has focussed more on the value of the increased support created through crowdfunding campaigns [34, 35, 12], our results indicate that while this may be of value, it may not result in sufficient funding being secured for the project to go ahead.

Previous work has also highlighted how making donations public signals a strong relationship between donor and organisation [43]. However, other work suggests that this can compel people to donate in order to avoid social stigma [28, 44, 45]. While this is somewhat acceptable in the short-term, if it affects an organisation’s reputation then it is likely to have a negative effect in the long-term. Many of the projects we studied noted that running the crowdfunding initiative through a pre-existing online platform created a sense of respectability, preventing organisations from appearing to be begging for money or ‘guilt tripping’ their service users. This appears to have maintained goodwill from all the relevant stakeholders.



The crowdfunding projects described in the present paper were successful, and created change within local communities, indicating that crowdfunding could be used to fund community-led projects. However, given the donor behaviours present in our investigation - particularly the small donor base and the reliance on high-value donors - is necessary to consider what this means in terms of participation and control.

### *7.1. Participation and Control*

Freeman et al. [46] have argued that HCI has a need to have a greater “emphasis on how to make the design process democratic, so as to design technologies and practices to make a broader and diverse group of urban inhabitants (not just the young, affluent, and mobile) have a voice, be heard, and engage in city life” [46]. One of the established concerns with digital civic schemes relates to expanding participation to previously marginalised groups while ensuring that research teams do not have an overly dominant role in the innovation and design process [8]. We hoped that crowdfunding would be a mechanism for dealing with this concern by democratising the decision as to what community projects took place, i.e. by allowing citizens to ‘vote with their feet’ through donations of finance. This is more than letting the public decide what gets funded through a vote as each individual has pledged money and thus has a stake in the decision. In doing so, crowdfunding would re-invigorate “a more contemporary interpretation of community values” [47].

However, our experiences indicate that crowdfunding is no panacea for achieving a more diverse and inclusive participation in community innovation. As we have discussed in practical terms, the vast majority of the funding the projects received came from existing audiences, i.e. those who were already known to project leaders, and all of the projects were heavily dependent on a small number of larger donations to achieve their success. Not only did this restrict the amount of finance that could be expected, it also affects the demographics of the audience participating. Some of the projects specifically stated that much of their audience faced challenges in donating online, essentially marginalising them from contributing to the project. This reliance on pre-existing audiences has broader implications in terms of the types of projects that crowdfunding could support. Such projects will include those that do not have large audiences; projects where the audience does not have the financial means to donate; projects which require ongoing financial support; projects that are socially significant but which lack community appeal - in all of those cases, it is unlikely that crowdfunding would

be a successful funding mechanism.

From our experience, it appears that crowdfunding tends to privilege well-established groups with large, financially secure audiences, resulting in a consolidation of existing power structures that could limit opportunities for grass-root change. Such concerns correspond to those highlighted by Davies [30].

More positively, supporting community-led projects through crowdfunding can be seen as moving the financial burden, choice and responsibility away from civic authorities towards community groups. We have perceived this as a response to the current financial climate in some countries, including the UK, where civic authorities are under tremendous financial strain, restricting their ability to fund anything other than key city services. That said, as there are concerns regarding the use of crowdfunding as the sole mechanism for funding community-led projects, there remains an unsolved question of how to allay those concerns either through the development of mechanisms used to augment crowdfunding to make it more socially acceptable or the development of alternative funding mechanisms that are complementary to the pros and cons of crowdfunding. However, the benefits we have outlined, coupled with this willingness to crowdfund again, highlights that, in some circumstances, crowdfunding can be successful in financing community-led projects. To increase the success of civic crowdfunding campaigns, we offer the following advice to community groups.

## **8. Advice to Community Groups**

The challenges we have identified relate to broad socio-economic-governmental issues around how community groups working in the area of digital civics should operate. On a narrower focus, we distilled our experiences of working with our crowdfunding community groups into four clear lessons regarding how to approach crowdfunding in the context of digital civics. While there are many tips and advice sheets on crowdfunding, these are the first that exclusively focus on digital civics, and are amongst the first that focus on civic crowdfunding.

These lessons now form part of the advice CAMK provides for groups considering crowdfunding as a funding mechanism.

### *8.1. Lesson 1: Select your platform carefully*

It is well established that crowdfunding is expensive for community groups, in terms of the time investment to make it successful. Many of the groups were frustrated that given the time they put in, the platforms take a relatively large cut of the donations raised.

This fee is perhaps worth paying in the context of entrepreneurial crowdfunding, where the benefit you gain from the platform is the large audience of potential donors. However, our data suggests that in the context of civic crowdfunding, the number of donors who are attracted through the platform, rather than by the group's existing social network, is small.

In those circumstances, we suggest that projects consider other platforms with other formulations, particularly if those platforms offer lower fees and are based on a 'keep what you get' model. While these platforms may be less well known, this matters less to donors as long as they have a clearly reputable donation system (i.e. PayPal), and operate in the country the project is operating in.

### *8.2. Lesson 2: Prepare your business model*

There is a difference between community groups who are forming around a new concern and want to use crowdfunding as initial capital costs, and well-established groups who want to expand their activities.

In both cases, projects require a 'business model' of sorts if they are to be sustained; after the capital injection from crowdfunding, the project needs a plan as to how they will cover ongoing costs. This is particularly significant in the context of digital civics where a significant challenge is the need to fund technological running costs, maintenance costs, training costs and eventually replacement for any technology [8, 10].

For new groups, crowdfunding is much more attractive - the necessary promotional activities are already occurring, and groups do not have to be legally recognised to receive funding (unlike for other grant schemes). For established groups, crowdfunding works best when coupled with other promotional activities, to reduce workload.

The business model also needs to consider how to reach people without the skills or willingness to donate online who are still interested in the project. Digital civic projects should not disenfranchise segments of the population through technical skill. This can take different forms - the allotment society made good use of offline donations, while the community fridge project used

internet-enabled tablets at face-to-face events to gather donations live. The importance is considering how the project operates in an inclusive manner.

### *8.3. Lesson 3: Work with other organisations*

Given the way crowdfunding operates, the default project will be run by a single community group. Our advice is that this is a limitation that costs time and reduces donations. By partnering with another organisation (be that another group seeking funding or a large partner who is willing to match fund), the benefits projects accrue include:

- A significantly increased pool of potential donors
- A reduced time investment for the organisation as work can be shared
- If working with another community group, it can become easier to find a glamorous project that may be attractive to donors
- It reduces the marginalisation of community groups in lower socio-economic areas

### *8.4. Lesson 4: Focus your messaging on benefits*

As with all publicity activities, messaging is key. Previous work in the area of digital civics has shown that people are much more engaged by the ‘civics’ than the ‘digital’ (e.g. [8]).

Our community groups would agree with this sentiment. Donors (with rare exceptions) do not care about technological innovation in the context of civic crowdfunding, they care about the benefits the project is going to bring to the local area. In selecting a topic that is glamorous, the temptation is to focus on the digital innovation. Our advice is to avoid this completely and ensure that any project pitch is based around the benefit that the technology can bring, rather than relying on the technology as the element of innovation.

## **9. Limitations**

Throughout our work, we have been clear that the lessons and reflections we have experienced are empirically connected to a particular context; a specific smart city initiative (MK:Smart) within a particular location (Milton Keynes, UK). One of the difficulties with work in the area of digital civics is the questionable transferability of the results. Cities are complex socio-technical assemblages of social groupings, spatial structures, physical

infrastructure and human practices [48] with distinct histories, cultures, social, political and economic settings, and distinct populations. It would be naïve to suggest that the results and experiences of this study are directly generalisable to every other context. We argue that the value of our work is in contributing to the conversation as to how to continue to develop our approach to engaging citizens in digital civic initiatives. While crowdfunding appears to be one mechanism to continue some form of community-led projects, it required facilitation (discussed shortly) and still excluded some people from participating. We still have much to learn and understand about how to facilitate meaningful citizen participation in cities; this paper contributes an empirically-based contributory step.

One of the challenges of work in this area is the activist element. CAMK's purpose is to support community change and, as researchers, part of our goal was to support the projects we were working with achieve success. While this gave us a deep understanding of the challenges the community groups faced, we have no understanding of how representative these experiences are, nor can we be sure how successful the projects would have been without our involvement. While this is a limitation, we argue that it is also a strength. We are not studying an artificial situation; indeed the partnership between the Open University, CAMK, and the projects has given us greater insight by allowing us to become more closely affiliated with what the projects are trying to achieve. In further work, we plan to continue exploring these issues, taking a broader lens approach.

One of the limitations of our work is the significance of digital technology within each of the projects. We consciously decided to have a broad interpretation of what we would consider to be 'digital' and prioritised the social benefit of a proposed project over the technological innovation. This is in-line with other initiatives focussed on community-led projects within digital civics (e.g. [8, 49]). This allowed the four projects to select the most appropriate technology to fulfill their identified needs - and in each case, the technology involved was novel to that organisation. The projects involved more technology than would be expected from the 'typical' civic crowdfunding project [30].

However, this approach does limit what conclusions we can draw regarding the appropriateness of crowdfunding as an approach for financing more techno-centric community-led projects. That said, the experiences and perspectives of our project leaders help explore the likelihood of such initiatives emerging without facilitation. In each case, the organisations lacked the tech-

nological skills and expertise to develop more techno-centric projects while the problems they were seeking to address did not align to strongly technical solutions. Furthermore, in their project selection process, they believed that increasing the amount of technology in the project pitch would discourage people from donating. Coupled with an inability to crowdfund running costs (which would be significant for many technological deployments), our experiences exemplify the challenges of using crowdfunding to support more techno-centric community-led projects. This is an issue we plan on exploring in more depth in further work.

## **10. Conclusion**

All cities should support their citizens and communities in being able to innovate and create social change. While there have been a variety of approaches taken to support citizens and communities in innovating within digital civic initiatives, few have done so in a financially sustainable way. Through our work we have explored crowdfunding as an approach to financing community-led projects. Our results indicate that, in some circumstances, crowdfunding does have a role to play, successfully funding four community-led projects. In addition, we found that crowdfunding can have a number of resultant benefits for project leaders, irrespective of the amount raised. These include an increased sense of empowerment and ownership over the results of the project alongside an increase in local and national exposure for organisations leading the initiative. However, our experiences highlight that crowdfunding on its own is not sufficient to sustain digital civics citizen innovation. We identified four key challenges, namely 1) the benefits gained versus the time invested, 2) a reliance on existing social networks, 3) the need for glamorous projects and 4) issues of exclusiveness and marginalisation. These challenges mean that crowdfunding still needs to be complemented by alternative forms of funding. Our experiences indicate that crowdfunding is no panacea for achieving a more diverse and inclusive participation in community innovation and that further investigation is needed in order to fully map the financial landscape of how to fund citizen and community led projects.

**Word Count: 10398**

## **11. Acknowledgements**

The authors would like to thank everybody in Milton Keynes who has taken part in any of our engagement activities, particularly the project leaders for their hard work, dedication and commitment. This work was undertaken as part of MK:Smart which is part funded by the UK Higher Education Funding Council for England (HEFCE). HEFCE had no involvement in the study design, the collection, analysis and interpretation of the data, in the writing of the report or the decision to submit the article for presentation.

## **12. References**

- [1] J. A. Weiss, J. E. Gruber, R. H. Carver, Reflections on value: policy makers evaluate federal information systems, *Public Administration Review* (1986) 497–505.
- [2] D. Shapiro, R. Traunmller, Cscw in public administration: a review, in: H. E. BONIN (Ed.), *Systems Engineering in Public Administration*, IFIP Transactions A: Computer Science and Technology, North-Holland, Amsterdam, 1993, pp. 1 – 17. doi:<https://doi.org/10.1016/B978-0-444-81560-6.50006-X>.
- [3] V. Vlachokyriakos, C. Crivellaro, C. A. Le Dantec, E. Gordon, P. Wright, P. Olivier, Digital civics: Citizen empowerment with and through technology, in: *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, CHI EA '16, ACM, New York, NY, USA, 2016, pp. 1096–1099. doi:[10.1145/2851581.2886436](https://doi.org/10.1145/2851581.2886436).
- [4] J. Whittle, How much participation is enough?: A comparison of six participatory design projects in terms of outcomes, in: *Proceedings of the 13th Participatory Design Conference: Research Papers - Volume 1*, PDC '14, ACM, New York, NY, USA, 2014, pp. 121–130. doi:[10.1145/2661435.2661445](https://doi.org/10.1145/2661435.2661445).
- [5] D. Schuurman, B. Baccarne, L. De Marez, P. Mechant, Smart ideas for smart cities: Investigating crowdsourcing for generating and selecting ideas for ict innovation in a city context, *Journal of theoretical and applied electronic commerce research* 7 (3) (2012) 49–62.

- [6] C. Crivellaro, A. Taylor, V. Vlachokyriakos, R. Comber, B. Nissen, P. Wright, Re-making places: Hci, 'community building' and change, in: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, CHI '16, ACM, New York, NY, USA, 2016, pp. 2958–2969. doi:10.1145/2858036.2858332.
- [7] C. A. Le Dantec, M. Asad, A. Misra, K. E. Watkins, Planning with crowdsourced data: Rhetoric and representation in transportation planning, in: Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing, CSCW '15, ACM, New York, NY, USA, 2015, pp. 1717–1727. doi:10.1145/2675133.2675212.
- [8] D. Gooch, M. Barker, L. Hudson, R. Kelly, G. Kortuem, J. V. D. Linden, M. Petre, R. Brown, A. Klis-Davies, H. Forbes, J. Mackinnon, R. Macpherson, C. Walton, Amplifying quiet voices: Challenges and opportunities for participatory design at an urban scale, ACM Trans. Comput.-Hum. Interact. 25 (1) (2018) 2:1–2:34. doi:10.1145/3139398.
- [9] A. Garbett, R. Comber, E. Jenkins, P. Olivier, App movement: A platform for community commissioning of mobile applications, in: Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, CHI '16, ACM, New York, NY, USA, 2016, pp. 26–37. doi:10.1145/2858036.2858094.
- [10] N. Taylor, K. Cheverst, P. Wright, P. Olivier, Leaving the wild: Lessons from community technology handovers, in: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI '13, ACM, New York, NY, USA, 2013, pp. 1549–1558. doi:10.1145/2470654.2466206.
- [11] M. Balestrini, Y. Rogers, C. Hassan, J. Creus, M. King, P. Marshall, A city in common: A framework to orchestrate large-scale citizen engagement around urban issues, in: Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems, CHI '17, ACM, New York, NY, USA, 2017, pp. 2282–2294. doi:10.1145/3025453.3025915.
- [12] A. Light, J. Briggs, Crowdfunding platforms and the design of paying publics, in: Proceedings of the 2017 CHI Conference on Human Factors



- in Computing Systems, CHI '17, ACM, New York, NY, USA, 2017, pp. 797–809. doi:10.1145/3025453.3025979.
- [13] D. o. E. United Nations, P. D. Social Affairs, World urbanization prospects the 2014 revision.
  - [14] H. Chourabi, T. Nam, S. Walker, J. R. Gil-Garcia, S. Mellouli, K. Nahon, T. A. Pardo, H. J. Scholl, Understanding smart cities: An integrative framework, in: 2012 45th Hawaii International Conference on System Sciences, 2012, pp. 2289–2297. doi:10.1109/HICSS.2012.615.
  - [15] J. M. Carroll, M. B. Rosson, Participatory design in community informatics, *Design Studies* 28 (3) (2007) 243 – 261, participatory Design. doi:https://doi.org/10.1016/j.destud.2007.02.007.
  - [16] C. Parra, C. Rohaut, M. Maeckelbergh, V. Issarny, J. Holston, Expanding the design space of ict for participatory budgeting, in: Proceedings of the 8th International Conference on Communities and Technologies, C&#38;T '17, ACM, New York, NY, USA, 2017, pp. 213–221. doi:10.1145/3083671.3083702.
  - [17] B. Wampler, Participatory budgeting in Brazil: Contestation, cooperation, and accountability, Penn State Press, 2010.
  - [18] B. Wampler, J. Hartz-Karp, Participatory budgeting: Diffusion and outcomes across the world, *Journal of public deliberation* 8 (2).
  - [19] Y. Cabannes, Participatory budgeting: a significant contribution to participatory democracy, *Environment and Urbanization* 16 (1) (2004) 27–46. doi:10.1177/095624780401600104.
  - [20] A. Goel, A. K. Krishnaswamy, S. Sakshuwong, T. Aitamurto, Knapsack voting for participatory budgeting, *ACM Trans. Econ. Comput.* 7 (2) (2019) 8:1–8:27. doi:10.1145/3340230.
  - [21] C. G. Mkude, C. Prez-Esp, M. A. Wimmer, Participatory budgeting: A framework to analyze the value-add of citizen participation, in: 2014 47th Hawaii International Conference on System Sciences, 2014, pp. 2054–2062. doi:10.1109/HICSS.2014.260.

- [22] R. Matheus, M. M. Ribeiro, J. C. Vaz, C. A. de Souza, Case studies of digital participatory budgeting in latin america: Models for citizen engagement, in: Proceedings of the 4th International Conference on Theory and Practice of Electronic Governance, ICEGOV '10, ACM, New York, NY, USA, 2010, pp. 31–36. doi:10.1145/1930321.1930328.
- [23] S. Stortone, F. De Cindio, Hybrid participatory budgeting: local democratic practices in the digital era, in: Citizens right to the digital city, Springer, 2015, pp. 177–197.
- [24] E. M. Gerber, J. Hui, Crowdfunding: Motivations and deterrents for participation, ACM Trans. Comput.-Hum. Interact. 20 (6) (2013) 34:1–34:32. doi:10.1145/2530540.
- [25] M. D. Greenberg, B. Pardo, K. Hariharan, E. Gerber, Crowdfunding support tools: Predicting success & failure, in: CHI '13 Extended Abstracts on Human Factors in Computing Systems, CHI EA '13, ACM, New York, NY, USA, 2013, pp. 1815–1820. doi:10.1145/2468356.2468682.
- [26] T. Mitra, E. Gilbert, The language that gets people to give: Phrases that predict success on kickstarter, in: Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing, CSCW '14, ACM, New York, NY, USA, 2014, pp. 49–61. doi:10.1145/2531602.2531656.
- [27] C.-T. Lu, S. Xie, X. Kong, P. S. Yu, Inferring the impacts of social media on crowdfunding, in: Proceedings of the 7th ACM International Conference on Web Search and Data Mining, WSDM '14, ACM, New York, NY, USA, 2014, pp. 573–582. doi:10.1145/2556195.2556251.
- [28] Y. Kim, A. Shaw, H. Zhang, E. Gerber, Understanding trust amid delays in crowdfunding, in: Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, CSCW '17, ACM, New York, NY, USA, 2017, pp. 1982–1996. doi:10.1145/2998181.2998207.
- [29] A. Xu, X. Yang, H. Rao, W.-T. Fu, S.-W. Huang, B. P. Bailey, Show me the money!: An analysis of project updates during crowdfunding campaigns, in: Proceedings of the SIGCHI Conference on Human Factors

- in *Computing Systems, CHI '14*, ACM, New York, NY, USA, 2014, pp. 591–600. doi:10.1145/2556288.2557045.
- [30] R. Davies, Civic crowdfunding as a marketplace for participation in urban development, in: *The Internet, Policy & Politics Conference 2014*, 2014, pp. 1–25.
- [31] R. Davies, Three provocations for civic crowdfunding, *Information, Communication & Society* 18 (3) (2015) 342–355. doi:10.1080/1369118X.2014.989878.
- [32] A. Stiver, L. Barroca, M. Petre, M. Richards, D. Roberts, Civic crowdfunding: How do offline communities engage online?, in: *Proceedings of the 2015 British HCI Conference, British HCI '15*, ACM, New York, NY, USA, 2015, pp. 37–45. doi:10.1145/2783446.2783585.
- [33] A. Stiver, L. Barroca, S. Minocha, M. Richards, D. Roberts, Civic crowdfunding research: Challenges, opportunities, and future agenda, *New media & society* 17 (2) (2015) 249–271.
- [34] J. G. Kim, K. Vaccaro, K. Karahalios, H. Hong, ”not by money alone”: Social support opportunities in medical crowdfunding campaigns, in: *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, CSCW '17*, ACM, New York, NY, USA, 2017, pp. 1997–2009. doi:10.1145/2998181.2998245.
- [35] J. S. Hui, M. D. Greenberg, E. M. Gerber, Understanding the role of community in crowdfunding work, in: *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing, CSCW '14*, ACM, New York, NY, USA, 2014, pp. 62–74. doi:10.1145/2531602.2531715.
- [36] M. Balestrini, T. Diez, P. Marshall, A. Gluhak, Y. Rogers, Iot community technologies: leaving users to their own devices or orchestration of engagement?, *EAI Endorsed Transactions on Internet of Things* 1 (1).
- [37] R. Gittell, A. Vidal, *Community organizing: Building social capital as a development strategy*, Sage, 1998.
- [38] S. Lindtner, S. Bardzell, J. Bardzell, Reconstituting the utopian vision of making: Hci after technosolutionism, in: *Proceedings of the 2016 CHI*

- Conference on Human Factors in Computing Systems, CHI '16, ACM, New York, NY, USA, 2016, pp. 1390–1402. doi:10.1145/2858036.2858506.
- [39] S. Dey, B. Duff, K. Karahalios, W.-T. Fu, The art and science of persuasion: Not all crowdfunding campaign videos are the same, in: Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, CSCW '17, ACM, New York, NY, USA, 2017, pp. 755–769. doi:10.1145/2998181.2998229.
- [40] J. Corbin, A. Straus, Basics of qualitative research, Sage, London, UK, 2008.
- [41] A. Vanolo, Is there anybody out there? the place and role of citizens in tomorrows smart cities, Futures 82 (2016) 26–36.
- [42] S. Bardzell, J. Bardzell, Towards a Feminist HCI Methodology: Social Science, Feminism, and HCI, in: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI '11, ACM, New York, NY, USA, 2011, pp. 675–684. doi:10.1145/1978942.1979041.
- [43] J. G. Kim, S. Park, K. Karahalios, M. Twidale, Labor saving and labor making of value in online congratulatory messages, in: T.-Y. Liu, C. N. Scollon, W. Zhu (Eds.), Social Informatics, Springer International Publishing, Cham, 2015, pp. 245–260.
- [44] J. Meer, Brother, can you spare a dime? peer pressure in charitable solicitation, Journal of Public Economics 95 (7) (2011) 926 – 941. doi: <https://doi.org/10.1016/j.jpubeco.2010.11.026>.
- [45] S. Smith, F. Windmeijer, E. Wright, Peer effects in charitable giving: Evidence from the (running) field, The Economic Journal 125 (585) (2015) 1053–1071. doi:10.1111/eoj.12114.
- [46] G. Freeman, J. Bardzell, S. Bardzell, Aspirational design and messy democracy: Partisanship, policy, and hope in an asian city, in: Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing, CSCW '17, ACM, New York, NY, USA, 2017, pp. 404–416. doi:10.1145/2998181.2998291.

- [47] G. N. Hearn, M. Foth, T. Stevenson, Community engagement for sustainable urban futures : editorial preface, *Futures* 43 (4) (2011) 357–360. doi:10.1016/j.futures.2011.01.002.
- [48] R. Kitchin, The programmable city, *Environment and Planning B: Planning and Design* 38 (6) (2011) 945–951. doi:10.1068/b3806com.
- [49] T. Nam, T. A. Pardo, Conceptualizing smart city with dimensions of technology, people, and institutions, in: *Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times*, dg.o '11, ACM, New York, NY, USA, 2011, pp. 282–291. doi:10.1145/2037556.2037602.