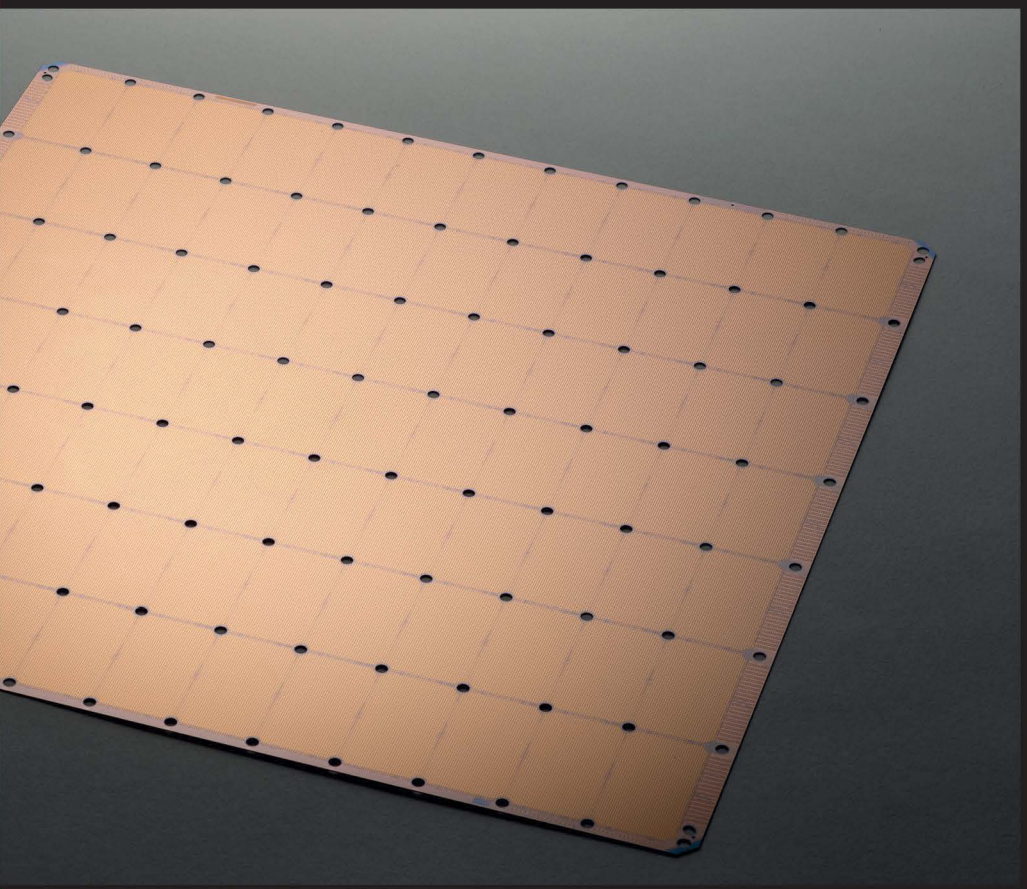
LSE Department of Management

ISSN 2042-5686 (Online)

iSCHANNEL

The Information Systems Student Journal



Volume 14
Issue 1
September 2019

ISSN 2042-5686 (Online)

iS CHANNEL Volume 14 Issue 1 September 2019

Contact
Information Systems and Innovation Group
Department of Management
London School of Economics and Political Science
Houghton Street
London WC2A 2AE
Email: is.channel@lse.ac.uk

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EDITORIAL – From the Senior Editor

In its 14th year of publication, the iSCHANNEL student journal offers another volume with a set of peer-reviewed thought-provoking, timely, and insightful articles. Out of a large number of submissions, the editorial team agreed on a selection of varied pieces pertaining to debates on the impact of information systems on a range of fields.

Daniel Quevedo Seguel discusses the social aspects of building information modelling in the UK construction industry, and details the actions and practices in construction projects. **Pasquale Spinoso** sheds light on the information infrastructure around the management of migrants in Italy and demonstrates the need for the constant cultivation of technological assemblages. In turn, **Johanna Horz** draws attention to electronic voting in Africa, and highlights the shortcomings as well as ethical considerations related to the creation of large voter databases. **Fjoralba Krapi** provides a critical literature review on the motivations and incentives to participate in open-source initiatives that shape the digital domain. **Slava Oganezov** focuses on the credit market and its disintermediation through peer-to-peer lending platforms, concluding that these new intermediaries have the potential to reduce transaction costs in comparison to traditional banks. **Sean J Baier**'s analysis of Twitter's account suggestion functionality contributes to the debate on collective action and its organisation through social media. Finally, **Cathal Greaney** reviews the origins and core concepts of business models based on collecting and monetising user data.

Spanning industries, continents, and perspectives, the articles reflect the rich intellectual community that current students and alumni help to create around the journal every year. As the Senior Editor, I would like to congratulate all authors and thank for all submissions we received. The publication of this volume was possible owing to the efforts of the whole editorial team and reviewers. We are also grateful to Dr. Will Venters, the Faculty Editor, for his support.

It is also the last volume I contribute to as the Senior Editor. I would like to express my gratitude to all editors, reviewers, and authors I had the pleasure of working with over the past four years. I am sure iSCHANNEL will flourish under the incoming Senior Editor and will go from strength to strength with every volume, reflecting the intellectual curiosity and research rigour of its contributors.

Marta Stelmaszak

Senior Editor

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Understanding Building Information Modelling Collaborative Practices in the UK Construction Industry

Daniel Quevedo Seguel

MSc Management of Information Systems and Digital Innovation
Department of Management
London School of Economics and Political Science

KEYWORDS

Collaboration
Practice theory
Enactment
Technologies-in-practice
Building information modelling
Experimentation

ABSTRACT

From the nineties onwards, several reports in the UK have claimed that the construction industry is one of the most unproductive sectors. In this context, building information modelling (BIM) has been presented as a collaborative methodology or technology that can improve productivity levels within organisations, as well as when working among different enterprises. With this objective, the British government mandated the use of BIM in the development of public projects in 2011 as a way of enhancing collaboration among the numerous participants of the edification process. However, little attention has been paid to how the actual collaboration occurs. Dominant narratives, normally issued from managerial and engineering perspectives, tend to overlook and simplify social aspects as collaboration. By focusing on social aspects, the present work draws on practice theory and the concepts of enactment and technologies-in-practice to analyse the actions and practices that occur in the coordination process of projects. In summary, this study proposes that people do not necessarily enact BIM in collaborative manners and that it is instrumental to investigate more precise concepts such as synchronisation and exploration in order to understand technological change and provide relevant insights for the industry.

Introduction

Some authors use the term "fragmented" (Isikdag & Underwood; 2010) to describe the construction industry because it is composed by a large number of differentiated individuals and organisations belonging to public or private sectors, who are highly specialised on specific tasks and participate at all stages of the edification process, from the requirement to the delivery of the building. This requires substantial effort for the coordination of every task and activity. Therefore, construction is a field that is at considerable risk of inefficiencies and waste of resources.

Latham's report "Constructing the team" (Latham; 1994) and Egan's report "Rethinking construction" (Egan; 1998) assessed and described the UK construction industry as ineffective, adversarial and inefficient in understanding customer needs. These documents provided recommendations such as a better understanding of customer needs, enhancing partnering and collaborative work, measurement of performances and rethinking processes to reduce cost and time. From then on, the public sector adopted different actions, namely the development of complementary reports, the establishment of new organisations, public-private partnerships and implementing strategic plans. In 2011, BIM (building information modelling) was mandated by the Minister for the Cabinet Office as an official technological requirement to be utilised for the development of public projects oriented towards accomplishing productivity and sustainability goals. It has been thought of as an instrument to delegate certain actions in technology or a methodology, which will theoretically allow the industry to tackle its deficiencies trough collaboration.

Although many use the term "BIM" to refer to a technology and others refer to it as a methodology, this article conceives it as both (Azhar et al.; 2012, Succar; 2009). Beyond this definition, it can be argued that BIM is based on 3D parametric models capable to host rich information, potentially available for use in different stages of the edification process by clients, architects, engineers, constructors, public agencies, etc. A specific complex phase is the coordination of projects, where all the engineering designs are put together with the architectural design to be fitted. Primarily because of its visual qualities, BIM is considered as an enabler that helps to identify clashes among elements in order to promptly rectify projects and to reduce errors and costs.

Popular narratives define BIM as collaborative. Usually, these perspectives based on managerial, engineering and economic disciplines are related to rational and calculated planning of work and do not examine human behavioural issues. Relationships among the participants of coordination are ignored, minimised or simplified as things related to standards or technical interoperability among BIM

Corresponding Author
Email Address: dh.quevedoseguel@gmail.com

software. Therefore, because of its capacity to analyse and understand the complexity of human processes, social science approaches are suitable for enriching our comprehension. Thus, instead of adopting approaches that dictate how people should organise work and use technology, this research observes and analyses how the actual work is performed.

This work focuses on the tension of using technology to expect certain results in unfavourable contexts. It has been claimed that the construction industry is characterised by an adversarial atmosphere that is rooted in cultural attitudes (Latham; 1994, Egan; 1998). It can be observed in diverse aspects, such as the treatment to workers (Egan; 1998) or structures like contracts and tender procedures that facilitate conflict and defensive stances, especially in the client/contractor and contractor/subcontractor relationships (Latham; 1994). Since numerous work relations are created in all stages of edification processes, a reasonable query emerges: How is collaboration enacted by using BIM in this so-called adversarial construction industry?

This analysis is based on the practice theory, which considers the everyday practice as the building block of social orders. This approach provides valuable vocabulary and concepts to gain rich insights about the human organisation of work and serves as a sensitive lens to study social phenomena (Nicolini; 2012). In particular, the concept of "technologies-in-practices" developed by Orlikowski (Orlikowski; 2000) from the perspective of human agency is valuable in comprehending how people enact technology in their particular contexts and its consequences. Accordingly, it is possible to obtain sector-specific insights for the use of IT.

Literature Review

Practice Theory Literature Review

Several information systems scholars address the gap between planned activities by using technologies and the actual performance of those activities (Boudreau, Robey; 2005, Orlikowski; 2000, Dery et al.; 2006). From one side, technical rational approaches are often related to technological deterministic perspectives, which are dominant in the field of BIM. These discourses carry several assumptions, such as regarding the capabilities of the technical features of hardware, software, and applications to ensure that certain organisational structures or social orders occur when used. Practice theory, from a socio-technical perspective, provides a valid lens for nondeterministic studies regarding innovation with technology in the context of organisations. By focusing on the daily actions of people, this umbrella concept (Gherardi; 2012) offers ideas and concepts that facilitate a better understanding of the complexity of technology among human groups. However, a universal manner of application of this theory is not available (Gherardi; 2012) and some suggest the notion of a "broad family of theoretical approaches, connected by a web of historical and conceptual similarities" (Nicolini; 2012).

It is possible to find elements of the social practice theory in the works of several authors of diverse theoretical origins, but common roots are predominantly found in the works of philosophers Wittgenstein and Heidegger (Reckwitz; 2002). They criticise the dualistic view of the world that is based on Rene Descartes' ideas and the physical scientific approach, where entities and the mind are separated. Other researchers from the social sciences, such as Pierre Bourdieu and Anthony Giddens develop theories based on these authors' ideas in the context of their own times. Particularly, Giddens' structuration theory has been foundational (Giddens; 1984). However, since the author does not account for a clear application of the theory in the technology studies domain, different scholars from different approaches developed their own interpretations.

Wanda Orlikowski extends Giddens's "structures in practice" model to "technologies-in-practice" concept as a feasible structure that is enacted in the recurrent use of technology (Orlikowski; 2000). This perspective addresses the focus on human agency since people can choose to enact technologies in different manners, but also recognises the influence of several factors and structures by considering the context as an essential aspect in this understanding of practices. Thereby, this model explains the relationship between both sides of the dualism between agency and structure.

The researcher shifts the view that users "embody structures" contained in the IT artefact to focus on the "emergent" new structures since humans interact recursively with the technological properties available. Furthermore, the technology-centred idea that users "appropriate" the characteristics inscribed in technology is replaced with the concept of "enactment" that positions people's actions as the starting point to study the way it enacts the emergent structures in the context of interactions with the technology at hand. This extends the scope of user possibilities to perform circumvent uses of technologies. It could be by ignoring them, inventing new ones or working around them, which could even result in a scenario that is contrary to the expectations of technology designers (Orlikowski; 2000).

The same author and Susan Scott, have worked on the notion of sociomateriality that accounts for the relevance of material agency and the inseparability between the technical and the social aspects, which offers interesting perspectives for the understanding of technology in organisational contexts (Orlikowski & Scott; 2008). However, this article focuses on theories described in the abovementioned paragraphs since they provide useful lenses for the study of the theme in question.

Building Information Modelling Literature Review

This review observes two primary characteristics in BIM literature. First, there is an increase in the number of publications in recent years that coincides with the 2011 UK public mandate. Second, the largest portion of articles is related to BIM in the engineering, managerial and economics fields and only a low portion is written from social areas that try to comprehend human action.

A marked engineering tradition can be observed from its origins in the nineties related to computer-aided design (CAD) areas of research when technical concerns such as feeding vectorial data and 3D models were popular (Grilo & Jardim-Gonçalves; 2010).

Over time, different themes and perspectives emerged. Some scholars developed new concepts such as building product models (Eastman; 1999) that were later related to the BIM term. From the raise of publications number, approaches from engineering, managerial, economic or organisational perspectives were rarely elaborated purely from each perspective and they were developed intertwined with each other. For instance, recurrent interests from a managerial/engineering view such as automation and optimization of processes or IFC as language have been popular. Similarly, popular themes from a managerial/economic perspective have been related to productivity issues or cost-benefit analysis; for example, "Return of investments or ROI", "BIM as decision making tools" or "BIM for calculation".

This diversification of interests also includes papers that consider, at some point, social or organisational aspects. These publications range from articles mentioning collaboration or adoption aspects as relevant in superficial levels to a few other examples related to BIM research from theories related to the social sciences (Santos et al.; 2017).

Collaboration in the first-mentioned group is assumed to always be beneficial and realisable when solving interoperability (technical) challenges, such as in the case of using a server as a BIM collaborative platform (Singh et al.; 2011). Others subtly recognise collaboration as a human ability (Isikdag & Underwood; 2010). However, it is only concerned with the means and guides for communication and presumes that collaborative dynamics will emerge and subsequently improve productivity. Some explicitly position human factors, albeit in the absence of social explanations. One illustrative example is Bilal Succar who develops a research and delivery framework for BIM (Succar; 2009) that is intended at integrating every aspect and approaches and assumes these as managerial resources that will behave as expected. Other researchers such as Grilo and Jardim-Gonçalves develop a model to measure the impact of interoperability by examining employees and cultures (Grilo, Jardim-Gonçalves; 2010) recognising the complexity of human action and organisations; however, they do not extend on this topic. These examples represent the dominant approach that is focused on planning models to guide action.

Alternatively, there are a few but valuable articles based on social sciences theories that better explain the complexity of human activity at work. Henrik Linderoth analyses the implementation of BIM from an actor-network theory perspective, by discussing how technology defines new relationships and roles and how these new definitions are aligned with the original network (Linderoth; 2009). In another article, the same author opines that BIM sensemaking is an important component of the social analysis and argues about the relevance of actors in understanding the institutional logics that shape periodic actions and thereby affect the use of technology (Linderoth; 2016).

Anne Kokkonen and Pauli Alin adopt a similar stand and indicate that during daily activities, people create practices by means of reflective learning when they implement BIM. They argue for the increasing need for flexibility in practitioner expertise since this must be created and re-created over time (Kokkonen & Alin; 2016).

Research Study

Methodology

This work presents a qualitative research study that is aimed at studying the particular activities of the coordination of projects by using BIM as a piece of study. This stage is representative of the relational practices among different agents.

Semi-structured interviews, a flexible and powerful format (Rabionet; 2011) that allows raising more and better-oriented questions, has been used in this research. Surveys consider four individuals that work with Autodesk Revit® software in different companies in the UK. They have been involved in the coordination of projects from different roles, as shown in Chart 1.

Regarding the limitations of the method, some interviewees did not respond to every question for reasons such as confidentiality, lack of time or experience. However, it did not affect this investigation since the information gathered was valuable enough for proceeding with the analysis.

Conceptual Framework

Addressing to the research question, Orlikowski's technologies-in-practice (Orlikowski; 2000) model has been adopted. The author has developed a lens based on practice theory that seeks to continue the discussion about technological and organisational change, particularly extending the structurational approach to include emergence and enactment of valuable terms.

She argues for the potential to observe technology enacted in practice as a structure influenced by norms, interpretative schemes and facilities that users have in hand. The study also defines three different types of enactments that have structural consequences in the status quo of organisations: inertia, where users choose to use technology to retain their existing processes; application, where people use technology to augment or refine their way of doing things and change, where users substantially alter their proceedings (Orlikowski; 2000).

These ideas are valuable in order to observe the coordination of a projects stage, since the manner in which BIM is used has the capacity to reinforce or transform the status quo within organisations and also at intra-organisational levels.

Figure 2: Enactment of Technologies-in-Practice. Source: Orlikowski, W. (2000).

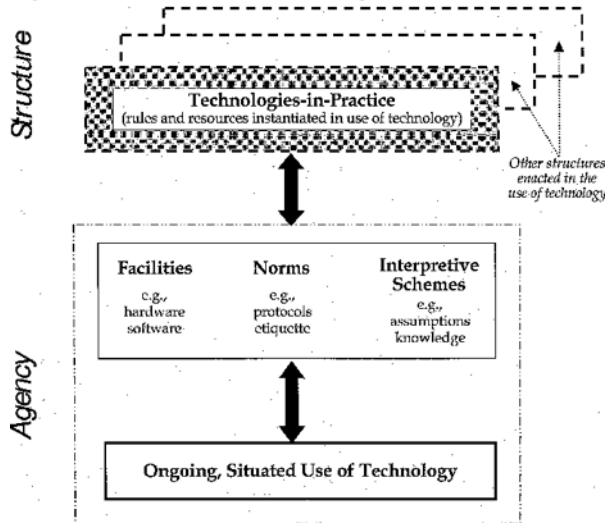
In the next chapter, four mentioned cases are

Role	Interviewee	Type
Building Services	Services 1	Semi-Structured Skype meeting
Structural Engineering	Structural 1	Semi-Structured Skype meeting
Architecture	Architect 1	Semi-Structured Skype meeting

Chart 1: Interviewees Summary Table

presented under the light of these frames in a table that facilitates observing them in parallel. They are described according to the technology-in-practice chosen by users for each case. Subsequently, the cases are analysed by considering the observations made in the use of the model, the existing literature and the information collected.

Figure 2 **Enactment of Technologies-in-Practice**



Cases

The interviewees enacted technologies-in-practice in different manners: (See Table 2 on the next page)

Individual-Productive Technologies-in-Practice

"Services 1", a specialist in mechanical services, self-trained in Revit and with experience in coordination, was hired in a Building Services office to be in charge of implementing BIM for a data centre project. According to him, he could not involve other offices to work with BIM since others did not possess that expertise. Thus, he decided to model every project which resulted in all of the information for coordination passed through him. "Services 1" commented that the coordination was improved because everyone could observe and correct the clashes on time. In parallel, he mentioned that it impressed some engineers outside the office who had never seen BIM being applied to their projects, thus he further took the opportunity to provide new, fast and didactic methods to improve the quality of the process with him as coordinator.

In this case, technology is used to obtain personal benefits by leveraging a new position of power in a context where it is not usual for building services specialists to lead and organise workflows. Since other participants used BIM in low levels, it can be said that they adopted the inertia type of enactment that facilitated a way for the interviewee to take advantage of this context.

Collective-Problem-Solving Technologies-in-Practice

"Structure 1", a Spanish engineer in charge of the structural services at the London branch of an international office, coordinated an airport project with architects established in Spain. The interviewee stated that they did not adopt British Standards Level 2, but the project had significantly better communication than others with those standards. They adapted their own work manners in a comfortable way for both sides under the vision that the project is a car pushed by everyone. They relied on strong Revit capabilities to create templates, special elements and views to better understand problematic points, transfer information and make design decisions. On some occasions, "Structure 1" travelled to Spain to coordinate directly with the architects and technical teams. He commented that the people involved were highly motivated and had in place an architect leader who ensured everyone´s opinion felt as important, which made him feel like belonging to a new family. According to him, it has been his best coordination experience because of the personal relations that were established. This manner of using this software based on collective visions of solving a common challenge reinforced the value of cooperation and the existing work practices of the company.

Process-Support Technologies-in-Practice

"Coordinator 1" is part of a U.S. firm and is employed in the UK branch developing big-sized projects of a different kind. The specialists involved in the projects can develop their projects at different locations. This company believes that working in Revit increases efficiency, and they have been trying to accommodate standards among locations. "Coordinator 1", mentioned about the efforts that they invest in homologating the work in different projects but opined that there are several factors that influence the way projects are developed. He highlights, in an example, the client requirements in assigning a specific engineering office that does not use Revit. He claimed that different conditions change the process. In order to overcome inefficiencies, "Coordinator 1" has been in charge of integrating UK and U.S. standards for generating a mixed guide to work based on existing resources more than on using their own methods.

In parallel, "Coordinator 1" also stated that the company has made efforts to improve communications among specialists by providing a multi-platform system that allows calls and screen sharing. He also commented that the firm values meetings and

Table 2 Types of Enactment—Conditions, Actions, and Consequences

Type of Enactment	Interest in using the Technology	Interpretive Conditions	Technological Conditions	Institutional Conditions	Technology-in-Practice	Processual Consequences	Technological Consequences	Structural Consequences
Inertia	Low	Limited technical knowledge	•Networked personal computer •Customizable groupware tool	•Hierarchical •Individualistic •Competitive	*Limited-Use*	•None	•None	Reinforce and preserve status quo
Application	Very High	Extensive technical knowledge	•Networked personal computer •Customizable groupware tool	•Nonhierarchical •Collaborative •Participative	*Collaboration*	•Increased effectiveness in development •Improved collaboration	•Changes to the tool •Changes to the data	Reinforce and enhance status quo
	Moderate	Moderate technical knowledge	•Networked personal computer •Customizable groupware tool	•Hierarchical •Individualistic •Competitive	*Individual-Productivity*	•Increased efficiency in communication	•Changes to the data	Reinforce and enhance status quo
	High	Detailed technical knowledge	•Networked personal computer •Customizable groupware tool	•Communal •Cooperative	*Collective-Problem-Solving*	•Increased effectiveness in problem solving •Increased cooperation	•Adaptations to the tool •Changes to the data	Reinforce and enhance status quo
	Very High	Competent technical knowledge	•Networked personal computer •Customizable groupware tool •Call tracking tool	•Team-focused •Cooperative •Learning-oriented	*Process-Support*	•Increased effectiveness in customer service •Increased efficiency in communication	•Adjustments in the tool •Changes to the data	Reinforce and enhance status quo
Change	High	Competent technical knowledge	•Networked personal computer •Customizable groupware tool •Call tracking tool	•Team-focused •Cooperative •Learning-oriented	*Improvisation*	•Redefined work distribution •Shift in type of collaboration •Change in ways of learning	•Adaptations to the tool •Changes to the data	Transform status quo

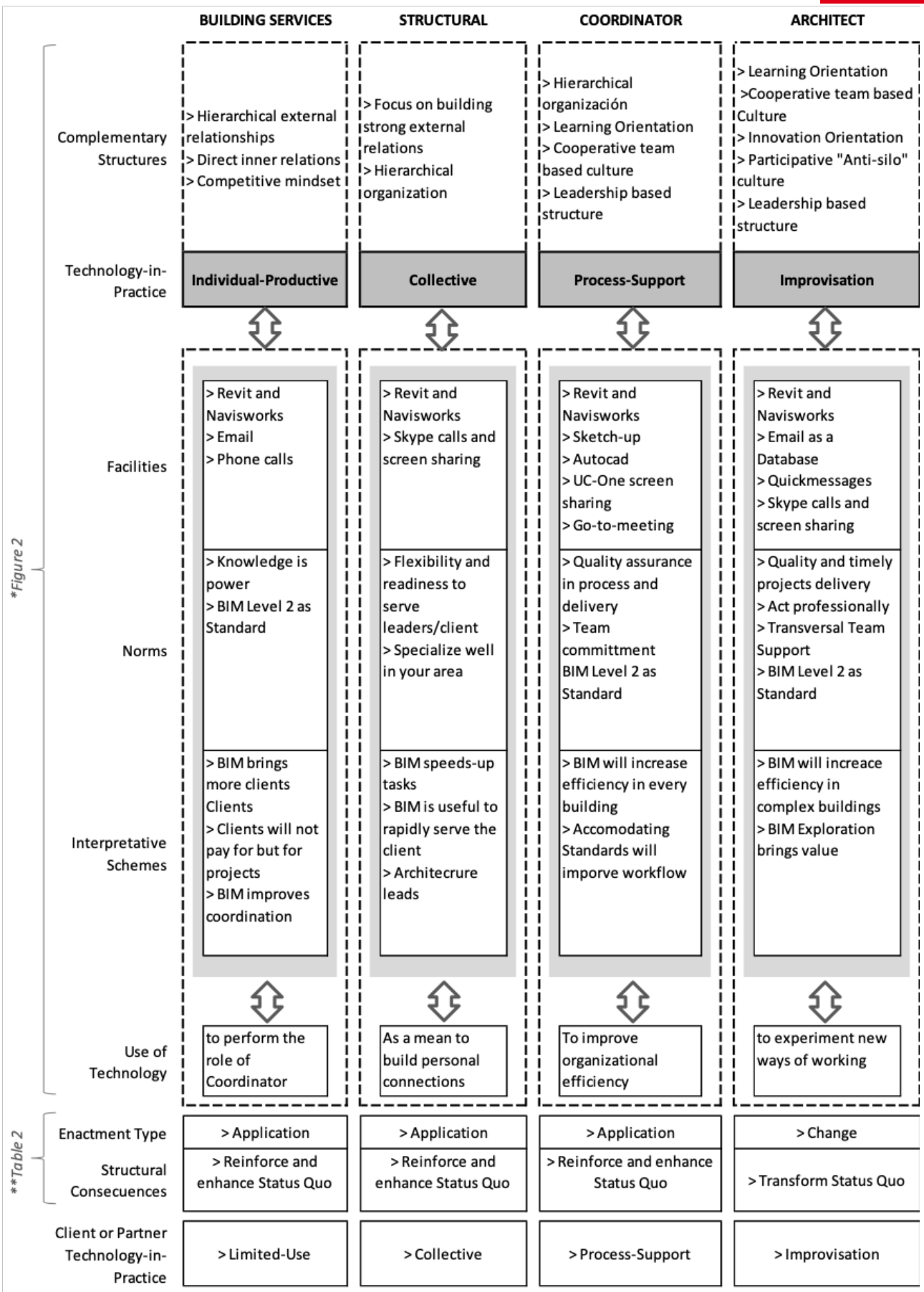
Table 2. Enactment of Technologies in Practice. Source: Orlikowski, W. (2000).

encourages everyone to provide opinions.

Improvisation Technologies-in-Practice

"Architect 1" is part of a design team in a global company specialized in architecture, engineering and coordination of healthcare projects, which characterized the specific technical and normative requirements. They implemented Revit expecting to increase efficiency among teams, not only applying the software provider rules, but also encouraging people to explore new ways of working. The interviewee became proficient in Revit over time, along with colleagues who have been a part of the creation and definition of new processes. Their team, similar to other teams, relies on a Revit-experienced architect leader who communicates their workflows to the department of digital practice that in turn supports and encourages the permanent exploration and improvement of processes within the architectural team as well as in the work with the engineering teams.

Architect 1 stated that they perform diverse manners of working, supported by an array of technological and non-technological communication forms. The company developed an in-house platform that is linked to Skype with several features such as quick messages, calls and screen sharing that is used for coordinating projects and share knowledge with colleagues in other cities. A "hashtag open email system" allows them to browse any specific topic, as well as to share knowledge or to ask anyone inside the firm and its international branches. Architect 1 mentioned that they sometimes adopted non-conventional forms of working such as chatting with the colleague in the next seat or modelling and



*Orlikowski, W. (2000). Enactment of Technologies in Practice. Figure 2
**Orlikowski, W. (2000). Types of Enactment-Conditions, Actions, and Consequences. Table 2

Chart 2: Developed by the Author

coordinating with all engineers in front of only 1 computer.

According to Orlikowski, the value found in ongoing experimentation and change may reinforce the existing structures such as learning orientation, participative anti-silo culture and cooperative team based culture, which is coherent with the interviewee's Revit-learning process since it was implemented in the office.

Discussion

With regards to our research question, two lines of discussion are followed.

First, there is no guarantee that collaboration or any other kind of relationship can occur. Thus, it can not be seen as inscribed neither in the artefact nor in the standards. In chart 2, the "Use of technology" line indicates the diverse aspects that are relevant to people that are coherent with the existing structures, facilities, norms and interpretative schemes. The enactment of technologies-in-practice as a structure resulted in diverse elections of use. In the first case, BIM collaboration was not selected. Considering the norm "knowledge is power" the user opted to enact technology for re-positioning himself in the role of the coordinator (Linderoth; 2009), to benefit himself or the organization he represented. In the second case, even when not based on BIM Level 2 standards, the interviewee collaborated in accommodating the work to be comfortable to both sides, based on their flexibility and readiness to serve the client. The third case sought to ensure quality in accommodating standards to rule actions and account for BIM as supportive of performing efficient processes; however, it is not evident if and how collaboration occurs. The fourth case presents collaboration occurring in formal and informal ways. In the end, people chose how to enact technology.

Therefore, BIM does not necessarily implicate collaboration. Moreover, Building Services 1 individual productivity technology-in-practice enactment may lead to support his view of BIM as an effective tool for individual gains by demonstrating personal value, which could reinforce non-collaborative practices (Orlikowski; 2000).

Second, broadening the focus from collaboration to more precise terms would be valuable. Coordination processes can be affected by numerous and changing factors that bring variability to the processes. The information gathered shows that not only collaboration but different social dynamics can happen, which are relevant to better understand this phenomenon. Thus, two concepts are presented.

On the one hand, synchronisation is a more precise concept that provides value to the process. In the construction sector, organisations buy services to other specialist offices or individuals by configuring a strong path-dependent manner for operation. In practice, since specialists develop their agreed service, they can merely fulfill their contract and not necessarily do it in collaborative manners, especially in the context of several participants competing with each other. Therefore, even when BIM work on the cloud allows every specialist to observe the moment when other specialists are developing and modifying the project in real time (as is the aim of UK BIM Level 3) they would be merely performing their work in a synchronised manner. Differentiating this term from collaboration allows focusing on the benefits of synchronisation for productivity, as well as enhancing the comprehension about what to expect from others, thus augmenting trust levels.

On the other hand, experimentation term recognises the value of flexibility. Improvisation technology-in-practice in the fourth case accounted for change as a type of enactment because it significantly modified the artefact by generating new BIM templates and developing applications to communicate across offices (Orlikowski; 2000). Moreover, it modified workflows in the permanent exploration of new manners to work with or without technology and the organisational structure by creating the area of digital practice to support managing knowledge and innovation. By borrowing aspects from the existing standards or BIM execution plans (BEP), by developing templates and by organising groups based on expertise, they built a base of resources to work with that was supported by project leaders. This way, teams and individuals adopted tailored processes for each project, accompanying them with **several and** flexible methods of work that led to finding feasible solutions (Kokkonen & Alin; 2016). They relied on an array of technological and non-technological solutions to design and coordinate projects and felt the liberty to physically and virtually meet in diverse manners.

This case accounts for a balance between automation and flexibility and shows the human choice for experimenting with new processes as a valuable manner to face complexity.

In this manner, extending the prevalent focus on collaboration to other terms such as synchronisation and experimentation, as well as others that may emerge is necessary to gain precision in BIM knowledge. Ensuring such precision is meaningful for the public sector in the development of policies, standards and setting industrial strategies and for the private sector in the comprehension of these trends not as merely operative but as an organisational and business issue.

Further research on the topic is required to extend the concept of emergent BIM processes based on practice theory where the focus is on the actual use of technology. As this study indicates, several themes may arise from this approach. Some could study how building execution plans (BEP) are enacted under the perspective of the emerging practices, where change is usual (Kokkonen & Alin; 2016) or how emergent practices define new roles (Linderoth; 2009) in the use of BIM. Similarly, it would be enriching to explore complementary aspects of BIM use from the perspective of social sciences in order to broaden the little but informative literature available.

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The Italian Information Infrastructure for the Management of Migrants

Pasquale Spinoso

MSc Management of Information Systems and Digital Innovation
Department of Management
London School of Economics and Political Science

KEYWORDS

Information Infrastructure
Migration crisis
E-government
Interoperability
Assemblage
Cultivation

ABSTRACT

This paper examines the enactment of the Information Infrastructure for the management of migrants in Italy. The recent migration crisis required e-government tools to deal with the management of migrants in Italy, and this paper critically explores how the relevant Italian Authorities put in place a purpose-built government solution, the Information Infrastructure, to better manage and allocate migrants in the Italian Territory. This work closely focuses on the functionalities enacted in the Information Infrastructure, and critically analyses its main characteristics and interoperability. This research derives from a case study which enables the phenomenon to be explored from multiple sources and angles. The findings are explored through the lens of the assemblage framework, which helps to uncover the real nature of this Information Infrastructure, identifying it as an assemblage, a heterogeneous composite which results from the encounter of technology with a spectrum of socio-technical dimensions. Looking at this Information Infrastructure as an assemblage will help to unveil the role of mediation between the various interests and dimensions in the making of the assemblage. In particular, we will argue that the interplay of dimensions has led to an Information Infrastructure that is suboptimal and imperfect by contrast with the original plans because some dimensions fail to recognize the effects of the others. Moreover, we aim to demonstrate that the attempts to design an assemblage that is fully controllable a priori failed because an assemblage is always in-the-making and needs to be continuously cultivated by its actors.

Introduction

Europe has always been shaken by waves of migration, but recently these have become more consistent in the aftermath of the "Arab Spring". In the early phases of the migrants emergency in Italy, the situation was managed by using exactly the same procedures that were used in non-crisis periods. However, it soon became apparent that these old procedures were insufficient to cope with the new massive waves of migrants, particularly because they failed to exploit fully the advantages offered by e-government tools.

Studies around the usage of ICT in the Public sector (the e-government literature) have highlighted the benefits of ICT in public procedures, enabling them to become more efficient and effective (Heeks, 1999). Amongst the e-government initiatives undertaken by States, the designing of Information Infrastructures (II) has recently emerged as one of the most relevant. Information Infrastructures immediately turned out to be the ideal solution for the management of migrants in Italy. First, in non-crisis periods, a plethora of uncoordinated and dispersed Information Infrastructures sprang up. Following the emergency, under pressure from the Parliament, a process of re-organisation took place. This newly created Information Infrastructure for the management of migrants in Italy (called SGA, Sistema Gestione Accoglienza), is a carrier of different interests, from Parliament, aiming to monitor the allocation of migrants more effectively, to the several agencies directly interfacing with this II.

This paper aims to carry out a case study of the Information Infrastructure for the management of migrants in Italy (SGA). In particular, we will use the assemblage framework to demonstrate that this II can be seen as an assemblage and to show how the continuous process of mediation over the various socio-technical interests has led to a sub-optimal II.

Literature Review and theoretical framework

In the course of the last 15 years, with the advent of Communication in Information Technology (ICT vs IT), it soon became meaningless to talk about independent architectures that do not interlink with each other; rather, the so-called Information Infrastructures began to emerge. Information Infrastructures (II) are composed of interdependent layered systems over an installed base, which means that their design is path-dependent and shaped by

Corresponding Author
Email Address: pasquale.spinoso@gmail.com

existing infrastructures (Hanseth, Lyytinen, 2010).

The deployment of an II will be shaped by the dynamic interaction between socio-technical artefacts, and the Information Infrastructure will be the result of the inscription of these elements into the technology. The more designers aim to have control over the Information Infrastructure by fostering interoperability between these elements, the less flexible the platform will be (Ciborra, 1998). Even the most flexible system has inscribed legacies which do not allow for full flexibility, which means that "today's choices constrain tomorrow's possibilities" (Edwards et al, 2007). Enacting a system means that the designers have to translate the complexity of the world into the logic of technology, by means of what is called functional simplification and coding (Contini, Lanzara, 2014; Contini, Cordella, 2015).

The acknowledgement of the importance of socio-technical factors is also present in the framework of assemblages (Lanzara, 2009). We will use this framework to look at the case of the Italian Information Infrastructure which is in place for the management of migrants. According to this framework, the development of an assemblage is the result of negotiations that involve several actors, such as political authorities, bureaucratic organizations, ICT providers and so on. From this viewpoint, an Information Infrastructure with these features of mediation of interests could be seen as an assemblage, that is to say, a context-dependent composite seeking to compromise multiple socio-technical dimensions and interests.

The process of enacting an assemblage is characterized by the continuous mediation of these interests, which makes the project unpredictable and subject to frequent changes and interventions. Because of the ongoing mediations of interests that have the tendency to maintain their own specificity, assemblages tend to grow "in layers" and never reach a final stage (Lanzara, 1999). In this chaotic situation, usually, there is the emergence of an institutional sponsor (like the Government) and a project champion, which takes control of the development of the assemblage and tries to mediate the various and often conflictual interests. It appears clear that an assemblage cannot be designed a priori, rather it is a process of continuous refinements (and reconversion of available material for new purposes or "bricolage") (Ciborra, 2002).

The rise of assemblages modifies the organizational landscape in the Public Sector, introducing new practices and making some of the old ones obsolete. Public organization practices are increasingly the result of the concatenations and mediation of administrative and technological interests (Barry, 2001). The administrative action thus becomes dislocated: as the assemblage is a loosely structured and heterogeneous composite, so organizational practices are no longer contained within fixed boundaries but are instead inscribed in all the components of the assemblage. Thus, the development of an assemblage entails a re-organisation of the Public Organisations involved. This can also lead to friction between the many power groups that make up the Public Sector.

Lanzara considers also the concept of interoperability when examining the assemblage; the scholar maps out its innovative character based on three interoperability domains: technical compatibility, functional compatibility and institutional compatibility. Technical compatibility refers to the compatibility between the technical components of the Information Infrastructure; Functional compatibility is the functional simplification of the normative/institutional components in the technology; Institutional compatibility refers to the degree of integration between the multiple institutional agencies dealing with the assemblage.

Thus, it appears clear that the interconnections that arise in an assemblage are not only interconnections between systems, but also between dimensions (e.g. political, juridical, technical). Thus, assemblages are composite configurations of technical artefacts with socio-technical and institutional components, that, during the process of development, may also be converted and linked. The development of an assemblage does not come out of the blue. Rather it should consider the presence of a context-specific and history-dependent installed base in a given dimension, and not force changes in such a dimension if it shows reluctance towards change. The installed base could be both technical and infrastructural, but, especially in the public sector, also organisational and institutional. The installed base should be seen as a duality. It could be a source of inertia in e-government action, but also a powerful enabler of new trajectories in the e-government domain, especially when its components can be turned into useful resources. It is thus in the hands of the various actors to cultivate (Ciborra, 2003) the multiple components of the installed base to make the assemblage grow fruitfully. In other words, the installed base is not a fixed concept but could evolve and mutate as the development of the assemblage progresses (Velicogna, Carnevali, 2009).

The proposed framework could lead us to deduce that, because of these continuous interactions of multiple actors, the dynamics of assembling components can be understood only in the enactment of the assemblage, and not as an abstract a priori. Particularly, the construction of an II is the result of ongoing interpretation of the socio-technical components that characterize the assemblage. Because the various actors involved have different experiences and backgrounds they tend to interpret the same components differently, thus enacting "strategies for the construction of alternative versions of reality' (Lanzara, 1993; Lanzara, Patriotta, 2001). This paper distances itself from IS research of so-called technological determinism (technology development follows a linear fashion), instead, it is in line with the stream of research arguing that the enactment of technology needs to be continually "cultivated", interpreted and is always in-the-making.

Methodology

The aim of this paper is to explore the following research questions:

"Why this Information Infrastructure can be considered an assemblage?"

"How the interaction and balance of multiple socio-technical dimensions may lead to a sub-optimal Information Infrastructure?"

Given the complexity of this issue, the research method chosen for this paper is that of the in-depth case study. A case study requires the author to do "research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence" (Yin, 2009). It thus proves to be particularly effective for studying those phenomena that are relevant in contemporary debates, like the migration crisis that is shaking Europe and Italy in particular.

The focus of this research will be the allocation of migrants managed by SGA (even though this paper also stresses the interdependences of SGA with other II). A case study involves collecting data from multiple sources, and this research is not exempt from this approach.

The qualitative methodology of this dissertation will include consultation of documents made for internal purposes and semi-structured interviews with employees and executives from the agencies involved in interfacing with SGA. See Figure 1 for a list of interviewees.

To carry out coherent data analysis, all interviews were tape-recorded and transcribed. Then, the transcripts and documents were categorized according to a thematic analysis approach.

Case study

The management of migrants in Italy is performed by several Public Agencies, all of which deal with an architecture of Information Infrastructures. Three main infrastructures are put to use in the management of migrants: SGA; VESTANET and DUBLINET. These three infrastructures are interconnected so as to manage the phenomenon at a local, regional and national level. Our study will look specifically at the SGA II and will analyse in depth how this infrastructure manages the allocation of migrants within the Italian territory.

SGA is used to "be a supporting tool for all those actors involved in the management of the initial reception of migrants and the planning of their allocation. In particular, by means of SGA, it is possible to keep complete track of the migrant's progress, from arrival on Italian Territory to exiting the hospitality process" (Ministry of Internal Affairs, SGA manual). SGA has been heavily promoted by the Italian Parliament, with the aim of gaining an overview of the allocation of the migrants in Italy. Parliamentary pressure is leading to replacement of the old system of monitoring which relied on obsolete integration between the Information Infrastructures at a local and central level.

SGA, which inherits some functions from previous Information Infrastructures that were in use at local level for the management of migrants, was designed to be integrated with two pre-existing infrastructures: VESTANET and DUBLINET. VESTANET is used to recognize the status of political refugee. DUBLINET is a national system which allows for the reallocation of a certain number of migrants within the EU countries that have ratified the Dublin III Treaty.

Linking back to SGA, this is in the hands of the Ministry of Internal Affairs and, with stringent limitations, also accessible to private owners of CAS, accommodation structures where migrants are allocated. The Ministry of Internal Affairs is divided into three bureaucratic structures responsible for managing immigration: the Central headquarters (DCSCIA), local offices (Prefectures), and local police stations. Thus the SGA system is managed by all these three structures, each holding authority for different procedures and having sole access to specific functions in the Information Infrastructure. By concentrating certain functions within the Central headquarters and decentralizing other functions to the periphery, the bureaucratic structure of the Ministry of Internal Affairs seems to match the principle of "dispersed" management of migrants in Italy. In fact, the existence of an extensive network of local offices of the Ministry of Internal Affairs facilitates the management of migrants who are distributed throughout the entire Italian territory.

POSITION	DATE	LOCATION
Prefect of Arezzo	12/04/2018	Arezzo
Prefecture IT official	13/04/2018	Arezzo
Prefecture official for migrants	13/04/2018	Arezzo
NGO representative	13/06/2018	Arezzo
Vice-Prefect of Rome	12/06/2018	Rome
Local Police office IT functionary	17/07/2018	Arezzo
SGA responsible	18/07/2018	Rome
DCSCIA Director	18/07/2018	Rome
Prefecture IT official	20/07/2018	Arezzo
Prefecture IT official	22/07/2018	Lecce
Prefecture IT official	24/07/2018	Florence

Figure 1: List of interviewees

Because SGA is used simultaneously by different agencies within the same Ministry, the developers of this II were questioned about the creation of one single tool within SGA to give each user the opportunity to monitor all the steps involved in registering and allocating every migrant, regardless of the agency involved. Thus, SGA developers came up with a flagging tool available to all the structures of the Ministry to monitor progress in allocating migrants and the status of the operations.

When a new group of migrants arrives, with the consequent creation of a build-up, five flags are activated. These five flags correspond to "national planning of allocation of migrants"; "regional planning of allocation of migrants"; "allocation"; "census" and "validation of the arrival of the migrants in accommodation". See Figure 2.

To explore the process of allocating and housing migrants throughout the Italian territory we will take a detailed look at how SGA works.

When a boatload of migrants first arrives in Italy, the system begins to record an initial snapshot of the situation of migrants upon arrival, which then will be further implemented and extended. This first monitoring is carried out by the Central Headquarters (DCSCIA) and, as regards the census, by local police offices.

Following the creation of this "arrival of migrants" event, the flags on the monitoring tool are activated. The first flag refers to national planning of migrants within the Italian Territory. This step is in the hands of the DCSCIA, which is responsible for all those tasks that require central coordination between multiple actors (the Italian regions). With this processing stage, the migrants are allocated from the "hotspots" (accommodation near the place of landing) to the regional hubs.

The SGA system takes great care to avoid migrants getting "lost" during the transfer and allocation process, which means preventing some migrants voluntarily or involuntarily becoming "invisible" to the system, either because they escape or because of human error (e.g. keying in the wrong number of migrants). Thus, the system has proved to be of great use in minimizing the risk of human error (e.g. alert in case of keying in inconsistent numbers of migrants).

Having discussed the first step in allocating migrants, now we will turn our attention to regional planning. The prefecture heading the region (Prefettura Capoluogo di Regione) is responsible for the allocation of migrants within the single provinces of the region. See Figure 4.

There are some important factors that affect the allocation of migrants within each Italian Province. The local prefecture may indicate that a socio-cultural event (e.g. political party or trade union demonstration) is to take place in the Province in a specific period of time. As the allocation of migrants in Italy is heavily charged with political implications, the recognition of external social factors is important in order to manage the allocation of migrants more effectively. Pragmatically, the Ministry of Internal Affairs tries to avoid the allocation of migrants while a demonstration is being held in a particular Province if the political climate is heated. See Figure 5.

The third flag refers to the allocation of migrants in each Italian Province and is carried out by local Prefectures. The Local Prefecture is responsible for ratifying conventions with CAS managers, the private owners of accommodations.

The fourth flag refers to the census of migrants. This processing stage is crucial for allocation because the census of migrants means that those that have the right to hospitality, those that do not and those that have to be treated differently (e.g. those that show vulnerability) can all be distinguished from each other. The census, which is in the hands of the local police stations, has proved to be particularly problematic because often migrants lack of any kind of documents. For this reason, the first step is to provide each migrant with a unique identification code (CUI). Recently, each CUI has been univocally linked with a fingerprint of the migrant. In this way, the migrant can be univocally monitored throughout the allocation process. See Figure 6.

The census is fundamental because some nationalities (e.g. Syrians) are supposed to follow a different pattern of allocation, being reallocated within those countries which have ratified the Dublin III Treaty. Thus there is tight integration between the census of migrants and DUBLINET, the II responsible for the reallocation of migrants.

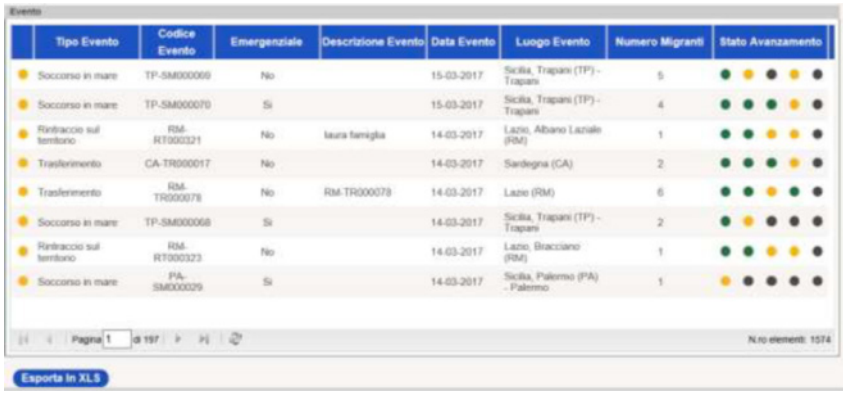

Figure 2 : The flag tool in SGA

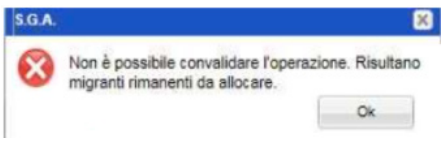

Figure 3: Alert message in SGA in case of missing migrants

The system next registers whether the migrant is vulnerable, and thus if he/she could be given the status of refugee. Clearly, the census of migrants is closely integrated with VESTANET, the II which is in the hands of those authorities whose role it is to recognize or deny the status of refugee. See Figure 7.

The fifth flag is the validation of the arrival of migrants in accommodation. This processing step involves close collaboration between the local Prefecture and the managers of CAS. For this reason, SGA is also accessible (with stringent limitations) to the private owners of accommodation.

This processing stage is fully operative only thanks to solid cooperation from the managers of the accommodation structures, who have to communicate promptly directly on SGA if the migrant has not arrived in the accommodation or he/she has left the accommodation without authorization, so as to activate the tracking procedures by the relevant authorities.

Analysis and Discussion

The enactment of the Information Infrastructure for the management of migrants in Italy has been supported by a plethora of different actors, namely, Parliament, the DCSCIA, Prefectures and "questure". This is coherent with one characteristic proposed by Lanzara, stating that an assemblage is the result of the mediation of the interests of multiple actors.

The decision to design this Information Infrastructure came after criticism moved by the parliament commission for digitalization in the Public Sector (the Institutional Sponsor of this assemblage) to the DCSCIA. This criticism claimed that the management of migrants failed to exploit fully the advantages offered by e-government tools.

Consequently, the DCSCIA stands out as the real project champion for the development of this new Information Infrastructure as the DCSCIA organized meetings with the actors that were supposed to interface with the Information Infrastructure to collect the requirements for SGA. Clearly this led to changes in the organizational landscape. In the enactment of SGA, the DCSCIA took a powerful, central role. In fact, before making SGA fully operative, the DCSCIA required all subunits (Prefectures and local police offices) to upload all information relative to migrants. It required all the prefectures to send offline excel sheets with the migrants' details to central headquarters. This "despotic" behaviour proved to be particularly ineffectual and led to delays in the introduction of the II. Moreover, it led to frictions amongst the power groups and to a low degree of institutional compatibility.

In the enactment of the Information Infrastructure, some components have been interpreted differently by different actors. For example, the confirmation of the presence of the migrant in accommodation in some Provinces is directly in the hands of the Prefectures, while in others it is managed by the managers of private accommodation. Specifically, this depends on the interpretation of the privacy regulations in each Local Prefecture.

The SGA case also presents characteristics of re-adaption of components from previous Information Infrastructures. In fact, SGA took some of its components from the Tuscany region II for the management of migrants. As a result, the construction of the assemblage in layers and the

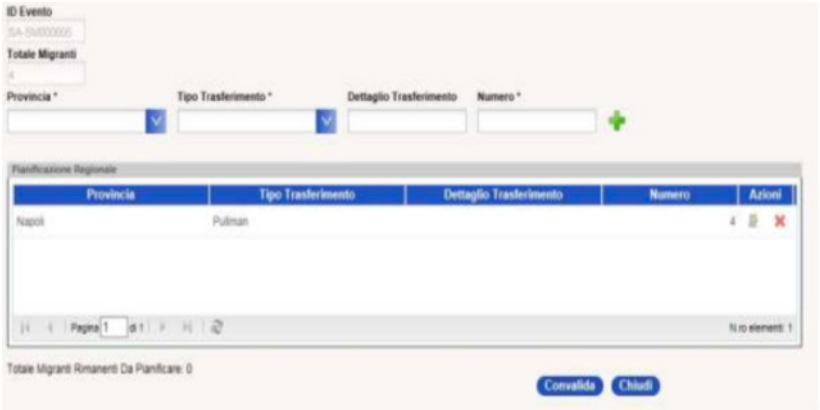

Figure 4: Regional planning for the allocation of migrants

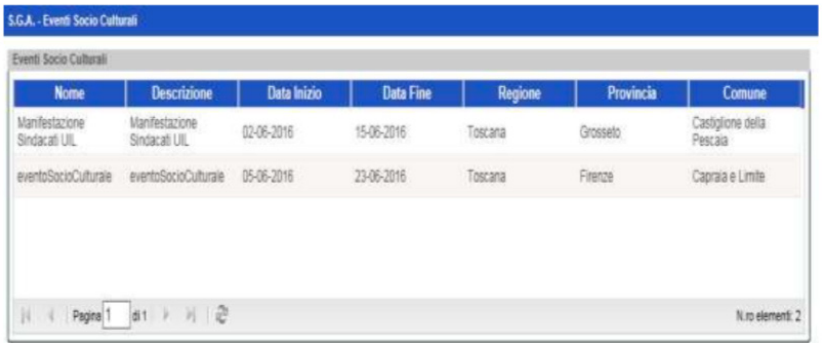

Figure 5: The socio-cultural events displayed by SGA

reconversion of existing materials for new purposes (bricolage) can clearly be seen.

The design of an assemblage should take into consideration the presence of a strong installed base in a given socio-technical dimension and not force changes in such a dimension if it is reluctant to change. This reflects the balancing of interests and dimensions that tend to maintain their own specificity and the impossibility of reaching an optimal solution. In other words, interests need to be made compatible with one another; they have to be mediated. In accordance with the framework proposed, SGA is also the result of interconnections between different dimensions (e.g. political, technical, juridical etc). For example, the SGA system is designed so that the managers of accommodation for migrants can themselves interface with SGA. However, because of the constraints of Italian Privacy legislation, the technical SGA interface which is in the hands of private actors is limited in its functions, so as not to disclose sensitive information concerning migrants.

If we regard the installed base as a duality, we are able to observe how in the case of SGA this assumes mainly an inactive role. It has been observed in fact that Italian Legislation, a critical installed base in SGA, places considerable constraints on the enactment of technology in the Public Sector (Lanzara, 2009). Particularly, as we have observed in our case, the Privacy Code and its interpretation have acted as inertia in the enactment of SGA. However, in the duality of the installed base, we have also been able to identify some enabling components. This is true of the fingerprint database that has been linked to the CUI code to identify the migrant univocally. In this case, this newly created technical compatibility between two components has formed a strong installed base, eliminating the risk of duplication of migrants' profiles. In other words, this installed base has avoided the risk that the same migrant, when moving to another county, declares another biographical identity and is counted twice.

The installed base is not a fixed concept but is evolving over time. The actors thus have to be ready to recognize the changes in the installed base and cultivate them. Italian legislation has recently introduced consideration of vulnerabilities as a determining factor for the recognition of the status of political refugee. Following this, the technical infrastructure had to change accordingly, to inscribe within its functions the vulnerabilities of the migrants. This installed base showed an evolving pattern. The various actors thus had to cultivate the new components with a caring attitude and adapt their behaviour as change occurred, recognizing that an assemblage is always in-the-making.

Main lessons and implications

This case study intended to examine the setting up of the information infrastructure for the management of migrants in Italy. Our findings suggest that this information infrastructure can be analysed under the lens of the "assemblage framework" as depicted by Lanzara. To this end, we highlighted the important role of the mediation of interests in the enactment of an Infrastructure. In line with the assemblage framework, we showed how this Information Infrastructure is not only the result of the interaction of technical components, but of a broader spectrum of socio-technical dimensions, such as technical and juridical dimensions. The result of the ongoing attempt to balance these dimensions is a sub-optimal Information Infrastructure. One finding of this research is that to reach more satisfactory outcomes, dimensions should recognize the effects of other dimensions on the assemblage.

This study also highlighted the duality of the installed base. The installed base could be both an enabling force for the development of the assemblage but also a dead weight. In our study, we demonstrated how the interconnection with the fingerprint database has had beneficial effects on the Information Infrastructure. On the other hand, Italian Legislation, and particularly the Privacy Code, does not permit the full exploitation of e-government tools.

Lastly, we argue that the assemblage is not exempt from interpretation problems. As we have outlined above in the analysis of the case, the validation of the number of the migrants in accommodation is carried out differently in different Provinces, and this increases the overall inefficiency of the II. The outcome of the assemblage cannot be predicted a priori because different interpretations may occur, and actors may deploy the same components differently. This is in line with the research stream

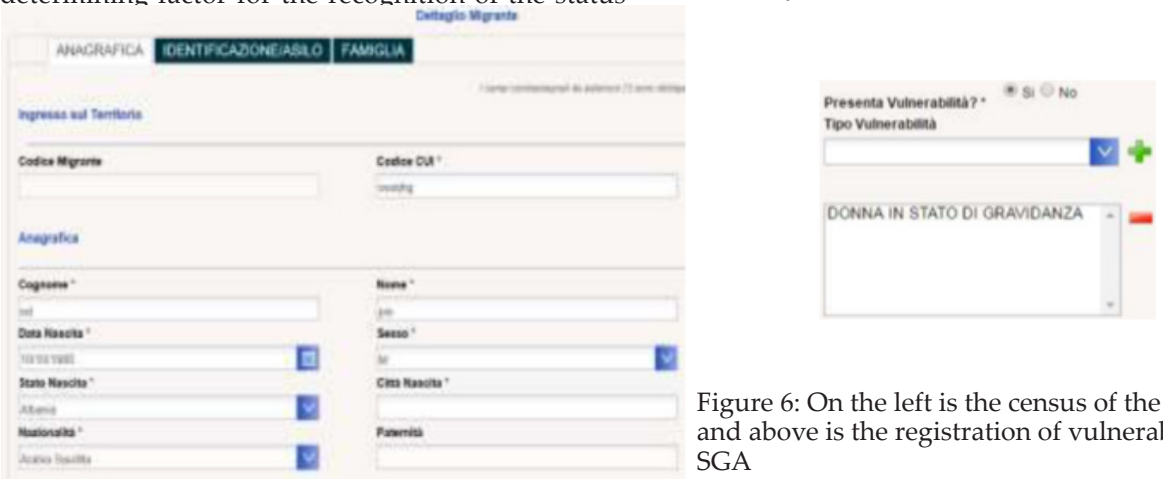

Figure 6: On the left is the census of the migrant and above is the registration of vulnerabilities in SGA

rejecting the so-called technology determinism; technology enactment does not happen in a linear fashion, rather it is characterised by continuous interventions, adjustments and refinements.

Conclusion

The use of ICT in the Public Sector is rapidly gaining momentum and this paper explored one such application in a particular area of Public procedures in Italy. Our case study aimed to study specifically one II (SGA), which is in use for the allocation of migrants, through documents and interviews. These data sources revealed some positive features of the II under analysis, for example, the presence of alerts to limit users' mistakes. Using the lens of the assemblage theory, we also observed problems in the enactment of this II. In particular, we highlighted how the interplay of conflictual interests, actors, and dimensions has led to a sub-optimal Information Infrastructure.

Given the plethora of public agencies involved in the management of migrants in Italy, we decided to focus only on those that directly interact with the Information Infrastructure for the management of migrants. We hope that future research will also conduct interviews and collect documents from other agencies which do not directly interface with SGA but have a substantial effect on the management and allocation of migrants in Italy. One limitation of this research is that it fails to analyse the trade-off between usability and security. However, the interviewees did not disclose any details regarding this trade-off.

In conclusion, we believe that novel research in the domain of the Information Infrastructure for the management of migrants should also explore the phenomenon at European Level, conducting interviews and gathering documents from European actors.

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Electronic Voting in Africa – Silver Bullet or Tool for Repression?

Johanna Horz

MSc African Development
Department of International Development
London School of Economics and Political Science

KEYWORDS

Digital Control
Biometric Data
Big Data
Electronic Voting Technologies
Digital Elections

ABSTRACT

Electronic Voting Technologies (EVTs) are increasingly used in elections, whether as electronic voter identification or digital ballot counting. Enthusiasts state that EVTs can avoid manual error and interference, thereby curbing corruption. African elections infamous for electoral rigging and marred by low trust, making them the perfect case for EVTs. However, as this essay shows, EVTs in authoritarian settings can prove more harmful than beneficial. Electronic ballots can misfunction or be manipulated. Moreover, the mandatory collection of biometric data by states can lead to increased civilians surveillance and repression. This paper details the pitfalls of EVTs and ethical dilemmas. It concludes that in the absence of political will, the creation of large databases curbs rather than enhances democratic freedoms.

Abbreviations

BFR (Biometric Facial Recognition)
DRC (Democratic Republic of Congo)
EISA (Electoral Institute for Sustainable Democracy in Africa)
EMB (Electoral Monitoring Body)
EO (Electoral Observer)
EVT (Electronic Voting Technology)
ICT (Information and Communication Technology)
IEO (International Electoral Observer)
PVC (Permanent Voting Card)
US (United States (of America)
VVPAT (Voter-Verified Paper Audit Trail)

"You go to so many countries where everyone has this incredible confidence in the potential of technology […] even when the ruling party has no interest in free and fair elections. It makes you want to shout: 'Just digitalizing things is not going to save you'"
IFES Expert in Cheeseman 2018:1402

Introduction

With the proliferation of "digital money" and "digital trade", "digital inclusion" is a proclaimed silver-bullet with which "African can enjoy leapfrog-development" (World-Bank,2017). At the heart of this lies Big-Data, "high-volume, machine-readable data" (Mann,2017:4) which is collected, stored and analyzed for "faster, easier and cheaper" products and services (Nyst,2013). With Africa's electoral quality chronically low, technology is increasingly used to make election procurement chains more transparent (Nwanguwu,2018:2). All or partial elements in the electoral cycle can be digitalized through electronic voting technologies (EVTs) as displayed in Figure 1, most with biometric technology (Privacy-International,2019).

This essay seeks to investigate whether EVTs can enable "democratic-leapfrogging", thereby liberating the African voter or whether EVTs assist authoritarian states in executing control. Chapter 2 will scrutinize how EVTs can control ballot casting and Chapter 3 details how (biometric) EVTs can be manipulated to

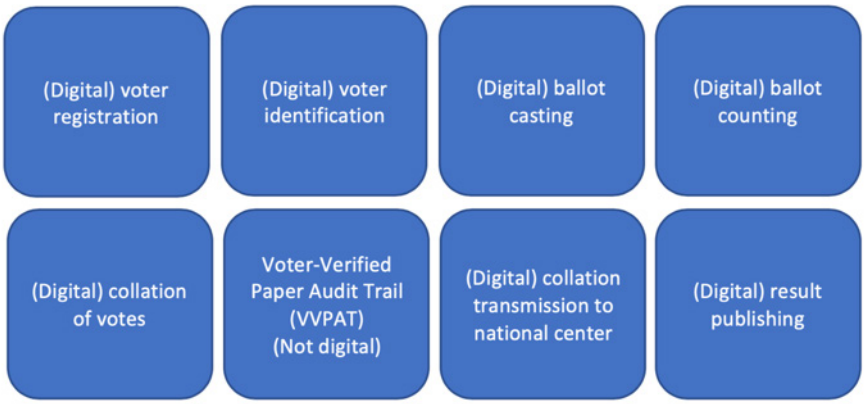

Figure 1 – Electoral-Process-Elements-(Adapted-from-Sambo,2018:8)

Corresponding Author
Email Address: johanna@horz.org

control society. Chapter 4 discusses how EVT neglects the underlying conditions of repression, "traditional" electoral fraud and unreliable institutions, and meanwhile, its implementation adds burdens of surveillance, donor-dependency and strengthens authoritarian rule.

The essay will conclude that digital-leapfrogging in the context of African elections is utopian since EVT cannot establish transparency in authoritarian and unfree contexts. Rather, biometric technologies serve to digitalize the often colonially-inherited control-states leading to power abuse and surveillance. Data privacy has been neglected within the debate on EVTs despite the "seeming rush for the deployment of digital technologies in election administration" (Nwanguwu,2018:4). The author thus builds on existing work on data privacy within economic digitalization (Mann,2017), data profiling in Western states (Gangadharan,2012) and the unintended consequences of EVTs (Cheeseman,2018).

Ballot Control

EVT risks outside control over the ballot in three ways: excluding voters, eliminating ballot secrecy and undermining result credibility.

With conflicts over regional power-distribution, Nigeria has struggled with rigging methods such as consensus inflation, multiple-voting and impersonations (Ahmad,2015:95). To combat this, biometric Permanent Voting Cards (PVCs) were introduced in the 2015 Nigerian election, with which voters were identified at the polls. Yet, this system severely limited voters, since 11 million could not collect their PVC, making them ineligible to vote (Giles,2019). Further, 41% of PVC readers failed on election day (Ahmad,2015:11), leading to confusion and time-delays in how to proceed. This shows the danger of complex voter registration and the risk of malfunctioning equipment which could purposively be sent to opposition strongholds to exclude large shares of voters.

Ballot secrecy, a pillar of democracy, must be maintained even with EVTs. However, Namibia 2014 and Democratic Republic of Congo (DRC) 2018 show that digital ballot-casting severely restricts this right. While advertised as simplifying ballots (Swanepoel,2010:70), the current Namibian system (Figure 2) appears rather complicated with numerous Ballot Units needed to cast one's vote (EISA,2014:6). EISA (ibid:8) reports that "many voters were unsure about which buttons to press" and thus electoral staff assisted the technologically illiterate (ABC/AFP,2014). Further, Sentry ((a)2018:1-4) exposed that EVT deemed "unsafe" for the 2017 Argentinian election was resold to the DRC, despite severe limitations since Ballot Units "store[d] more information than simply a voter's ballot selection […] including the time a person voted, their place in line and other voter-specific or ballot-specific identifiers" (ibid:4-6). This shows that EVTs put voters at high risk of intimidation, coercion or being misled, undermining the credibility of the election by providing "specialist" assistance in voting and eliminating confidentiality. This could impose normative compliance and especially in contexts in which voting for the opposition is seen as treason or betrayal, ensuring ballot privacy is essential.

Figure 2 – Namibian-Ballot-Unit-(EISA,2014:6)

Lastly, as the Nigerian example shows, technology can fail or be manipulated, discrediting the election. Therefore, keeping a Voter-Verified-Paper-Audit-Trail-(VVPAT), which exposed results tampering in the 2017 Kenyan election (Burke,2017), is highly recommended. However, in 2014 Namibia did not use VVPAT making transparency questionable (EISA,2014:5). Even though the DRC used VVPAT, the Financial Times (2019) still detected electoral fraud. Problematically, however, the price of EVT reduces the number of (International) Electoral Observers (IEO/EO). This is despite the 2012 Ghanaian election proving IEO/EO presence useful since "machines were more likely to fail when no observers were present and [this] machine failure was correlated with over-voting" (Cheeseman,2018:1402). Chan (2017) further points out that IEO/EO now need "electronic expertise" and calls for "electronic-observation" which has not been incorporated, making voters in electronic elections more vulnerable to coercion and manipulation.

Societal Control

EVT risks the control of society in three ways: leading to data creep, use of data profiling and digital surveillance.

Breckenridge (2006:272-281) identifies a "data-creep" in the making of "biometric-states". Today, 23 African countries use some form of biometric data collection in their voter registration (IDEA,2019) and ID4Africa (2019), a movement of 43 African states, advocates for the provision of "digital identities" for Africans. These increasingly merge biometric with demographic information for government provision of "key transactions" on online platforms like "e-citizen" in Kenya (Nyabola,2018:71). While the Kenyan platform is still restricted to government services, the "Rwandan-Digital-Vision" boasts that it "can serve as a unified interface between an individual and any agency of the government or commercial enterprise" (ID4Africa,2016:2).

This seeming encouragement of Big Data along with the trend of "greater emission, personalization

and centralization" of data (Mann,2017:3) can lead to data profiling, which is "making predicative determinations of behavior" based on data analysis (Gangadharan,2012). Especially the inclusion of "industry" data, as advocated by Rwanda and ID4Africa is dangerous since African countries are frontrunners of mobile-phone services. These collect significant information about not only calls placed and thus social networks but also GPS locations, transactions and purchases (Nyabola,2018:65). This "biometric data trail" (Beckenridge,2006:269) is highly problematic for democratic integrity in authoritarian states. In her article Nyst (2013) warns that "centralized identity databases" pose a risk of surveillance in enabling governments to "build profiles […] about location, ethnicity, religion, gender, land ownership, political affiliation, financial status and health" of the population.

Citizens often have no choice in whether to provide their data since governments have made it compulsory (Rwanda), linked it to vital services (Kenya) and/or voting (Nigeria), making society vulnerable to "unchecked citizen surveillance" (Nyabola,2018:7). Dystopian visions like Orwell's 1984 are already becoming a reality in China. Biometric facial recognition (BFR) is now used to "publicly name and shame even minor dissidents" and CCTV cameras record and instantly-monitor everything. Moving from panopticon to surveillance, the Chinese government gets alerts when ethnic minorities "stray 300 meters from their house" and China is currently developing BFR technology to read emotions (Economist,2018).

With these developments, Western nations are scrambling to install data protection laws (EU,2019). However, most African governments do not have data-protection laws, making data in African "biometric states" described above vulnerable for hacking, identify theft and other abuse and coercion. With EVTs, there are currently "no agreed international standards […] each country has its own limited standards" (Sambo,2018:12-15). Thus in authoritarian contexts, incumbents can make their own legislation, mandate biometric voter registration, force industries to share their data in order to build-up coercive surveillance states. Chan (2017) advocates that "the African Union needs to devise a standard set of requirements" but "has fallen behind". There appears to be a "lack awareness about the true value and potential of [African] data" (Mann,2017:21) and thus in this "clearly irreversible" process (Beckenridge,2006:272), "citizen data keeps disappearing into an unregulated black hole" (Nyabola,2018:75).

Discussion

EVT is advocated as improving transparency and accountability throughout the electoral cycle (Figure 3). Especially in the African context, in which elections are marred by rigging, EVTs are said to improve credibility, trust and provide accurate results. Delayed results, for example in Kenya 2017, caused violence, which EVTs with immediate voting transmission promises to avoid. Moreover, with African countries having large rural populations, EVTs could make it easier to reach isolated populations and transfer the results via satellite in real-time. However, the empirical evidence detailed in Chapter 2 and 3, indicates that in the African context EVT has done little to improve said indicators. This section explores how EVT neglects the underlying conditions of repression, "traditional" electoral fraud and unreliable institutions. Meanwhile, its (premature) implementation adds burdens of surveillance, donor-dependency and strengthens authoritarian rule.

Figure 4 (on the next page) shows the freedom levels in Africa, a continent on which 82% are "unfree" or "party-free" countries (Freedom-House,2019:19). Introducing EVT, which reduces ballot secrecy, easily eliminates large segments of the population from voting, increases the risk of opaque digital tampering and forces civilians to provide their (biometric) data, thus puts citizens at higher risk of electoral fraud and manipulation as opposed to less.

While some digital manipulation now occurs (Nyabola,2018:158-163), Cheeseman-and-Klaas-(2018) find that "traditional" forms of corruption like gerrymandering, bribes and coercion remain the most significant rigging methods in Africa. EVT cannot eliminate these. For elections to be free and fair there must be "political will", which in most authoritarian states there is not. Instead of focusing on voting technologies, Ahmad (2015) and Swanepoel (2010) demand that more focus should be on the Electoral Monitoring Bodies (EMBs) which "enhance the credibility of elections" by facilitating and organizing the processes (Sambo,2018:3). Only with a credible EBM can the chronic erosion of trust between citizens and governments be mended. Instead, EVTs add problems of digital surveillance

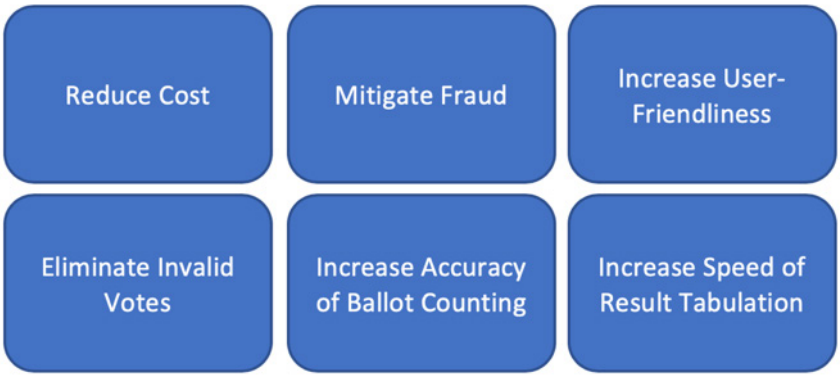

Figure 3 – Pros-EVT-(Adapted-from-EISA-2014:5)

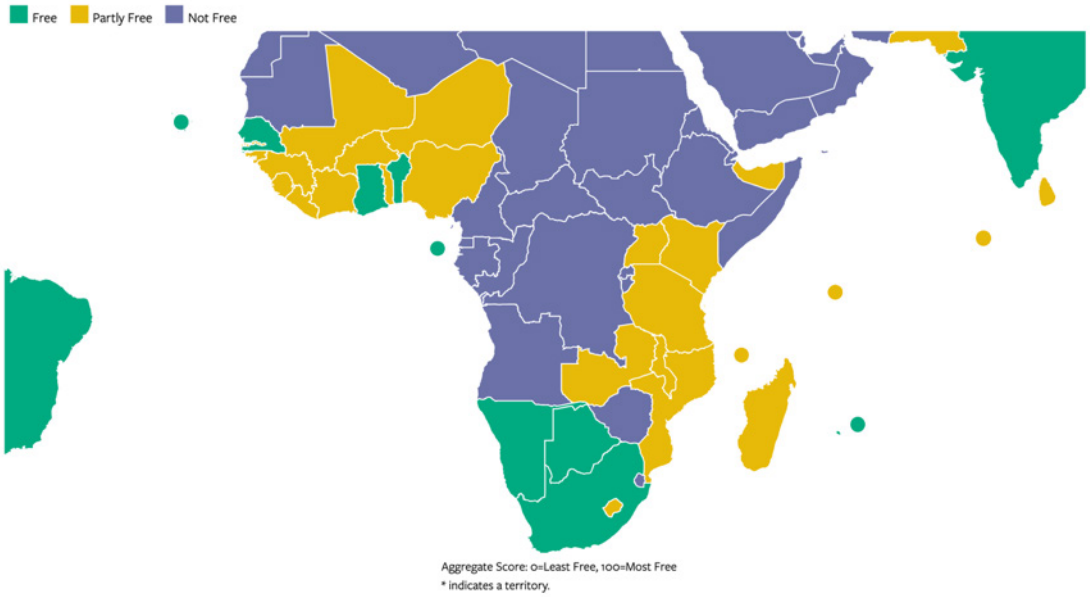

Figure 4 – Freedom-House-Scores-Africa-2018-(Freedom-House,2018)

and donor-dependency.

In many African authoritarian regimes, political opposition candidates, party members and voters already face mistreatment, imprisonment or targeted killings (Human-Rights-Watch,2019). Thus the use of e-voting technologies for "democratic" purposes might well be misused in order to accumulate mass data for dissident surveillance. Knowing both people's emotions, their whereabouts, as well as their voting behavior, will allow governments to undermine collective action movements of opposition and force citizens to vote for the incumbent. Biometric information forces the opposition to either vote and expose their opposition status, conform or abstain from voting to safeguard their privacy – each option serving the government. Especially in the African context where colonial legacies of control states exist, injecting these state frameworks with digital "weapons" is dangerous. The same way that Gangadharan (2012) finds that in the US digital "inclusion" policies resemble "old forms of prejudice", digital technologies in the African context can become sources of previous control and surveillance too. It is worrisome that the Rwandan government, whose genocide was partly due to Belgian-issued ID cards, now has a National Identity Agency and mandatory biometric data collection (ID4Africa,2016:2).

Lastly, EVTs are extremely expensive, with the 2017 Kenyan election being "the most expensive election in African history" (Nyabola,2018:169). This will reinforce what Cheeseman (2015:122) terms "democratic dependence" in which African governments rely on international funding for their elections, making them less reliant on their citizens and more accountable to their donors. Especially for states like Somaliland, which has avoided debt and which the Economist (2017) has termed "East Africa's strongest democracy", introducing iris-scan technology in "the world's most sophisticated voting register" (Juma,2017), seems inappropriate. Moreover, most of the technology is not made in Africa, thus creating a heavy import-dependence (Sambo,2018:9) as well as "issues of ownership and control" in light of software patents (Democracy-Reporting-International,2011:4). There is limited knowledge sharing since companies are unwilling to share information, making EVTs less transparent. "Different systems provided by different companies" (Chan,2017) further undermine South-South knowledge diffusion.

Conclusion

"Africa has become a testing ground for technological-leapfrogging" (Juma,2017), however, as Cheeseman (2018:1399) points out: "you cannot digitalize integrity". This essay has shown that the idea of democratic-leapfrogging through EVT is rather utopian. Instead, it has expanded the options for authoritarian control to totalitarian levels. Mann (2017:3) warns that "as African economics become increasingly "digital", data will become a source of power", however, the EVTs show that data is already a source of power-saving African voters neither from "electronic cheating" nor from "electronic abuse" (Chan,2017).

In a world in which the West is increasingly withdrawing from digital technologies, in which fears arise from data profiling and tracking and data-protection laws are getting more important – there should be no haste to proliferate these technologies to authoritarian states. If the end goal is a democracy – rule of the people – then providing technologies of control is not the answer. The findings of this essay point towards a digital fallacy, and the need for solving underlying structural issues of political will and trust. This will require innovative outside-the-box and bottom-up thinking rather than the imposition of technology. While manual methods in elections also have their faults, the "fetishization of digital technology" (Cheeseman,2018:1399) has imposed more harm than freedom.

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Motivations and Incentives of Participation in Open-Source Software ("OSS"):

A Review on Extrinsic and Intrinsic Motivations and how Motivation Matters in a Digital Domain

Fjoralba Krapi

MSc in Information Systems and Digital Innovation
Department of Management
London School of Economics and Political Science

KEYWORDS

Open-source software
Intrinsic motivations
Extrinsic motivations
Open innovation
Knowledge share
Economics of sharing

ABSTRACT

The model of open-source software innovation is important because it guides the understanding and the process in which explicit knowledge becomes a public good through open innovation. Open-source software (OSS) has been viewed as challenging to classic economic theories and other developed models. According to the open-source model, two basic characteristics found in the private-collective are 'non-rivalry' and 'non-exclusivity' in consumption, meaning that innovation produced is viewed as a 'free good' that can be used without any restrictions and will not devalue through distribution (Von Krogh et al., 2006). The purpose of the review is to explore the available literature review on how and why developers participate in the open-source software movement, and how their contributions are viewed from different schools of thought on a broader digital domain.

Introduction

Knowledge is broadly defined as the understanding of concepts, facts, information or subjects. It does not appear all at once and accumulates slowly over time (Gächter et al. 2010). Over the past few years, firms have recognized the need for collaborative knowledge and tried to find ways to exploit internal innovation as well as motivate outside sources to innovate (Gächter et al. 2010; Dalle and Jullien, 2003). Some of the literature reviewed implicitly suggests that open innovation creates opportunities for firms to fuel innovation and enhance their creativity (Gächter et al. 2010; Lerner and Tirole, 2005, Krishnamurthy, Ou and Tripathy, 2014), hence making the term of open innovation a powerful framework used at the firm level to generate, capture and employ intellectual property. Other studies argue more on the side that open innovation creates an altruistic atmosphere where contribution happens on the values of collective goods and relationships (Bergquist and Ljungberg, 2001; Zeitlyn, 2003, Von Krogh et al., 2012). In our study of the patterns and practices related to motivations to participate in open-source software, we have observed the presence of different schools of thought and theories. Some of the technical-rational theories found in the literature focus on traditional approaches to extrinsic motivations driven by self-interest, career and pay incentives (Lakhani and Wolf, 2005; Bonaccorsi and Rossi, 2003; Lerner and Tirole, 2005), while socially-embedded theories offering anthropological and psychological points of view argue on the idea that "gift-economies" and reciprocity are primary incentives driving participation behind the OSS (Bergquist and Ljungberg, 2001, 305-320; Zeitlyn, 2003). Although the debate between different schools of thought does not fail to recognize the link between both intrinsic and extrinsic incentives, it also suggests a distinction between the when deciding to share knowledge rather than conceal it at the private-collective innovation model. The remainder of the paper follows this structure: First, it starts by exploring the most frequently used classifications of motivations behind the OSS. Second, it identifies different disciplines and their approaches to developers' motivations to participate in OSS, namely extrinsic and intrinsic motivations. Third, it explores existing literature in an attempt to make a broader sense of the contribution and why the contributions to OSS matter in a digital domain. The paper acknowledges the broadness of the private-collective innovation model and hence focuses mainly on OSS.

Method

To review the classifications of developers' motivations to participate in OSS, we have selected a total of 15 articles from 10 different journals. The academic journals were mostly published in Information Systems, Research Policy and Information Management, the most popular being MIS Quarterly and Information Systems Journal. To identify relevant articles, we conducted a search

Corresponding Author
Email Address: albakrapi@gmail.com

using selected search terms that represented the fields of A) Open-Source Software and B) Developers' motivations in participating in OSS. Articles were included if the theory they were based upon was identified; and if the main topic of the article was related to open-source software. Articles that failed to meet these criteria were excluded.

Classifications of Extrinsic and Intrinsic Motivations

The current literature on OSS developer motivation has identified several theories behind motivations that drive OSS but has mainly classified them as intrinsic and extrinsic motivations in the self-development theory. Although the literature reviewed is mostly based on the self-development theory, it is important to mention that this is not the only theory on which the motivations were based, and the spectrum of study is larger than what our review covers. Broadly, literature has categorized external goods as goods that include "capital, status, or power, which are the property of individuals and/or institutions" (Von Krogh et al., 2012) or as "expected future returns, personal needs" (Hars & Ou, 2002). Internal goods are defined as "public goods that benefit all participants in the social practice and the wider community" (Von Krogh et al., 2012) or as internal factors founded in altruism (Hars & Ou, 2002). Motivational components, as defined by literature, originate either from the act of participation (intrinsic) or from external rewards (extrinsic) (Von Krogh et al, 2012). Similar distinctions are also made by Choi, Kim, and Yu (2009), Bonaccorsi and Rossi (2003) and Krishnamurthy, Ou and Tripathi (2014). Several authors define some of the main internal motivators being altruism (Hars & Ou, 2002; Von Krogh et al., 2012, Baytiyeh and Pfaffman, 2010) and peer recognition or similarly defined as community identification (Hars & Ou, 2002; Bergquist and Ljungberg, 2001; Zeitlyn, 2003). The other body of literature notices the presence of self-interest (Lerner and Tirole, 2005; Lakhani and Wolf, 2005), human capital (Hars & Ou, 2002; Raymond, 1998), career and pay (Krishnamurthy, Ou and Tripathy, 2014). Although literature distinguishes between these two sources of motivations, it does not disregard the presence of the combination of intrinsic and extrinsic motivations in developers' motivation in participating in the OSS.

Understanding how Extrinsic and Intrinsic Motivations Work

The central idea and characterization behind the OSS were based on the idea of gift economies (Raymond, 1998; Zeitlyn; Von Krogh et al., 2006; Bergquist and Ljungberg, 2001). Gift economies are based on social relationships, values and norms created on the economy of gift exchange and are not "regulated by possession or exchange of money or commodities" (Bergquist and Ljungberg, 2001). The phenomena of gift-giving have been found as a common theme in (Bergquist & Ljunberg, 2001; Zeitlyn, 2003) where the authors dig into the classic writings on OSS and theoretical foundations that lead to the success of OSS. Their papers provide a theoretical overview from an anthropological point of view. For instance, (Zeitlyn, 2003) argues that the symbolic meaning of gift-giving revolves around reputation, power, and influence. Giving a gift, hence contributing, is translated into an obligation to the receiver that he/she has to give the 'gift' or code back. A similar argument is found in (Bergquist & Ljunberg, 2001) where the gift being exchanged is transformed from a product to an obligation, an argument which indicates the difference between gift and commodity transactions present in Dalle and Jullien (2003), Lerner and Tirole (2005) and Zeitlyn (2003). The empirical evidence found in Lerner and Tirole (2005), however, challenges the arguments mentioned above by stating that profit encourages investment, and as long as the benefits of participating exceed the costs of doing so, participation will occur. Hence, developers stop contributing to OSS development freely if their commercial payoff is not satisfactory (Lerner and Tirole, 2005). Nevertheless, throughout the literature, most of the authors viewed economic theories as not being able to fully explain the OSS phenomenon.

To anthropologists, concepts such as kinship, trust, and reciprocity are the main drivers behind the participation (Zeitlyn, 2003; Bergquist and Ljungberg, 2001). In an attempt to discern the social dynamics of OSS, Zeitlyn (2003) argues that the concept of kinship is built through interaction between developers where monetary transactions between kinship structures are nonexistent. For instance, Von Krogh et al. (2012) draw importance on social theory developed by Alasdair MacIntyre in 1981 (as cited in Von Krogh et al. 2012) of considering scientific knowledge as an internal good of science that "benefits the scientific community and humanity at large" (Von Krogh et al, 2006). In light of this theory, the authors in Von Korgh et al. (2012) develop a theoretical framework that views motivations from two different theories, self-determination, and the social practice view. As defined in the study, self-determination theory recognizes the presence of both intrinsic and extrinsic motives as "predictors and outcomes of institutional arrangements such as governance or norms" (Von Krogh et al, 2012, p.655). This theory assumes that the individual OSS developer views the output of his/her participation as a product in which he/she might get a reward of value (Von Krogh et al, 2012, pt. 655). On the other hand, the authors introduce an ethical dimension by using the social practice view which accounts for motivational dynamics and views outputs as goods that are moved by social practice to contribute to the collective good. The concept of open-source software development in relation to the idea of a collective good being shared to the community has been proposed in several other studies, where the main argument is that the "good" (the code) being produced follows standards defined by social practice, or the collective environment (Von Krogh et al, 2012; Baytiyeh and Pfaffman, 2010). A similar pattern was found in Baytiyeh and Pfaffman (2010) and Hars and Ou (2002) where the authors show empirical evidence how altruism and "the desire to help for the greater good worldwide" (Baytiyeh and Pfaffman, 2010, p.1345) was a primary motivation behind OSS contributors. The concept of 'collective good', viewed from anthropological perspectives, serves as an extension of the classical

notions of economics and therefore integrates more cultural and social terms to the term (Zeitlyn, 2003). For instance, Zeitlyn (2003) suggests that the notion of capital is extended to a symbolic capital to relate to the reputation gained through participating in the OSS. However, economic literature disregards the notion of symbolic capital somehow and views it as an increase in human capital that enables the participants to get better job opportunities, higher salaries and fulfilling jobs (Hars and Ou, 2002). This increase in human capital shows the benefits of career advancement, improvement of programming skills of the developer (Hars and Ou, 2002); hence, it connects more to the extrinsic values behind participation.

The main pattern found in the majority of literature mentioned above shows that developers are mostly motivated to contribute to this knowledge-building environment characterized by intrinsic motivations such as altruism, sharing knowledge for the good of the community, desire to learn, satisfaction, kinship, fun, reputation and reciprocity (Von Krogh et al, 2012; Zeitlyn, 2003; Baytiyeh & Pfaffman, 2010; Krishnamurthy et al. 2014; Von Krogh & Hippel, 2012) Strong supporting evidence of intrinsic motivations was also found in Lakhani and Wolf (2005) who study motivational components using regression analysis. Essentially, these patterns bring us to an interesting resemblance coined by Bergquist & Ljungberg (2001) between gift economies and academic research, which become key themes in understanding the quality assurance and share of knowledge in the OSS also implicitly found in Gächter et al. (2006). When an individual gives away knowledge, whether, in terms of code or information, they receive status and reputation and become visible to the academic community (Bergquist & Ljungberg, 2001). Their visibility is connected to an 'intellectual gratification' similar to scientific discovery in academia (Bergquist & Ljungberg, 2001). A slightly similar argument was found in Hars & Ou (2002) where the former found significant results in the level of identification within the hacker community that resembled a similar community as the academia mentioned in more socially-embedded studies (Bergquist & Ljungberg, 2005; Zeitlyn, 2003). In terms of reputation, economic-based literature has identified patterns of 'gaining status' that mainly guide how developers decide to contribute to enhancing their reputation in the open-source software community since reputation directly links to external benefits gained from contribution (Andersen-Gott, Ghinea, and Bygstad, 2012).

The Challenge to Conceptualize the Common Good in the OSS

The majority of literature observes the above-mentioned motivations of developers and/or firms behind the participation from different perspectives but struggles to determine how the model of open-source software alters other models affected by the public share of knowledge. As defined in one of the first attempts to define open source software, the notion of open-source software is developed because innovation and voluntarily effort of developers develop code and programs for the common good where "people bring their resources to the table" (Raymond, 1998, p.28). The core debate between already mentioned anthropological, economic and psychological based perspectives, but also by other disciplines such as information science, organization science, business ethics, and management, has emphasized the struggle to conceptualize open software as being 'free' and 'open-source,' and how the combination of the idea of public knowledge and free software affects communities, researchers, policymakers and the global internet community in general. Does open source software fall into libertarian values of altruism found in most of the body of literature, or is it another alternative of seeking profits by big corporations? An economic-based analysis of 'Libre' software argues that calling a software such as Linux 'free' or 'open-source' is misleading due to three reasons: "the software is being sold by companies, openness does not guarantee modification and not everyone is allowed to redistribute the software freely" (Dalle and Jullien, 2003, p.2). The main argument is that 'Libre' software could have the potential to be turned into an economic model and economic institution to improve collective welfare if the appropriate public intervention works as an enhancer mechanism for knowledge management (Dalle & Jullien, 2003). The authors' ability to conclude their arguments is very limited due to the ambiguity of the OSS viewed from an economic standpoint. But even so, another body of literature has stressed the concern that public intervention or patenting of knowledge will hinder growth (Lerner & Tirole, 2005). The economics of open access is stressed in Lerner & Tirole (2005) through the challenge of academic economic and "the rise of open access journals" (p.117), where the issues of sharing technology, setting common standards and combining "freely available and commercial components arise both in the open-source and commercial realm" (Lerner & Tirole, 2005). Bonaccorsi and Rossi (2003) also shed light into the peculiarity of the OSS and coordination issues of developers in the absence of a central authority, but argue that open source projects are far from being "anarchical communities" because licenses and tacit rules govern the structure of OSS (Bonaccorsi and Rossi, 2003, p.1246-1248).

Conversely, studies from anthropological viewpoints argue somewhat differently to knowledge-intensive goods. For instance, as also elaborated in the section of understanding extrinsic and intrinsic motivations, Zeitlyn (2003) argues that the discourse should take social theory into account. The idea of 'kinship structures' illustrates the social dynamics behind the OSS and how these structures are based on 'gift economies' where the exchange facilitates coordination without the need of a central authority (Zeitlyn, 2003). The analogy of 'kinship structures' reflects the software projects and participants within the OSS, claiming that these structures shape and confine the social webs that make up the open-source development. Bergquist & Ljungberg (2001) add to this line of argument by arguing that the open source communities are driven by norms of peer review as a social mechanism, reputation, and gift-giving. The 'digital gifts' involved in this process suggest

interdependencies between gift-givers and receivers but also restructures social relationships based on the type of digital information being exchanged. As the authors in Zeitlyn (2003); Von Krogh et al. (2012) and Bergquist and Ljubgber (2001) suggest, the 'gifts' being exchanged do not have the characteristics of products like defined in Lerner and Tirole (2005), but they hold the characteristics of obligations created through this give-and-receive relationship (Zeitlyn, 2003; Bergquist and Ljugber, 2001). Although these social relationships suggest an altruistic community based on libertarian values (Bergquist and Ljubgber, 2001), they do not necessarily exclude power given to the gifts exchanged. The same pattern was found in Zeitlyn (2003) within the notion of 'symbolic capital' where developers work to create power and influence under the concept of successful gift-giving (Zeitlyn, 2003, p.1289) Where this discussion usually ends, however, is on the question of the word 'open' in open source and how this reflects a decentralized knowledge sharing and innovating process. Whereas some are convinced that the OSS will continue to function on the idea of kinship, altruism and give-and receive relationship (Bergquist and Ljubgber, 2001; Zeitlyn, 2003), others maintain that such a process of open innovations needs effective public intervention that would serve as economic incentives in order to keep the incentives of contributing to the OSS going (Bonaccorsi and Rossi, 2003; Dalle and Jullien, 2003).

Conclusion

In this review, I have tried to examine literature based on the motivations behind participating in the open-source software movement, namely extrinsic and intrinsic motivations found in the self-development theory (Von Krogh et al., 2012). I note that several studies have formed theoretical frameworks with propositions to examine the types of motivations, and some have developed extensive research reviews to do so. I have also noted the presence of two main schools of thought, namely the social anthropological school of thought examined in Zeitlyn (2003), Von Krogh et al. (2012), Bergquist & Ljungberg (2001), Baytiyeh and Pfaffman (2010) and the more economic and market-based school of thought analysed in works such as Lerner & Tirole (2005), Bonaccorsi & Rossi, (2003) and Lakhani & Wolf (2003).

The reviewed literature also highlighted arguments from economic standpoints that view OSS as a complex issue in explaining how "open knowledge" thrives in an environment dominated by proprietary standards. In different circumstances, anthropological studies view the model through social theory and introduce concepts such as kinship structures, power relationships and altruism in an attempt to explain the motivations driving the OSS development (Bergquist & Ljungberg, 2001; Von Krogh et al 2006; Lerner and Tirole, 2005), while others argue in favour of appropriate public intervention as an enhancer mechanism for continuous open innovation (Dalle and Jullien, 2003; Lerner and Tirole, 2005). I hope this review offers greater insights and incentives to study whether the contributions in the open-source software are temporary by-products of a capitalist socio-economic regime or something that can have the potential of being an alternative to these models, and of course the ways in which this contribution, whether intrinsically and/or extrinsically initiated, matters in the digital domain.

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The Effect of Digital Platforms on Disintermediation of the Credit Market: Rise of Peer-to-Peer Lending

Slava Oganezov

MSc in Information Systems and Digital Innovation
Department of Management
London School of Economics and Political Science

KEYWORDS

Digital platforms
Peer-to-peer lending
Banking

ABSTRACT

The financial crisis of 2008 resulted in a loss of public confidence in traditional financial intermediaries like banks. People sought alternative business models to serve consumers' interests and create a fair financial system. Players driven by digital technologies started to emerge in the credit sector, including peer-to-peer (P2P) lenders. These companies operate technology platforms that connect lenders and borrowers, directly facilitating loan deals and disintermediating banks from the process. Since its origination, this subsector has experienced exponential growth and become a meaningful force in the industry and growing field of literature. However, scholars have not compared these new players to traditional banks to determine whether they facilitate an efficient lending process. I aim to investigate how the digital platforms used by P2P lenders affect underlying transaction costs resulting from information asymmetries in the credit market. To this end, a conceptual framework was developed with a focus on four key aspects: provision of liquidity, transformation of risk, diversification of investment and level of agency. Case studies of two UK P2P lending platforms, Zopa and Relendex, were analysed using the framework. The findings show that P2P lenders are superior to banks with regards to reducing transaction costs in three of the four key areas. Therefore, these new intermediaries do indeed promote the efficiency of the credit market by disintermediating the banking system.

Introduction

The economic crisis of 2008 destroyed consumer confidence in banks. Millions of borrowers were left with enormous debts and small businesses and individuals had no access to credit (Mateescu, 2015). The idea of disintermediation—the ability to access credit without banks—led to the creation of peer-to-peer (P2P) lending platforms. P2P companies operate digital platforms that connect lenders and borrowers, enabling them to execute loan deals. It started with groups of people on social networks facilitating credit between each other but eventually led to a complete subsector in the credit market. Although P2P is small concerning overall loan volumes, it is already a $26-BN industry that is growing by 53% annually (Prableen, 2017).

P2P lending originated in 2005 with Zopa in the UK and in 2006 with LendingClub and Prosper in the US. Hence, it is a relatively new research field. Most research is focused on factors that influence loan request success and interest rate, including social factors (Freedman & Jin, 2008) and loan description (Lin, 2009). However, it is crucial to understand whether these new players increase consumer welfare by promoting the efficiency of credit markets. There is a lack of comparison of P2P lending to traditional banking and examination into the effects of ITCs on the disintermediation of banks (Bachmann et al., 2011).

Corresponding Author
Email Address: oganezov.s@gmail.com

Research Question

The objective is to understand the effects of digital platforms on the disintermediation of the credit sector. I explore how digital platforms led to this disintermediation, fuelled the rise of P2P lending, and impacted information asymmetry and transaction costs.

Research Question: *How did digital platforms affect the disintermediation of the credit industry and lead to the rise of P2P lenders?*

Literature Review

Financial Disintermediation Theory

The economic models currently employed by policymakers around the world assume that the Modigliani and Miller (1958) theory holds. The theory states that the functioning of the financial markets can be fully summarised by efficient mechanisms of financial prices that encompass all available information in the market. However, such economic models do not hold in practice as they assume perfect information and neglect the importance of financial intermediaries.

In financial markets, information asymmetry exists because borrowers naturally possess better information about their likelihood of repayment than lenders. Imperfect information theory (Akerlof,1970; Rothschild and Stiglitz, 1976) holds that imperfect information between the parties in credit transactions leads to information and transaction costs. Diamond and Dybvig (1983) explain that financial intermediaries like banks exist due to their ability to reduce transaction costs. Depositors tend to be risk-averse and do not know exactly when they will need funds. Without an intermediary, they would be locked in long, illiquid investments and punished by reduced returns if they must liquidate early. Financial intermediaries can also reduce information costs by transforming the risk characteristics of assets. Economies of scale and evaluations of borrowers and investment projects enable them to effectively analyse risk. These factors enable banks to transfer information about borrowers to investors without giving away their information advantage at a lower cost than an individual borrower would be able to do (Leland & Pyle, 1977).

Diamond (1984) states that financial intermediaries exist because they reduce information and transaction costs through diversification. By being able to diversify investments over a range of assets, they reduce the effects of single defaults on the performance of the overall portfolio (Fisher, 1975). Thus, financial intermediaries are crucial players in financial and credit markets because they decrease the costs of directing capital from uninformed lenders and effectively allocate funds. However, the presence of asymmetrically-held information in financial markets shows that there is room for improvement in the market structure through disintermediation and re-intermediation by more efficient agents (Pflaum & Hateley, 2013).

Digital Platforms

Digital platforms have become a key transformative force across industries. Parker and Van Aystyne (2005) define platforms as "enablers of interaction between different groups of surrounding consumers and complementors". Therefore, platforms facilitate value-creating exchanges between parties (Cennamo & Santalo, 2013; Gawer, 2014). Their wide adoption can be explained through a reduction in all types of transaction costs. A platform reduces search costs by locating necessary information and negotiation and enforcement costs by establishing appropriate coordination mechanisms between participants (Cordella, 2006). However, due to the interdependencies between the various factors related to transaction cost, it may increase because disintermediation can cause information overload and re-intermediation instead is able to decrease transaction cost (Cordella, 2006). Therefore, platforms need to establish appropriate mechanisms if they are to become more efficient intermediaries then incumbents.

Network effects underpin platforms' exponential growth and market dominance. They are defined as the "demand side economies of scale", where the subjective value of a platform for a particular user is dependent on the quantity of other users (Eisenmann et al., 2011). A high number of consumers on a platform leads to a significant increase in its perceived value. Platform markets are dominated by monopolies and winner-take-all dynamics because once the critical mass of adoption is reached, the platform enjoys exponential growth and a massive "user base advantage" (Eisenmann et al., 2011; Gawer, 2014).

To win the market, platforms must establish regulatory mechanisms to acquire users and facilitate interaction. Pricing is the most often covered mechanism, and the related literature suggests that the 'correct' price is the key determinant in competition among platforms (Parker & Van Aystyne, 2005; Cennamo & Santalo, 2013; Eisenmann et al., 2011). It relies on the principle that a platform owner establishes a price for each side based on its "relative network externality benefits" (Parker and Van Aystyne, 2005), like growth and willingness to pay, often subsidising one side and charging the other. However, Boudreau and Hagiu (2009) argue that "getting the price right" is not enough. Rather, platform owners should use a range of legal, technological and information mechanisms along with pricing to achieve a two-step strategy of maximising value created for the whole system and value extracted.

Some industries are more prone to platform revolution than others. Markets that are highly information-intensive and fragmented, characterised by extreme information asymmetries or those with unscalable gatekeepers are most likely to be transformed by digital platforms (Parker et al., 2016). Banks still hold significant power in the financial industry, and the platform revolution has not reached its full scale due to high regulatory control and costs of failure (Parker et al., 2016). However, digital platforms focus on specific products offered in a bundle by banks and outperform them in that particular area. Companies like PayPal are performing online transactions, TransferWise does foreign exchange and Zopa facilitates loans. Once the regulators catch up and new technologies prove to outperform old models, the financial industry will likely look very different.

P2P Lending

The failure of the banks and standard financial institutions has led to the accelerated growth of alternative finance solutions based on innovative business models and new technologies. The rise of digital platforms affected the credit sector and led to the creation of P2P lending platforms. The term "P2P lending" refers to "loan origination process between private individuals on online platforms where financial institutions operate only as intermediaries required by law" (Bachmann at al., 2011).

By directly connecting investors with borrowers, these platforms operate with lower operational cost than banks, enabling them to offer lower rates to borrowers and higher returns to lenders than banks. The intention is to cut out the middleman and make the whole process efficient, transparent, accessible and controllable by users (Mateescu, 2015).

To fully understand this industry, it is important to examine the stakeholders involved in the lending process (Freeman, 2010). Figure 1 (Bachmann et al., 2011) depicts the stakeholders in a typical P2P lending platform. Internally, a P2P lending platform is not much different than companies or banks in which management, employees and owners have respectful levels of influence. However, there are more external than internal actors.

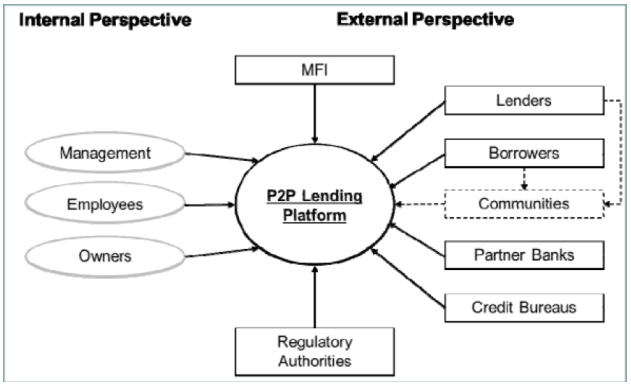

Figure 1. Stakeholders of a P2P lending platform

Regulations set by the UK FCA govern P2P lender operations. Companies must hold £50,000 in reserves, have partner banks for deposit holdings and fund transfers and credit bureaus that hold and verify valuable data about borrowers (Galloway, 2009).

Industry has evolved since its pure P2P origins. Many players have now moved towards a P2P marketplace lending model, whereby institutions buy loan portfolios from P2P platforms (Mateescu, 2015). Some platforms have started to acquire loan listings from loan originators, like micro-financing institutions that perform underscoring and collection themselves.

Conceptual Framework

Financial intermediation theory (Claus & Grimes, 2003) explains the existence of financial intermediaries as a result of information asymmetry. Intermediaries reduce information and transaction costs to efficiently channel funds between lenders and borrowers. This helps us understand why these intermediaries are being disintermediated by efficient agents who can further reduce costs. I employ a conceptual framework grounded in financial intermediation theory called the "Financial Disintermediation Framework" (FDF).

It is important to break down how intermediaries in the credit market decrease information and transaction costs. There are four main components in the literature that inform the FDF:

1. *Provision of liquidity*, allowing lenders to exit investments at any time, reducing transaction costs
2. *Transformation of risk* characteristics of assets through specialisation, reducing information costs
3. *Diversification of investment*, leading to a reduced risk of default and monitoring costs

Many transaction costs arise from principal-agent problems (Jensen & Meckling, 1976). Therefore, the level of agency is the fourth component of the FDF, as depicted in Figure 2:

Figure 2. Financial disintermediation framework

The FDF is used to analyse the effects that digital platforms had on the credit industry. The P2P lenders in the identified case studies are analysed and compared to banks in four aspects to show whether and by how much these new agents reduce information and transaction costs, leading to the disintermediation of current players.

Research Methodology

I use a qualitative method to gain an in-depth understanding of complex and socially constructed phenomena such as financial intermediation in credit markets (Denzin and Lincoln, 2005). Given that P2P lending is a relatively new field of study with limited prior theory available an inductive approach was chosen due to its capacity to remove limitations imposed by a research hypothesis and include a diverse range of data sources (Saunders, 2012).

A case study was followed as part of the research design due to its ability to provide a deep understanding of the research context, as shown by Eisenhardt and Graebner (2007). This is of great importance when the research requires a study of a complex environment such as the evolution of the credit industry. Further, such an approach is also particularly suited towards combining various methods of data gathering leading to a richer information base to perform analysis on. I utilised a multiple case study approach to achieve replication with purposive sampling of two case companies that allowed for in-depth research. (Yin, 2009; Neuman, 2005). Zopa is a P2P lending platform that created the entire industry while Relandex is an innovative property P2P lender that offers secured loans.

I utilise primary (six non-standardised interviews; Appendix 1) and secondary data (information displayed on corporate websites, blog posts, historical operational data and financial industry reports by Morgan Stanley and P2pbanking.com. Data was analysed in accordance with Eisenhard's (1989) comparative case study analysis. I categorised the chosen companies' data using the novel financial disintermediation framework presented in this paper. Then I performed cross-case analysis to draw correlations between two case companies and draw initial conclusions about the whole credit industry. As a final step, I analysed each of the framework's four components in depth to determine whether it reduced transaction costs.

Findings and Analysis

This subsection is dedicated to the cross-case analysis of the case companies. The differences and similarities between Zopa and Relendex are expressed in terms of: 1. Provision of liquidity, 2. Transformation of risk, 3. Diversification of investment and 4. Level of agency.

1. Provision of liquidity: The initial concept of P2P lending by Zopa was similar to that of bonds, with regular interest repayment and the ability to receive full principal at the end of the loan lifetime. Zopa's team quickly realised that: "ability to access funds at their discretion is of crucial importance to the savers on the platforms". Now both Zopa and Relendex offer the option to prematurely exit an investment through 'secondary market' features, although with a slight difference in how liquidation is performed. Zopa automatically and almost instantly performs re-sales of loans to other lenders once there is enough demand. Conversely, Relendex gives lenders the option to auction off their outstanding loans to other lenders. Although the execution of the 'secondary market' feature varies across companies, managers of P2P lending platforms realise that the ability to conveniently liquidate investments is important to investors.

2. Transformation of risk: P2P lending platforms pay close attention to their ability to choose creditworthy borrowers, effectively assess risk and communicate this information to lenders. Both platforms employ a combination of credit analysts and statistical models to give 'internal credit scores' to borrowers based on underlying levels of risk. Zopa has six credit bands based on expected default rate while Relendex has four credit classes and pays attention to loan-to-value and interest cover ratios. P2P lending platforms seem to universally use credit classes to price loans and communicate the level of risk of a particular loan to lenders. However, a credit band is not a measure of absolute risk. Rather, it is a subjective measure that indicates whether information asymmetry exists in the market.

3. Diversification of investment: P2P lenders aim to incorporate Investment diversification into their technological platforms by splitting invested money across a range of loans to minimise the effect of a single default on expected ROI. Zopa offers bundled products of certain portfolios that are predetermined by their system that calculates an optimal diversification strategy depending on the investment amount and risk appetite of the lender. Relendex does not offer any specific features to integrate diversification into its platform. However, Relendex generally has loans secured by assets with high monetary value making them significantly less risky than an average P2P loan. According to Relandex, their average lender profile consists of 40-50 years old experienced investors, who 'understand the concept of diversification quite well'. Both platforms pay attention to the importance of diversification, although to a lesser degree due to the nature of their products and target customer demographic.

4. Level of agency: P2P lenders offer technological platforms that create environments and tools for borrowers and lenders to execute transactions. They act as intermediaries but do not execute significant agency because funds are allocated according to lenders' choices. The degree of choice and level of platform involvement varies across platforms. Zopa has tighter control and higher agency because it creates investment portfolios and only offers lenders a marginal choice regarding the level of risk they are willing to take. Conversely, Relendex offers live auctions for loans and leaves the choice of what to invest completely to the discretion of lenders. The two platforms have distinctly different levels of control and execute agency according to their respective beliefs and strategies.

Placement in Industry Context

P2P lenders were compared to banks and other financial institutions regarding the four components of the FDF to evaluate whether they actually provide a reduction in transaction costs that contributes to the disintermediation of the industry.

Provision of Liquidity

One of the key sources of transaction cost reduction in credit markets is the provision of liquidity by intermediaries. Because markets are unstable and most lenders are bad at predicting when they will need capital, the ability to liquidate an investment makes investors more likely to invest and increases the efficiency of fund transfers. Banks are huge hierarchical institutions that provide savings accounts to customers who are looking to earn fixed interest on their deposits. Given their scale and reserves, banks can provide depositors with the ability to withdraw funds at any time without having to collect funds from debtors. P2P lenders also pay fixed interest on deposits, but they offer a different product than savings accounts. Most P2P platforms have a 'secondary market' feature that enables lenders to exit investments at their discretion before the maturity date, although not instantly. The delay varies across platforms. It can be seen that P2P platforms are inferior to banks in this regard. However, as illustrated by Zopa, we can expect the platforms to catch up with banks as the sector grows.

Transformation of Risk

The ability to understand and transforms risk impacts the capacity of financial intermediaries to effectively allocate funds. These institutions can better understand underlying levels of risk in assets like loans or investment projects than individual lenders. Banks have departments dedicated to risk management and many risk analysts. They primarily rely on information from credit bureaus and use standard FICO models. There is some level of automation, but many processes are manually performed with 'unscalable gatekeepers' (Parker et al., 2016). Further, the risk is not translated to lenders because investment strategy is completely at the discretion of banks.

Conversely, P2P lending platforms specialise in using new risk models, employing 'big data' and machine learning. The processes are automated, and the model

improves as the business grows, giving businesses the ability to effectively understand risk. Further, this superior knowledge is passed on to lenders in the form of risk classes that are used to communicate underlying levels of risk. Although information asymmetry still exists, it is clear that P2P lenders decrease such market inefficiency, contributing to a reduction in information costs.

Diversification of Investment

Since the time of Fisher (1975), investors and financial institutions have known that diversification is crucial to hedging risk and reducing the effects of unsuccessful investments. In credit markets, intermediaries like banks can diversify across a range of loans by utilising their scale while increasing their specialisation debt monitoring. These practices reduce transaction costs by enabling lenders to avoid such activities. However, this diversification occurs on the bank's balance sheet, so individual lenders do not know how diversified their personal funds actually are and they could lose all of their investments.

P2P lending platforms integrate the concept of diversification into their product offerings by splitting the money of individual lenders across a range of loans to ensure that lenders only lose a portion of their portfolios when bowers default. The collection process is usually outsourced to specialised collection agencies. Therefore, from the institutional perspective, banks can be seen as more diversified than P2P platforms, but from the individual perspective, P2P platforms offer better diversification of individual portfolios than banks and communicate this information, greatly reducing transaction and information costs. As the P2P sector matures and goes cross-border, we can expect further market efficiency improvements.

Level of Agency

Financial markets face principal-agent problems, wherein intermediaries act in their own interest rather than that of their depositors, creating transaction costs. The level of agency that banks exercise is high because lenders have almost no control over or knowledge of where their capital goes and rely on banks to receive their returns. Conversely, digital P2P platforms create a transparent environment and tools for lenders to create individualised investment strategies or follow platform suggestions. This gives them a significantly high level of control and transparency, decreasing agency problems. However, it can be argued that because P2P lenders do not lend their own funds, they are more likely to take risky credit. The business of the lenders is dependent on trust in the platform, which is driven by low default rates, so to them, the risk assessment and ability to pay back interest to lenders is at least of the same importance as to banks. Therefore, it becomes evident that the overall level of agency executed by P2P lenders is quite low, leading to a reduction in transaction costs.

Discussion

It is important to close the gap in the literature by comparing P2P lenders and traditional banks.

As shown by Cordella (2006), the introduction of ICTs can lead to the disintermediation of current players due to decreased transaction costs if they employ proper mechanisms to avoid information overload. Therefore, I assumed that the use of digital platforms by P2P lenders would lead to a reduction in transaction costs and promote the efficiency of the credit market. Compared to banks, these new agents indeed reduce transaction costs in three out of the four areas identified in the framework. P2P lenders do not provide superior liquidity because the borrower can instantly withdraw funds from banks but not P2P platforms. However, P2P platforms perform better than banks regarding the transformation of risk due to employment of superior risk analysis models and the communication of that information to lenders in the form of credit classes. The findings are shown in Figure 3:

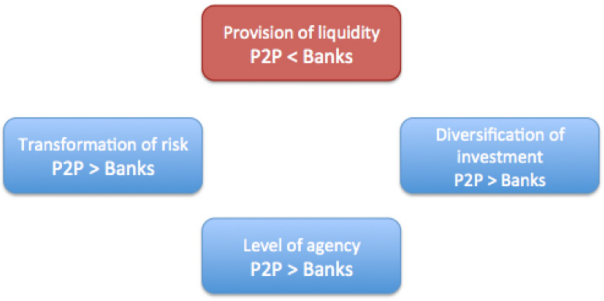

Figure 3. Results of financial disintermediation framework

In line with findings of financial intermediation research (Diamond and Dybvig, 1983; Lelan Van Alstyne d and Pyle, 1977; Diamond, 1984), new players are more efficient intermediaries as they reduce information asymmetry and transaction costs, promoting the efficient functioning of the market. As the P2P lending sector matures, the ability of P2P companies to provide liquidity and investment diversification will increase in relation to size, further promoting efficiency.

Limitations

Despite a significant effort put into a choice of the most appropriate research design, there are several limitations to research that remain and need to be addressed. The main limitation is that the paper is focused on the economic perspective of the effect of digital platforms on the credit industry. Using transaction costs as a primary concept and drawing on the literature from financial intermediation and economics stream of digital platforms it does not pay significant attention to technological and managerial issues that also had an impact on disintermediation. Therefore, although data was acquired from a variety of sources in different felids, the findings concentrate on economics perspective for disintermediation of the credit industry.

Moreover, the paper is written based on the assumption that ICTs, such as digital platforms leads to a decrease in transaction costs. However, although the findings support the assumption, there are cases when ICT can lead to a decrease in efficiency and rise of transaction costs. Therefore, it is imperative

to examine the evidence rigorously and look for evidence that might disprove the findings. Further research under the opposite lens might prove useful to ensure the validity of the finding.

Further, due to a complex nature of the phenomenon under study, in-depth nature of the research question as well as time and resource limitations on data gathering the research focused on two cases studied limiting potential data saturation. Purposive case study sampling was aimed at maximising external validity, but due to a limited number of cases, the generalizability of research findings is restricted. Finally, this research paper offers snapshot finding, yet, the research question involves a study of the industry and implies that longitudinal data can be valuable. Future research on the topic involving a higher amount of case companies performed over longer periods of time can contribute to the field.

Conclusion

To understand the effects that digital platforms had on the disintermediation of the credit industry and the rise of P2P lending, case study analysis of two P2P lending platforms was performed and findings were compared to data about regulated banks. Under information asymmetry in financial markets, transaction costs create intermediaries that aim to reduce them and improve market efficiency. Therefore, disintermediation occurs when new players using ICT significantly reduce transaction costs.

The findings of this paper show that P2P lenders are superior to banks regarding reducing transaction costs in the diversification of investment, the transformation of risk and level of agency. These new intermediaries are promoting efficient fund exchanges. These findings show the significance of P2P lending in transforming credit markets to be consumer oriented. Due to the limited number of case studies and time constraints, this study is limited regarding generalisability. However, it can act as a catalyst for other academics to contribute to the field and practitioners to look closely at the new players enabled by digital platforms.

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Yin, R. (2014) "Case Study Research: Design and Methods: Applied Social Research Methods."diversification will increase in relation to size, further promoting efficiency.

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CHANNEL

Computing the Revolution: An Exploration of Computed Sociality and High-Risk Collective Action

Sean J Baier

MSc in Information Systems and Digital Innovation
Department of Management
London School of Economics and Political Science

KEYWORDS

Social Media
Collective Action
Encoding
Computed Sociality
Like Economy
Platforms

ABSTRACT

Over the past decade, social media has come to the fore of collective action discourse. Much of the research in this space has focused on the use of social media as a tool that, in some form or another, influences the diffusion of collective action related information and the recruitment of participants. This paper claims that "social media" is a term at risk of reification and "black-boxing" in the collective action lexicon unless researchers unpack the inner workings of the artifact. As such, this paper uses the theories of encoding, computed sociality, and McAdam's work on recruitment to social movements to analyze Twitter's "account suggestion" feature. Further, it argues that the fundamental design of this feature does not necessarily facilitate participation in high-risk collective action.

Introduction

At the turn of the decade, between 2009 and 2011, a series of protests and revolutions occurred in Egypt, Iran, Moldova, Tunisia, and the Ukraine. A flurry of exuberant news articles, blog posts, and television reports promoted the unprecedented role of social media in aiding what have become known as the "Twitter Revolutions." Unsurprisingly, the hype regarding social media's role has sparked an intense discourse and a new stream of interdisciplinary research centered on social media and collective action.

This discourse reached fever-pitch when Malcom Gladwell (2011) wrote in The New Yorker that the "revolution will not be tweeted." Further, Gladwell (2011) drew on the work of the noted social movement scholar Doug McAdam (1986) and stated that "The platforms of social media are built around weak ties. Twitter is a way of following (or being followed by) people you may never have met" and as a consequence does not inspire participation in revolutionary activity. This contention serves as the inspiration for this paper.

In using the term "built," Gladwell (2011), purposefully or not, implies that the actual design of social media platforms is to some degree deterministic of participant activity in high risk collective action. In other words, that the social environment of twitter is a highly mediated and constructed one. This opens an interesting line of inquiry into the role of platform architecture and whether the internal algorithms and processes of social media have the ability to shape collective action. In this paper, I intend to breach this topic. More specifically, I will argue that Twitter does, indeed, facilitate "weak-ties" by exploring the link between participation in "high-risk" collective action and the computed sociality created by Twitter's "account suggestion" function.

To do this, I have structured the essay as follows. In the next section, I will review the extant literature on social media and collective action in order to situate the discussion. I will also address the literature of personalization, as it is key to understanding the subsequent conceptual framework. I will then outline Alaimo and Kallinikos' (2016;2017) theories of encoding, computed sociality, and McAdam's (1986) model of participation in high-risk activism. Using these conceptual frameworks I will present a brief case study of Twitter's "account suggestion" function followed by a critical discussion. Finally, I will address limitations and further research.

Literature Review

The literature review focuses specifically on social media and collective action. Research that discusses technology, media, or the internet in relation to collective action have been excluded (Bellin, 2012; Bennett, 2003; Bimber et al., 2005) despite their contribution to the broader field of technology and collective action.

Social Media and Collective Action

Within the social media and collective action stream of research, it is commonplace to break the literature into two thematic factions: skeptics versus enthusiasts. This dichotomy is, perhaps, best exemplified by Joseph (2011) and his review of those who believe technology and social media are catalysts for good and positive change in collective action (Shirky, 2011) and those who believe the phenomenon is overblown (Gladwell, 2011; Morozov,

Corresponding Author
Email Address: seanbaier@gmail.com

2011). This review, however, attempts to step outside of these themes and discover how the authors view the artifact itself. At a high level, artifacts are treated as a tool which, as distinguished by Gonzales-Bailon et al. (2011), effectuate the "dynamics of diffusion" or the "dynamics of recruitment."

Nearly every author within this narrow research stream focuses on the social media platform as a tool and the subsequent exploration of its instrumentation in the broader environment. The "tool" is discussed relative to its capacity for the diffusion of information and the recruitment of people to the cause. Howard et al. (2012) focus on user activity, noting that often social media activity spikes preceding an event which then plays a role in both its discourse and diffusing of ideas. Gonzales-Bailon et al. (2011) found, in contrast, that there is more activity after a protest and that there is not much evidence regarding recruitment or how social media disseminates calls for action. This exposes yet another divide in the broader literature and can be seen in numerous other papers (Hussain et al., 2012; Lim, 2012; Wolfsfeld, 2013; Zheng & Yu, 2016). Anderson (2011) may be the lone exception in that she disavows social media as a factor nearly all together. Segerberg and Bennett (2011), acknowledge the role of the artifact but only at face-value. Noticeably, most authors tend to "black box" the artifact itself and largely ignore the inner workings of the technological artifact. This runs the risk of reifying the term "social media" and ignoring how it actually operates.

Milan's work (2015a; 2015b) begins to correct this reification process by breaking away from the sociological and communications perspectives. She is, perhaps, the first to seriously consider the topic of social media platforms and collective action from a socio-technical perspective. The author argues that social media has a new role as "broker" in the construction of meaning for activists (Milan, 2015a). Further, she uses Gerlitz and Helmond (2013) to note that social media platforms "prompt a type of sociality based on predefined activities," (Milan, 2015b) a concept which will be detailed in later sections. Milan is important to this paper in that she sets the precedent for understanding social movements and collective action by acknowledging the social embeddedness of technology.

Personalization and the Evolving Economies

The concept of personalization is necessary to understand why Twitter designed the "account suggestions" function in a way that mediates sociality. It is helpful to step back from social media and first look at an example from a traditional medium, like television. An advertisement for the 2019 Super Bowl cost a record breaking average of $5.25 million for thirty seconds of television time (Huddleston, 2019). The reason being that the Super Bowl is a one time "platform" that aggregates the attention of a major portion of the global population. That attention is key to advertising success and is likened to a resource in what is deemed the "attention economy" (Davenport & Beck, 2002). What Super Bowl advertisers cannot do, however, is tailor their ads to specific individuals. Social media, on the other hand, can. Social media has created an avenue through which attention can be aggregated and out of which the "Like Economy" has developed (Gerlitz & Helmond, 2013).

In the "Like Economy" the "social is of particular economic value, as user interactions are instantly transformed into comparable forms of data and presented to other users in a way that generates more traffic and engagement" (Gerlitz & Helmond, 2013). This transformation of user interaction into usable data to generate attention, known as filtering, is the crux of personalization. It provides users only with the information that is relevant or adds value to them and therefore enables a more targeted advertising avenue (Parker, Alstyne, & Choudary, 2016). Through personalization Twitter is better able to retain attention of the users by giving them a mediated experience and individualized content. Personalization also, to some extent, facilitates who users might interact with on the platform, central to this paper's argument. The next section begins an exploration of how this is done.

Encoding, Computed Sociality, and High-Risk Participation in Collective Action.

To explore the link between Twitter's processes and its potential ability to broker participation in high-risk collective action, the next section lays out encoding, computed sociality, and McAdam's model of high-risk participation in collective action as conceptual frameworks.

Encoding

Social media platforms are designed in such a way that user participation is channeled through predefined avenues (Alaimo & Kallinikos, 2017). In the case of Twitter, these avenues include liking, following, retweeting, and posting. The act of mediating user social participation into these channels is called encoding (Alaimo & Kallinikos, 2016; 2017). Such encoding forms the basis for the development of the assumption of user intentionality or user preferences, for example, a user tagging a certain item of clothing may imply an intentionality to buy (Alaimio & Kallinikos, 2017). Gerlitz and Helmod (2013) take such actions as "liking" on Facebook to have encoded "approval."

This process of engineering user participation produces a significant amount of data. As noted by Alaimo and Kallinikos (2017), it is important to distinguish between the types of data produced. When posting a comment on a photo, a user provides the platform with a set of unstructured data referred to as user generated content. The user generated content itself is not necessarily useful. The act of commenting, however, provides a linkage between two objects, the user and the photo, which renders the social computable (Alaimo & Kallinkos, 2016). Ultimately, the encoding process employed by social media, and the social data therein, is not about the social itself; rather it is about the data garnered through the act of being social (Alaimo & Kallinikos, 2016). The implication, therefore, is that social media creates an environment in which participants can

interact to facilitate the mediation of social data. In effect, the social data created only exists because of the artificial constraints under which the platform design allows it to be encoded.

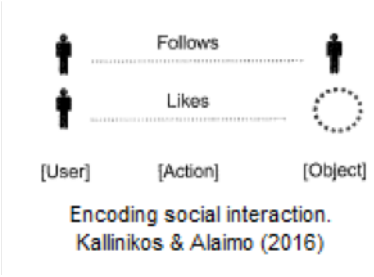

Figure 1: (Kallinikos & Alaimo, 2016)

Computed Sociality

In the real world, people do not commonly follow people around (without legal consequences, at any rate), nor do they "tag," "like," or "retweet" them. In this vein, the sociality of social media is inherently artificial and mediated. This mediated state is called "computed sociality" (Alaimo & Kallinikos, 2016; 2017). Social media, then, cannot be taken at face value and the underlying algorithms and data operations must be taken into account to overcome the illusion of neutrality (Gillespie, 2010).

Put differently, social media platforms are constantly constructing and reconstructing an algorithmic "scoring" of user similarity and popularity (Alaimo & Kallinikos, 2017). Such algorithms, though, are "wedded" to databases and are inherently meaningless without data (Gillespie, 2014). In the context of social media, those algorithms are wedded with social data that has been encoded through mediated human action (Alaimo & Kallinikos, 2016). As such, these algorithms are socio-technical in nature and without human initiation, they would simply be a circular logic lacking meaning. The algorithms, then, are only made meaningful when the offline sociality is "flattened" through an engineered process of encoding which ultimately creates a computed sociality (Alaimo & Kallinikos, 2017). Simply put, the user experience of social media is not necessarily a realistic expression of community and social life because it was designed in a way to facilitate the extraction of data, not in a way to facilitate realistic social situations.

McAdam's Model of Recruitment and Participation in High-Risk Activism

To complete the conceptual lens through which I will view the case analysis of Twitter, it is necessary to break away from social media and explore Doug McAdam's (1986) model of recruitment to high-risk activism. In his literature review, McAdam (1986, p. 65) makes the point that social movement literature tends to be split into two factions. The first is individualism, meaning the individual has some innate quality that makes him or her more susceptible to participation in movements. The second is structuralism, meaning, the structure of the institution or organization facilitates the participants entry into social movements. Further, he notes that the literature tends to focus on low risk activism (signing a petition), rather than high-risk activism (violent protests or revolutions) (McAdam, 1986, p. 68). This distinction and focus on the latter allowed him to narrow his research to single events and the factors of participation therein. McAdam (1986, p. 87) noted that most people in his study, both those who participated and those who withdrew, had a strong attitudinal affinity for the cause and, therefore, the factors of participation are not necessarily individualistic and are being mediated elsewhere. Ultimately, with data from 720 participants and 241 "no shows" from the 1964 Freedom Summer in Mississippi, USA, McAdam (1986, pp. 77-82) found that there were three key factors in participation. First, is those who had a larger number of organizational affiliations. Second, those who had higher level of prior civil rights activity. Finally, those who had stronger ties to other participants in the movement were more likely to participate noting that weak ties may be more effective as diffusion channels while strong ties "embody greater potential for influencing behavior" (McAdam, 1986, pg. 80).

Twitter Case Analysis

In this section, I will review Twitter's "account suggestion" to exemplify encoding, the creation of computed sociality, and the implications therein.

The Encoding and Personalization of Twitter's Account Suggestions

Definitionally, "following" on Twitter refers to the act of subscribing to another user's tweets, allowing the updates of the "followed" to appear on the home timeline ("Following FAQs," n.d.). The act of following, as Alaimo and Kallinikos (2017) suggest, is facilitated through predefined channels. In Twitter's case, users are able to follow by selecting the "follow button" on a user's tweet or profile page, via SMS, or QR code ("How to Follow," n.d.). These channels of participation, however, are incumbent on the fact that a user has found an account they want to follow. Users can, obviously, find accounts to follow in any number of ways (search, offline recommendation, back-links, etc.) but Twitter also has a function through which they suggest accounts a user may want to follow via a personalization algorithm.

Twitter's account suggestion algorithm makes recommendations of accounts to follow based on a range of factors. First, and most straight forward, if you allow Twitter access to your contact lists (phone, e-mail, etc.) it will make one to one suggestions in the event that those contacts match another Twitter user ("About Twitter's Account Suggestions," n.d.). With your contact data Twitter's algorithms can go a step further. One user ("object 1") is now linked to another user ("object 2") via contact information and if "object 1" confirms this linkage to "object 2" by "following" then an association is encoded and social data produced (similar to the figure from Alaimo & Kallinikos (2016) featured above). If a user does not allow Twitter access to their contacts then Twitter employs a similar process across a number of other mediated contact points. These contact points include location, user tweets, other accounts a user follows,

tweets a user views, retweets, likes, or even third-party websites visited if they integrate Twitter content ("About Twitter's Account Suggestions," n.d.).

The Twitter platform has been specifically designed to allow multiple channels (the aforementioned tweets, likes, etc.) through which users create social data. Of course, this data is created in the back-end and not visible to the user (Gillespie, 2014). Ideally, the users are passively creating such social data rather than knowingly liking objects with the intent of skewing the algorithmic recommendations. This stylization and organization of user participation (Alaimo & Kallinikos, 2016), is Twitter's way of encoding user preferences and are the basis of the social data that is fed into their algorithm, which then provides personalized suggestions (see conceptualization, on right). To emphasize, the act of viewing a tweet, the act of liking that tweet, the act of following other accounts, or the act of visiting specific third party website are acts which have been facilitated by the organization of the Twitter platform to encode meaning. The byproducts (object linkages) become the basis of the social data that is used to personalize user account suggestions.

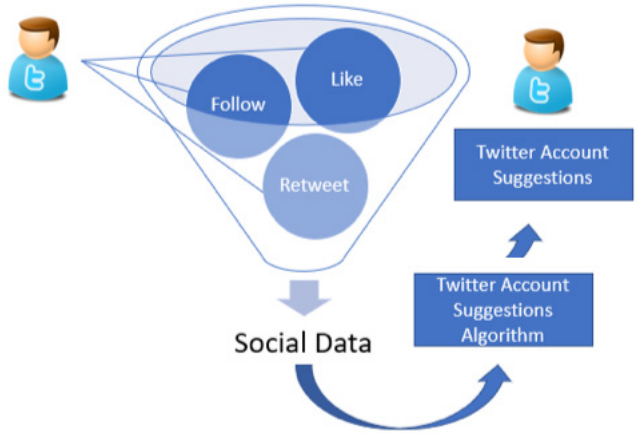

Figure 2: Encoding

A Computed Revolution?

The interpretations of Twitter's account suggestion processes on participation in high-risk collective action are numerous. Drawing from the first conclusion of McAdam's (1986) model, users that participate in high risk collective action tend to have a larger number of organizational affiliations to the movement in question. If a new Twitter user has an offline connection to just one member of a protest organization, for example, and elects to allow Twitter to use their contacts then by the logic defined above the user will be recommended to follow that user and possibly, by association, to follow more Twitter users affiliated with the organization. McAdam's (1986) second conclusion states that people who had prior involvement in high-risk collective action are more likely to be motivated to participate. A Twitter user with prior involvement may have multiple contacts, may visit third-party websites associated, or may already follow users engaged in the protest activity and thereby be recommended users who are also associated. However, a user with neither prior affiliations or a history of collective action may be less likely to be recommended users affiliated with a specific cause. In effect, it might be interpreted that Twitter's account suggestion enhances the possibility of participation for people who are already involved, but may have little to no effect on those who are not.

McAdam's (1986) final conclusion, that strong ties to participants are the greatest indicator of participation in high-risk collective action, begs the question of whether or not Twitter facilitates strong ties between users. Users connected to other users via email or phone contacts might be considered strong ties, though, that in itself is questionable as there are numerous reasons to have an individual's contact information. Beyond that, however, it appears as though Twitter facilitates weak-ties and the reasons are two-fold. First, Twitter has created a computed sociality. As such, the social interactions of a user are very much unlike their actions in the offline world. Liking a tweet from an activist is a far-cry from attending a rally or even having an interest in the social movement. Yet, such an action is encouraged by the very design of the platform and then used to create personalized account suggestions. Second, even if a user follows an activist, has an interest in the cause, and the algorithm recommends other members of that cause; such connections are not two-way. When a user follows another user, it is a unilateral action and the "followed" user does not necessarily follow back or communicate directly with the user ("How to follow," n.d.). In that sense, Twitter's account suggestion feature facilitates weak ties.

Based on the reporting above, I might be inclined to suggest that Twitter does not facilitate strong-ties between users and thereby does not, by design, encourage participation in high-risk activism excepting cases where users have prior strong-ties offline. Further, it could be argued that it does, by design, facilitate weak-ties which, according to McAdam (1986), may be more effective for diffusion. Not many would argue that Twitter's strength is in its ability to diffuse information. This reasoning is also in line with the argumentation made by Gladwell (2011), that social media creates weak-ties and, aware of the underlying technology of Twitter or not, he may have been on to something when he said that "the revolution will not be Tweeted."

Summary, Limitations, and Future Research

In this paper, I have introduced what I consider a soft spot in the literature of social media and collective action, the artifact. I have attempted to introduce the underlying processes of encoding and its subsequent computed sociality into the understanding of participation in high-risk activism. Based on this, the argument is made that Twitter is not necessarily designed to facilitate such participation.

This paper, by necessity, is constrained by word limit and can only focus on a single feature within the platform and ecosystem. Additionally, the arguments presented are based on the linking of conceptual frameworks rather than empirical testing. I am, therefore, careful to acknowledge that this essay does not make claims of proof or causality nor claims of

extending theory. Further, this paper is constrained in that there are other threads of social computing that could expound upon this understanding, such as aggregation/commensuration. The paper does, however, attempt to bring awareness to this research stream that the artifact itself is largely missing. Additionally, within popular culture there is the possibility of the reification of social media as a black boxed savant for collective action; this paper attempts to combat that line of thinking.

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Data Privacy in the Age of Surveillance Capitalism

Cathal Greaney

MSc in Information Systems and Digital Innovation
Department of Management
London School of Economics and Political Science

KEYWORDS

Social Media
Collective Action
Encoding
Computed Sociality
Like Economy
Platforms

ABSTRACT

Ubiquitous information technologies such as smartphones enable the collection of users every digital action and allow private enterprises to commoditize a user's data. This leads to asymmetries of power between the users who share their digital actions and the corporations who can aggregate and analyse their data for profit. The benefits enjoyed by the users act as a justification for the loss of privacy resulting from this activity. In this article, I review the origins and core concepts of the surveillance capital business model and its effect on privacy and I discuss the potential dangers of an environment where a user's every digital action is recorded.

"We're at the beginning [of surveillance capitalism] not the end. We name it, we tame it. That's the work now. To reignite our democracy, wake it up, for this work of the 21st century" (Shoshana Zuboff, 2019)

"Dataism is a new ethical system that says, yes, humans were special and important because up until now they were the most sophisticated data processing system in the universe, but this is no longer the case" (Harari, 2016)

"Enterprise mobility affords great flexibility within the appropriate context, but also significant opportunities for extensive surveillance. Modern workers have anywhere to go, and nowhere to hide" (Sørensen, 2011)

Introduction

Almost everything we do online produces a digital record. When we make a call, send a message, buy a pizza or go for a jog our data is recorded and captured. Surveillance capitalism captures this personal behavioural data, translates it into predictions and sells those predictions into new markets that trade exclusively in behavioural futures (Zuboff, 2015). Is this scary and Orwellian and a precursor to internalized social controls, or merely continuing progress in the relentless drive towards a new age of "dataism" (Harari, 2016). Regardless of the political or technological viewpoint, surveillance capitalism is already enmeshed in our daily lives by means of smartphones, watches, fitness trackers and other ubiquitous information technologies. Our digital data has become a critical raw material and is analysed and sold to advertisers and used to enhance digital services, increase our digital participation and used to augment the existing government surveillance apparatus.

Enterprises, through similar mechanisms, can monitor workers every action (Sørensen, 2011). Firms even host 'microchip parties' (Agence France-Presse, 2018; Mills and Press, 2017), to convince employees to implant a tracker under their skin. Amazon carefully monitors their warehouse workers and if inefficiencies are detected they can be automatically cautioned (Bort, 2019). UPS drivers face similar scrutiny on their delivery routes (Goldstein, 2014). Within the political realm, Bloomberg reported that Facebook adapted its surveillance capitalism mechanisms to directly influence voters in the 2017 German national elections, controversially resulting in the AfD party getting a surprising increase in votes (Silver, 2017). In Brazil, political commentators argue that the winning candidate in the last presidential elections owed his victory in part to sophisticated use of social media (Leahy, 2018; Leahy and Schipani, 2018). However, it is worth noting that in the latter two cases mentioned, there was no indication that Facebook's motivations were political. As discussed later in this article, it was merely a side effect of their relentless pursuit of ever-increasing user engagement.

The techniques of surveillance capitalism are largely subliminal and shockingly effective in the manipulation of social behaviour (Zuboff, 2019). Surveillance capitalism's primary focus may be within the commercial sphere, but like traditional advertising, it can and is being applied to other spheres of influence. In order to understand surveillance capitalism, it is helpful to first consider its origins.

The origins of surveillance capitalism

Surveillance capitalism traces its roots to Google's reaction to the 1999-2000 dot-com bust. Up to that point, there was a reasonably balanced power relationship between the nascent web companies who needed users and the users themselves who benefitted from the emerging online services. The phrase 'if you're not paying for the product, you are the product' (Serra and Weyergraf-Serra, 1980) was sometimes co-opted to describe this business model. When the dot-com bubble burst in April 1999 investors threatened to withdraw support unless a profitable business model was applied. In response, Google adopted a straightforward 'keyword search'

Corresponding Author
Email Address: cathal@irishapps.com

based advertising business model (Brin and Page, 1998). Advertisers would choose keywords and when users conducted a Google search using these same keywords they would see the adverts. In parallel to this, there was a realization that Google's user-generated collateral search data had tremendous predictive value. Google applied their considerable compute ability and proprietary access to this data to predict the kinds of ads their users were likely to click on. It became known as the "click through rate" (Lohtia et al., 2003) and represented the perceived relevance of an ad. Google offered this new predictive service to advertisers in a black box fashion and advertisers accepted it. The phrase 'you are the product' can be changed to 'your data surplus and predictive behaviours are the product'. In March 2008, Facebook hired Sheryl Sandberg to spearhead their adoption of the surveillance capital business model pioneered by Google. This represented an inflection point and saw the accelerated adoption of surveillance capital techniques by major players such as Microsoft, Netflix, Uber, and many others.

During this transitionary period, internet companies switched from selling products online, to the harvesting of their user's data as the primary source of revenue. The mechanisms of this new business model were largely kept invisible to users. The benefits of a globally connected community operating in a transparent manner were highlighted while the risks of power asymmetry, social control, and exploitation of users' data remained obscured.

This period of the dot-com bust and emergence of surveillance capitalism is well documented but poorly understood and barely theorised. The remainder of this article will examine information systems concepts related to data privacy and surveillance capitalism and discuss the power dynamics shaping this evolving paradigm.

A Definition of digital privacy

Digital or information privacy is a difficult concept to define. It relates to the accessibility of personal information. Services such as Gmail, Facebook, Instagram and WhatsApp harvest our personal data for commercial gain and users seem happy to participate. The development of services that rely on surveillance and users' responses to these services has challenged the traditional definition of privacy. Information systems scholars have offered some guidance. Bélanger and Crossler (2011) define privacy as "the desire of individuals to control or have some influence over data about themselves". Smith et al. (2011) explore definitions of privacy as a right or as a commodity. They argue that the traditional view of general privacy as a human right is ill-suited to the commercial world and that within this context a privacy paradox is observed between a user's expressed wishes for privacy and their contradictory consumer behaviours.

This privacy paradox phenomenon refers to a user's express wish for digital privacy while willingly revealing personal information online (Dinev, 2014; Smith et al., 2011). Following this observation, it is useful to think of privacy as a commodity (Fuchs, 2012) in which it is not considered an absolute value, but can be assigned an economic value. Privacy benefit is a related concept and refers to the rewards gleaned from providing personal information to firms, including financial gain and personalization of services (Smith et al., 1996; Caudill and Murphy 2000; Hann et al. 2008; Phelps et al. 2000; Xu et al. 2010). If an individual thinks their interactions with a firm will result in the unwanted release of their personal information it is referred to as privacy risk (Featherman and Pavlou 2003; Malhotra et al. 2004). Based on the success of Facebook and Google, it is reasonable to conclude that users perceived privacy benefit far outweighs their concerns over privacy risk. But to what extent are general users aware of the erosion of their privacy? In order to answer that question, we should consider the specific modes of collection being employed.

Commercial data collection companies are becoming increasingly invasive. Cookies and similar tracking artefacts are routinely placed on user's devices and facilitate the collection of large amounts of behavioural data. Keyboard and mouse input are recorded along with the recording of conversations through laptop and smartphone microphones and images are captured using devices cameras (Sipior et al., 2011). In the early 2000s when these practices were emerging there was little effort employed to inform the user of the level of tracking taking place. Over time the major smartphone platforms introduced notifications and explicit opt ins so that users had to agree before services or apps could record data using smartphones location capabilities, microphone or cameras. Based on this, it is reasonable to conclude that users are informed as to the extent their digital activates are being recorded. Zuboff (2019) argues that despite these opt in practices users privacy is being forcibly eroded. She recalls the philosopher Roberto Unger's warning of "the dictatorship of no alternatives" and argues that users have no choice but to cede their privacy in order to avoid practical digital exclusion regardless of the level of digital risk or privacy benefit. She goes on to discuss existing digital concepts such as 'digital ubiquity' through the lens of surveillance capitalism and introduces the concepts of 'digital instrumentarianism', 'instrumentarian power' and 'radical indifference'.

The Four Horsemen of Surveillance Capitalism

Digital instrumentarianism, digital ubiquity, radical indifference, instrumentarian power.

Digital instrumentarianism describes firms influencing our behaviour so that the predictability of our actions increases. Surveillance capital does not care about what we do, who we are or what our problems might be, so long as data can be captured and predictions can be extracted from it. Zuboff (2019) calls this "radical indifference", referring to the indifference of surveillance capitalism to an individual's actions, so long as predictive data can be gathered. Facebook's Andy Bosworth described it as:

*"…connecting people so deeply that anything that allows us to connect more people more often is *de facto* good… [not] for ourselves or for our stock price. It is literally just*

what we do. We connect people" (Andrew Bosworth, 2016)

Digital ubiquity is the core enabler for surveillance capitalism. Zuboff describes it as an intense, thick surround of digital instrumentarianism which subliminally shapes a user's behaviour in a direction that favours a firm's commercial outcomes. Surveillance capitalism will encourage actions that make a user more predictable. The familiar example of the 'filter bubble' (Nguyen et al., 2014) in the hands of surveillance capitalists does not just increase user engagement through enhanced user experience. Its main objective is to increase a user's predictability in the online world through altered behaviour. The same devices that allow us to monitor, can now be used to actuate, both in the online world and increasingly in the physical world. Data scientists call this monitoring and actuation.

One of the best early examples of monitoring and actuation was provided by Kramer et al. (2014) who conducted a massive scale experiment in collaboration with the Facebook news feed team. They introduced an "emotional contagion" (Hatfield et al., 1993) by reducing the volume of positive expressions within a user's news feed. As a result, they observed the person producing fewer positive posts. To illustrate a real world context, Zuboff (2019) cites the Pokémon Go app. Pokémon Go is a mobile game that uses augmented reality to project Pokémon cartoon characters within physical locations. In order to progress through the game, the user must find these virtual characters by going to physical locations. It uses the same processes as online targeted advertising, but in this case business customers pay for future behaviour in the real world. Users are directed towards specific restaurants or shops outside of their conscious awareness. Pokémon Go is a good example of monitoring and actuation and how surveillance capitalists have moved away from the laptop and now rely on the mobile phone as the chief supply chain interface for its raw materials. In the next section, I discuss the role of the smartphone as the primary tool for data capture.

Smartphones and privacy

Surveillance capital leads to intense competition for behavioural surplus and prediction products and it is no longer enough to have a high volume of surplus (scale). A variety of surplus (scope) is also needed. The user's mobile phone becomes the critical tool with economies of scope working in two dimensions (Anderson, 2019; Zuboff, 2019). Firstly, to extend out as far as possible by capturing locations and actions and then extending as deeply as possible by capturing feelings and emotions through the analysis of user images, videos and voice (Cambria, 2016). But the most predictive surplus comes from intervening in users activities, and herding users in specific directions (Wykes, 2019). This competition has resulted in pressures being applied to new and established businesses to leverage their data to create products for digital prediction markets (Shimp, 2017). In the age of surveillance capitalism, the primary goal is to maximize user engagement while minimizing the awareness of dataveillance activities happening in parallel. The term "dark patterns" is used in the app design community to describe design patterns that are not in the user's best interests or not optimized for the user (Zagal et al., 2013). In the case of surveillance capitalism, an app's user interface is optimized for data capture rather than for optimal user experience. Faced with the competitive pressures of surveillance capitalism, app designers may have to prioritize data capture over user experience in order to remain competitive in the market place.

Some scholars have proposed steps to safeguard digital privacy. Cavoukian's (2012) Privacy by Design (PbP) framework can be used when considering digital privacy and includes principles such as privacy by default, privacy embedded in core architecture, secure communications and transparency and respect for user privacy. PbD principles encourage the use of methods such as encryption during transmission which would significantly enhance security, even when using platforms controlled by surveillance capitalist firms. The metadata would still be exposed to data harvesting, but the user data would enjoy significant protection. Data prediction markets provide motivation for malware and phishing attacks (Felt et al., 2011). Malware and phishing attacks are used to harvest data for sale on the data markets (Bhandari et al., 2017; Jain and Shanbhag, 2012; Wright et al., 2014) and in these cases, following PbD guidelines by increasing the security robustness of apps and awareness of attack vectors could enhance users privacy.

Instrumentarian power

To complete our discussion of surveillance capitalism it is worth considering the power dynamics in play. Social and political study of technology is core to Information Systems research (Eaton et al., 2015; Markus, 1983; Orlikowski, 1991; Sørensen, 2011). Surveillance capitalism works through the medium of all of the digital instrumentation while turning the user into instruments of others gain. For this dual reason, Zuboff (2019) uses the term "instrumentarian power" to describe surveillance capitalism's instrumental relationship with its user base. Instrumentation is used at arm's length to shape behaviour. The user is not aware or afraid of it. Zuboff (2019) considers surveillance capitalism to be anti-democratic and makes a convincing case for her views. She considers the potential benefits that may accrue as secondary to how they would be achieved and that getting a great outcome in an anti-democratic fashion is not good for our society. Extreme asymmetries of knowledge result in extreme inequalities of power (Zuboff, 2019). Computation replaces politics. Resistance is not possible because we're not aware of what's happening. Computational certainty may not be compatible within the democratic social context.

Other social scientists have taken a different view. Harari (2018, 2016) calls surveillance capitalism a subset of 'dataism' and describes it as an emerging ideology in which "information flow [is the] supreme value". He goes on to describe the historical advantages

of democracy in terms of data flow and distributed communication and power sharing. He reasons that democracy flourished in the 20th century because it adopted a more decentralized communications and power system than competing totalitarian systems and points out that democracy or more specifically, liberal democracy has gone through several cycles of crises and regeneration and has the potential to adapt to new forms of emerging power based on data.

When examining power dynamics there are obvious parallels between the traditional advertising industry and surveillance capitalism. When advertising emerged after the First World War, it shared the same characteristics as surveillance capitalism does now. It was an emerging phenomenon based on cutting edge technology and used by private firms as a means of passive manipulation and control and became known as "manufactured consent" (Herman and Chomsky, 2010). Rather than subverting democracy, it instead became a vital tool for democracy in the 20th century.

Conclusion

Harari reminds us that history is not deterministic. "The same technological breakthroughs can create very different kinds of societies". Zuboff has highlighted an important phenomenon and provides a wakeup call to the academic, professional and political establishments. The field of Information Systems is well placed to illuminate the emerging field of commercial data surveillance as it transforms our society and influences our everyday actions. Smith et al. (2011) warn that the practice of commercial sharing of data by Facebook, Google and other major tech firms risks eventually alienating users. With increased awareness of the pervasiveness of surveillance capitalism, public opinion may shift and demand may emerge for products that better protect user's privacy. For example, users may choose to pay for an encrypted email service such as ProtonMail rather than using Gmail. Noted venture capitalist Roger McNamee (2019) was instrumental in introducing surveillance capitalism into Facebook and is now vocal in his opposition to these practices and believes they will ultimately be self-destructive to the firm due to user backlash. Some scholars have illuminated other negative effects such as algorithmic discrimination, hidden political influence and the expansion of state influence on everyday lives (Crawford and Schultz, 2014; Noble, 2018).

This article has focused on the more opaque aspects of surveillance capitalism, some of which could be interpreted as negative social developments. There are overwhelmingly positive aspects of recent technological progress in areas associated with data collection and open communication. Ubiquitous networking provides unprecedented access to educational opportunities and other knowledge based services and digital experiences that enhance everyday lives. New forms of consumer power have emerged that disrupt parasitic industry practices and deliver enhanced value to consumers. As discussed earlier, there are asymmetries of power at play. Facebook, Microsoft, Google and Amazon are at the forefront but there is little evidence they or other major players have abused this power imbalance beyond their corporate profit motives. These imbalances can be combatted through the use of accessible encryption and anonymization services. Should abuses occur on a significant scale then it is reasonable to assume that users would respond by employing some of these anti-surveillance techniques or by simply boycotting the offending services in favour of more secure modes of communication.

However, the concerns expressed in this article about the secretive aspects of surveillance capitalism should not be dismissed as an overreaction or paranoia. Despite the rhetoric of transparent communications that the major players extol, they operate in a zealously guarded and secretive manner. The vast data centre infrastructure needed is only available to a select few. Algorithms used to collect data and influence users are purposefully hidden from view and treated as prized internal IP. The technology of surveillance capital is only available to the biggest handful of players.

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Information Systems and Innovation within the Department of Management

Within LSE's Department of Management, we form the leading European university-based research cluster focusing on Information Systems and Innovation, and are recognised widely as amongst the top ten such clusters in the world. We have 12 full-time academics and benefit from the contributions of Visiting Professors, all of whom are scholars of international repute and leaders in the field, from Visiting Fellows who are experts in their respective fields, and from project researchers and our PhD students.

Faculty are active in the International Federation of Information Processing (IFIP), the Association for Information Systems (AIS), the UK Academy for Information Systems (UKAIS), the British Computer Society (BCS), and other national and international organizations including United Nations and European Union bodies. They are Editors-in-Chief of major journals including JIT, ITP) and variously serve as Senior and Associate Editors on most high quality refereed journals in the IS field (e.g. MISQ, MISQE, ISR, EJIS, ISJ plus over 20 others).

Teaching in Information Systems has been rated as excellent by the UK's Quality Assurance Agency and its research is recognized as internationally excellent by the Higher Education Funding Council for England. Awards and recognition are extensive and include Frank Land's Leo award of the AIS for Lifetime Exceptional Achievement, Ciborra's AIS Distinguished Member award, and Willcocks's Price Waterhouse Coopers/Corbett Associates World Outsourcing Achievement award for academic contribution to this field.

The Department of Management runs several high profile Information Systems seminar programmes. These include the annual Social Study of ICTs seminar run over two days in March which attracts over 200 international participants and has a related two day research workshop.

Information Systems faculty are actively involved in the delivery of two degree programmes offered within the Department of Management – a one-year MSc in Management, Information Systems and Digital Innovation of (MISDI) and a PhD in Information Systems. In addition they provide Information Systems knowledge within the core management BSc and MSc courses within the department.

These Faculty's research, teaching and dissemination strategies are closely interlinked and their distinctive focus on the social study of Information Communication Technologies (ICTs) and Innovation underlies a concern for policy and practice issues in six major fields (see figure). The MSc in Management, Information Systems and Digital Innovation (MISDI) draws on all items.

LSE Information Systems Alumni Group (LISA)

LISA (LSE Information Systems Alumni) is the Information Systems and Innovation Group's official alumni group. It is dedicated to establishing, maintaining and forging new relationships between alumni, industry and the Group. It is open to any alumni of the Group's programmes (ADMIS, ISOR, MISI, MISDI, PhD) and is supported by staff within the Group. LISA has over 1000 members globally and is expanding through its regular activities.

LISA regularly organises events for alumni and current students and provides opportunities to network, socialise and learn. Some of LISA's previous activities include alumni panel discussions, expert industry and academic speaker sessions, career workshops and social events.

If you wish to contribute or participate in our activities, kindly get in touch with LISA representative.

Communications - Heemanshu Jain (MSc 2008-09) Email: heemanshu@alumni.lse.ac.uk

LISA on Facebook - https://www.facebook.com/groups/LSE.IS.Alumni/

LSE Department of Management

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THE INFORMATION SYSTEMS STUDENT JOURNAL

VOLUME 14 ISSUE 1

September 2019

Sponsored by

Department of Management
London School of Economics and Political Science

Published by Department of Management
at the London School of Economics and Political Science.