Today’s conference is hosted by the Data, Organisations and Society cluster of the Centre for Business in Society. The conference focuses on how organisations from the private, public and third sectors are experiencing and responding to the tension in the data environment.
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BAM is the leading authority on the academic field of management in the UK, supporting and representing the community of scholars and engaging with international peers. Today’s event is supported by three of BAM’s Special Interest Groups (SIGs):

- The Strategy SIG covers a broad spectrum of issues concerned with the development and implementation of strategy in organisations;
- The e-Business and e-Government SIG provides a forum for academics and practitioners on all aspects of applying Internet and related technologies in public and private sector organisations;
- The OTCD SIG (Organizational Transformation, Change and Development) welcomes colleagues studying any aspects of change management and organisational development, seeking to improve the quality of research and to expand the capacity of the field.
Welcome

Data availability has increased exponentially in the last decade, paving the way for a new business environment. As such growth accelerates, a better understanding is needed of the opportunities this new phenomenon provides and of the innovation, ethical, social, privacy and security challenges it poses. Current tensions include the digital skills shortages, threats from cyber-attacks and the requirement to embrace GDPR legislation.

The conference provides a great opportunity to explore how organisations from the private, public and third sectors are experiencing and responding to such tensions. Contributions have come from a wide range of institutions and disciplines, reflecting the diverse nature of interest in this field and its growing importance.

I would like to thank you for your excellent submissions and for your interest in the conference. I look forward to meeting you today and hope that you have a productive and interesting day with us.

Acknowledgements

Many colleagues have helped in the creation, organisation and management of this event, including Professor Sally Dibb, Dr Alexeis Garcia-Perez, Professor Maureen Meadows, Dr Carlos Ferreira and Dr Alessandro Merendino. They have been ably supported by our wonderful CBiS PGRs. Particular mention should go to Claire Brewis, Viktoria Lamprinaki, Rebecca Beech and Isabel Galvis.

We also wish to say a special thank you to our Keynote speakers Professor Samuel Fosso Wamba, Professor Blaine Price and Detective Constable Patrick McBrearty for sharing their knowledge, experiences and wisdom.

Finally, thanks to the CBiS Operations team of Jo Bishop and Debbie McArdle. Without all of their creativity, planning and management, this event would not have been possible.

Professor Lyndon Simkin
Executive Director of CBiS
Conference Chairs

Welcome to this conference hosted by the Data, Organisations and Society research cluster from the Centre for Business in Society (CBiS) at Coventry University. We would like to thank you for your submissions and to congratulate you on having your abstracts accepted. Our Data, Organisations and Society cluster researches issues around the new ‘big data’ environment, and the opportunities and challenges that it presents for individuals, organisations and society. These issues have inspired us to stage today’s event, and to organise a special issue of the journal Technological Forecasting and Social Change (submissions by end May 2019).

We are delighted to be supported by three Special Interest Groups of the British Academy of Management: Strategy; e-Business and e-Government; and Organizational Transformation, Change and Development.

A special word of thanks also goes to our keynote speakers, Professor Samuel Fosso Wamba of Toulouse Business School, Patrick McBrearty from the West Midlands Regional Cyber Crime Unit and Professor Blaine Price of the Open University. We eagerly anticipate the interesting contributions we know they will make to today’s proceedings.
Today’s Conference

The conference will explore the emerging and prominent role of data; in information-driven organisations, this is sometimes summarised in the statement that ‘data is the new oil’. Data availability has increased exponentially since the turn of the 21st century, paving the way for a new business environment. Big data has been described as a management revolution, and the next frontier for innovation, competition and productivity. It presents both a challenge and an opportunity: organisations now have access to a stream of real time, digitized data relating to how people, companies and other organizations interact; yet in order to turn these data into knowledge, the whole process of data analysis – also known as big data analytics or consumer analytics - needs to be carefully planned and organised.

Many organisations do not yet fully understand the implications of big data and have not yet realised the potential to be gained from big data analytics. Taking advantage of big data is an evolutionary process, as organisations get to grips with the potential of big data, and new organisational routines become established. However, big data analytics have the potential to provide business value at several stages of the value chain, as well as to support organisational agility through knowledge management. This value has important consequences for improving organisational processes and creating competitive advantage. In order to discover, create and realise its full significance, it is necessary for organisations to invest in IT innovation and develop skills in data analytics.

As the growth of big data accelerates, a better understanding is needed of the opportunities and challenges associated with this new phenomenon. Some of the economic and societal pitfalls associated with big data are not yet fully understood. Scholars have argued that big data can disrupt existing industries, with potential consequences in terms of job losses. The algorithms that are central to big data analytics can lead to increased inequality and reduced social cohesion. Privacy may also be under threat; for example, if data from fitness trackers recording exercise patterns, sleep patterns and diet are shared with corporations in industries such as health insurance, negative consequences for consumers could result. Even the democratic process may be disrupted by big data, as is evidenced by the on-going debate on the role of social media in the US Presidential Election and the UK Brexit Referendum in 2016.

We look forward to exploring these and other issues reflecting tensions in the data environment with you all today. Important conversations to be taken forward at the conference include:

- New ways of doing business and new business models emerging from the transformation of data;
- Big data, analytics and its application as a driver of innovation and strategy development;
- Causes of tensions on data use for private, public and not-for-profit organisations;
- Impact of the digital skills gap in organisations;
- Navigating the relationships between stakeholders which own, store and use data;
- Role of new business models in transforming data ownership and privacy-friendly business models;
- Privacy issues from the collection and storage of personal data by organisations;
- Data governance and the implications of GDPR for organisations;
- Managerial issues emerging around cyber security management;
- Implications for organisations of data security breaches.
## Programme

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<td>Coffee and registration</td>
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<td>09.50 - 11.00</td>
<td><strong>Keynote speakers</strong></td>
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<td>Patrick McBrearty – West Midlands Regional Cyber Crime Unit</td>
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<td><em>The National Cyber Security Threat: A Law Enforcement Perspective</em></td>
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<td>Samuel Fosso Wamba – Toulouse Business School</td>
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<td><em>Big Data Analytics Capability Impacts on Firm Performance</em></td>
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<td>11.00 - 11.30</td>
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<td>15.30 - 15.45</td>
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<td><strong>Special Issue</strong> - <strong>Technological Forecasting and Social Change (TFSC)</strong></td>
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Keynote Speakers

Professor Samuel Fosso Wamba

Dr Samuel Fosso Wamba is Full Professor at Toulouse Business School. Prior to this, he was Associate Professor at NEOMA Business School and Senior Lecturer in the School of Information Systems & Technology, University of Wollongong, Australia. Dr Wamba successfully defended on September 2015 his Habilitation of Conducting Research in Management Science at the Telecom Business School, France. He earned his PhD in industrial engineering at the Polytechnic School of Montreal, Canada. He also holds an MSc in Mathematics from the University of Sherbrooke in Canada, and a second MSc in Electronic Commerce from HEC Montreal, Canada. He is CompTIA RFID+ Certified Professional, Academic Co-Founder of RFID Academia.

Professor Blaine Price

Blaine Price is a Professor of Computing at The Open University. For the last decade, he has contributed to research in privacy, especially applied to the quantified self. His current research centres on the human side of wearable and ubiquitous computing technology applied to health and wellbeing. He was Principal Investigator on the EPSRC funded project ‘Monetize Me: Privacy and the Quantified Self in the Digital Economy’ and is currently PI on the STRETCH project using socio-technical systems to help older adults live longer in their own homes.

Detective Constable Patrick McBrearty

Detective Constable Patrick McBrearty is a Cyber Protect Officer within the Regional Organised Crime Unit for the West Midlands (ROCUWM). ROCUWM has the responsibility of protecting the communities in the West Midlands from serious and organised crime.

He has served within the Police for sixteen years in a variety of Intelligence and Investigation departments pursuing those engaged in serious and organised criminality. Prior to this Patrick has served in a variety of public services, including reserve and regular military service.

Patrick has a good understanding of cyber security from an academic standpoint having studied a BSc Risk and Security Management followed by an MSc Criminal Investigation and Cyber security. In addition to his day job, Patrick is an Associate Lecturer part time at the University of Worcester within the Criminology Department.
The Centre for Business in Society (CBiS)

The Centre for Business in Society (CBiS) is home to specialist researchers within the Faculty of Business and Law. CBiS is responsible for nurturing and developing the research culture and expansion of dedicated research activity. The Centre's research explores the impact of business and policy-making on society with the aim of promoting responsibility and changing behaviours to achieve better outcomes for economies and societies. Research teams are organised into four thematic clusters. Today’s conference is organised by the Data, Organisations and Society cluster, which examines the digital economy in terms of data innovation and strategy, data protection and privacy. The other CBiS research clusters are: Sustainable Production and Consumption; Economic Development and Inclusive Economies; and Sector, Economic and Financial Studies. These research clusters examine aspects of sustainability and ethical consumption in the circular economy, as well as investigating new models and policies in economic development to reflect changing societal values and realigned public spending. Other research focuses on the economic and social impact of financialization at the national, organisational and individual level, and behavioural change interventions to enhance societal well-being.

Coventry University

CU is a forward-looking, modern university with a proud tradition as a provider of high-quality education and a focus on excellent applied research. The university was awarded Gold in the Teaching and Excellence Framework and has been chosen to host three national Centres of Excellence in Teaching and Learning. CU’s students benefit from state-of-the-art equipment and facilities in all academic disciplines including business and law, health, design and engineering laboratories, performing arts studios and computing centres.

The city-centre campus is continually developing, with plans for further investment over the next few years. Through its links with leading edge businesses and organisations, the University’s researchers build strong networks to support exciting interdisciplinary projects; and students benefit from project and placement opportunities that enhance their employability on graduation. CU has a major presence in Coventry, which contributes to the city's friendly and vibrant atmosphere and enables it to foster successful business partnerships. This presence was instrumental in the City of Coventry recently being awarded the prestigious UK City of Culture 2021.
### Session 1 - 11:30 – 12:30

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<td><strong>Big Data and Big Stuff</strong>&lt;br&gt;Chair: Dr Lindsey Appleyard&lt;br&gt;Room: 1.4</td>
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<td><strong>P13</strong>: Modelling Cultural Change by Implementing Technology for Multi-agency Information Sharing&lt;br&gt;<em>Kate Dobson, Dr Anitha Chinnaswamy, Dr Alexeis Garcia-Perez, Dr Zilia Iskoujina</em></td>
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<td><strong>P48</strong>: Modernizing Public Service Provision in the Sultanate of Oman&lt;br&gt;<em>Fatma Alzadiali</em></td>
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<td><strong>P17</strong>: Understanding the Role of Knowledge Sharing Within Online Communities&lt;br&gt;<em>Rebecca Beech</em></td>
<td><strong>P29</strong>: Surfing the Fourth Wave: A General Framework for Conceptualizing Big Data Research in the Internet of Everything&lt;br&gt;<em>Theo Lynn, Pierangelo Rosati</em></td>
<td><strong>P42</strong>: Legitimacy and Trustworthiness in the Era of Big Data: Tensions between Organisations and Individuals&lt;br&gt;<em>Dr Carlos Ferreira, Dr Alessandro Merendino, Professor Maureen Meadows</em></td>
<td><strong>P50</strong>: The Paradox of Personal Data Using under GDPR: A Higher Education Perspective&lt;br&gt;<em>Severina Iankova, Hongfei Liu</em></td>
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<td><strong>P22</strong>: A Comparative Study of the Differences between Data-Rich Two-Sided Platform Companies &amp; One-Sided Businesses &amp; the Role of Data as a Driver of Innovation&lt;br&gt;<em>Dr. Nigel Walton</em></td>
<td><strong>P33</strong>: The Role of Big Data and Analytics in Addressing Societal Challenges: A Systematic Mapping Review of the Literature&lt;br&gt;<em>Illias O. Pappas, Farzana Quayyum, Letizia Jaccheri</em></td>
<td><strong>P46</strong>: Trust and Commitment Effect on Information Sharing in Online Professional Communities&lt;br&gt;<em>Dr Rebwar K. Gharib, Professor Sally Dibb</em></td>
<td><strong>P53</strong>: The Use of Social Media by Police Forces to Enhance Public Confidence&lt;br&gt;<em>Dr Zilia Iskoujina, Jamie Wallis</em></td>
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<td><strong>Application of Big Data and artificial Intelligence</strong></td>
<td><strong>Innovation</strong></td>
<td><strong>Organisational Strategy and Big Data</strong></td>
<td><strong>Cyber Security</strong></td>
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<tr>
<td>Chair: Dr Anitha Chinnaswamy</td>
<td>Chair: Dr Helen Roby</td>
<td>Chair: Prof Lee Quinn</td>
<td>Chair: Dr Donna Wong</td>
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<td>P57: Dynamic Service Analytics Capabilities for Service Systems in the Global Big Data Economy – A Systematic Review and Agenda for Future Research. <em>Dr Shahriar Akter, Saradhi Motamarri, Dr Mujahid Mohiuddin Babu, Mario Fernando, Professor Samuel Fosso Wamba, Kathy Shen</em></td>
<td>P69: Cybersecurity and “Connected” Cars: An Auto Industry Game-Changer? <em>Garikayi Madzudzo, Dr Alexeis Garcia-Perez, Professor David Morris</em></td>
<td>P83: Organisational Ambidexterity – Responding to the Big Data Challenge <em>Claire Brewis</em></td>
<td>P98: An Experimental Study on Understanding and Managing Customer Reactions to Data Breach in Three Types of Firms <em>Vignesh Yoganathan, Hongfei Liu, Victoria-Sophie Osburg</em></td>
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<td>P61: SME Credit Assessment using AI and Big Data <em>Dr Huamao Wang</em></td>
<td>P73: Data-Enabled Job Gigification: Where Have All the Jobs Gone? <em>Professor Ashley Braganza, Dr Ana Canhoto, Dr Weifeng Chen</em></td>
<td>P88: Are Retailers Doing Enough to Meet the Big Data Environment Challenge? <em>S.B. Giglio, E. Pantano</em></td>
<td>P102: Individuals’ Smartphone Security Behaviour: Similarities and Differences in Developing Countries <em>Dr Mahmood Shah, Dr Nisreen Ameen</em></td>
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<td>P65: Social Network, Media Supervision, and Investment Efficiency: An Empirical Examination of Chinese Listed Companies <em>Dr Xiaoping Yang, Professor Panagiotis Andrikopoulos, Dr Dongmei Cao, Zonghan Yang</em></td>
<td>P76: Rising to the Digital Challenge: The Role of Innovation Champions’ Cognition and Attitude, in European SMEs <em>Dr Ana Canhoto, Dr Sarah Quinton</em></td>
<td>P92: Unravelling the Tacit in a Digital Age: The Inescapable Role of Inarticulable Insight <em>Professor Lee Quinn, Dr Barry Ardley, Professor Sally Dibb</em></td>
<td>P108: Lost in Translation? Persuasive Practices and Big Data Analytics <em>Dr Jeff Hughes, Professor Kirstie Ball</em></td>
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<td>P80: Data as an Important Tool to Decarbonise the Energy System: Emerging Business Models <em>Dr Helen Roby, Professor Sally Dibb</em></td>
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The presentation will highlight the international and national threat to the UK from cybercrime. This will focus on the national policing strategy of cybercrime and how it is being delivered regionally. This will be achieved by highlighting, threats and motivations, the policing structure, support available and general advice. This will concluded with a number of short case studies.

**Keywords:** Big data, big data capability, blockchain, supply chain, performance, research agenda.

Big data analytics (BDA) is emerging as an important topic among scholars and practitioners because of its high operational and strategic potentials. In this talk, after proposing a definition of BDA, I will present some of our recent works on the topic at the organizational and inter-organizational levels. Then, I will introduce our latest research on blockchain-enabled supply chain optimization and end with some promising research avenues.
ABSTRACTS SESSION 1
TRACK 1: Knowledge Sharing

Modelling Cultural Change by Implementing Technology for Multi-Agency Information Sharing

Kate Dobson, PhD Candidate, Centre for Business in Society, Faculty of Business and Law, Coventry University, UK. Email: dobsonk2@uni.coventry.ac.uk

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Dr Alexeis Garcia-Perez, Reader in Cyber Security, Centre for Business in Society, Faculty of Business and Law, Coventry University, UK. Email: alexeis.garcia-perez@coventry.ac.uk

Dr Zilia Iskoujina, Senior Lecturer in E-Business and Associate, Centre for Business in Society, Faculty of Business and Law, Coventry University, UK. Email: ac2729@coventry.ac.uk

Background

Inter-organisational information sharing systems are widely accepted as the norm in private sector organisations, from small-scale customer relationship management systems to highly complex, intelligent, information sharing systems. Local government trails behind in the adoption of such systems, Desmond and Koteche (2017) confirming that “the state, unlike private enterprise, is struggling to innovate”. Nevertheless, local government is increasingly required to deliver more with tightening budgets, so a push to find technological solutions to deliver a leaner but optimal service is vital. Sivarajah and Irani (2018) go so far as to suggest that councils could become leaders in how emerging technologies can be utilised for the benefit of the public, highlighting examples including London Borough of Enfield Council’s chatbot, Amelia, dedicated to dealing with resident queries or authenticating licences and a drone supplied by Kent Fire and Rescue used to survey the ruins of Grenfell Tower.
The introduction of new technologies is a critical move in any organisation, regardless of its size and reach. New technologies enable an organisation to not only exploit its established capabilities but also explore new businesses opportunities, both of which lead to innovation in its management processes, its products and services (Gibson and Birkinshaw, 2004; Guisado-González et al., 2017). Such innovation often takes the form of new frameworks redefining the existing human relations at the workplace.

Data is becoming more important in the way county councils deliver services to their residents. Services are provided by multiple agencies across the county council, however, to deliver an optimal, efficient and cost-effective service, it is required that the data is shared across agencies, but Cowell and Martin (2003) state that traditionally county council agencies operate as silos. To utilise data effectively, county councils are looking to provide the foundation for more integrated, user centric support across local providers by implementing a multi-agency information sharing technological solution (WODA, 2017). The county council understand the importance of a successful project to empower workers with the knowledge and understanding to engage with emerging data sharing opportunities with confidence. However, frontline workers have traditionally not been receptive to technological change and information sharing. Without the engagement of the system users, the frontline workers, the project to implement an information sharing technology solution will fail. A need therefore arises to investigate the attitudes, and the impact on relationships and culture, across the multi-agency local government when implementing an information technology solution.

Hence, the aim of this research is to develop a framework that models the cultural change within a complex organisation when implementing an information sharing technology solution.

To achieve its aim, the study proposes a longitudinal study that seeks to understand the cultural change that takes place within the organisation as the technology intervention project is implemented. The project will be well measured to include different settings and possibilities for better observations. Qualitative and quantitative methods including observation, interviews and surveys will allow for the study of those changes as part of an action-research methodological approach involving a sample of up to 3,000 individuals directly involved in the processes being studied.

The motivation for completing this research comes firstly from Kate Dobson’s membership of the Worcester Office of Data Analytics (WODA) committee, the force behind the project to produce and implement a single view information sharing system for Worcestershire County Council. The project and committee are still in their infancy, however, support and enthusiasm for the project is demonstrated by
leading agencies within the organisation, including the police, fire services, children’s services, acute hospital trusts and others. This research addresses an aspect of the project not yet addressed by the committee, though highlighted as a requirement for the success of the project and furthermore adds significant impact and value to the project.

Secondly, the research and the success of the WODA project is driven by Kate Dobson’s first-hand experience of the difficulties agencies have when multiple agencies have contact with a resident and they have no access to shared data. The research seeks to suggest a lasting solution that can ensure a better framework as far as the admission of new technologies in multi-agency working is concerned.

**Expected Outcomes:**

The anticipated result of the study will be to map the cultural change within the multi-agency organisation as the program of change progresses. The study will be expected to produce a framework for modelling cultural change when implementing technology to create a single view information sharing system for a multi-agency organisation. The research will be expected to fill the gap that exists in the research around organisational change management occurring due to interventions with technology in multi-agency organisations. In Worcestershire County Council, agencies will use the data system as a single view information sharing source of the residents of Worcestershire, ensuring efficiencies, no data duplication and an aid to provide the residents of Worcestershire with better local government services. This research will offer other Councils an insight of how the application of the system can be used to provide efficient and cost saving services. This research will also provide a justification that a framework for modelling cultural change is important in the course of implementing new technology in a multi-agency organisation.

**References**


Understanding the Role of Knowledge Sharing Within Online Communities

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Literature review

Due to the vast popularity of social media use, this has had a significant impact on how consumers share knowledge about personal interests and hobbies online. Subsequently, online communities within social media platforms have become a haven of rich and insightful comments and reciprocating conversations between consumers. However, there is a limited understanding within academia and managerially about what drives consumers’ knowledge sharing within an online community. Thus, warranting further research to explore what drives consumers to share knowledge within online communities. This study addresses this gap, building upon Wang and Fesenmaier (2004) study, which discusses the constructs participatory benefit and contribution incentive, which are shown within their findings to drive knowledge sharing. Participatory benefit consists of four benefits (hedonic, psychological, functional and hedonic) which are benefits in which consumers seek when sharing knowledge within an online community (Wang and Fesenmaier 2004). Contribution incentives entail of five incentives (instrumental, status, quality, efficacy and expectancy). These constructs can be seen within the conceptual model within Figure 1.

72% of UK consumers interact online, with 1 in 2 consumers using information found online to aid decision making to purchase a product (Mintel 2017, McKinsey 2013). Highlighting the importance of knowledge sharing online, and the importance for academics and managers to understand the drivers behind this. Literature discusses a co-consumed knowledge sharing which is between users within an online community, consumers freely share knowledge with each other in order to benefit each other (Cervellon and Wernerfelt 2012). The study intends to examine co-consumed knowledge sharing, as research warrants to understand the consumer perspective concerning knowledge sharing within an online community.

Literature highlights the anticipated shift towards consumer empowerment within online platforms, stating the consumers’ voice which organisations/brands need to listen to (Labrecque et al. 2013, Kozinets 1999, Levine et al. 2000). Prior literature suggests that it is not a one-way conversation between the
organisation/brand with the consumer, but a two-way conversation, where consumers are encouraged to share their opinions (Labrecque et al. 2013). Recent literature highlights the importance of how consumer empowerment positively impacts consumers knowledge sharing, Shen et al. (2014) suggest that 8 in 10 empowered consumers share knowledge online.

The study’s context consists of greening consumers clothing consumption, e.g. consuming/disposing/caring for clothes via alternative methods reducing consumer’s impact on the environment. For instance, shopping in charity/thrift shops, swapping clothes, having a capsule wardrobe, recycling clothes, and not washing clothes as often/with less detergent (Bly et al. 2015, Claudio 2007). This context is of importance at present, as researchers warrant further understanding on how to encourage consumers’ pro-environmental behaviour, and reduce their environmental footprint (Bly et al. 2015). Considering this study having an online aspect, research suggests that knowledge sharing online, can influence consumers decision making to purchase green products (Shen et al. 2012, Joergens 2004). Thus, setting the study within a green context can offer positive implications which entails of encouraging consumer pro-environmental behaviour.

Figure 1 illustrates the conceptual model derived from the literature review, and synthesizes the constructs and variables discussed above.

Figure 1: Conceptual Framework (Sourced form Author: 2017)

Considering the literature review and conceptual framework. Below are the research questions.

- RQ 1 - What roles do hedonic, social and functional participation benefits play within consumers’ knowledge sharing within an online community?
• RQ 2 - How does consumer empowerment and knowledge sharing inter-relate, regarding consumers narrative within an online community?

• RQ 3 - What is the relationship between the participation benefits in RQ 1, with consumer empowerment and knowledge sharing?

Methodology

The study’s philosophical underpinning entails of a subjectivist and interpretivist approach, and inductive approach. The study firstly undertook an exploratory study in order to understand consumers’ language and behaviour within an online community. The exploratory study entailed of a content analysis of YouTube videos which fit the context, and two focus groups. The insightful findings from the exploratory study informed the main study, which entailed of the methods, netnography and content analysis. NVivo 11 was used as part of the data analysis, to code the data alongside content analysis (Saldana 2016).

Initial main study findings

RQ 1:

The study finds that the most predominant participatory benefits driving knowledge sharing are social and functional, in particular when sharing knowledge about their personal experiences and consumption activities. A significant theme within the data is trustworthiness, which is suggested due to the consumers sharing personal knowledge when discussing their greening of clothing consumption e.g. sharing knowledge about their money issues, family and daily routine. In order to share such personal information, the aspect of trust is present within the online community.

RQ 2:

The findings highlight that co-consumed knowledge sharing, is the most predominant type within Twitter. Self-expression is a major theme, it can be suggested that consumers express themselves, via their opinions shared within others when reciprocating or when stating single comments. It can be suggested from the findings that consumers are empowerment from different situations within the online community. For instance, it can be suggested form the data that consumers are empowered by sharing their personal experiences e.g. buying a charity shop bargain, and then sharing knowledge. Also, empowered from their shared interests when sharing knowledge within the online community.
RQ 3:

The findings demonstrate a significant relationship between all three constructs, which is suggested within the theme of trustworthiness which reassures the consumers to share their personal experiences, which leads to consumer empowerment. This demonstrates that trustworthiness is an important factor within the online community which encourages knowledge sharing. It can be suggested that as a result of trust driving of knowledge sharing about personal experiences, this results in consumer empowerment which encourages further sharing of knowledge.

Managerial implications

The study delivers a deeper understanding about how/why consumers are sharing knowledge within an online community. Suggesting how greening of consumption knowledge is shared, thus brands/organisations can understand how to encourage knowledge sharing and pro-environmental behaviour consisting of consumers greening their clothing consumption.

Academic implications

The study provides warranted exploration into the drivers of consumers’ knowledge sharing within online communities. Further highlighting how future studies can use netnography to collect data on consumers’ behaviours within an online community. Due to the significant interest within online behaviour and study’s conducts research projects online, this study aims to deliver rich insights into how to successfully undertake the method alongside content analysis.

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A Comparative Study of the Differences between Data-Rich Two-Sided Platform Companies & One-Sided Businesses & the Role of Data as a Driver of Innovation.

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It is the purpose of this paper to analyse the extent to which data-rich two-sided platform companies have an innovation advantage over traditional one-sided firms. The dissertation explores the extent to which transformational business model innovation is being driven by the data-rich firms and how their unique platform ecosystems and networks provide them with a sustainable competitive advantage over linear one-sided mechanistic structures that are significantly less data intensive. The aims and objectives of the paper are outlined below.

Aims & Objectives

1) Conduct a literature review of business model theory to identify the differences between the static and dynamic perspectives and how the application of the Penrosian (1959) and RCOV approaches (Lecoq et al., 2006) might be developed further using data as the key integrating mechanism that drives business model innovation.

2) Undertake an analysis of platform and ecosystem theories and typologies and explore how they demonstrate the business model innovation advantages achieved by two-sided platform companies over established one-sided firms due to their unique configurations.

3) Critically review the relevance of the resource-based view (RBV) of strategy (including dynamic capabilities and the knowledge based view) and the value chain approach in relation to innovation in the data-rich Internet economy and the advantages of the two-sided platform companies.

4) Test the hypothesis that the two-sided data-rich Internet-based firms have a superior innovation advantage over the established one-sided firms using an innovation audit to evaluate the innovation capabilities of high growth two-sided Internet firms against established one-sided businesses.
5) Undertake an analysis of the research findings and consider the strategic implications of the results.

The paper undertakes a detailed literature review of theories and concepts relating to business models, platforms and ecosystems and the resource-based view of strategy. The review of business models highlights a shift towards the new knowledge-based economy away from the traditional industry-based one-sided business model perspective. The analysis also reveals that the transformational perspective has gained ground over the static business model theories due to the increase in business model innovation following the dot-com boom and bust. However, although the knowledge-based view (KBV) has become increasingly predominant over recent years, there has not been any consideration given in business model theory to the role of data. Moreover, the two-sided platform theories were also under-represented. This is what gave rise to the research gap.

The paper provides detailed definitions and explanations of the ecosystem and platform concepts including Gawer’s (2009) four types of platform model. The benefits of the frameworks are discussed and how they illustrate changes in competitive forces due to the high levels of business model innovation and how these contrast with the linear one-sided models.

Meanwhile, the paper provides a detailed critique of a broad range of RBV (resource-based view) theories including dynamic capabilities (Teece et al., 1997), Danneels (2008; 2012) second order competencies, Prahalad and Hamel’s (1990) core competences and Grant’s (1996) knowledge-based view. The importance of value networks (Peppard and Rylander: 2006) as a substitute for Porter’s (1990) traditional value chain is also considered as well as the RCOV (Demil and Lecoq: 2010) and the Wheel of Business Model Reinvention frameworks (Voelpel et al., 2004). Meanwhile, the chapter concludes with a discussion of the research gap and how it would be tested using an innovation audit methodology.

The literature review is followed by an explanation of the innovation audit research approach, how the innovation audit technique has evolved over the years plus the reason for its selection over other methodologies (Tidd and Bessant, 2013). A data analysis is undertaken where the results from 100 companies are analysed. These consist of 57 two-sided firms and 43 one-sided companies. Cronbach’s Alpha is used to test the reliability and consistency of the questions, followed by a correlation matrix, Mann-Whitney U test, cluster analysis, factor analysis and the use of box and scatter plots as illustrations.

The results of the innovation audit clearly revealed a significant differential between the median and mean scores for the two-sided and one-sided firms. This strongly suggested that the two-sided firms had
a clear innovation advantage over the traditional one-sided businesses due to their data-rich platform business models. The strategic implications of the results highlight the important role of data as a source of competitive advantage. Meanwhile, as the two major world powers (USA and China) battle for artificial intelligence (AI) supremacy, the extent to which limitations placed on data transfer and sharing by the European Union regulators might negatively impact upon the innovation advantage of European companies over the long-term.

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The ongoing digitization and the resulting increasing amounts of data in nearly every aspect of modern life have been the foundation for many modern technologies, which have become viable solutions for the industrial sector within the last years. These technologies hold great potential for substantial and sustainable changes in industrial manufacturing and additionally will enable engineers to design and develop the manufacturing processes of the future.

One of these technologies is additive manufacturing, also referred to as 3D printing, rapid manufacturing or direct (digital) manufacturing. The additive manufacturing term covers a number of different technologies, which can be distinguished by the materials used and the way these are processed. However, all of them are characterized by an additive manufacturing process, where material is added layer by layer to the work piece. They also have in common, that digital product representations, for example built with CAD-solutions or gained from three-dimensional point clouds, can be manufactured directly from the existing digital dataset, without the need for expensive or product-specific machines and tools. Furthermore, the production process in itself is carried out in a highly automated way, that does not require human intervention.

While additive manufacturing has been mostly used for prototyping in the past, it has recently started to make its way into industrial manufacturing, especially applied for individual parts or small and medium series production. This change also leads to the establishment of new business models, next to the necessary suppliers of 3D printing materials in powder, liquid or filament form and engineering companies specializing in the production of devices for additive manufacturing, there has also been a growth of service providers, such as 3D copy shops, where companies or customers can have their digital models printed and brought into a physical form.
High quality has become an extremely important criterion for businesses and customers alike, as it ensures that products meet the required specifications. To ensure that the required quality standards are met, a large set of data can be collected and evaluated manually, for example via sampling methods, or automated, for example via process-integrated measurements and intelligent systems.

Sampling methods usually examine the finished products geometrical shape and material properties after the manufacturing process has been finished. Depending on the sampling method and frequency chosen it is possible that specific faults are found a longer time after the production has started and that a whole batch of products is faulty and has to be disposed, which means a loss of materials, energy and production time. Especially in context with additive manufacturing this means additional costs, due the high investment costs for manufacturing systems, the expensive materials and the high energy consumption.

Sensors and data analytics for automated quality control processes in additive manufacturing. Process-integrated measurements allow the analysis of the production process on three different levels, as sensors can gather data on the machine, the production process and the material. The gathered data can be analysed and used to automatically identify or predict possible faults and to link those to possible causes with a fault-cause analysis. Possible sensor applications could include the optical measurement of geometry, material throughput, process parameters such as laser intensity, vibration signals or power consumption. The gathered data can be analysed by the application of artificial intelligence technologies, such as knowledge based systems or artificial neural nets.

Using this approach for additive manufacturing, by adding different sensors into additive manufacturing systems, will allow a process-integrated quality control, which will reduce waste and losses, while at the same time allows the production of high quality parts with little to no human intervention. This furthermore allows to reduce the number of personnel required for production tasks and will shift the focus from these tasks towards controlling tasks, whose main objective is the control of the automated production and quality control processes.

While this will reduce the amount of physical work it introduces a potential skill gap, as the required employees would need comprehensive knowledge on both, additive manufacturing processes and the way the utilized artificial intelligence systems make decisions, in order to carry out the control tasks. Furthermore, this might lead to a decrease of the overall workforce, as a larger number of processes can be automated and people might become unemployed and thus might have to switch to completely different fields of work.
Surfing the Fourth Wave: A General Framework for Conceptualizing Big Data Research in the Internet of Everything

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The Internet has evolved in a series of waves (Cisco, 2012). The first three waves were device centric. In the first wave, we went to a device, typically a desktop PC, to access the Internet. As mobile computing evolved, soon we brought our own devices with us and could access the Internet anywhere at any time. Today, we are in the midst of the so-called Internet of Things (IoT) where devices (things) are connected to the Internet and each other. These things comprise a multitude of heterogeneous devices ranging from consumer devices, such as mobile phones and wearables, to industrial sensors and actuators. Gartner (2017) estimated only 8.4 billion things were connected representing just over 0.5% of the total estimated connectable physical objects worldwide. Since the late seventies, numerous authors and commentators have put forward various visions of the “wired” or “network” society whose social structures and activities, to a greater or lesser extent, are organized around digital information networks that connect people, processes, things, data and networks (Martin, 1978; Hiltz and Turoff, 1978; Dijk, 2006; Castells, 2010). More recently, this concept has gained momentum and has been popularised as “The Internet of Everything” (IoE). Cisco (2013a, 2013b) forecast that the IoE will generate up to US$19 trillion of value for the public sector and private sectors by 2022 resulting from increased asset utilization and employee productivity, improved supply chain and logistics, optimized customer experience, and accelerated innovation.

For many, the volume, variety and velocity of data being generated by IoT and IoE is the most notable feature of these phenomena. Making sense of this so-called ‘big data’ is challenging for practitioners and researchers alike requiring significant technical upskilling in new specialized computationally-based research techniques to manage these massive stores of data and identify phenomenon and capture social and behavioural dynamics (Morabito, 2015; Colleoni, 2013). George et al. (2014) note that nascent state of big data research may result
in an initial “trade-off between theoretical and empirical contribution, and the rigor with which data are analysed.” While they note that the immense volume of big data, often unstructured in nature, introduces statistical challenges both in terms of correlative patterns and causality, they are nonetheless optimistic about the opportunities for new scholarly inquiry particularly in management research (George et al. 2014).

The objective of this paper is to propose and visualise a general research framework for researchers to conceptualise big data research in the Internet of Everything. The paper is focussed not on specific IoE-related problems but rather is concerned with any entity, process or event characteristic within the IoE and how it might relate to other characteristics associated with other entities, events or processes. IoE represents a convergence of multiple disciplines and domains and as such a ‘general framework should be capable of being used to understand IoE related problems and research questions in conjunction with widely accepted levels of generalisation (abstraction) in both the social sciences (nano, micro, meso, macro) and computer sciences (computation, algorithmic/representational, physical/implementation).

Furthermore, the framework should provide a sufficiently general abstraction of the IoE in that it facilitates sense making without getting in to a non-generalizable level of granularity.

Figure 1 A General Framework for Conceptualising Big Data Research in the Internet of Everything
Figure 1 illustrates the framework proposed in this paper. In this framework, five core entities are identified and defined – social actors, things, data and networks. Each of these entities has a myriad of characteristics that may change and evolve over time and inflect our understanding of how value can be generated and captured at different units of analysis.

- **Social Actors (S)**, while typically human, need not be; the framework is flexible enough to accommodate the emerging concept of computers as social actors (Lynn et al. 2015; Zhao, 2003).

- **Things (T)** are primarily physical however they may also be virtual and exist in augmented and/or virtual reality. Two key functional requirements of things in IoT and IoE are data sensing (collating data) and network connectivity.

- **Data (D)** here are discrete artefacts that can connect to other entities including data, for example through hashtags, and may be sourced from first party, second party or third party sources.

- **Networks (N)** are systems of interconnected entities and are both conduits and entities in themselves. Our framework accommodates networks between different types of IoE entities and those of the same type e.g. machine-to-machine (M2M) networks.

- **Events (E)** are occurrences of interest at given time and/or physical or virtual space. Processes (P) are obviously critical to how entities interoperate in the IoE and comprise general (e.g. communication) and domain-specific processes. They are essential to how value is created, captured and delivered in the IoE.

All entities and processes take place in an infrastructural setting and the framework recognises that in the IoE, additional data and metadata is created and collated at the infrastructural level. For example, depending on the networking, processing and storage capabilities of a given device, these activities may be centralised (in the cloud), at the edge (at the device) or in an intermediary layer (the fog) and not only store or process this data but also may extract other hardware, software, functional use or other ambient data that can provide different and/or new insights. Finally, each IoE use case is situated in space (physical or virtual) and time and it is against this context that different types of events occur and impact the IoE.

As the IoE can be explored from numerous perspectives, we argue that such a research framework can play an important role for researchers to make sense of a complex and dynamic environment and isolate the major constituents of the IoE experience. In addition, the proposed framework can be used as a general-purpose scaffold for crafting research agendas on the IoE and avoiding duplicated and unfocussed research endeavours. Its applicability will be illustrated with reference to an e-health use case.
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The Role of Big Data and Analytics in Addressing Societal Challenges: A Systematic Mapping Review of the Literature

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The evolution of Information and Communication Technology drives the digitalization process in many aspects of peoples’ daily life’s, as information and knowledge becomes available easier and faster to more people. With huge amounts of data being generated every moment from a growing number of sources, big data, analytics, and “smart” environments have received increased attention in driving organizational decision making (George et al., 2014, Pappas et al., 2018, Gupta et al., 2018).

Most organizations are focusing on how to give meaning to the data, and get value-driven answers that will increase their performance (Mayhew et al., 2016), while influencing at the same time (directly or indirectly) different members (or actors) in the society (e.g., individuals, businesses, governments, academia) (Chen et al., 2012). In the big data and analytics ecosystems, the different actors need to work together in various levels, while developing multiple capabilities and following specific innovation processes in order to create value and achieve social change (Pappas et al., 2017, Pappas et al., 2018). It is important to understand these actors, the data they generate, their interactions, and which are the necessary capabilities that they need to develop to harness the endless potential offered by digital transformation.

The value of big data is clear for addressing technical and business problems (Chen et al., 2012), however research on the social value of big data is not at the same level (Agarwal and Dhar, 2014, Zicari, 2014), raising the question on how well big data can be used to address complex social problems. There are hundreds of publications around big data and their applications, as well as an increasing number of publications, from various fields, discussing social innovation and how it can help societal transformation (Phillips et al., 2015, Voorberg et al., 2015). To achieve this much needed transformation combining two elements can help; the social innovation process along with the innovative practices, guidelines, and policies that stem from the application of big data and analytics (Pappas et al., 2017). Thus, there is a need
for a mapping study in the area allowing us to develop a research agenda and roadmap of big data and analytics and their applications leading to societal change.

The mapping can help us understand what conditions can enable successful solutions, combined with strategies, tactics and theories of change that lead to lasting impact (Cajaiba-Santana, 2014, Pappas et al., 2017, Zicari, 2014). Furthermore, the mapping will allow to capture the needed capabilities, resources, and conditions that the big data actors need to develop or acquire in order to manage big data applications, increase social value and solve societal challenges and create a sustainable society. To contribute to the creation of sustainable societies, we have done a systematic mapping of the literature related to big data and analytics and their applications leading to social change. A systematic mapping review is a process to analyze the properties of the research papers in a specific research field (Petersen et al., 2015). The objective is to offer a map of the research that is being done, thus offering the basis for a reflection process among the researchers in this field.

For the systematic mapping review, studies were eligible for inclusion if they were focused on the topic of how big data and analytics, and their applications, can foster social innovation, and lead to societal impact, change and transformation within a social innovation ecosystem (Pappas et al., 2017). For example, papers that deal with contemporary technologies that are based or generate big data are considered as relevant. We do not search for the term social value, as it is a more general term addressed by many studies without though having in mind social good or societal challenges. However, if a study clearly addresses social value then it is included in the analysis. The systematic mapping review included research papers published in academic outlets, such as journal articles and conference proceedings, as well as reports targeted at business executives and a broader audience, such as scientific magazines. Given that our focus was on the societal transformation that big data entails, we included quantitative, qualitative, and case studies. Since the topic of interest is of an interdisciplinary nature, a diversity of epistemological approaches was opted for.

Based on the search with keywords, a total number of 593 publications were found. After removing the duplicates, 465 publications were considered and categorized as relevant or irrelevant to our study; which left us with 158 relevant papers. The findings show that papers addressing big data and analytics for social good appear to be published after 2012, which makes sense since it is shortly after the term big data gained increased popularity. The main fields of publications include social sciences, political science, management, service management, artificial intelligence, internet of things. Also, the topics vary and include smart cities, ethics and privacy, open data, data sharing, digital transformation, data science,
knowledge management, communication, sustainable development, innovation. The contributions of the publications are conceptual/theoretical, empirical, or methodological, with most of them being theoretical. Although there are many empirical studies that employ big data and analytics and contribute in a way to the social good, they do not use terms social change/impact/transformation/good, thus they are not included in our analysis. Similarly, the findings show that many studies in management or information systems do not use these terms in their abstract or titles even if the field needs to address societal value (Agarwal and Dhar, 2014, Pappas et al., 2018, Gupta et al., 2018) along with business value, highlighting the need for the mapping of the field offered by this study.

References


Introduction

The tension between the two observable and measurable societal reference points of structures and agents form one of the central debates in social research.

Structures are enduring, relatively stable and scalable patterned groupings of individuals (Sewell, 1992). They resemble the scaffolding within which human activity is organised. Examples include governments, communities, and corporations. They enable action to be taken by individuals by releasing resources (capital, expertise, geographical coverage), thus leveraging the impact that individuals can have in mastering events and shaping outcomes.

Each of us is an agent. Agents are causal, self-interested, action driven but risk averse individuals (Eisenhardt, 1989) with tacit knowledge of how the world works. The restless energy of agency mobilises the resources possessed by structure in pursuit of personal (and group) outcomes.

However, structure and agency do not form a duality. Structures are altered by the activity of agents, who in turn, are altered by their exposure to, and interaction with, structures and institutions (Wight, 2006; Giddens, 1984). The resulting structuration of society comes part of the way towards explaining why and how change occurs in society, how new norms are adopted and structures altered to accommodate these norms.

Trust works at the confluence of structure and agency, an interchange between functionally organized economic and administrative systems structures and communicatively structured "life-world" agents (Mintzberg & Waters, 1985; Baxter, 1987). It promotes information exchange (Butler, 1999) and the
resultant interactions can lead to opportunity, change, transformation and growth (Savolainen and Lopez-Fresno, 2013). The manifestation of this blending of structure and agency is the formation of risk taking relationships where both parties can benefit or suffer (Mayer et al, 1995; Kong, Dirks & Ferrins, 2014).

Trust provides a binding between structure and agents, part interpersonal relationship and part structured interaction. As such, it becomes a qualified reliance on information in order to counteract the unknowability of delegated actions in search of goals (Gerck, 2002). It acts as a pathway between uncertainty and reliance and trust ‘acts as a bridge’ to overcome missing information (Luhmann, 1979; 2018).

In online environments trust is an attractive vector for cyberattack, but also offers a way to provide a measure of certainty that is not wholly conveyed by, or dependent upon, the online medium in which the interaction takes place. Approaching the problem by considering structure and agent represents diversified and shared risk reduction cybersecurity strategy options for organisations.

**Theoretical Contribution**

The study and practice of cybersecurity in distributed information systems is associated with assuring the system trust of the computing machines that power the internet (Jøsang et al, 2007; Pennington, 2003). However, the source, quality and attitude of the recipients of such information (Nurse et al, 2011) is also a major influencer of delegation behaviour in online environments, suggesting that the underlying drivers of cybersecurity behaviour are at least partly psychological, predicated on the needs of agents in their dealings with organisations, especially their need for safety, personal growth, and to belong to a supportive community (Maslow, 1943).
The research in progress presents a multilevel model (see above) of trust formation that synthesises prior work in the areas of social exchange, agency theory and planned behaviour. It explores the interplay between the ‘top down’ generation of trust belief as fostered by trustworthiness and the ‘bottom up’ earning of trust by repeated interaction and communication.

It presents an original contribution to the theory of trust formation in blended socio-technical environments, and proposes a taxonomy of cybersecurity protection based on the needs of participants in exchanges online. As such it synthesises and extends the extant research and theories in the field of trust with those of the discipline of cybersecurity.

**Methodology**

Following a rigorous item purification and development of some new items, a 45-item survey instrument was distributed online to 400 members of the UK general public in October 2018; using Qualtrics. Participants provided scenario based answers to questions about their interactions and attitudes to retail, banking, and the updating of electronic medical records.

The quantitative questionnaire results were analysed using Confirmatory Factor Analysis and Structural Equation Modelling (Hair et al, 2006). The resulting statistical analysis phase will be used to derive paths and relationships between mediating and moderating independent and dependent variables and their associated constructs.
Implications and Conclusions

The work has implications for trust development in the relationship between businesses and customers through an increased understanding of the role of structural and communication factors in social exchanges. The implications of the work include reframing cybersecurity as a risk sharing relationship enabling mechanism. The tested model represents trust as a mediating information system (Jones & Karsten, 2008) that can help to reconcile the deliberate and emergent strategies available to organisations in managing the threats (and opportunities) that business to customer cybersecurity awareness and management offers.

The research is practitioner relevant due to the introduction of the EU General Data Protection Regulations (GDPR) in May 2018, extending the rights of citizens and the responsibilities of organisations to manage personal information. The research evaluates the measures in the legislation in terms of trust, communication behaviour and trustworthiness in exchanges and this will outline the practical cybersecurity controls that can be taken by organisations to protect themselves and their customers. It also provides a useful baseline for future research in these areas.

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The prominent role of data in information-driven organisations is sometimes summarised in the statement that ‘data is the new oil’ (The Economist, 2017). As the growth of big data accelerates, a better understanding of the opportunities that the new phenomenon offers - and of the challenges it poses – is needed (Mayer-Schönberger & Cukier, 2013). Previous studies (Wang & Hajli, 2017) show the potential of Big Data to foster productivity, efficiency, and growth in businesses and industries. On the other hand, Big Data has the potential to damage existing social contracts (Mayer-Schönberger & Ramge, 2018), possibly resulting in societal disruption through mass unemployment, increased inequality and reduced social cohesion (O’Neil, 2016).

As a result of these tensions, Big Data has the potential to compromise how individuals evaluate organisations in terms of how legitimate and trustworthy they are. For instance, the recent #DeleteFacebook campaign, which followed the Cambridge Analytica scandal (Cherney, 2018), shows how the individuals’ evaluation of a business as legitimate and trustworthy can compromise and disrupt an entire organisation. Legitimacy refers to a ‘generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions’ (Suchman, 1995, p. 574). On the other hand, trustworthiness is a multifaceted concept that refers to the ability, benevolence and integrity of a third party (trustee) to carry out its performance (Mayer, Davis, & Schoorman, 1995). Ability refers to the perception that a third party has a certain set of skills to carry out its mission and achieve its goals in a competent way. Benevolence refers to the perception that a third party has a genuine concern for the well-being of its stakeholders. Integrity
refers to the perception that a third party will adhere to a set of values and principles that are acceptable to stakeholders.

The disruption brought about by new Big Data business models can impact individuals’ judgements about the legitimacy and trustworthiness of organisations using Big Data. This creates a tension between individuals and organisations, as the latter need individuals’ legitimacy and trustworthiness to access resources. If individuals judge an organisation as illegitimate and untrustworthy they may choose not to share their data with it. As a consequence, businesses may lose market share, may have their reputation compromised or may close down – as shown in the Cambridge Analytica example. Most individuals will only engage with organisations seen as legitimate (Deephouse, Bundy, Tost, & Suchman, 2017) and/or trustworthy (Baer et al., 2017). In this vein, McKnight, Cummings, & Chervany (1998) point out that the perception that a third party (for instance, a business) is competent, benevolent and honest will affect the engagement of individuals with that business. As a consequence, to be able to gain access to the resources of others (such as getting access to Big Data), organisations need to create trustworthy relationships with individuals. Therefore, the key to the success and development of the organisation lies in gaining the trust of present and potential stakeholders (Leblanc, 2016).

Existing literature on Big Data (McAfee & Brynjolfsson, 2012; Sivarajah, Kamal, Irani, & Weerakkody, 2017) has given little consideration to the extent to which the combination of legitimacy and trustworthiness play a meaningful role in the Big Data context. It remains unclear how individuals respond to an organisation that is perceived to be (il)legitimate or (un)trustworthy in the era of Big Data. Therefore, by combining the trustworthiness (Colquitt, Scott, & LePine, 2007) and legitimacy literature (Suddaby, Bitektine, & Haack, 2017), this theoretical study seeks to map out the individuals’ responses to (il)legitimate and (un)trustworthy businesses. For instance, why are some individuals reluctant to share their own data with certain organisations? On the other hand, why are some individuals prone to share their own private data in exchange for a given service? Or how do individuals react if a business is perceived as legitimate but untrustworthy? We believe that the concepts of legitimacy and trustworthiness can help us to understand individuals’ responses to organisations’ actions as a result of a proper or improper utilisation of Big Data.

This study makes important contributions to both theory and practice. First, our research theoretically contributes to the debate on legitimacy and trustworthiness, by bringing the two concepts together in order to produce a framework of potential individual reactions to illegitimate and untrustworthy practices. Second, this research theoretically contributes to the Big Data literature in the management
field by shedding light on how legitimacy and trustworthy play a role in the era of Big Data. Third, this research has important implications for businesses. Businesses will be able to put forward strategies to improve their legitimacy and trustworthiness, by understanding how individuals react to their actions. By doing so, businesses will have a better understanding of how to regain their legitimacy or trustworthiness (if compromised) in order to collect more quality data.

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Trust and Commitment Effect on Information Sharing in Online Professional Communities

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Keywords: Information Sharing, Trust, Interpersonal Trust, Website Trust, Commitment, Online Communities, and Online Professional Communities.

Prior research demonstrates the importance of information sharing for the success of organisations. Online professional communities are considered to be effective platforms enabling the decision makers of organisations to connect and interact with other like-minded people and share information. This information sharing is one of the crucial driving factors for effective strategic decision making, organisational development, and is a powerful driving force of innovation within organisations. Numerous other studies have examined the factors affecting data and information sharing in different online platforms, including for online professional and online business communities.

Research in this area, however, is still evolutionary for two main reasons. First, the vast majority of prior research examines the information sharing phenomenon by focusing on the quantity of information shared in various online settings. The research presented here shows that the quality of information shared is also important and needs attention when investigating the phenomenon. Second, trust and commitment have been seen to be compelling factors affecting information sharing in various electronic domains, with these concepts being studied extensively by many scholars. Despite this substantial literature, this paper argues that there is still limited understanding of the relationship between these two concepts and information sharing requires further examinations.

In particular, prior studies have paid limited attentions to the multi-dimensional aspects of trust and commitment, and to the complex interrelationships between these constructs and information sharing in the online domain. To fill these gaps, this paper proposes a framework to better understand how different dimensions of trust (interpersonal trust and website trust) and different aspects of commitment (continuance commitment, affective commitment, and normative commitment) influence both the
quantity and quality of information shared in online professional communities. Data were collected from 292 participants (mostly business owners and managers of organisations) who were members of several professional communities on LinkedIn. The framework was then tested using the Structural Equation Modelling (SEM) approach applying the Partial least squares (PLS) technique. The analysis shows that interpersonal trust positively influences both quantity of information ($\beta = 0.24$ at $p \leq 0.001$) and quality of information ($\beta = 0.21$ at $p \leq 0.001$) shared in online professional communities. Similarly, website trust is found to have a positive impact on both quantity of information ($\beta = 0.40$ at $p \leq 0.001$) and quality of information ($\beta = 0.41$ at $p \leq 0.001$). Among the three types of commitment, only affective commitment is found to positively influence the quantity ($\beta = 0.21$ at $p \leq 0.01$ and the quality of information ($\beta = 0.16$ at $p \leq 0.05$). Moreover, interpersonal trust is shown to have a positive impact on affective commitment ($\beta = 0.56$ at $p \leq 0.001$). The results of a post-hoc analysis show that affective commitment mediates the relationship between interpersonal trust and both quantity and quality of information shared in online professional communities.

This study makes several significant contributions to existing research and knowledge and has significant practical implications for online professional community providers. From a theoretical viewpoint, this study provides empirical evidence supporting the importance of information quality in online information sharing domains, suggesting researchers should pay greater attention to the phenomena. The post-hoc analysis scrutinised the interrelationships between interpersonal trust and the three types of commitment, and their overall influence on information sharing. Surprisingly, the results revealed that the relationship between trust and commitment is far more complex than previously shown. This study provides a stepping stone for future research in the area of data and information sharing in different electronic domains. From a practical perspective, the finding of this research suggest that community providers should provide a mechanism and implement effective strategies to improve the quality of information shared among community members. They should also improve the quality of their online platforms, take further steps to develop and sustain community members’ trust, and provide effective means to help them develop a stronger sense of belonging and attachment to their online professional communities.
This research focuses on modernizing public service projects in the Sultanate of Oman. It explores the opportunity for modernizing these Services. It offers awareness and better understanding of how administrative elites explicate and enact the principles of New Public Management “NPM” in modernizing Public Service and explores the institutional capability of Oman’s public sector to develops a conceptual model of modernizing public service provision in Oman. From this orientation, the theoretical aim of the research is to examine the main drivers for improvement and modernizing services in the public sector in Oman, investigates how and to what extent the doctrine of “NPM” impacted on Oman. Also, how elements of “NPM” express themselves in management practice in Oman’s public sector organisations and identify barriers and facilitators of modernizing public service provision in an emerging economy context. The research builds upon and extends existing theorizing about NPM and draws practical implications on its implementation for the modernize Public Service initiatives, in Oman and beyond.

In order to achieve an empirical domain, the research is based upon systematic comparison of five in-depth case studies, examines projects from different sectors (education, health, technology, manpower, and civil service) that were completed during the period from 2011 to 2015, to identify, evaluate and compare the work that has been done in each situation and recognize which indicators must be monitored and what more needs to be done. All selected projects are electronic database systems designed to organize and streamline the work procedures of these organizations, replacing manually paperwork by technology, aimed at achieving Oman’s e-Governance initiative of transforming Oman into an advanced, world-class e-Government by seamlessly integrating all Ministries and Government entities to provide faster and more effective public services online. By facilitating better interaction between citizens, businesses and Government. This initiative will take Oman forward to a new age of progress, prosperity and strive to empower people and transform Oman for the better by creating these kinds of projects.
Furthermore, this study aims to learn from the impact of evaluation conducted on all these projects and apply these lessons to other projects. Moreover, the conducted results probably will help the researcher to build the theoretical framework which will be the first for staff, funders and partners on considering ways of modernizing public service provision in the Sultanate of Oman and drawing an improvement action plan for eliminating the negative aspects sited in the projects. The research using the theory of change methodology to review substantial change initiatives in the public services of Oman with a view to making best practice recommendations, which are supposed to contribute to the development of public services in the country. It is hoped that this will help in introducing broad changes to the final outcomes which can be the efficacious and successful indicators for the user satisfaction.

The data has been collected through semi-structured two types of interviews:

- Administrative elites, key staffs, experts, policy makers in the government: to examine the public sector in Oman and what has been done in public sector improvement and modernizing public service.
- Members and stakeholders in the selective projects: to examine the work that has been done in each project.

Moreover, official government documents and evaluation reports will be reviewed.

This thesis identifies and fills gaps in the study of modernizing public service in developing countries, which is an under researched area. It contributes to the existing literature that emphasizes improvements in public service organizations in developing countries generally, and within the Omani public sector specifically.
The Paradox of Personal Data Using under GDPR: A Higher Education Perspective

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Research Background

The General Data Protection Regulation (GDPR) was introduced in December 2015 and became law on 25th of May 2018 and replaces the Data Protection Act 1998 in the UK (Tankard, 2016: ICO, 2018). GDPR is a Europe-wide law that sets out requirements for how businesses will deal with personal data. With the scandals of Cambridge Analytica and Facebook misuse of personal data, the handling of personal information as well as the monetisation of data is under serious scrutiny (Datoo, 2018). With the huge value of personal data and the growing awareness of the way data is being used and mined, organisations and institutions can no longer adopt low hearted attitude towards customer data.

Research Rationale

With over 2 million students enrolled within higher education in the UK in 2016/2017, the implications of GDPR within the educational sector is highly significant and requires further research (Statista, 2018). Across 162 higher education institutions in the UK, an enormous amount of personal data is collected, processed and used for various purposes (Universities UK, 2018). Unlike any other industry, higher education sector shoulders the responsibility of being a role model in the society and plays the enlightening role for the future workforce (Procario-Foley and Bean, 2002). Universities usually attract particular attention from the authority when implementing new rules, whilst students always keep in pace with social trends. Under the government’s tightened regulations, individuals also becoming more conscious about revealing their personal data (Chua et al., 2017). Therefore, universities need to be more careful about how they handle the data of current and prospective students, whilst promoting trust and transparency as an institution (Mintel, 2018).

With the higher education system being heavily reliant on continual influx of potential students and GDPR also strictly governing what can or cannot be done with personal information, the education system
provides a highly suitable sector to investigate the implications of the new regulations (Hemsley-Brown & Opalatka, 2006). GDPR sets up boundaries of universities’ expectation towards the data using and shapes the way that universities utilise the students’ personal data to fulfil the marketing and management oriented tasks. However, the scarcity of empirical research on GDPR and its application poses an urgent call for better understanding of the GDPR’s implications in industrial use. Higher education sector handles abundant amount of information and reflects the influences of GDPR on marketing activities and internal management. Therefore, this research aims to investigate how the higher education sector within the UK is affected by GDPR and what implications GDPR brings to the intuitions.

**Theoretical Contribution**

Marketing practices within organisations are being transformed due to increased digitalisation, with online data representing opportunities for targeting wider audiences on a global scale (Quinn et al., 2016). Thus, data security, privacy and management of personal data are becoming highly significant and needing to be further explored in the ever-digitalising society, especially under the regulations of GDPR (Fosso Wamba et al., 2015; Hou et al., 2018; van den Broek et al., 2018; Bernard-Wills, 2017). To address such urgent calls, this study draws on institutional theory and aims to provide modern understanding of factors that impact data management and data security within the UK educational sector from the perspectives of data owners and data managers, respectively. According to institutional theory, it is often the case that governmental demands are not always met within organisations (Oliver, 1991), while organisations’ demands might also be inconsistent with individuals within the organisation. Such dynamics create a government-organisation-individual triangle dilemma regarding personal data protection and management (Hsu et al., 2012). The findings of this study are expected to contribute to the extension of institutional theory in the digitalised context.

**Research Method**

With GDPR being released in May 2018, relevant research is still limited and requires further investigation. This study applies mixed methods research, specifically exploratory survey and in-depth semi-structured interviews in order for unanticipated aspects and narratives of individuals involved in the educational system within UK to be revealed (Rynes & Gephart 2004).

To demonstrate an integrated view on the GDPR’s implications and mechanism in influencing the activities within the universities, participants in this study are divided into information giver (i.e. students) and information collector (i.e. universities). The reason for choosing quantitative method in the first phase of
the study is to validate theories about how and to some extent why a phenomena, in this case regulations by GDPR, are managed (Johnson & Onwuegbuzie 2004). Approximately 300 surveys will be distributed to current students within 3 different universities. The aim is to understand the students’ awareness and perception of the GDPR’s application in the universities and reflect whether students have particular expectation about how their personal data to be handled and used by the universities.

In contrast, on the information collectors’ side, there are many responsible parties that are influenced by GDPR. Based on Yang and Maxwell (2011), we mainly focus on three perspectives of inter-organisational information using: organisational and management perspective (e.g. marketing department), technological perspective (IT department) and political and policy perspective (e.g. legal service department), and will invite at least two employees from each sector for interviews. In this phase, we aim to investigate the impact of GDPR in real life educational settings, deeper description and understanding of the actual implications, barriers, and processes will be gained (Pratt 2009; Rynes & Gephart 2004).

The main reason for choosing mixed methods is due to the increasingly complex, dynamic and interdisciplinary research world that requires the use of multiple methods to facilitate and provide superior research (Johnson & Onwuegbuzie 2004). Furthermore, data security and privacy is becoming hugely important that requires dynamic research method. As a result, two studies will be carried out within one overall study answering broader and more complete range of the research question, due to the fact that no single method or approach is confined (Jick 1979: Johnson & Onwuegbuzie 2004).

Analysis and Discussion

Data will be collected and analysed by February 2019.

References available upon request.
The Use of Social Media by Police Forces to Enhance Public Confidence

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This paper aims to analyse and benchmark the usage of social media by various police forces to provide recommendations of the best methods and frequencies for public engagement by police forces via social media.

The usage of social media has increased tremendously (Resnick, Adar, and Lampe, 2015; Moreno, Navarroa, Tenchb, and Zerfass, 2015; Huang, Baptista, and Newell, 2015). It is clear whether social media is liked or disliked, it cannot be ignored due to its huge impact on revolutionary changes in communication in our society. In the conversation age, organisations need to listen to, and engage with, a wider range of stakeholders in order to be successful (Moreno, Navarroa, Tenchb, and Zerfass, 2015). Therefore, government agencies are increasingly moving from simpler towards more sophisticated and complex practices of social media use, which are characterised by important innovations at the technological, political and organisational level (Ferro, Loukis, Charalabidis and Osella, 2013). However, despite the popularity of social media, only 43% of the organisations are conducting any measurement involving blogs and social media, and most of this research focuses upon communication outcomes such as the amount of information being disseminated (Wright and Hinson, 2013 referenced in Moreno, Navarroa, Tenchb, and Zerfass, 2015). Therefore, we need to ask the question on whether government agencies need to concentrate more on the amount of the information or the content of the information, by other words how organisations need to balance quantity versus quality of the information circulated.

This is even more important for such public services as police forces, as there are some issues the police need to address. On the 19th of August 2014, several media sources, such as BBC and the Guardian, published news that hundreds of police officers were under investigation for breaching social media guidelines by posting racists or threatening comments on Twitter or Facebook, or making friend requests to victims of crime. About a seventh (14%) of the cases reported resulted in no further action at all. The
majority of other cases were dealt with through advice being offered to the officer in question. Steve White, Police Federation of England and Wales Chairman, stated that ‘forces must ensure officers are effectively trained and aware of the latest social media protocols’.

In any other organisation, from one hand police forces cannot ignore the importance of social media and its popularity in usage. From another hand, police forces need to be extremely careful how they can utilize the benefits of social media usage in line with the latest rules and regulations. Despite the popularity of social media and despite the necessity of increasing public perception, police forces will not be using social media in the way commercial enterprises or celebrities use social media. Therefore, the policies of social media usage among police forces need to be carefully designed. In order to analyse how social media is used by police forces and in order to understand what strategies currently are in place and what improvements police forces can make in the future, we need to benchmark usage of social media by police forces and based on our analysis provide best methods and frequencies for public engagement.

To evaluate the use of social media by police forces, we applied content analysis techniques (Stemler, 2001; Lai and To, 2015; Schwartz and Ungar, 2015). Twitter, Facebook, YouTube, and Instagram were found as the key to operations and therefore were selected to monitor. In order to provide benchmarking for police forces’ activities, social media accounts of police forces in local (East Anglia, UK), national level (UK) in comparison with another country’s police forces that successfully use social media for their public engagement (USA) were monitored. Local police forces were selected according to their geographical proximity to each other. They were as the following: Cambridgeshire Police, Hertfordshire Police, Suffolk Police, Norfolk Police, Bedfordshire Police, Essex Police, Kent Police. National forces (Metropolitan Police, Greater Manchester Police, Police Scotland, Police Service of Northern Ireland, Heddlu South Wales, Heddlu Gogledd Cymru (North Wales)) were selected according to the coverage of the large areas in the UK, and as a result produce a lot of content for comparison and reference. The US police forces (New York Police Department (NYPD), Los Angeles Police Department (LAPD), Dover Police (US), Baltimore Police) were chosen to benchmark because they are known for producing content that gets a reaction, is engaging or makes headlines (good and bad). We analysed four social media accounts in 16 police forces; in total 64 accounts. Then, the engagement and sentiment analyses techniques were used to analyse the data.
References


KEYNOTE SPEAKER - PROFESSOR BLAINE PRICE

Smart Homes for Older Adults: Supporting Grandad or spying on Granny?

The decreasing cost of internet connectable sensor makes it relatively cheap and easy to instrument a home with off the shelf devices resulting in the ability to collect vast amounts of data from a single home. Advances in machine learning can allow us to process this data to infer what the occupants are doing at a given time and to recognize when they deviate from normal patterns. With our aging population and pressures on medical and care home facilities, these technologies have the potential to help more older adults age safely at home through automatic monitoring to catch a possible decline before it results in a hospital or care home admission. In this talk I will discuss some of the technical, social and legal challenges of these technologies and how they might be resolved.
1.0 Introduction

The progressive digitisation of organisational processes and socio-technical interactions, is elevating the role of ‘data’ and some term it as ‘oil for digital economy’ (Wedel and Kannan, 2016) and some term it an ‘asset’ (Davis and Patterson, 2012). The characteristics of big data (BD) are itself evolving from 3Vs to 7Vs namely: volume, velocity, variety, veracity, value, variability and visualisation (Mikalef et al., 2017). Increasing interest in BD both from academia and practitioners substantiate the explosive growth and interest on harnessing the power of Dynamic service analytics capabilities (DSAC) for research as well as business decision making (IDC, 2017; Wedel and Kannan, 2016). Riding on this wave of optimism, this paper explores where does DSAC fit within data-driven markets, and what capabilities are needed to derive informational and decisional value. This study focuses on service analytics capabilities of ‘service systems’ which are defined as a value co-creating process using resources, such as people, technology,
organization and shared information to satisfy customer needs better than competing alternatives (Akter et al., 2016a). Cardoso et al. (2015) define service analytics as “the process of capturing, and analysing the data generated from the execution of a service system to improve, extend, and personalize a service to create value for both providers and customers”. With the advent of big data now firms have much more dynamic capabilities to sense, seize and transform service adaptiveness and innovation for service systems (Teece et al., 2016). Although big data analytics has become of strategic importance for service systems, leveraging dynamic analytics capabilities continues to be a challenge. Motivated by this challenge, the main research question we address is: what are the dimensions of dynamic service analytics capabilities for service systems in big data economy?

2.0 Research Methodology

The research is based on a systematic literature review and 28 in-depth interviews (n=28). To address the research gap, the review has been undertaken using Scopus, Web of Science (WoS) and Google to extract relevant extant literature on this subject matter. We searched for service analytics, dynamic service analytics, service analytics culture, data-driven services etc. A total of 321 retrieved articles are screened based on first title, abstract, keywords and then body of the text. Narrowing the list to 50 articles, final lists of 20 relevant articles were chosen for deeper analysis. In addition, we conducted a thematic analysis of 30 in-depth interviews following the guidelines of Braun and Clarke (2006).

3.0 Findings on Service Analytics Capabilities

Overall, the findings put forward six dynamic service analytics capabilities (i.e., management, technology, talent, data governance, model development and service innovation capabilities) with future research agenda.

3.1 Management Capability

Management capabilities are reflected in a firm’s ability for planning, investment, coordination and control of BD deployments. Akter et al. (2016b) propose that a firm’s three distinct capabilities comprising of management, technology and talent define its big data analytics capabilities (BDAC). To realise full benefits, firms need to facilitate a seamless coordination across its functional divisions so as to ensure that all entities operate for a common vision and based on single truth (Kiron et al., 2014).

3.2 Technology Capability
A service system’s technology capability is composed of its infrastructure’s connectivity, compatibility and modularity (Akter et al., 2016b). These characteristics enable to flexibly configure data resources to facilitate real-time decision making (Davenport, 2012, Barton and Court, 2012).

3.3 Talent Capability

Talent capability consists of management of technology, technical skills, business knowhow and relational knowledge (Akter et al., 2016b). Matured organisations invest in training and enhancing their employees’ analytical skills thereby create a competitive advantage (Ransbotham et al., 2015). These skills range from management of technology, technical know-how, business knowledge and relational knowledge which enable the people to deliver their job responsibilities in a big data-driven service system.

3.4 Data Governance Capability

The data governance capability consists of four component areas of competency: data architecture, life-cycle management, master data management, and privacy and security management (Wang et al., 2016). Service systems especially, healthcare and financial firms need to focus on who have access to which data, their continuous business need for it and how to protect the privacy of the individuals (Davis and Patterson, 2012, Wang et al., 2016). While DSAC promises big benefits, robust service systems to ensure security and privacy are still at its infancy (Demirkan and Delen, 2013, Motamarri et al., 2017).

3.5 Model Development Capability

For DSAC to have an impact on a service system’s performance, data must flow in a modular way from its inception to the point of service delivery or every touch-point where a customer interacts with the firm (Hall et al., 2016, Kiron and Shockley, 2011, Vargo and Lusch, 2004). Firms can build their models (Descriptive, Diagnostic and Prescriptive) via aggregation, sampling or selection to reduce the dimensionality of structured BD (Wedel and Kannan, 2016).

3.6 Service Innovation and Adaptiveness Capability

Service innovation refers to the refinement of an existing service or origination of a new service altogether (Maglio and Chei-Hyeon, 2016). DSAC has a massive capacity to harness data from multiple sources is able to provide deeper insights about the market, competition, and customer’s perceptions about their services vis-à-vis competition (Wedel and Kannan, 2016).
4.0 Implications

The foundation of the DC framework is suitable for service systems in big data environment to gain an edge in the market. Service systems constantly focus on developing dynamic analytics capabilities that can adapt, orchestrate and innovate with market and technology developments (Teece, 2014). Despite the growing momentum of service analytics capability in big data environment, there is a paucity of research on service analytics capability model and its relevant dimensions. It is no surprise that Ostrom et al. (2015) have identified data-driven service analytics as one of the critical service research priorities. Thus, this paper presents a useful starting point of dynamic service analytics capabilities for service systems in the big data economy with an agenda for future research.

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References can be provided upon request.
SME Credit Assessment using AI and Big Data

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Big Data and Artificial intelligence (AI) is bringing significant changes to our lives. Nevertheless, there is a lack of an investigation into the effects of these state-of-the-art technologies on society, organizations, and business, especially on the operations of small- and medium-sized enterprises (SMEs) and micro-enterprises. SMEs contribute to more than one-half of the world's GDP and two-thirds of employment, but they faced tremendous credit constraints on securing funding for financing their operations because they lacked sufficient track records of credit and relevant data. Technological developments in Big Data and AI analysis have the potential to fill the SME financing gap.

The objective of this paper is to examine the impact of these technologies on society through the lens of the innovative applications of Big Data and AI to SME credit assessment, focusing specifically on the use of big data and quantitative ML models of default risk to enrich the analysis of SME credit status. We pay particular attention to the predictions of credit risk measures based on ML and their use in the origination and monitoring of SME loans.

The research question is how AI is applied to assess SMEs' credit profiles for facilitating SMEs' access to external finance given the scarcity of data on SMEs' credibility and performance. This question is approached by firstly examining the models of machine learning for SMEs' credit assessment. Then these models are trained by using limited SME data and large public company’s data, where these data are collected mainly from several databases. These databases include Orbis (worldwide public and private companies) and FAME (UK and Irish companies) from Bureau van Dijk, Blomberg, and Datastream.

SMEs make large contributions to economic growth, employment, and social stability but many SMEs find it almost impossible to obtain bank loans because banks are reluctant to take the risk of lending to SMEs since the 2008 financial crisis. Particularly, a large number of SMEs have little chance of securing a bank loan due to their little or no credit history.
Figure 1: The declining SME access to loan and overdraft in the UK. Source: UK Finance.

Alternatively, an increasing number of SMEs turn to online leading platforms. However, it is challenging for these platforms to evaluate SMEs' credit risk and debt repayment capacity because of lack of information or serious information asymmetry, compared with large public companies. Therefore, it is critical to develop an efficient scheme to assess SMEs' credit risks considering a large number of borrowing applications to online leading platforms.

Figure 2: The rising volume of SMEs' alternative finance application. Source: altfidata.com

Traditional credit assessment methods that are mainly applied to large public companies are not suitable to assess SMEs' credit status. These methods use traditional statistics models that arrive an inference on a company based on the historical data of the company. Nevertheless, it is difficult for these methods to
reach an inference on an SME within an acceptable confidence interval due to a small or no sample of historical data.

On the contrary, the recent development in AI, especially cutting-edge technology in machine learning ML and deep learning (DL) algorithms, is capable of filling the gap of providing a reliable credit and risk profile of an SME even the data on the SME's history of credit and performance are scarce. The key is that these algorithms' inference accuracy can be improved significantly by training them with a large amount of seemingly irrelevant data, e.g., data on large public companies that operate a business or have a start-up experience similar to the SME borrower. As a result, these algorithms enrich the SME's profile by breaking the boundaries of different databases. It uses the state-of-art technology to achieve competitive advantage in the lending decision making process.

ML and DL are the fields at the forefront of AI that can be applied to assess an SME's credit status. ML makes computers learn from company data that serve as an experience and then computers make predictions about the SMEs' future credit profile. DL further uses a cascade of multiple layers of learning for the extraction of the SME's credit feature, where the previous layer's output is the input to its successive layer.

Specifically, an application of ML to SMEs' credit assessment comprises five steps. First, ML gets the past data of companies on metrics measuring companies' operational performance, solvency, liquidity, asset efficiency, and debt repayments. Second, ML cleans the data collected by converting the data into a format operated by computers. Third, ML builds a mathematical model to classify data into distinct groups and then tweak model parameters for different groups when it is trained by data. Fourth, the model accuracy is tested by SMEs' data that have not been introduced before. Fifth, ML uses new data to improve the accuracy of an SME's credit assessment by reducing errors.

There are three broad categories of ML algorithms and all of them have potential applications to SMEs' credit assessment. First, supervised learning algorithms provide an output that is clearly defined in advance, e.g., an SME's default probability. We tell ML what the right answer of default probability is and supervise its learning procedure. Second, unsupervised learning algorithms automatically cluster data and find underlying structures or patterns of SMEs' credit profiles. Third, reinforcement learning learns about data over time and adjusts the way of assessing an SME's credit status in order to maximize its estimation accuracy.
Python programming language is applied to implement ML and DL algorithms for SMEs' credit assessment. Python has the advantages of flexibility and efficiency as a high-level language as well as the advantage of fast computation through encapsulating functions written in a low-level language like C language. Among diverse function libraries, there are special libraries for machine learning. For example, the Scikit-Learn library provides convenient interfaces for basic ML tasks of supervised learning and unsupervised learning. The Theano library that is originally developed by Google uses an intuitive flow structure for more advanced ML design. These libraries are based on the fundamental Numpy and Scipy libraries for fast linear algebra operations and Matplotlib library for rich plotting style.

In conclusion, Big Data and AI are changing our society. This paper investigates the effects of these technologies on society, organizations, and business, especially on SMEs and micro-enterprises. We examine the question that how do Big Data and the cutting-edge techniques in AI provide an efficient and rich assessment of an SME's credit profile and how do they facilitate the SME's access to finance, which is critical for the SME's development. The challenge of SME data scarcity is solved by training AI models with numerous, related datasets on public companies.
Social Network, Media Supervision, and Investment Efficiency: An Empirical Examination of Chinese Listed Companies

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Keywords The independence of media supervision; Social networks; Investment efficiency

The determinants of the efficiency of corporate investment activities is an area well documented in corporate finance literature since the seminal studies in the field during the decade of the seventies (Litzenberger and Budd, 1970; Myers, 1977). Prior studies suggest a wide range of factors that can possibly affect such decisions including changes in the wider economic environment, the governmental policy, and within the corporate decision-making process (Zhang and Song, 2009). More recently, a significant number of studies in corporate finance started to concentrate on the impact of social media, especially the use of media supervision on the success of corporate financing and investment decisions (Rogers et al., 2016). According to Dai et al. (2018), media supervision improves corporate transparency via the provision of professional information to the investment community and the wider public; hence reducing information asymmetry, improving governance and increasing investment efficiency.

Within the Chinese context, social networks and government intervention play a significant role to investment efficiency (Chen et al., 2011; Chen and Xie, 2011). In contrast to the developed economics where allocation of resources is effectively determined by the financial markets, social networks in China appear to gain an increasing influence to the way companies allocate their capital resources and finance...
their investment (Peng and Luo, 2000). Hence, they have become a strategic resource that enterprises are competing for (Chen and Xie, 2011).

A social network has two dimensions, namely, network-relation and network-structure with the concept of ‘structural holes’, depicting the phenomenon that there is no direct links between certain individuals. This is based on the structure of social network (Burt, 1992). The enterprise is embedded in the social network and obtains resources from its internal and external social relations. Social networks are like “structural holes” where social resources such as wealth and reputation are embedded for enterprises to achieve their corporate goals (Lin, 2001). While social networks influence positively corporate investment efficiency, prior literature suggests the possibility of an agency conflict between management (agents) and the principals as the former group often tries to get access to social network resources mainly for the purpose of serving their own best interests rather than those of the latter (Azar and Micali, 2018). In addition, a recent study from social psychology suggests that agent self-interest is bounded by norms of reciprocity and fairness (Bosse and Phillips, 2016). However, this bounded-self assumption has limited convincing power as it fails to explain CEO’s attitudes/beliefs towards fairness as well as to what extend their care affects their behaviour.

Extant empirical studies on social networks within Chinese firms suggest that they start becoming an integral part of the actual operating environment with media supervision significantly influencing investment efficiency (He et al., 2008; He et al., 2015). However, there are no studies so far concentrating on the link between social networks and media supervision. Especially, the extent to which mechanisms of media supervision can be used to enhance corporate governance represents a topic of a significant theoretical and practical interest as it can help us understand how better use of social network can enhance investment efficiency and resource allocation within firms.

This paper addresses this gap in the literature by investigating the impact of social network and media reports used as proxies for media supervision on the investment efficiency of Chinese listed companies during the period 2011 to 2016. Hence, our contribution to the literature is twofold. First, we enhance our knowledge of corporate investment efficiency under conditions of information asymmetry and agency conflict by focusing our investigation on the effect of media supervision on investment efficiency. Second, we study the mediating effect of social network on the relationship between media supervision and investment efficiency. This is done for the first time in the literature.
Our modeling approach follows that of Chen et al. (2011). Hence, model (1) explores the relationships between media reports (Media) and corporate investment efficiency (INV); while, model (2) explores the mediating effect of Social Network (SN) on media governance. These are algebraically illustrated as

\[ INV_{i,t} = \alpha_0 + \alpha_1 Q_{i,t-1} + \alpha_2 \text{Media}_{i,t-1} + \alpha_3 Q_{i,t-1} \times \text{Media}_{i,t-1} + \alpha_4 \text{CFO}_{i,t-1} \]
\[ + \alpha_5 \text{Lev}_{i,t-1} + \alpha_6 \text{SEO}_{i,t-1} + \alpha_7 \text{Size}_{i,t-1} + \alpha_8 \text{ListAge}_{i,t-1} + \varepsilon_1 \]  
(1)

and

\[ INV_{i,t} = \alpha_0 + \alpha_1 Q_{i,t-1} + \alpha_2 \text{Media}_{i,t-1} + \alpha_3 \text{SN}_{i,t-1} \times Q_{i,t-1} \times \text{Media}_{i,t-1} \]
\[ + \alpha_4 Q \times \text{Media} \times \text{SN}_{i,t-1} + \alpha_5 \text{CFO}_{i,t-1} + \alpha_6 \text{Lev}_{i,t-1} + \alpha_7 \text{SEO}_{i,t-1} \]
\[ + \alpha_8 \text{Size}_{i,t-1} + \alpha_9 \text{ListAge}_{i,t-1} + \varepsilon_1 \]  
(2)

where, \( \text{Lev} \) stands for the level of corporate leverage; \( \text{CFO} \) stands for the currency flow of operations; \( Q \) is the Tobin’s Q ratio representing investment opportunities; \( \text{SEO} \) stands for Seasoned Equity Offerings capturing possible increase in equity financing; \( \text{Size} \) is the log of the firm’s total assets, and \( \text{ListAge} \) is the firm’s listing age. The subscripts \( i \) and \( t \) represent company \( i \) and period \( t \) respectively.

In brief, our results strongly support the intervening effect of social networks on the relationship between media reports and investment efficiency of the company. This relationship is also found to be asymmetric with social network and media supervision having a stronger link with investment efficiency in private enterprises than in state-owned enterprises. We also show the effect to be stronger for firms located in the eastern region than in central and western regions of China, raising significant questions regarding the role of cultural and social differences across regions.

The findings in this study have significant policy implications for Chinese corporates as it shows that firms can improve the efficiency of their investment activity by improving the effectiveness of their media supervision.

References


Cybersecurity and “Connected” Cars: An Auto Industry Game-Changer?

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**Keywords** Cyber security management; Knowledge sharing; Automotive industry; Connected cars; Vehicle innovations

The undoubted potential of Information and Communication Technologies (ICTs) to be exploited for good and, on the other hand, the vulnerabilities of critical infrastructures and digital services which may result in significant negative impacts on society, need to be managed. These challenges cross all sectors, manifest themselves at all levels from the individual to the global, emerge and mutate very rapidly and, in many cases, are still largely unknowable. And they are not only technical; as with all major changes driven by technological development, those promoted by ICT bring social, political, business and economic shifts which affect us all, now and in the future. In turn ICT-driven transformations can only be fully understood and harnessed for the undoubted benefits they can bring, if they are analysed from individual and societal perspectives in tandem with the technical.

Connected cars are fully-fledged nodes on the “Internet of Things” (IoT) that is the web of physical objects, including cars, embedded with electronics, software, sensors, and network connectivity that enables them to collect and exchange data. They consume, create, supplement, direct and share digital information with other vehicles and infrastructure. Cars become entertainment centres, communication-hubs, mobile offices, learning spaces, shopping malls and whatever else we can dream up. Estimates of the likely number of connected cars abound, but about one in five cars will have some sort of wireless connection
by 2020, that is a quarter of a billion vehicles. The value of the 2020 connected car market is estimated at €122bn (Allied Market Research 2014).

We are used to thinking about cars from a transportation standpoint, but increasingly they have become large mobile devices with tremendous processing power. Some experts estimate that more than 100,000 data points are generated by the technology in a contemporary automobile. Advances in artificial intelligence (software that applies advanced computing to problem-solving) and deep learning (software analytics that learn from experience) allow on-board computers connected to cloud processing platforms to integrate data instantly. Connected vehicles can be framed as a collection of complex software systems, subsystems and sophisticated components manufactured and developed by a multitude of suppliers. They can contain over 60 embedded electronic control units (ECUs), making the car highly dependent on numerous complex software systems. Most high-end connected vehicles can embody software code that exceeds 100 million lines and have the computing power of approximately 20 personal computers.

However, the major auto manufacturers will not be able to deal with these shifts in their traditional way. Long development cycles, incremental change and arms’ length supplier relationships will no longer work. The constant addition of new connected services and features embodying unfamiliar technologies will require OEMs (original equipment manufacturers) to become part of a complex ecosystem of traditional suppliers, technology giants such as Apple and Google, telecoms providers, technology start-ups and aftermarket service providers.

Despite the prominence of cybersecurity, on the one hand, as a growing and urgent issue, and the all-pervasive shift to connected cars there is little research which combines the two areas of interest. The auto industry research agenda, largely resourced by the industry itself and often conducted by industry-related bodies, tends to stress the benefits of connected cars; cybersecurity issues are only just beginning to be given prominence. Cybersecurity research, and the literature on cybercrime, tends to stress costs and the negative impacts and there is relatively little work which relates to connected cars specifically. Discussions of cybersecurity threats, by their nature, tend to downplay the major benefits which ICT can bring to car users individually and collectively. There is a major research gap to be filled.

This paper takes a broad view of the cybersecurity challenges contingent on the development of connected cars. These challenges are economic, regulatory, industrial and infrastructural – and that is just a summary starting list. The existence of a major legacy of older (“unconnected”) cars coupled with a road infrastructure built for them; the tension between the need for knowledge sharing across a wide variety
of actors and the disincentives to reveal vulnerabilities and cybersecurity breaches; and the potential doubts about driver acceptance of new technologies and willingness to pay for them are also considered.

References


Data, and its use in disruptive technologies such as artificial intelligence, machine learning and the internet of things, is driving new ways of doing things, supporting new business models and transforming existing ones. One manifestation of doing things differently is the spread of gig working (Petriglieri et al., 2018). Gig workers include contractors, freelancers, agency staff and self-employed people who move from one job to another (Fleming, 2017).

This paper argues that the spread of gigification will increase along three dimensions. One is breadth, by this we mean gigification will spread to different sectors and industries. Another dimension is depth, which refers to the types of jobs and work that will be gigified. Currently, jobs that involve manual, repetitive and standardised tasks are being gigified. Data and technology is enabling jobs further up traditional hierarchies to include middle and senior management jobs. The third dimension is speed, namely the acceleration of jobs being gigified as organisations seek to reduce costs, improve service levels and increase their returns on shareholder value.

Gig work is already pervasive and well developed in certain sectors, exemplified by musicians that performed in a venue for a night, actors between films, construction workers during winter months, self-employed people and agency staff. Whereas the use of gig workers has spread more widely with business models reliant entirely on using gig workers – Uber and Deliveroo, for instance - traditional organisations in sectors such as retail, hospitality and food sectors are using gig workers, too.

The extent to which gig work has penetrated the hierarchy varies. In most organisations, the depth of gig work is still shallow, as gig jobs tend to be at the lower levels. Many organisations use contract staff for cleaning the offices or hire security staff via an agency or third party intermediary. Further up the hierarchy, organisations retain project managers and IT experts often as independent workers to work for
a limited period of time. At C-suite level, interim directors are used for temporary periods, while waiting to recruit a permanent replacement. The use of AI technology, for instance in the legal profession, is expected to eliminate the need for large swathes of lawyers.

Understandably, policy makers and people are concerned about the rate at which jobs will be eliminated by emergent, disruptive technologies. Frey and Osborne (2013) estimate that 47% of US jobs can be automated but they are unable to specify the timescale or speed at which might happen. Arntz and her colleagues (2016) take the view that job tasks rather than whole occupations will be automated. They argue that jobs contain tasks that are difficult to automate and therefore people will be required to be employed. They suggest that the rate of automation will be slow because the adoption and utilisation of technology is restrained by economic, regulatory, organisational and, more generally, societal issues. Brynjolfsson and McAfee (2011) highlight the difficulty of assessing the time it takes for technology to replicate human perception and actions. As explained by Frey and Osborne (2013), Brynjolfsson and McAfee refer to a paper by Levy and Murnane (2004) in which they suggest that embedding peoples’ perceptions and abilities in software to automate driving is highly problematic. Yet, by 2010, Google had developed several completely autonomous Toyota Priuses.

The above discussion and brief review of the literature leads us to pose three questions:

What sectors are likely to experience the gification of work?

Which jobs are more prone to be gigified?

What is likely timeframe for jobs to be gigified?

To address these research questions we will 1. Create a set of characteristics that typify gigified tasks; 2. Group the characteristics to reflect task families, 3. Develop a questionnaire that individuals can self-administer to assess the likelihood of their task family being gigified 3. Provide indicators of the uncertainty and volatility of earnings that the task family they are part of. 4) Enable workers to visualise the extent to which their job and, consequently, their earnings, are at risk of being gigified.

We draw on the concept of four intelligences presented by Huang and Rust (2018), to unpack different jobs into the mechanised, analytical, intuitive and empathetic tasks that characterise them. By focusing on tasks, rather than industry or job title or even organisational hierarchy, we can better generalise our findings to a wider range of people in a greater variety of jobs.
Our study is aimed at collecting empirical data that can act as an early warning system for people whose jobs are at risk of gigification. This is important because while there is no clear resolution to the debate of entire jobs disappearing or jobs being partly automated, the movement to job gigification seems inexorable.

References


Rising to the Digital Challenge: The Role of Innovation Champions’ Cognition and Attitude, in European SMEs

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Keywords digital innovation, digitalisation, SMEs, managerial cognition, attitudes, technology adoption

Despite the recognition that technological innovation can’t be separated from human agency (Laufs et al., 2016), there can be a tendency to highlight the tensions between technology and humans, and the barriers to digital innovation, rather than how firms successfully adopt and adapt to digital technologies (Morgan-Thomas, 2015). As such, there have been calls for researchers to explore the role of micro level factors that support successful innovation (e.g., Lin et al, 2017), in the increasingly digitally driven, data dependent and rapidly changing business environment.

One such stream of work focuses on the central role of managers in leading and nurturing change in their organisations (e.g., Volberda et al., 2013). Managers drive the initial decision to invest in digital technologies as well as the dissemination of innovation across the firm (Belso-Martinez et al., 2013). Their impact is particularly significant in small and medium businesses (SMEs), given the limited number of staff, the relatively flat hierarchical structure, and the informal communication channels that are common in this type of firms (Agostini, 2016, Cerne et al., 2013). Specifically, SMEs’ owner-managers, play a significant role in strategic decision making (Child and Hsieh, 2014), including digital strategy (Gao and Hafsi, 2015).

Given the importance of individual managers in the successful adoption and implementation of digital innovation, there is a growing body of work investigating the attitudes and behaviours of innovation champions (e.g., Lin et al, 2017). However, there is a lack of insight regarding how digital innovation champions form the positive perceptions which eventually trigger the decision to invest in digital technologies. Therefore, the aim of this paper is to investigate how managers who champion digital innovation form positive assessments of digital innovation, and which factors impact on this assessment. We focus on SMEs because digital technologies have been heralded as providing SMEs with new business opportunities and greater competiveness. Moreover, these firms form the basis of European and indeed
worldwide economies (European Commission 2013), particularly during periods of uncertainty and change (Carsrud and Cucculelli, 2014). Therefore, it is important to understand their situated digital adoption.

We investigated SME owner-managers’ cognition and personal experiences, and the effect of these in the development of positive assessments of the value of digital technology. The manager’s cognitive processing, and the filtering of information about the business environment, are driven by that manager’s beliefs and interests and subjective experiences (Bazerman and Chugh, 2006, Potter and Balthazard, 2004). Previous studies also suggest that the filtering process is influenced by management attitude and, more specifically, their positivity towards change and willingness to take considered risks (Grant et al, 2014; Jones et al, 2013, Morgan-Thomas, 2015, Peltier et al, 2012).

Therefore, we investigated the following interlinked research questions: How do managers in European SMEs which have adopted digital innovation perceive that digital technology adds value to their businesses? AND How does the interplay between the managers’ cognition and their personal experiences shape those perceptions?

To investigate these questions, we conducted a two-stage empirical study of SME owner-managers in Britain, Ireland, Italy and Spain, across five industry sectors. Through the thematic analysis of 48 in-depth interviews and the regression analysis of 337 surveys, we found that the owner-managers saw digitalisation as an opportunity to transform their firms’ processes and performance, in many ways, from operational aspects such as cost savings, to strategic ones such as enablers of change; and that their enthusiasm mirrored or even exceeded that in related literature (e.g., Borges et al, 2009 or Galliers et al, 2012).

There were concerns with the risks associated with adoption of digital technology, both direct risks such as hacking, and indirect ones such as technology obsolescence and dependency. However, these did not stop adoption. Rather, the champions’ general belief in the technology gave them a sense of urgency to pursue digitalisation for their SMEs, and the confidence that their organisations would be able to surpass the challenges faced. This belief was amplified by the managers’ positive attitude towards digital technology, as well as their willingness to try out new things and embrace change.

We also found that a low level of technical skills is not an insurmountable block to the digitalisation of SMEs. While skills development may be necessary in order for SMEs to take full advantage of the
technology, the key to digital innovation lies in the managers’ attitude towards technology and innovation.

Our study foregrounded the role of the individual in digital adoption within smaller firms, and has confirmed the enhanced influence that managers have in SMEs. Enacting digital innovation happens as a result of positive perceptions and attitude towards the potential benefits of digital technologies and these positive perceptions occur as a result of the cognitive processes and personal experiences. Tension between digital ‘technology’ and the people who enact the technology can be mitigated substantially through innovation champions.

Our contribution lies in the reaffirmation of the value of human agency in a time when a technology and systems led perspective of business growth and performance appears to be prevalent. The increasing weight given to datafication, digitalisation and technical skills should not be at the expense of acknowledging and valuing the critical role played by individual managers.

References


Data as an Important Tool to Decarbonise the Energy System: Emerging Business Models

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The energy sector is changing in response to the need to reduce carbon emissions to mitigate climate change. This need to de-carbonise energy use is putting pressure on the electricity sector specifically as transport, through electric vehicles (EVs) and heat, through ground source heat pumps are electrified. Existing fossil-based sources of energy are produced largely on demand so can cope with consumer demand fluctuations (Helm 2018). With the greater integration of intermittent and distributed energy sources and increased demand from EVs, new sources of energy flexibility to balance demand and supply are needed (Schuller 2015; Yu 2016). Demand management, data and energy storage are crucial in this integration. Demand management is only possible with greater insights into the usage of energy from data produced from smart meters. This presentation will explore the opportunities and new business model’s digitisation offers in support of the decarbonisation of the energy sector and the challenges its use poses for privacy and loss of control.

Energy is unlike other forms of production where it is possible to store products for use at a later date, although storage technologies, such as batteries are now rapidly improving and becoming more prevalent. The largely on-demand of energy requires close monitoring of supply and demand levels to balance the two (Seavers 2017). Intermittent and inflexible renewable sources of energy bring challenges to ensure this balance between supply and demand is maintained without overloading the network.

New business models are emerging, many of which focus on the need to manage demand and supply flexibly to support the intermittent flows of energy from renewables. Smart meters are facilitating this process by giving the industry unprecedented access to data about energy usage. Previously this data was only available at the aggregate level, but through smart meters usage data is available for individuals up to every half an hour. This opens up new business models that involve consumers in the process of managing supply and demand on the grid. These new business models can see consumers as energy
service providers, offering flexibility to the grid through time of day tariffs. Here consumers respond to price signals to use more or less electricity in response to changes in demand across the network. With greater EV ownership, consumers can be energy service providers through using the batteries in their cars in vehicle to grid storage. Charging the car when demand on the grid is low and supply is high and drawing power from the vehicle’s battery to supply the home when demand on the grid rises. Other consumers may take an even more active role in the system by installing solar photovoltaic panels on their roofs combined with battery storage, offering their energy generation and storage capacity to support demand management.

These new business models driven by data, such as vehicle-to-grid energy storage and demand management solutions require new consumer behaviours (Geels 2012; Cohen 2014) and new forms of social cooperation, such as peer-to-peer energy trading (Camarinha-Matos 2016).

These models enable consumers to sell energy and demand-side flexibility to the grid and each other, fundamentally altering consumers’ roles in the energy system. This has interesting implications for engaging consumers in energy, where their usage becomes visible through in-home displays from smart meters or more actively by becoming consumers, producers or sources of energy storage. Such engagement could be a key stepping stone in wider engagement to sustainability in other practices. Energy production is psychologically and physically remote from consumers, contributing to a passive engagement with energy, which encourages unconscious and potentially wasteful consumption practices (Rogers et al. 2012). Putting energy usage data in the hands of consumers has the potential, through social learning, to increase levels of engagement, bringing energy closer to them and changing energy consumption practices (Rogers et al. 2012).

However, not all consumers want this level of engagement and a different use of data could be a way to deliver the same benefits of reduced consumption, managing supply and demand thus supporting decarbonisation without consumer engagement. Energy usage in the home could be controlled externally, where ‘smart’ appliances are turned on and off automatically in response to fluctuations in demand and supply by energy suppliers. EVs could be linked to smart charging and kitchen appliances becoming part of the Internet of Things.

For some this loss of control and handing over of data may be something they are happy to do, especially in return for payment or reduced bills, whilst for others it could raise concerns about data privacy. Access to half hourly energy usage data allows energy suppliers to see in detail our routines and behaviours;
when we are at home and when we are away. From an energy supplier’s perspective this level of data and control is ideal for managing supply and demand. However, it highlights a mismatch between the needs and wants of business and what consumers consider an intrusion of their privacy.

The energy system is at a point of change as methods are being developed to decarbonise the network. Data has the potential to play an important role in this process by supporting the development of new business models.

References


This paper presents a theory, in response to the challenge of Big Data, that existing organisational ambidexterity literature is incomplete. The experiences of four large, mature firms highlight that in addition to the recognised modes of ambidexterity a game-changing mode is required. Game-changing ambidexterity uses short term engagements with expert teams to explore and exploit Big Data.

**Context**

The digitisation of the business environment has generated new sources of high volume, fast flowing, diverse and complex data. This Big Data can be explored and exploited to improve an organisation’s competitive position, whether by consolidating the existing business or finding new business opportunities. New firms entering the market, using data-led models, may be unhindered by the legislative, financial and structural burdens of existing firms. Established firms have to find innovative approaches to their data to compete with the new players.

There are two challenges, firstly, “the basic problem confronting an organisation is to engage in sufficient exploitation to ensure its current viability and at the same devote enough energy to exploration to ensure its future viability” (March 1991: 105). Secondly, the firms have to prioritise and allocate resources between exploration and exploitation (Gupta, Smith and Shelley 2006) so they have to determine how to manage the tension between the two (He and Wong 2004). There is a balance to be had. Exploration involves experimenting with new alternatives with returns that are uncertain, but where success guarantees future viability of the firm. Whereas, exploitation refines and extends existing competencies, technologies and paradigms whilst securing current firm viability, however it risks inertia (Prange and Schlegermilch 2009).

Organisations which are simultaneously exploring and exploiting are described as ambidextrous (Tushman and O’Reilly 1996). Existing theory identifies three modes of ambidexterity.
• Structural ambidexterity, where different parts of the firm manage conflicting demands of exploitation and exploration (O’Reilly and Tushman 2004).

• Temporal ambidexterity, where exploration and exploitation are dealt with at different times (Tushman and O’Reilly 1996).

• Contextual ambidexterity, where established processes, systems and context enable employees to prioritise and divide their time between conflicting demands (Birkinshaw and Gibson 2004).

Initially the three modes were proposed as separate solutions to balance the tension of exploration and exploitation, although they are now viewed as complimentary (Chen and Katila 2008). Furthermore, firms switch between different modes of ambidexterity depending on the nature and timing of the development (Jansen et al. 2013).

Methodology

The study has investigated the experiences of four case-study firms which are using Big Data to inform their strategic marketing. The firms are large, mature, UK-based companies from the media (MEDCo), fast moving consumer goods (FMCGCo), education (EDCo) and automotive retail (AUTOCo) sectors. Insights from twenty semi-structured interviews have captured their experiences and provide the basis for the development of a grounded theory of organisational ambidexterity in response to the challenge of Big Data.

Findings

Rather than using a single mode of ambidexterity, to cope with the tensions of exploring and exploiting data, the case study firms use a combination of modes of ambidexterity.

Structural ambidexterity - involves the separation of exploration and exploitation in different parts of a firm, using ‘dual structures’ to manage the conflicting demands (Duncan 1976). The FMCGCo uses a traditional model, where Big Data exploitation is carried out through the R&D team, while exploration is carried out by the sales and marketing functions. In contrast MEDCo’s lack of capability around Big Data and digitisation led them to establish a new business division, recruiting staff with an entirely new skills base than the established firm. For AUTOCo exploiting the potential of the Big Data systems developed for the mainstream business have resulted in the establishment of a new digital division of the firm.
Temporal ambidexterity – the separation of exploration and exploitation by sequential timing is viewed as an ideal approach for firms experiencing technological shocks to their business operations, such as engagement with Big Data (Tushman and O’Reilly 1996). In this mode, long periods of incremental data exploitation might be punctuated with significant strategic exploration projects. The AUTOCo exploit-then-explore example reflects this temporal approach. Similarly, EDCo is undertaking sequential projects for data exploitation, followed by New Product Development exploration of the ideas generated by the exploitation process.

Contextual ambidexterity - enables tensions to be addressed within organisations’ structures and routines, with individual employees having the autonomy to make their own judgements on how to divide time between conflicting demands (Birkinshaw and Gibson 2004). For MEDCo and FMCGCo the intuiting of opportunities for exploration and exploitation remains with senior level individuals, with clear alignment to the corporate strategy. In EDCo contextual ambidexterity is widely used with senior managers making strategic decisions on exploration or exploitation of data whilst departmental staff make tactical and operational decisions using the same repository of data.

Game-changing ambidexterity - What is evident from the case studies, but is not reflected in the literature is the role of expert individuals in temporary, sequential activities. Using Big Data requires technical expertise and knowledge, combined with expert and functional knowledge of the firm. This requires cross-team working of expert individuals for the period of the exploration or exploitation activity. This is dissolved after a period and a different group established for subsequent activity. FMCGCo recruited external technical partners to work with their R&D team to support their exploitation project, whilst EDCo established a project team of in-house experts for their exploitation project supported initially with an external IT partner. This team was dissolved when the project ended and a different team established for subsequent exploration work. AUTO Co used a similar in-house model, shifting the expert exploitation knowledge to a new team to set up a new explorative division.

Discussion

The case study findings suggest that rather than three modes of ambidexterity there are four, as shown in Fig. 1.

The inclusion of game-changing ambidexterity captures the practices of firms in responding to the Big Data challenge. Organisations are bringing together expert individuals from within and outside the organisation to work temporarily to engage the firm in using Big Data. Inevitably this engagement sits
outside the meta-routines of the organisation, but once complete can be absorbed harmoniously into the main business.

Fig 1. The four modes of organisational ambidexterity

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<th>Innovation level</th>
<th>Innovation logic</th>
<th>Sequential</th>
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<td>Organisation</td>
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Brewis C. (2018) developed from Prange and Schlegelmilch 2009 p.219

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Are Retailers Doing Enough to Meet the Big Data Environment Challenge?

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Keywords data environment; retailing; big data analytics; analytical techniques; machine learning; consumer behavior

The actual market and society are characterized by a continuous effort in digitalization, which embraces different sectors and is becoming prominent for marketing and retailing (Rust and Huang, 2014; Leeflang et al., 2014). In this competitive scenario, digital (online) channel has become the core of many business transactions, by making available a large amount of information of different nature. Indeed, digitalization is pushing towards a channel migration strategies toward online channel (e-channel) (Trampe et al., 2014), while transforming retail exchanges (how consumers might access and buy products and services), retail offer (products/services), retail settings (where and how the transaction activities take place), and the actor involved in these activities (i.e. retailer, consumer, other parties and stakeholders) (Hagberg et al., 2016). This digitalization is transforming both the offline and retail scenario, by providing consumers with a new service landscape guaranteeing cost savings, utilitarian value, and hedonic/symbolic benefits (Willems et al., 2017.). Therefore, we can consider as a digital disruption is taking place.

Moreover, this digitalization process is continuously making available an impressive amount of data that firms would exploit to gain competitive advantage (Bradlow et al., 2017; Pantano et al., 2017), consider for example all the information it is possible to access on consumers visualization of each product, time spent, subsequent buying, etc. hourly, and how these information can be exploited by companies to improve strategic and operational decisions, to target consumers, predict demand, etc. (Aldubai et al., 2016; Pantano et al., 2017). Preliminary studies in this direction suggest that companies would benefit from new tools and techniques to successfully manage this data, in terms of data compression and scalability (handling data size and complexity), statistical sufficiency for modeling, computer performance, etc. (Bradlow et al., 2017; Bruno and Ferreira, 2018; Verhoef et al., 2016).
For instance, Ocado (one of the largest online-grocery retailers) launched the Ocado Smart Platform as a new hardware and software to host a shopping experience for large third-party retailers who navigate online. Processing thousands of orders every day and generating thousands of data, Ocado considered Google the best partner to host huge amount of data to be manage. The platform supports moving the data in the cloud and while enabling Ocado managers advanced data-driven analytics which further support supports business decisions and inform the supply chain in inventory control, logistics efficiency and demand prediction. Therefore, Ocado uses the Google Cloud Platform (Google App Engine, Google Cloud Storage, Google Cloud Dataflow, Google Storage Nearline, Google BigQuery, Google Compute Engine, Google Container Engine) to make online food shopping and uses big data (large volume of data available online with high computing performances to be stored, accessed and managed) analytics and cloud storage to deliver groceries right to the consumer, exploiting an amount of data available on consumers’ profiles (including past orders and trends).

Ocado provides an advantageous shopping experience, pushing consumers to consider the more appropriate method of buying online food, rather than in physical stores (Pantano et al., 2019). Actually, the Google Cloud Platform hosts more that 100TB of data for Ocado.

The emerging big data and open data generate opportunities useful to understand consumers experience with a certain brand, product or service and destination. Moreover, their analytics allow a systematic knowledge of consumers’ evaluations of the most or least relevant factors of a certain retailer (Fan et al., 2015; Gensler et al., 2015; Pantano et al., 2017) bringing towards the development of a sort of “social intelligence” (Lau et al., 2014; Dindar and Yaman, 2018).

Therefore, the proliferation of textual and non-textual and unstructured data is currently is increasing rapidly with the need for companies to summarize, understand and making sense of, process and store massive amount of data for achieving competitive advantage, characterizing the new big data environment where retailers are faced to perform (Bruno and Ferreira, 2018; Hakeem, 2017).

As a consequence of the emerging big data environment, new research is required to provide effective directions to gain the opportunities offered by the emerging big data and data environment as prompt by the technology push (Bradlow et al., 2017, Kannan and Li, 2017; Inman and Nikolova 2017; Pantano et al., 2017), while novel research on new thinking able to explore “new topics at the edge of our current knowledge” is strongly encouraged (Rust, 2017).
The aim of this research is to investigate the extent to which retailers are meeting the challenge of the big data disruption. To this end, the present study reviews the actual methodologies for successful big data analytics, with emphasis on machine learning approaches, such as face recognition and emotion detection of consumers’ pictures, sentiment analysis of tweets and posts, computerized content analysis of tweets and posts, etc. shared online through social media platforms (i.e. Flickr, Twitter, Facebook, etc.), as well as related benefits (in terms of detailed consumers’ insights and implications for management strategies) and challenges for retailers (in terms of computational costs), in order to provide guidelines for both scholars and practitioners.

References


Research Overview

Our research reconsiders the widely recognised notions of data overload, interpretive ambiguity (Calvard, 2015), and ‘analysis paralysis’ (Langley, 1995) in a managerial decision-making context. In particular, we expose the risks of overlooking a seldom explored, characterisation of strategic marketing management practice: the inherent role of tacit expertise. Our work considers the theoretical and empirical elements of tacit expertise in order to extend debates concerning the troubled nature of marketing’s role within the organisation during a volatile period of technological change. Illustrating three dimensions of the tacit (the inter-subjective; the intuitive; and the situational) with empirical vignettes drawn from managers within a range of organisations enable us to identify and codify notions of tacit expertise evident in a big data-driven managerial context. Our research offers a number of contributions. First, it provides an original attempt to codify the inarticulable in order to unravel the key dimensions of tacit expertise manifest in day-to-day strategic marketing practices. Second, our work paves the way for further managerial research in technology- and analytics-driven contexts, which seeks to expose and illustrate the inarticulable nature of consumer insight. Finally, we offer a novel, reflective examination of the ways in which tacit expertise begins to shape and impact upon subsequent strategic actions.

Research Problem

In a digitalised marketing era, managers are increasingly hesitant, constrained, and pressured. Despite big data’s promise of more actionable insights, managers face ongoing realities constituted by increasing
ambiguity and uncertainty (Quinn et al. 2016). Paradoxically, the consequence of this situation exposes an opportunity within which to explore the role of tacit knowledge as an indispensable component of managerial expertise.

**Theoretical Perspective**

Elucidations of tacit knowledge find their theoretical roots grounded within the realm of the inarticulable (Polyani, 1966a; 1966b). The nature of tacit knowledge is “ill-defined and elusive” (Collins, 2001, p. 107-8), denoting a mastery of practice, covering those things we simply ‘know’ how to do, that cannot easily be articulated (Hackley, 1999; 2000). Expanding this proposition, we draw upon the ancient Greek notion of métis as a form of knowledge committed to practice. Métis is constituted by its multiple and polymorphous nature, applied to situations that are transient, shifting and ambiguous (Detienne and Vernant, 1991; Mackay et al., 2014). For the Greeks, métis was something demonstrable in the ‘know-how’ of the artist or the skill of the ship’s captain in navigating hazardous seas and currents. Métis implies a set of behaviours combining factors such as intuition, forethought, subtlety and guile. These skills always appear below the surface, immersed in practical action and experience where attempts to make them explicit are much delimited. Similarly, in a business context, the talent of an outstanding manager may be attributable to nothing more than the consequences of a long apprenticeship, transforming the culmination of their attributes into what we might label as tacit expertise. And yet, the judgemental skills that s/he demonstrates are invisible, even in the digitally-driven domain of marketing with its attendant sophisticated software and decision-support tools (Dahl 2015). Judgement comes not necessarily from the data but from the person who has to make a decision and data are simply invested with meaning through a process of interpretation.

However, as Baumard (1999) notes, the tacit should not be viewed in isolation, independent of explicit knowledge. The tacit, as a social practice, must coalesce alongside a degree of technical expertise and the rules and regulations of the organisation. It is indelibly linked to the explicit becoming tacitly internalised as part of a person’s own knowledge and practice. Drawing from these debates enables us to frame the following three research objectives:

1. **Establish the extent to which the marketing decision-making in a big data context exposes the presence of tacit expertise;**
2. **Codify the ways in which tacit knowledge is constituted through marketing management practice.**
3. **Signpost how tacit expertise presents tensions within the organisational function of marketing.**
Methodology

Our empirical approach is driven through an analysis of data drawn from a recent study (see: Quinn et al., 2016). Within this data we encounter processes and decisions constituted through a number of tacit dimensions. During the analysis of our data, a series of functional categories are isolated, reflecting a discourse analytic approach, enabling insights to be drawn from interviewees’ words (Paltridge, 2006; Potter and Wetherell, 1987).

Findings

Tacit expertise provides an inherently notable characterisation of strategic marketing practice. Something less immediately accessible surfaces from our data, frequently typified by a use of the terms: “acumen”, “judgment”, “knowing” and “experience”. These terms are suggestive of a practice that is often reliant on a different type of knowledge base; a different story drawing from a body of knowledge existing in parallel to the technical, rational discourse. This basis of knowledge is called on extensively in the execution of practical accomplishment, the nature of which we seek to illustrate through the three functional characteristics of tacit expertise identified: the *inter-subjective*; the *interpretive*; and the *situational* (Appendix 1).

Conclusions

Our findings reveal that tacit knowledge is often intuitive, habitual and reflexive (Leadbeater, 2000). Indeed, as Boden (1994) suggests, the sense of any object is derived from its situation and therefore any form of managerial decision-making has to be acknowledged as indexical; explicitly linked to local conditions, necessarily dependent on those places, situations and people that generate it (Baumard 1999). The tacit is evidently a form of knowledge acquired by *doing* and then communicated by example, reflecting the social nature of expertise obtained through communities of practice (Wenger, 1998). However, once seen as essential to business insight and commercial survival, we also reveal tensions in how big data and sophisticated analytics are exposed for their inability to address strategic questions (Merendino et al., 2018). In this sense, the tacit management of insight, particularly digital insights, is impacting the ways in which organizations communicate and integrate strategic decisions. Consequently, a fuller understanding of the explicit role of tacit expertise in organisations provides an opportunity to appreciate a more psychologically and sociologically sophisticated view of organisational life (Baumard, 1999).
## Appendix 1 - Dimensions of the Tacit: An Empirical Illustration

<table>
<thead>
<tr>
<th>Tacit Dimension</th>
<th>The Inter-Subjective</th>
<th>The Intuitive</th>
<th>The Situational</th>
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<tbody>
<tr>
<td>Organisation Type</td>
<td>‘Know-how’ based and transferable becoming, in the process, collaborative practice and inter-subjective knowledge (e.g. Leonard and Sensiper, 1998)</td>
<td>Revealed through figures of speech and tropes where ‘thinking on their feet’ requires managers to become quickly attuned to circumstances, needs, and idiosyncrasies. Often highlighted through ‘gut feelings’ as a recourse to action (e.g. Patterson et al., 2012)</td>
<td>Comprised of situated practices whereby managers are not hesitant to remind us that their situated relationships, and the context of action, is central to the creation of value (e.g. Easterby-Smith and Araujo, 1999)</td>
</tr>
</tbody>
</table>

### Client Organisations

| Client H: | “...in terms of selection of those markets that’s a decision that involves, marketing, legal... we have the corporate development office who focus very, very strategically around potential opportunities for growth within any given market; but ultimately the decision is made by the Chief Exec.” |
| Client C: | “There is more and more data in this day and age, but that doesn’t mean there is more insight.” |
| Client E: | “You always end up with more and more data and research than you need and the tricky question is to see which we use.” |
| Client C: | “We still have a lot of agency data that we don’t have time to digest, sometimes less data is better than more data.” |

### Strategy Consultants

| Consultant C: | “So many clients still don’t have analytics departments; still don’t have the ability to do stuff in house, so they rely on third parties.” |
| Consultant B: | “Big data is a wonderful thing and yes, it’s amazing all the fantastic things we can do with that data. But you’d better know what to do with your big data. You better know how to get rid of the noise.” |
| Consultant A: | “Big data is not the solution. Big data is actually the problem. What clients really want is small data, which is simple.” |
| Consultant C: | “Increasingly the parent company is encouraging people across different brands to work with each other... there’s lots of encouragement to actually try and keep the right people, or the people that the organisation wants to keep. It’s interaction on a daily basis in terms of work but also in terms of moving across businesses.” |

### Client J: | “Increasingly the parent company is encouraging people across different brands to work with each other... there’s lots of encouragement to actually try and keep the right people, or the people that the organisation wants to keep. It’s interaction on a daily basis in terms of work but also in terms of moving across businesses.” |
Digital Agencies

Agency Informant A: “We totally have influence because most companies are in a complete panic about what to do.”

Agency Informant B: “Skills, processes, structures need to realign... by having digital people you’re marginalising other people in the organisation.”

Agency Informant B: “We frequently come across situations where there are big variances in data... sometimes the ability to measure and refine does create a level of strategic blindness to actually just making a decision and doing the right things.”

Agency Informant B: “Say you have six or seven groups, about 15 per cent in each group, or whatever it is. That’s fine because mentally I can get my head around that but actually in truth there’s 36, 100 different segments. I can’t get my head around that, so I’m not going to use that.”

Agency Informant B: “The challenge is always to go more senior... get into the boardroom, if you can, and have a sponsor for the work.”

Agency Informant D: “We’ll increasingly work in a more collaborative kind of way. I don’t think it will be feasible to have agency + client relationships; I think it will be much more collaborative. We’ll spend time with clients and they’ll spend time with us. And if we can invest them with the skills that we have it’s kind of a win-win situation.”

References


Purpose

As the digital revolution takes hold of most, if not all, everyday transactional and interactional situations between firms and stakeholders, it is increasingly important for managers to recognise data security risks and consequences of data breach. Whilst the need for adequate data security mechanisms cannot be overemphasised, invariably, even the most resourceful and technologically advanced firms are vulnerable to data breaches, either because of malicious attacks (data hacks) or inadequate/incompetent handling of data security (Choi et al., 2016). In this study, we examine customers’ psychological reactions to data breach and their subsequent willingness to share information in the context of three different types of firms. We utilise the theoretical bases of institutional trust and social justice to investigate if establishing procedural and distributive justices, when interactional justice has been breached, would have a favourable impact on trust towards three types of firms and alleviate privacy concerns, ultimately leading to a greater willingness to share information. Further, we examine these effects in the context of sharing two types of data, following the classification of personal data under the General Data Protection Regulations (GDPR) of the European Union.

Theoretical Background

Although the broader subject of digital privacy concerns has been widely studied (Bélanger and Crossler, 2011; Rohm and Milne, 2004), research into data breaches and their effects on customers is a nascent
field that includes some notable attempts to advance theory and practice (e.g. Goode et al., 2017; Kashmiri et al., 2017). According to social justice theory, perceived fairness in interactions give rise to better and stronger relationships in a social exchange context; which has been used for good effect in data privacy and related research (Ashworth and Free, 2006; Wirtz and Lwin, 2009). Operationally, justice can be classified into procedural (viewed in terms of fairness of procedures implemented), distributive (viewed in terms of resources: gained vs. used), and interactional (fairness of the treatment received during an interaction) (Blodgett et al., 1997). Even if not legally required, any reputed firm will have procedures and policies relating to data protection compliance. As such, in a data security breach situation, procedural justice can be said to have been breached; however, distributive and interactional justices may hold the key to an effective recovery (Choi et al., 2016; Wan and Zhang, 2014). Hence, establishing distributive (e.g. via fair compensation) and interactional justice (e.g. timely and personal apology) may favourably influence the situation following a data breach, where customers are likely to be less trustworthy towards a firm and more concerned about the privacy of their data, and consequently less willing to share their data with the firm. Nevertheless, the subsequent willingness to share data will be influenced by the type of data that customers are confronted with sharing.

Previous research has also identified differences between types of firms in terms of the extent, to which people are willing to trust firms with their personal data; for example, primary-care medical professionals and payment card companies are most trusted, whereas social media and other entertainment media forms are least trusted (Morey et al., 2015). There is therefore, a need to investigate if the effects discussed earlier are different, and to what extent, between different types of firms. Institutional trust theory can provide an appropriate basis for such differences. At the societal level, institutional trust can be viewed as a set of expectations that people come to have of institutions or large firms comprising collections of individuals with whom they do not have close connections or interactions (Bachmann, 2001; Maguire and Phillips, 2008).

**Design and Measures**

We conduct an online experiment simulating a data sharing scenario with a firm following a data breach, and manipulate the type of firm (private, public, charity), distributive justice (low, high), and interactional justice (low, high). Our experiment therefore, adopts a 3 (firm: social media, NHS medical practice, local charity) x 2 (distributive justice: low, high) x 2 (interactional justice: low, high) between-subjects design. Institutional trust and privacy concerns (mediators), as well as willingness to share personal data and special category data are all measured using scales adopted from previous research. A model of
hypothesised relationships is presented in Figure 1. Data collection is currently underway, and results are expected by the date of the conference.

*Figure 1: Conceptual model*

![Conceptual model diagram]

**References**


With the growing use of smartphones and mobile applications, there is a need to protect consumers’ data to ensure that they continue to use them safely. It is anticipated that by 2020, almost three quarters of the global population will benefit from a mobile subscription (GSMA, 2017). An individual mobile user is able to access various mobile services such as m-health, m-learning, m-commerce, m-money and m-banking. Given the sensitivity of the information provided and used by individuals on this device, it is important to study issues related to data protection and cyber-security attacks. The number of fraud attempts through mobile channels is dramatically increasing (O’Driscoll, 2018) and they are expected to continue evolving (Cyber Security Ventures, 2017). In 2017, there was a total of 197 billion mobile applications downloads (Statista, 2018). The high use of smartphones, along with the large amount of valuable and private information they hold, make them attractive to attackers interested in exploiting the devices to obtain private information (Bitton et al., 2018). One of the most challenging trends in mobile security is that individuals do not fully understand the risks inherent in mobile devices. Mobile applications are highly varied and often poorly understood, particularly for their activities and functions related to privacy and security. Users of smartphone devices play an important role in ensuring information security when using smartphones. These vulnerable devices can jeopardise confidentiality, integrity, and availability of individuals’ sensitive data. While smartphones offer vast opportunities for positive experiences, threats to users’ security and privacy emerge at the same time. Those include malicious apps, data loss, surveillance, and profiling, just to name a few (Kraus et al., 2017). As a high number of mobile applications are available freely, mobile users often use them without paying attention to the security aspects.
Extant literature highlighted the importance of human security behaviour (e.g. Venkatesh et al., 2017; Hui et al., 2017; Moody et al., 2018). While the majority of previous research focused on individual’s online security (e.g. McCormac et al., 2017; Choi et al., 2018; Gratian et al., 2017), only a limited number of studies have focused on the socio-cognitive behaviours that affect mobile security practices and security behaviour (e.g. Allam et al., 2014; Ophoff and Robinson, 2014; Masrek et al. 2017). The skills required from a mobile user to interact safely with his/her smartphone are different from those that are required for safe and responsible PC use (Bitton et al., 2018). Compared to desktop users, mobile device users are at least three times more vulnerable to phishing attacks (Kessem, 2012). Some of the reasons for this vulnerability is small screen size, lack of identity indicators, inconvenience of user input, switching between applications, habits and preferences of mobile device users. Hence, studying the behaviour of mobile users is essential.

Despite that the literature is rich with studies on online security behaviour, little is known about the context of individual consumer mobile security perceptions and behaviour in developing countries and there is inadequate research about users’ behaviour in dealing with mobile (smartphone) security threats, particularly in the Middle East in a cross-national context. In order to bridge this gap, this research will develop a theoretical model on consumers protective behaviour with mobile security threats. Hence, the main aim of this research is to analyse the factors that can affect smartphone security behaviour among individuals in a cross-national context. Data will be collected from individuals in households in these three countries.

The existing literature is rich with theories used to study individual’s security behaviour such as protection motivation theory (Rogers, 1975; Maddux and Rogers, 1983), general deterrence theory (Gibbs 1975), rational choice theory developed by (Becker, 1968), neutralisation theory (Sykes and Matza, 1957), theory of reasoned action (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980), theory of planned behaviour (Ajzen, 1985; 1991), social cognitive theory (Bandura, 1986) and social learning theory (Miller and Dollard, 1941). However, these theories mainly focused on the behaviour of employees in an organisational context rather than consumers in a voluntary setting. The model proposed in this research is based on an extension of the extended unified theory of acceptance and use of technology (UTAUT2) developed by Venkatesh et al. (2012) as the theory focused on the individual consumers’ behaviour.

The model proposed in the present study combines the main constructs of the UTAUT2: effort expectancy, habit, price value, effort expectancy, facilitating conditions, social influence, hedonic motivation and behavioural intention (measurement items adapted from Venkatesh et al.’s (2012) study) and the PMT:
perceived risk vulnerability, severity of the adverse consequences, perceived response efficacy and response cost (measurement items adapted from Woon et al. (2005), Thompson et al. (2017) and Verkijika’s (2018) studies). In addition, three new factors which were found important for the case for mobile phone security were added: cyber security acculturation (measurement items adapted from Straub et al. (2001) and Ameen and Willis’ (2018) studies), privacy concern (measurement items adapted from Dinev and Hart’s (2004, 2006) studies) and smartphone-specific features security threats (measurement items adapted from Tu et al. (2015), Dimensional Research (2017), Becher et al.’s (2011) studies). Some items were added by the authors to fit the context of mobile security in the Middle East.

The research will test the model in three different Middle Eastern countries namely: Iraq, Jordan and the United Arab Emirates (UAE) and explore the differences between the three countries. These three countries are ranked differently in the Global Cybersecurity Index (2017); UAE ranked as 47th in the global rank while Jordan and Iraq ranked 93rd and 159th respectively (International Telecommunication Union, 2017). We study the behaviour of mobile users in these three countries since these three countries represent the exemplars of distinct contextual difference.

Data will be collected from adults in each of Iraq, Jordan and the UAE through an online questionnaire. Questionnaires are currently being distributed online. A total of 533 completed questionnaires will be collected from each country. The collected data will be analysed using Partial Least Squares-Structural Equation Modelling (PLS-SEM).

**References**


In this paper we examine how organizational resources are brought together to create analytical insight through multidirectional and socio-material practices of persuasion. We draw on interviews conducted in three large organizations engaged in implementing analytical practices as well as with several consultants. The study is framed by several bodies of literature which consistently identify the presence of gaps in information systems implementation. Analytics is no different in that gaps between analysts and marketing practice areas are consistently reported and the filling of these gaps was a constant source of tension for the study participants. The gaps reported concerned marketing as well as C level colleagues’ understanding about the potential of analytics as well as the threat that analytics presented to the status quo.

Three areas of strategic information systems literature highlight the prevalence of gaps in systems implementation and the importance of their closure: The Strategic Information Systems Planning literature, literatures around strategic alignment as well as literatures which concern the use of IS for competitive advantage. The boundaries between each literature set are oftentimes blurred and it is common to encounter papers with a focus on more than one of the above research tracks. The strategic alignment of IS implementation is often cited as being a key tenet of deriving the maximum benefit from IS, and as a critical management issue (Brown and Magill, 1994). Preston and Karahanna (2009) find that senior management involvement is crucial and specifically emphasise the notion of a shared understanding between senior managers and the CIO as an antecedent for achieving strategic alignment. Due to the increasing complexity of the IS function, the difficulty and criticality of achieving a fit or congruence across the organisation and IS heightened.

The paper focuses on the role of persuasion in closing these gaps and in creating the shared understanding emphasised by Preston and Karahanna (2009). We emphasise that persuasion is much more than Aristotelian rhetoric. It is something which is practiced and is sociomaterial in character (Orlikowski and
Scott 2008). In using the term socio-materiality we are referring to the entanglement or mangle of the social and the material involved in the production and performance of information systems (Barad 2003). The analysis focuses on the micro practices of persuasion deployed by IS professionals, which, crucially feature the bringing together of different organizational resources to accomplish and enact persuasion. The analysis prioritises who does the persuading, what they do, how they do it, what they use and what implications this has (Jarzabkowski and Spee, 2009). It also emphasises the skills required for this work and how are they acquired (Whittington, 2003). We aim to show the richness, complexity and contingency in analytics adoption.

We find that persuasive practices are aimed to compel different groups within the organization to move to a more data intensive modus operandi. We reveal that those charged with implementing analytics persuade in multiple directions: across the organization, upwards and inwards – towards themselves. A host of elements: bodies, knowledges, software, lexicons of terms, money and the market were brought together within and through these practices. Across the organization the most common practice was to persuade marketing professionals to engage with analytics in their projects by placing analysts within marketing teams. Persuasive practices of translation, where analytics experts exchanged terminology with marketing experts were seen as key. Analytics experts were also keen to demonstrate that existing marketing could be complemented by analytics and challenged existing practices as outdated and inaccurate. Persuasive practices of information dissemination supported these claims. Upwards, analytics experts reported that persuading top management to support their projects was crucial and they did so by demonstrating, through proof of concept and experimentation, the extent to which analytics added value. Persuasive practices of visualisation were utilised to support such endeavours. Analysts themselves also searched for evidence that they were convinced by the efficacy of analytics.

In conclusion, this paper presents a novel approach to analytics adoption which dwells on how the tensions between IS professionals and other organizational constituencies are tackled in practice. It highlights the sociomaterial complexities and contingencies involved in the adoption of analytics as IS professionals persuade in multiple directions along the analytics adoption journey.

References


CALL FOR PAPERS: Special Issue

Tension in the Data Environment: Future Implications for Individuals, Organisations and Society

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Theme of the Special Issue

The prominent role of data in information-driven organisations is sometimes summarised in the statement that ‘data is the new oil’ (e.g. The Economist, 2017). The analogy suggests that data is the fuel and lubricant of organisations – ‘big data is everywhere’ (George et al., 2014, p.321). However, if oil is a finite resource, data is potentially reusable, enduring and infinitely available (Iqbal et al., 2018).

Data availability has increased exponentially in the last decade, paving the way for a new business environment (Fosso Wamba et al., 2015; Hou et al., 2018), innovative business models (Wang et al., 2018) and new challenges (Blazquez and Domenech, 2018). As this growth accelerates, a better understanding is needed of the opportunities that the new phenomenon offers - and of the innovation, ethical, social,
privacy and security challenges it poses. ‘Big data’ appears to give rise to organisational changes and new tensions for individuals, organisations and society that need to be addressed. Such tensions include the digital skills shortages, threats from cyber-attacks, requirements to embrace GDPR legislation and the use of Artificial Intelligence for forecasting and decision-making. Recent news items, such as Facebook’s fines for breaking data protection laws, highlight the importance and topicality of these issues. This Special Issue will focus on how organisations from the private, public and third sectors are experiencing and responding to such tensions and challenges in the business environment, and the implications of these challenges for individuals, organisations and society.

We invite the submission of original manuscripts that advance empirical (quantitative, qualitative and mixed methods), theoretical and conceptual understanding of the changing use of data and its impact. Manuscripts must have strong implications for theory and practice. The Special Issue is designed to widen interdisciplinary perspectives in relation to the topic of data.

Some indicative themes of relevance to this issue include (but are not limited to) the following:

- New ways of doing business and new business models emerging from the transformation of data;
- The role of new business models in transforming data ownership, including privacy-friendly business models;
- Big data, analytics and its application as a driver of innovation and strategy development;
- Antecedents and causes of tensions and risk surrounding data use for private, public and third sectors organisations;
- Impact of the digital skills gap in organisations;
- Navigating the relationships between stakeholders who own, store, manage and use data;
- Privacy issues emerging from the collection and storage of personal data by organisations;
- Data governance and the implications of GDPR for organisations;
- The implications of black box algorithms and algorithmic accountability;
- Understanding organisational responses to regulatory pressures in data security management;
- Implications for organisations of data security breaches;
- Managerial issues emerging around cyber security management;
- Analysis of the interaction of Artificial Intelligence with social, behavioural and environmental aspects in organisations;
• The use of Artificial Intelligence and Big Data Analytics in organisations for forecasting and decision-making;
• The effects of big data and Artificial Intelligence on the risk evaluation of large public corporations and small private enterprises;
• The developing trends and applications of combining block chains, big data, and Artificial Intelligence in diverse aspects of organisations;
• Bridging digital transformation and digital sustainability for increased value.

Submission Guidelines:

Suggested submission deadline: 30th May 2019 (earlier submissions, starting from 1st December 2018, are welcome)

Notifying the submitting authors regarding status of their paper: September 2019

Suggested publication release: late 2020

Papers should be submitted via the journal’s online submission system: https://www.evise.com/profile/#/TFS/login indicating submission to the special issue “Data Environment”. Please also refer to TFSC's “Guide for Authors” - https://www.elsevier.com/journals/technological-forecasting-and-social-change/0040-1625/guide-for-authors for style and format guidelines. Please direct any questions about the Special Issue to the guest editors.

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A Final Thank You

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From all of the members on the organising committee, we hope all of the delegates thoroughly enjoy the conference.

Thank you all again for your abstract and paper submissions, and for sharing your research with us at the conference. We welcome your feedback about the conference.

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