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Competitive Advantage in the Digital Economy Forum 2017

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Proceedings

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CADE 2017 Commentary: A Breeding Ground for New Ideas and Personal Connections

By Dr. Albrecht Fritzsche, Scientific Committee Member

In many ways, CADE 2017 has been a perfect example of the merging discourses of engineers and management scholars in research on the digital economy. Numerous presentations – both in parallel sessions and in the plenary – have made clear how much technical solution design functions as an enabler of economic development, and how specific algorithms (e.g. encryption) and architectures (e.g. personal data spheres) create operational structures on which new business opportunities can grow. At the same time, presentations and discussions at CADE 2017 have made clear that technical design needs strategic reflection to identify the best paths towards a flourishing future economy in which the customers remain mature and autonomous as actors and beneficiaries of the services provided to them.

While the theoretical constructs to discuss the digital transformation are manifold, service systems have played an outstanding role at CADE 2017. This is, of course, on the one hand due to the research background of the organisers. On the other hand, however, service systems actually seem to provide exactly the concept that is necessary to combine the technical and the managerial perspective in the discussion of the digital economy, as it can be used in both worlds at the same time and allows an integration of the different models generated there. This became particularly apparent in various keynotes at CADE 2017 and the discussion of the HAT (Hub of all Things). Still, the potential of the service systems approach to give account of competitive advantage in the digital economy seems far from being exhausted. One might even say that it has only been rather superficially applied until now for descriptive purposes, and that there is a lot of open space left for deeper analysis, classification, evaluation and strategic planning within the digital economy based on the service systems concept.

In this sense, CADE can be considered not only as a forum to collect and compare insights about the digital economy, but also a meeting where researchers convene to shape new perspectives on this hugely important topic and align their thoughts in order to make further progress in the future. The CADE Forum has just the right size to allow a direct exchange between all participants, in a location which attracts researchers from different countries who can add a broad spectrum of cultural perspectives to enrich the discussion. It thus fills an important gap in the wide landscape of conferences and workshops on service systems and the digital economy – as a breeding ground for new ideas and personal connections across disciplines and research communities. Next year's conference will surely draw on the momentum gained by CADE 2017, expand the network and inspire new discussions.

CADE 2017 Outcomes

Teaching the new and the old
A key outcome of CADE 2017 is the increased importance placed on teaching. Advances in the digital economy and crucial changes to existing theories are resulting in a trade-off in teaching and learning at universities. The constantly-evolving digital economy is bringing forth a wealth of new knowledge, even while making some existing theories redundant. It is widely acknowledged however, that students still need to be taught the basics. CADE2017 saw much discussion about finding the right balance between the new and the old, and on how teaching staff should structure their courses to ensure that students have a good grounding in the fundamental theories without missing out on new knowledge.

Increased collaboration between academia and industry
Where the digital economy is concerned, it is becoming increasingly clear that industry is ahead of academia. How do we close this gap? CADE2017 proposed increased collaboration between academia and industry, to ensure that research and practice work in parallel rather than having one ahead of the other. This is becoming increasingly important given the new knowledge that academia is generating in crucial areas. One example is the Hub of all Things, a platform born out of a UK government-funded research project which is not only General Data Protection Regulation (GDPR)-compliant but can also help industry overcome the barriers they will face when GDPR is fully implemented from 2018.

More multi- and inter-disciplinary work
More multi- and interdisciplinary research is clearly needed in the digital economy. CADE2017's panel discussion was truly a multi-disciplinary affair, with participation from computer scientists, innovation and technology management academics, and marketing, service and operations management scholars. The discussion saw many overlaps in thinking, giving rise to research opportunities that would require collaboration between two or more disciplines. CADE2017 also alluded to the need to cooperate more across disciplines with anthropologists, designers and legal scholars and practitioners, in order to suitably advance research in the digital economy.

CADE 2017 Summary

By Phil Davies, Organising Committee Member

The CADE Forum 2017 was an exclusive three-day forum held in Venice, Italy, bringing together academic and practitioner speakers to educate and to discuss the state of the art with PhD students, early career researchers and practitioners working within the digital economy. This year saw CADE enter its fourth year, following three successful years during which CADE grew from a predominately Western European forum to a European conference welcoming participants from Eastern Europe. In 2017, CADE Forum became a global event, with applicants from the USA and Australia, highlighting the increased importance of the digital economy and the Forum's relevance and popularity. This year, CADE also merged with WMG's Service Systems Forum to become a single event, tackling the topic of *Smart Service Systems, Digital Innovation, Privacy and Trust*.

In her welcome for CADE 2017, WMG Service Systems Group's Professor Irene Ng described how at present, the digital economy is causing the most unprecedented structural changes in society, business and the economy since the Industrial Revolution. Research and practice within the digital economy has been made a strategic priority in many developed countries, with academics, practitioners and governments alike placing emphasis on this area, she says, and it is now accepted that every business will be a digital one, with organisations putting in place digital transformation plans to make sense of the possible disruptions as well as opportunities.

With so many stakeholders within the digital economy, the academic community needs to understand and advise on actions to take that will improve societal well-being, as well as achieve competitive advantage for firms. CADE's unique format of bringing together multi-disciplinary thought leaders and researchers to build capacity for cutting-edge research through keynotes, plenaries and discussion in an intimate environment helps generate valuable insights and identify key areas of research going forward.

During CADE 2017, internationally-recognised thought leaders from a variety of subjects including Marketing, Service Management, Operations Management, Supply Chain Management and Computer Science shared their thoughts and latest research about the digital economy (see page 38 for list of keynote speakers). The CADE Forum aims to discuss the current state of the art in the digital economy, with a focus not just on presenting the latest research, but also on opening up avenues for future research with a lengthy discussion session following the presentations. This year was no exception, with thought leaders presenting various cutting-edge research topics whilst simultaneously addressing a number of increasingly important issues that left open the possibility for future research (see page 7 for further details on keynote presentations).

As well as the keynotes, for the first time in CADE's history this year saw the inclusion of parallel sessions, which gave participants the opportunity to present and then discuss their

own research. With the format of CADE placing emphasis on discussion, participants were given up to 15 minutes each to present their research, followed by a short discussion. With topics ranging from the future of blockchain, to participation styles of young people in virtual worlds, these presentations provided a broad and thought-provoking insight into the type of research being conducted in the digital economy. Awards were also offered for best paper (overall), most relevant to practice and unique methodological approach (see page 9 for the list of winners).

Much discussion also took place during CADE 2017's panel session, which saw the Forum's keynote speakers and scientific committee take open questions from participants. The first question drove a long discussion around the future of digital economy research and teaching. This question asked broadly: what needs to be done to advance digital economy research across disciplines, how can we encourage multidisciplinary work within the digital economy and how do we teach the additional knowledge created within said research. Interestingly, whilst the question's focus was on the first two areas, it was the teaching component that received considerable attention. The keynote speakers suggested different approaches, including interactive lectures, lectures from industry on best practice within the digital economy given that industry is seemingly ahead of academia in the digital economy at present (a gap that the Forum agreed needs closing), and creating a more comprehensive extra-curricular reading list which would subsequently be tested in class to ensure the reading is being completed. However, in view of the exponential amount of new knowledge coming into the world through ground-breaking research that needs to be learned and absorbed by students, imparting this effectively remains a considerable challenge for academia, and it is one that the Forum's panel put forth to the participants to solve, as they will be the ones teaching the research in the years to come.

Finally, I would like to take this opportunity to thank all of the sponsor organisations for their contributions toward CADE 2017: Warwick Manufacturing Group (WMG), Warwick's Institute of Advanced Study, The Surrey Centre for the Digital Economy (CODE) and the Hub of all Things (HAT). I'd like to also thank the keynote speakers, my fellow member of the organising committee (Max Green), Chiara Croft (Warwick in Venice organiser) and all of the participants for making CADE 2017 a success.

See you all at CADE 2018!

CADE 2017 Keynote Presentations

The following is a breakdown of each keynote presentation by title, a brief overview of their topic and the questions posed to not just CADE participants, but also the wider community of academics, practitioners and policy makers engaged in the digital economy.

For full presentation slides, please visit:
http://www2.warwick.ac.uk/fac/sci/wmg/research/business_transformation/ssg/ssgabout/sswmgactivities/cade2017/speakerbio/

Creating a Primary Market for Personal Data Exchange in an era of IoT: The Hub of all Things
Presented by Professor Irene Ng

Content
- Background to personal data on the Internet - it is EVERYTHING we do
- Current state of personal data 'harvesting'
- Overview of the types of data markets and how data has become a commodity
- The future of personal data with the Hub of all Things (HAT)
- Building the future of the internet...how the HAT fits in
- Linking the HAT ecosystem to Service-Dominant (S-D) Logic thinking

Questions posed
- How do we make it work?
- How do we make it successful?
- Activism vs Academic: What is the mid-range theory?

Digital Business Models: Personal Transportation
Presented by Professor Glenn Parry

Content
- Innovation, value and business models
- How technology disrupts transport in London
- Future digital transportation strategy

Questions posed
- Where will personal transport innovation go next, how and why?
- How do we manage the different regulation between existing industries and those emerging from the digital economy (e.g., black cabs vs. Uber)?

Service Encounter 2.0: The Roles of Technology, Employees and Customers
Presented by Professor Chris Voss

Content
- The changing roles of technology, employees and customers in the digital economy, and how these affect the customer and employee outcomes
- The role of technology in service encounters
- Business models for disruption in the digital age
- Developing a research agenda for Service Encounter 2.0

Questions posed
- What is the optimal human-technology mix in the service encounter?
- What jobs can employees perform better than technology? And vice versa?
- How can companies help employees and customers adapt to their new roles in the service encounter?
- How can employees and customers best be trained for their transformed roles?
- How can companies develop adaptive capabilities to manage the fast-changing service encounter?
- What is the optimal business model for success in Service Encounter 2.0?

Reconciling Technological, Market, and Business Model Innovation
Presented by Professor Stephen L Vargo

Content
- Institutions, institutional arrangements and service ecosystems
- Reframing innovation and institutionalisation
- Implications of S-D Logic for innovation and design of technology, business models and markets

Questions posed
- How can we reconcile innovation through the use of institutions?
- How do we design institutions to facilitate innovation and service-for-service exchange?
- How can institutions help generate a deeper understanding of business model innovation?
- How can we generate/what are the next mid-range theories for S-D Logic?

Future Safe Havens
Presented by Professor Jon Crowcroft

Content
- The future of safe havens
- Explanation/a right to an explanation for GDPR 2018
- Motives for public cloud infrastructure
- Opportunities for SGX
- MARU project at the Alan Turing Institute
- How HAT meets ALL the GDPR requirements

Questions posed
- How do we virtualise infrastructure locations better?
- For distributed analytics, is a hierarchal or P2P approach better?
- How does GDPR accommodate for mistakes made? (E.g., error in code, error in training, error in input)

Competing in a Hypercompetitive Environment
Presented by Professor Mark Davis

Content
- How power in the marketplace is shifting toward the customer
- The role of technology in services
- Competitive advantage through customer engagement
- Physical and digital service inventory (anticipating customer demand)
- Value is migrating from managing physical products to managing information and data
- Great service requires both human and technology components, not one or the other

Questions posed
- How can we use digital service inventory for competitive advantage?
- When is digital service inventory most valuable?
- How do we investigate and utilise the involvement of customers as competitive advantage in a hypercompetitive digital environment?

CADE 2017 Awards

Best Paper

Augmented shopping in a socially-situated context: The role of augmentation on purchase decision satisfaction in an online shopping environment
Jonas Heller (University of New South Wales)

Most Relevant to Practice

Sweatcoin: Developing novel algorithms to re-define rewards for physical activity
Mark Elliot (University of Warwick); Anton Derlyatka (Sweatco Ltd); Dmitry Koval (Sweatco Ltd)

Unique Methodological Approach

Measuring servitization in the digital economy
Zena Wood (University of Greenwich); Glenn Parry (The University of the West of England); David Walker (University of Exeter); Marco Del Vecchio (University of Warwick)

CADE 2017: Presented Abstracts

Parallel Session 1

Sweatcoin: Developing novel algorithms to re-define rewards for physical activity

Mark Elliot (University of Warwick); Anton Derlyatka (Sweatco Ltd); Dmitry Koval (Sweatco Ltd)

All of us want to be fit and healthy and yet over 60% of the UK are classed as physically inactive (Hallal et al, 2012). The vast majority can't find motivation to exercise enough. This lack of motivation to exercise can be explained by the systematic biases towards immediate reward in human behaviour, known as "present bias" (Camerer, Loewenstein, & Rabin, 2011). Despite its value in terms of quality of life, the rewards of exercise are long-term and hence from a behavioural aspect are heavily discounted. There is evidence that a combination of user interface elements, financial (Mitchell et al., 2013.) and non-financial incentives for exercise provides the immediate reward, encouraging longer-term motivation and engagement.

Sweatcoin has taken the idea of incentivised exercise and developed an innovative digital platform that makes physical movement valuable and thus solves the problem of motivation to exercise more. Sweatcoin tracks and verifies physical movement and converts it into virtual currency. The currency can subsequently be exchanged for goods and services. Since its launch in May 2016, Sweatcoin has 140,000 downloads with a 28% 30-day retention rate (compared to the health and fitness industry average of 4.5%). Importantly, initial results indicate an average uplift of 14% in the number of daily steps recorded by Sweatcoin users compared to before they had downloaded the app.

In this talk we will discuss a collaborative project between Sweatcoin and The Institute of Digital Healthcare (IDH), WMG, University of Warwick. The first part of the project will tackle the current technical challenges the company has identified. This involves broadening the range of activities that can generate currency. Advanced verification algorithms are required to maintain the robustness of the currency such that it can't be 'gamed' by the user (e.g. by shaking the phone). Currently, currency generation is limited to outdoor walking, due to a reliance on GPS signals. The project will collect data on cycling and indoor walking to facilitate the development of new algorithms for these activities. The IDH will verify the algorithms against gold-standard measures, to ensure the validity of the currency is maintained.

The company's philosophy is to encourage those with sedentary lifestyles to become more active and receive instant reward for doing so. Therefore, the second part of the project will involve research into motivation and reward in inactive populations. Focus

group discussions will investigate the value of '1000 steps' and what products and services would motivate individuals to earn currency to spend on the marketplace.

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Private-public paradox in social technology consumption: Moving beyond Technology Acceptance models towards a dynamic Paradox Theory of ongoing technology consumption

Suket S. Parihar; Anna Watson; Sue Halliday; Ariadne Kapetanaki (University of Hertfordshire)

Purpose: Consumers are now in post-adoption phases of digital social technology consumption. This technology constitutes the technical system or artifact as well as humans in the network. However, consumer technology literature is still largely asking questions relating to factors/conditions under which consumers adopt interactive social technologies. These are predictive, linear and derive from positivist assumptions. The challenge now facing marketers and consumer researchers is to understand why consumers continue to consume social technology and how they are doing so? To answer these substantive questions, the paper identifies and explores the issue of privacy in SNS or Social Networking Sites. In particular, the research explores the current issue of privacy paradox, which suggests that consumers continue to disclose information in spite of privacy concerns (Smith et al., 2011; Stewart, 2016), highlighting a conflict and tension in consumers' technology consumption experience. In exploring the literature, the research identifies a gap in our understanding of privacy in relation to social technology. General privacy has been largely conceptualised in relation to information and disclosure, whilst privacy as social interaction between the consumer and technology has not been given as much attention. Commensurate with prevalent theoretical conceptions (Ajzen, 2011; Smith et al., 2011), this is an either/or view of privacy. In contrast, this research argues that privacy is both information and social interaction management and conceptualises it as a co-creation process achieved through interaction between the consumer and the wider social technology. Here, social technology (SNS) is both operant and operand (Halliday, 2016; Vargo and Lusch, 2004). It influences and is influenced by the consumer-actor whose privacy-related awareness is becoming active. To underscore this conception of privacy and explore its individual perceptions, tensions and anxiety in the social technology context, the research argues for a paradox, both-and perspective (Poole and van de Ven, 1989; Smith and Lewis, 2011). A paradox perspective addresses the issue of a) social interaction; b) closely relates to tensions precipitated by technology both inherent in technical systems (of the form X-not X, such as competence-incompetence) and socially constructed (identified in this research as X-Y, such as privacy-public); and c) takes a long-term consumption time horizon. Furthermore, a growing number of studies are applying paradox as a lens to identify persisting tensions in various technology contexts (Barcelos and Rossi, 2014; Baron et al., 2006; Mick and Fournier, 1998). In contrast yet contributing to these debates, this research explores privacy as a tension between the private and the public in SNS. To this end, the paper develops an initial conceptual framework drawing out eight research questions to be explored further empirically.

Methodology/Approach: Conceptual development following a critical review of technology adoption and use models, consumer technology paradox literature and information privacy research.

Findings: The theoretical development proposes an alternative model for understanding privacy as a process of co-creation achieved through interaction between the individual and social technology (SNS) and draws out six research questions for further exploration. The developing model more powerfully explains the consumer concerns-behaviour paradox as identified in extant research (Peltier et al., 2009; Smith et al., 2011; Stewart, 2016) and augments firms' understanding of privacy in relation to digital platforms and consumer-decision making.

Originality/Value: This paradox perspective offers new insight into the theoretical nature of consuming technology as a process of coping and managing opposing paradoxical tensions. This significantly advances knowledge in an area of increasing importance to marketers: ongoing social digital consumption and likely future reactions of consumers to firm-instigated interactions.

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Smart service design: Efficiency and effectiveness of digital interactions for customer contact

Steve Pearce (University of Bristol)

Purpose: Digital interaction and self-service now pervade throughout services in the public, voluntary and commercial sectors of the economy. Self-service transactions have a significant economic impact (Castro et al., 2010) in most sectors of the service economy. This research explores service design characteristics with Customer Contact Theory, the Unified Services Theory (Sampson and Froehle, 2006) and Process Chain Network diagrams (PCN) (Sampson, 2012). Service designs using the UST, the service concept (Goldstein et al., 2002) and service encounter (Solomon et al., 1985) are the theoretical basis used for exploring service design. Customer contact theory (Chase, 1978, Chase, 1981) suggests service designs should reduce customer contact to reduce variation to achieve efficiency. Self-service increases customer contact, customer contact theory suggests efficiency reduces. To test this theory for digital interactions, effectiveness and efficiency of process outcomes are analysed for self-service interactions to identify service design characteristics and their impact on process outcomes.

Methodology/Approach: The research design is based on inductive theory-building using a single case. The study uses embedded cases within a single organisation to provide theoretical and analytical replication. Efficiency and effectiveness are analysed for the two embedded cases, one without digital interaction and one with self-service. Service designs for each case are analysed and explored.

Findings: This research developed and tested service design characteristics for customer inputs, measuring the resultant efficiency and effectiveness outcomes. Service design characteristics were identified that ensure efficiency for digital interactions and customer inputs. The role of mediating technology to replace service workers, provide process control, and reduce variation to achieve process efficiency is shown. With these design characteristics and mediating technology, this research refutes the original classification in customer contact theory – customer presence in the service system can improve efficiency and effectiveness. The findings from this research build service design theory. Customer contact theory is reconceptualised on a PCN diagram. This gap in service design theory and practice was acknowledged by Chase (2010).

Originality/Value: Service design research is lagging behind practice in the rapidly-changing contexts that exist in the digital economy (Ostrom et al., 2015). These contributions advance service operations management research, provide a theoretical base for further research in other contexts and have significant implications for practitioners for improving productivity. The choice of design characteristics has strategic business implications for competitiveness, service process design and productivity.
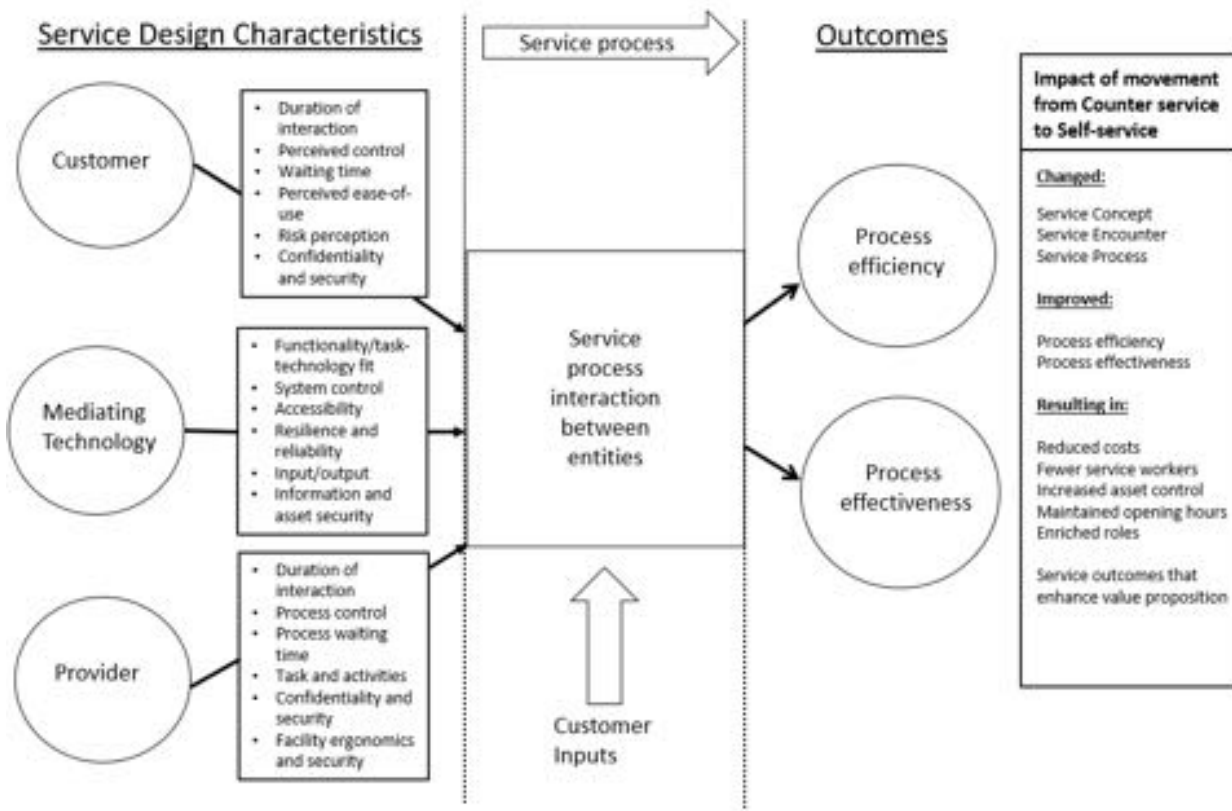
Figure 1.0 Service design characteristics and conceptual model

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Parallel Session 2

That HAT really ties your outfit together: Integrating wearables into an IoT ecosystem to augment device functionality and increase utility

Helen Oliver (University of Cambridge/The Alan Turing Institute)

Purpose: As of early 2017, wearable technology is in danger of becoming yesterday's fad. BBC News is questioning whether wearable tech has "had its day" (Kleinman, 2017) and Wallpaper* reports that wearables have "fallen below the cultural radar" (Bell, 2017). This is unfortunate timing when pinpoints of interesting wearables design are, at last, glimmering on the horizon. A number of recent innovations (Lo, Lee, Wong, Bui and Paul, 2016; Smelik, Toussaint and Van Dongen, 2016; Morby, 2016) transcend the "black-slab incrementalism" (Rose, 2014) of the smartwatch while showing evidence of genuine utility for their wearers. But a disadvantage is that "users do not want to be walking around with fifteen devices measuring fifteen different things across multiple body parts" (European Commission Business Innovation Observatory, 2015). Consistency of data, and privacy, are two of the biggest identified barriers to adoption of wearable technology.

This investigation is motivated by the same frustration expressed by the smart textile designer ten Bhömer (2016): "With these devices here, there is still one question that is mainly unanswered: how can these close-to-the-body technologies create value for us as human beings? [...] I personally still have not found the compelling reason to keep using these systems [...] I cannot help but feel like an actor in a complex information system." Thus, the purpose of this investigation is to discover:

- How can we create innovative wearable IoT devices that add value to everyday life?

Methodology/Approach: This investigation is a research-through-design of wearable IoT (Internet of Things) devices for use by independent adults in routine, non-threatening situations ("everyday wearables"). This will build upon previous work with the Hub-of-all-Things (HAT) and extend it into the wearables domain (Oliver, 2014, 2016). The inspiration phase will be driven by participatory Design Fiction (Lindley & Coulton, 2015), eliciting stories of imaginary, fantastical and even impossible wearables from the users, and translating them into real device designs and prototypes. They will wear their devices in the wild, enabling us to discover the factors which lead to acceptance or rejection of wearable IoT devices.

We have chosen the HAT platform as our software infrastructure to enable the cross-device contextualization that will augment the functionality of individual devices while ensuring consistency of data and safeguarding users' privacy.

Findings: This is a work-in-progress, and the goal is to create wearable IoT devices that users will want to wear. We want to see if the HAT increases the perceived utility of the wearables.

Originality/Value: This is the first study of the participatory design of "everyday wearable" IoT devices to use Design Fiction to elicit concepts directly from independent adult users, build prototypes inspired by the Design Fictions, and evaluate the prototypes in the wild over the long term. We hope that our work will produce everyday wearables that are beautiful and useful. More than this, we hope that the HAT's privacy-by-design, and the cross-device contextualization it enables, will address two of the major barriers to mainstream adoption of wearable technology, and thus become the foundation of a system that results in wearables that people really want to wear.

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Users' preferences towards online privacy: The case of GDPR

Michał Paliński (University of Warsaw); Maciej Sobolewski (University of Warsaw)

Purpose: Currently, Internet users are not in sufficient control of who collects their personal data and in what way they make use of it. The aim of this research is to estimate how customers value the possibility of control of their privacy on the Internet and on what this valuation depends. Specifically, Polish Internet users' preferences for respective mechanisms of privacy control included in the new EU regulation on data protection (GDPR) entering into force in 2018 are estimated. Since the GDPR places minimal demands on the providers of Internet services and platforms, our aim is to find out what level of privacy control would be expected by Internet users and how specific solutions should be designated to encourage people to protect their privacy on the Internet to a greater degree.

Methodology: We apply a discrete choice experiment (DCE) method to determine consumer preferences towards management of online privacy (Sobolewski, Paliński 2017). We focus on: (a) user preferences towards different 'scopes' of control mechanisms which might evolve from upcoming privacy reform in the EU; and (b) welfare assessment of the regulation. The specific objectives are: (i) to provide evidence on how individual users assign value to the specific aspects of privacy protection; and (ii) to explore heterogeneity of preferences with respect to relevant characteristics of users. The assessment of customers' preferences for specific instruments of privacy control on the Internet is carried out with the use of discrete choice experiment method. In this approach, respondents make choices between hypothetical alternatives, described by the set of measurable characteristics. Our final dataset consisted of 4390 choices made by 143 respondents. In our study, among attributes are variables representing a diversified level of: i) information obligation of online service provider; ii) objection to profiling and disclosure of personal data; iii) data portability between providers of online services; and iv) the possibility to edit and remove personal data. On the basis of the declared choices, the utility function estimation allows us to recognise customers' preferences for variety means of privacy protection. As a result, the evaluation of the relative importance of each attribute in monetary terms is performed. The estimated utility function allows us also to assess the effects of various potential regulations.

Findings:

- Estimated consumer surplus (3.4 EUR) is noticeable - relatively to previous studies. It is about 1/3 of the monthly broadband Internet subscription fee in Poland.
- The most important change in privacy control seems to be the right to object profiling and the right to be forgotten.
- Portability's coefficient is not significant and the sign is unexpected. We link this result with the fact of the abstract nature of personal data portability. Nevertheless, further research is needed to explain this result.

Originality: The empirical research on economic value estimation of both personal data and online privacy is growing. However, mainstream studies focus on consumer's willingness-to-accept to disclose personal data. Experimental studies on valuation of data protection (willingness-to-pay to protect personal data) using DCE are much more scarce. To the authors' best knowledge, there have not been any previous attempts in the economic literature to value general control mechanisms such as those envisioned in the EU's GDPR. Potoglou et al. (2015) is methodologically the closest study to our research. Nevertheless, their project was limited to privacy concerns regarding e-commerce. Our study focuses on core parts of the general protection mechanism in the global Internet enforced by the upcoming EU regulation. We focus on preferences towards these protection mechanisms without sticking to any specific context of a particular online service such as web browser, social network or e-commerce site.

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Regulatory framework for over-the-top services (OTT): Is the European Union afraid of OTT?

Joanna Mazur (University of Warsaw)

Purpose: 1) Presenting the European Union's approach towards regulating over-the-top services; 2) Defining key areas for levelling the playing field of OTTs and traditional services considering the 'same services – same rules' attitude; 3) Considering privacy regulation as the most important legal field of regulating OTTs from an economic perspective.

Methodology/Approach: 1) Analysis of legal acts considering the topic of OTT services and proposals of directives and regulations which are meant to refer to such services; 2) Examining the potential juxtaposition of the legal aspects of regulating OTTs and their economic value as well as influence on the social dimension of everyday life.

Findings: OTT services are one of the key factors that should be considered while completing initiatives to be included in the strategy of building a Digital Single Market for the European Union. Due to their differentiation, it is understandable that the topic of OTT services is crucial for the areas of regulation such as telecom rules, audiovisual directives, copyrights and privacy regulation. As OTTs provide an alternative to traditional means of communication and broadcasting of audiovisual content, it is vital to present a coherent strategy on the issue of applying the same rules to the same services.

At the same time, there is no legal definition of OTT services. Even though they were the subject of special reports prepared for the European Parliament (Godlovitch et al. 2015) and the Body of European Regulators for Electronic Communications (BEREC), European legislators seem to avoid defining OTT services in the process of creating law. However, OTT services are being regulated, e.g. interconnection services include some OTT services, which results in their fragmentary regulation in the proposed European Electronic Communications Code.

I argue that the challenge of regulating OTT services lies in precise definitions and in expressing a clear, coherent strategy which would give answers about the legal regime concerning OTTs, both to entrepreneurs and consumers. As one lacks those answers, it is crucial to recognise the areas in which European legislator declares to include OTTs within the proposed regulation.

Privacy regulation seem to be the case which provides one with the most advanced and wide proposals of applying common rules to interconnection services and therefore OTTs.

Originality/Value: The value of the research lies in searching for an answer to questions which should be raised regarding proposals of regulating OTT services. The process of making the law concerning new technologies illustrate difficulties regarding the most fundamental questions on attitudes towards the relationship between law and

technology: should the law answer challenges raised by technological innovation by being constantly updated or by being clear even through general rules, which would provide sufficient framework for stabilising the legal status of OTT services.

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Parallel Session 3

Sharing economy vs traditional firms: A war between standards?

Kristóf Gyódi (University of Warsaw)

Purpose: Sharing economy firms, based on online platforms, have become strong competitors of traditional companies in many services sector, including the taxi industry. Regulatory authorities all over the world are facing the challenge of how to react to Uber and other platforms, as they may enjoy unfair competitive advantage in otherwise heavily regulated sectors. The aim of this article is to provide an economic framework for the analysis of the competition between traditional and sharing economy firms.

Methodology/Approach: The business model and success of sharing economy firms is explained using economic literature on platforms, transaction costs and network effects. A novel model is introduced based on the theoretical literature on "standard wars", which describes the competition between technological standards (such as operating systems). From the perspective of a full-time service provider, the choice between a platform and a traditional firm is similar to the dilemma of choosing a standard. Platforms, just like technological standards, are subject to network externalities and lead to the lock-in of users. As a case study, Uber and the taxi industry is chosen. The model translates the problem of drivers into a two-player coordination game.

Findings: Collaborative platforms represent a new business paradigm, only partially compatible with the rest of the economy. The coordination game reveals the different equilibria of market shares and the possible strategies of Uber and taxi companies. The competing firms will try to attract drivers, often sacrificing profit. Uber may try to decrease the service fee it acquires from every transaction, or introduce social security contribution for the drivers. Taxi companies may also try to decrease commission charged to the drivers, provide better and more convenient vehicles etc. Finally, the model also shows the important role of regulatory authorities to create a level playing field. Adequate policy may include either the decrease of entry costs to the traditional economy or impose the same regulation for sharing economy platforms.

Originality/Value: The analysis contributes to the literature by showing that the theoretical models on the competition between technological standards can be implemented to analyse the rivalry between traditional firms and sharing economy platforms. A novel framework is presented to analyse such rivalry in the example of Uber and the taxi industry, also enabling an examination of policy impact on competition.

Parallel Session 4

Measuring servitization in the digital economy

Zena Wood (University of Greenwich); Glenn Parry (The University of the West of England); David Walker (University of Exeter); Marco Del Vecchio (University of Warwick)

The increasing opportunities that are offered by new technologies in the Digital Economy has led to companies evolving traditional business models. Methods are needed to identify these new business models and track their evolution; such methods could be used to define the Digital Economy. This abstract describes the latest developments in a computational method that identifies new business models through the analysis of a firm's webpages. The developments include more advanced feature engineering based on web-scraping and inclusion of data from social media thus allowing the different business models to be identified more accurately.

The method adopts a basic framework for a business model (Parry and Tasker, 2014), which included three elements of a business: value proposition, realisation of value in use, and worth capture. Since the Digital Economy is still ill-defined, the current method is being used to measure the diffusion of service and extent of servitization. Servitization is taken as a change in the business model, from a focus on purely product towards inclusion of service in the value proposition. The method incorporates machine learning, web-scraping, and ontological theory, to produce a general taxonomy of business models; such a taxonomy may lead to classifications that characterise the extent of Digital infusion into business models. The method has been implemented in Python and successfully applied to a sample set of websites: the West Country's 150 biggest businesses (Top 150 Businesses Guide 2014) as listed by Western Daily Press, UK.

The ability to measure the extent of servitization over time, and categorise according to degree of product/service offer, would be of great interest to servitization researchers and provide valuable insight for firms and markets. Previous approaches are time-consuming and reliant on databases which are not controlled by the individual firms of interest and may contain inaccuracies (Neely, 2009). The new method uses data that is created and disseminated by the firm themselves who have a direct commercial interest in its timeliness and accuracy. The method is more inclusive since it does not rely on databases where firms must meet a qualification to appear. Due to the dynamic nature of the Digital Economy, any method that is developed must be repeatable and allow for change. The method employs computational methods that can be run at minimal time and cost to the research team. The work seeks to provide a regular output that may be of interest to the research community and organisations, tracking trends in the number of firms in a market, their activity and changes in activity from product to service over time.

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Integrated process and project management in entrepreneurial service organisations

Arvi Kuura (Pärnu College, University of Tartu)

Purpose: The existence and usefulness of business processes and projects (including programmes and project portfolios), as well as entrepreneurial behaviour in service organisations, is commonly recognised by both practitioners and researchers. However, in practical management as well as in academic literature, the named fields appear still quite separated; both managers and researchers tend to be encapsulated in their professional specialist 'silos'. This has caused separation of both practice and research communities and injurious fragmentation of knowledge, debarring potential synergies. This paper intends to explore the existing and potential linkages between the ostensibly separated fields of practice and research, and to suggest alternatives to overcome detrimental separation. It is assumed that in practice these fields are better (yet still insufficiently) linked; thus linking on the research side needs acceleration.

Methodology/Approach: The paper is based on narrative reviews of the existing bodies of academic literature, using a loosely structured method, and attempting to discover existing and potential linkages across multiple fields. The approach is inter- or cross-disciplinary – combining different theoretical grounds, it deals with people's roles in permanent and temporary settings in service organisations.

Findings: At some points, primarily in practice, the examined fields have already come quite close and the trend of continuous rapprochement can be observed. Nevertheless, especially in academic knowledge building, there are still large unused possibilities to create useful synergies between the academic fields. This paper proposes some steps that could be taken in the (near) future – for one, integrated use of several management systems and/or standards, notably in service organisations.

Originality/Value: This paper illustrates how combining various research streams – what is not very common so far – can unfold possibilities for synergies in practice and particularly in research and development. Also, it outlines an idea – to develop a methodology for integrated process and project management for entrepreneurial (including small and medium-sized) service organisations. Following further developments may lead to the formation of a common body of knowledge for the examined fields, and even for related fields such as business analysis.

Programmable money, digital gold and the future of blockchain: Categorising the affordances and expectations of a promising technology

Beth Kewell (University of Surrey); Catherine Mulligan (Imperial College London); Phil Godsiff (University of Surrey); Roger Maull (University of Surrey)

Breakthrough moments occur when knowledge of what a technological discovery can do, or be used to accomplish, begins to travel outside of the laboratory or the innovation space, via talk and text. Discourse has a role in both disseminating this information and creating lasting representations of what the technology is capable of achieving. While highly subjective and esoteric in origin, these promissory modalities have an objective impact, framing perceptions of an innovation's potential credibility, acceptability, efficacy and nascent affordances within the factual domain (Brown and Michael, 2003; Webster, 2005; Borup, et al., 2006; Pollock, et al., 2007; Pollock and Williams, 2010; Van Lente, 2012). Promissory modalities can have a significant and lasting impact on factual perceptions of affordance at the strategic level, where they are inscribed into decision-making, from the moment the need for a new technology is identified to the buying decisions and implementation strategies that follow (see for example: Maier and Fadel, 2009; Withagen and Chemero, 2012; Volkoff and Strong, 2013; Ciavola and Gershenson, 2016). Promissory modalities relay complex messages about technological affordances (Gaver, 1991). Entrepreneurs and business strategists are skilled interpreters of these signs and symbols, which they use to establish a sense of the advantages to be gained from technology adoption. Being able to 'read' promise is an essential management competence that involves working within – and between – different affordance related knowledge categories (Bowker & Star, 1999). Given the gambles involved in technology adoption, it seems pertinent to consider how this interpretative task is performed so as to delineate between real promise and hype.

Firms in the service and manufacturing sectors are being encouraged to consider investing in Distributed Ledgers as the newest – and most promising – solution to prescient information management challenges and quandaries (see: Walport, 2016). In this paper, we consider how industry experts from the services sector (n=5) approached the interpretative task of reading Distributed Ledger Technology (DLT) promise, in 2015. Our informants were uniquely positioned to comment on DLT affordances, at a juncture in time that pre-dates much of the subsequent hype surrounding the growth of DLTs and blockchain cryptography. It is possible to see, within this sample, evidence of an interpretative process that has since become more widespread, framing investment and adoption decisions among diverse sectors, from finance to diamond trading (Walport, 2016). Our paper shows how this promise was 'read' by experts using different affordance knowledge categories to develop a sense of what could and could not be realistically

expected of DLTs. Use of affordance knowledge categories was closely associated with extemporizations of promise (Brown and Michael, 2003; Borup et al., 2006). The two forms of insight (one objective, one subjective) were often pinned or tacked together (Star and Griesemer, 1989) - much as in a patchwork cloth. Informants were able to interpret – and closely interrogate - notions of promise using this verbal/textual stitching method. We argue that this practice was pivotal to sensemaking of DLT promise among our interviewees, whose opinions reflect an interpretation of DLT efficacy that has since become more widespread.

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Do smart mobiles apps produce smart financial decisions?

Juan Moreno-Paredes (University of Southampton)

Smart mobiles and their user interfaces, 'apps' (SMA), have gained rapid acceptance amongst consumers. However, the impact of this technology's use on the nature and quality of individual decisions has remained under-researched. We fill this gap by examining 4.5 million trades of 5315 investors in the UK spread trading markets between November 2004 and March 2013. The results suggest that there are demographic differences between those who do and do not use smartphones for trading. After controlling for these factors, we observe significant performance differentials and differences in the nature of the trading decisions of these two groups. Furthermore, we show that those who use SMA achieve higher risked-adjusted returns, but exercise less trading discipline (measured by disposition effect). We discuss the possible reasons for our findings and the implications for financial market operators, regulators and for the efficiency of markets.

Parallel Session 6

An empirical analysis of the number of Unique Browsers of the websites of UK regional newspapers

Michael Brightman (University of Central Lancashire)

Purpose: Print circulation has been the traditional method of measuring readership and engagement of newspapers since the end of the 19th Century. Unique browser is the equivalent measure online in the 21st. The purpose of this empirical study was to investigate the relationship between the 4C's of Channels, Commerce, Content and Conversation as described by Nel and Westlund (Nel, Westlund 2012) and the number of unique browsers of the websites of UK regional newspapers.

Methodology: Fifty regional newspapers audited by the Audit Bureau of Circulation (ABC) formed the study and a 114-point audit of their website was carried out based on Nel (Nel 2010) as developed from Rappa (Rappa 2000) and updated for subsequent technological development.

Using binary notation for evidence of the elements on the website (1 for present, 0 for not evident) an index was then created for each of the 4C's configured from the number of elements that fell within each of the 4C's where understood to be:

- Channels – which different channels of communication and distribution or platforms are utilised by the website eg. bookmarking, apps, newsletters
- Commerce – which elements of the website have the potential to generate revenue eg. classified advertising, subscriptions, data gathering
- Content – what appears on the website itself other than just news eg. photo galleries, video, advertising
- Conversation – in what ways does the website seek to interact or engage with the browser eg. reader polls, comments on articles, forums

Multiple regression was then performed for each of the 4C's as explanatory variables with Unique Browsers as the response variable.

Prior knowledge suggested that Commerce may have a positive influence but Channels and Conversation would also, and to a greater degree. 'King' Content, as it has oft been termed, could potentially be a much more important measure.

Findings: As expected there was a positive correlation between Channels and Commerce and a greater relationship with Conversation. Surprisingly, Content had a very weak relationship. However, none of the results were statistically significant.

Although disappointing, these results are based on the judgement of the author as to which of the 114 website elements fit within each of the 4C's and input from interested peers may result in interesting differences.

Originality and Value: Greater print circulation gave newspapers the ability to charge advertisers more for the same space, hence its importance. It follows, that the higher the number of unique browsers the greater the fee that can be charged for advertisement online. However, until now there has been little academic research into the success of regional newspapers' websites. The findings suggest that more research is needed into what drives readers to UK regional newspaper websites and it may not be as obvious as one would assume.

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Service experience participation styles in a young people's virtual world

Janet Ward (University of Sunderland); Johanna Gummerus (Hanken School of Economics); Mitchell Ness (Newcastle University)

Purpose: To understand service experience in a virtual world service ecosystem.

Service research to date has tended to use the concept of the service ecosystem as a metaphor (Mars et al, 2013). Virtual worlds in contrast are essentially virtual ecosystems, i.e. "relatively self-contained, self-adjusting system[s] of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Lusch and Vargo, 2014, p. 1). The virtual world/platform owner is able to largely stipulate the rules of the environment, and regulate the resources available to the participants, whereas the vitality of the ecosystem depends on member activity. Teen virtual worlds are becoming increasingly complex offering not only social activities, but also games, competitions, creative opportunities that may include trading, virtual and/ or real world merchandise (Ward & Gummerus, 2014). Through their participation, members not only interact with particular content, but also strengthen their ties to the community (Kozinets, 1999).

Eisenbeiss et al (2011), working in Second Life identified four latent user segments of socializers, refugees, creativity seekers, and specialists. However it has been suggested that the teen focus of Habbo Hotel would moderate these results. Habbo Hotel is reported to have 51% of users in the 13-17 age range, with 30% in the 18-24 age range with a peak of 8.7 million concurrent users (Sulake, 2012). It opened in 2001 and therefore means it may have users with extended experience of the 'world'.

Methodology: A mixed methods approach with an extended period of ethnographic research in the Habbo.com hotel (English speaking) followed by an online survey analysed using SPSS, factor and cluster analysis. Detailed statistical analysis is available and confirmed the high quality of data set.

Findings: Initially, 56 different participation styles were identified from the ethnographic work and discussions with the company. The survey had a response rate of over 1400, after cleaning leaving 979 responses. Factor analysis reduced these to eight factors including potentially negative aspects. Cluster analysis was applied as a two-stage process to the eight activity factor scores. Profiles of the six clusters were developed from a descriptive analysis of the average Habbo activity factor scores for each cluster. The profiles were extended from analysis of behavioural and demographic measures and from factors representing additional constructs. The six clusters show a much more complex view of service experience and the customer participation and co-creation styles within a young person's virtual world.

Originality/Value: This work studies a much more complex and defined service ecosystem than previous studies. It also has a focus on the 16-24 age group which is a

less studied group. A larger range of factors including potentially negative aspects is reported. The six clusters allow a model of service experience in a teen virtual world to be developed with implications for management of such spaces. The results will also be discussed in the broader context of collective service experience.

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The impact of 3D printing on digital innovation in the sharing economy

Wen Liu (University of Cambridge)

Purpose: In recent years, the term '3D printing' (known as 'additive manufacturing') is widely used and has generated great public and academic interest. Different to the traditional machining process of subtracting materials, 3D printing systems can draw on a computer-aided design model to make three-dimensional objects by adding successive ultra-thin layers of the materials. Based on literature review, most of the articles focus on a specific 3D printing process such as selective laser sintering or fused deposition modelling to compare with the conventional manufacturing process in terms of the materials used and energy consumption in environmental perspectives. However, little has been done on its impact on business models and digital innovation. Therefore, the purpose of this research is to study the impact of 3D printing on digital innovation in the sharing economy. Also, it is important to learn more about how the specific business models offered by 3D printing providers affect the overall digital economy and the way that digital innovation is carried out.

Methodology: This paper involves a combination of critical analysis of literature and a qualitative research study. Qualitative research methods such as case study and semi-structured interviews are conducted to collect detailed and in-depth information and data. The exploratory case study identified the current business models offered by 3D printing providers and the 3D printing platform ecosystems.

Findings: We expect to enrich digital innovation theory. The main output of this research is a conceptual framework to identify failed value exchange and develop new value innovation opportunities for 3D printing companies via a systematic approach. The conceptual framework explains how 3D printing changes the business models from a value perspective. This is needed to increase knowledge and empirical evidence for 3D printing business models in the digital economy. The framework is designed and developed to provide a holistic and systematic perspective of digital innovation affected by 3D printing. Thus, firms can potentially benefit and be inspired by this framework to identify the way that digital innovation is carried out in the sharing economy by 3D printing.

Value: This paper identified the gap in literature regarding the impact of 3D printing on digital innovation in the sharing economy from a value perspective. It provides a valuable starting point from which further research with 3D printing in this perspective can be conducted.

Augmented shopping in a socially-situated context: The role of augmentation on purchase decision satisfaction in an online shopping environment

Jonas Heller (University of New South Wales)

Purpose: In this study we examine the current role of augmented reality (AR) as an enabler for consumer purchase satisfaction in an online store. The consumer's inability to assess contextual information about products, such as product-fit for fashion products, eye-wear or jewellery, is still one of the major shortcomings of online retail stores compared to physical stores. We argue that AR can overcome this shortcoming, however only if consumers have the potential to virtually try the product and share the information they receive during the try-on with peers to receive feedback during their shopping process (H1). This interaction hypothesis is based on the theory of socially situated cognition, which states that cognition and action are the emergent outcome of dynamic processes of the interaction between an agent and a (shopping) environment. Furthermore, we argue that AR increases the value of the information available for the consumer; hence information value acts as a mediator for the relationship of AR on purchase decision satisfaction (H2).

Methodology: We utilise the AR application of a large eyewear online retailer from Germany to empirically test our hypotheses in an online experiment. The application allows participants to use their webcam to virtually try-on sunglasses in real-time by filming themselves and virtually projecting sunglasses on the participant's heads. The study employed a 2 (augmented reality: absent, present) x 2 (social cognition: individual shopping, social shopping) between-subject design with 534 Amazon MTurk participants. Participants in the AR absent group were instructed to use the website of the eyewear retailer to search for a pair of sunglasses of their choice by comparing different product pictures, whereas participants in the AR present condition were instructed on how to use the virtual try-on application and encouraged to use the application for every pair of sunglasses they tried before making a decision. In the individual shopping condition, participants indicated which choice they made and received a series of scales to answer. In the social condition, participants were asked to upload a picture of their pair of sunglasses of choice and indicate the names of friends whom they would ask for shopping advice. On the next page, they received comments, supposedly from their friends, designed in the form of Facebook comments.

Findings: We tested our hypothesis using a moderated mediation analysis, confirming the positive interaction between AR and a social shopping situation on purchase decision satisfaction (b = .269, SE = .131, p < .05). Furthermore, AR is a significant predictor if information value (b. 547, SE = .098, p < .001), and that informational value was a significant predictor of purchase decision satisfaction (b = .390, SE = .029, p < 0.001). Those results support our mediating hypothesis.

Value: Purchase decision satisfaction can be significantly improved when employing AR in online environments; given users have the ability to share their shopping experience with others. Retailers are interested to increase purchase decision satisfaction, as it is one important antecedent for loyalty, product recommendations and word-of-mouth.

Towards a strategic model of disruptions and equilibria in digital service systems

Albrecht Fritzsche (University of Erlangen-Nuremberg)

Digital technology gives access to a vast manifold of new configurations of actors and resources in complex value creation systems. Out of this immense solution space for innovation, only a small fraction of actual configurations can actually be realised. One of the most important tasks in this context is therefore to understand which configurations are most likely to be realised and why.

Most research on digital industrial service systems has so far been exploring the new potential added by mobile, interactive and distributed technology on a clean slate. Currently, however, there seems to be a trend towards projects which give more consideration to existing industrial structures as a starting point for the digital transformation and the different paths which innovation can take from there. While this approach has the advantage to produce more realistic predictions of the near future, it bears the risk to underestimate the disruptive potential of digital technology and focus on incremental change.

This paper intends to develop a scientifically solid theoretical basis for industrial change due to the digital transformation which takes both incremental and disruptive processes into account. For this purpose, it combines elements of systems theory with others taken from evolutionary theory. The paper turns the attention away from the optimal configuration of actors and resources in a service system towards the regulative processes which ensure the integrity of systemic operation. The underlying idea is that disruptive change goes along with a regulative failure which puts a system permanently out of its equilibrium and creates the need to adopt different systemic views of interaction.

To support nascent theory in this field, the paper presents case studies from projects concerned with the digital transformation of industry. It identifies different forms of regulative processes enabling and supporting systemic activities and discusses how they are likely to be compromised by the introduction of new technical devices and the appearance of new value streams. Using data from project documents, interviews and workshop sessions, it identifies three main dimensions of regulation which need to be considered: (1) engineering activities to install, run, and maintain the systems, (2) role adoption, conflict management and politics in organisations, and (3) symbolic representation and storytelling about value creation in the systems.

Current evidence suggests regulative processes are most likely to fail in the domain of value creation, while role adoption, conflict management and politics in organisations are the most reliable basis to ensure a return to equilibrate states of systems operation. Explorative approaches of disruptions in digital service systems should accordingly best proceed from a value creation perspective. Exploitative approaches which are more

interested in actual paths taken by the digital transformation should rather consider organisational regulative processes.

The paper contributes to theory in the context of digital service systems by highlighting different forms of regulative processes. At the same time, it adds important insights to managerial practice regarding the recognition and enablement of incremental and disruptive change. Furthermore, it hopes to establish a new perspective on the digital transformation which can help the scientific community understand its own role in accompanying and guiding the digital transformation of industry. This might allow us to draw further conclusions about the function of such events as CADE 2017 and its strategic positioning.

CADE 2017: Keynote Speakers

Chris Voss

Emeritus Professor of Management Science and Operations, London Business School and Professor of Operations Management, Warwick Business School

Primarily an empirical researcher, Chris's research interests lie in service management, experiential services, operational improvement and benchmarking, manufacturing strategy and international issues in operations management. He is widely recognised as a leading scholar in the use of case study research designs. Chris has published in a variety of world-class journals, including: Journal of Operations Management, Production and Operations Management, the International Journal of Operations and Production Management and the Journal of Service Research. The former deputy dean of London Business School, Chris is also co-founder of the European Operations Management Association and is actively involved on its board, contributing to summer schools and writing workshops.

Glenn Parry

Professor of Strategy and Operations Management, The University of the West of England

Glenn's is interested in understanding what makes 'good' business, and works with organisations to help them with business models, value capture, servitization, and supply chains. Glenn is currently focussed upon the Digital Economy, and is a Co-I on the HALL/CONTRIVE project. He was a Co-I on the HAT project, and worked on a British Academy project examining Blockchain for Good. He was PI on an RCUK grant to explore Cryptocurrencies and distributed ledger, and Co-I on "The Uber Disruption", a project examining which variables can be used to describe digital technology disruption. Glenn has also worked in the creative industries [music, books, TV], exploring the impact of the move from physical to digital. He publishes in leading international journals and co-edited the books *Build to Order: The Road to the 5-day Car*, *Complex Engineering Service Systems and Service Design and Delivery*.

Irene CL Ng

Professor of Marketing and Service Systems, WMG, University of Warwick

A business (IO) economist through her doctoral training, Irene's research lies in the trans-disciplinary understanding of value and new business models. She has received global recognition for her work including several ESRC fellowship appointments, and is currently an ESRC/InnovateUK Innovation Caucus Thought Leader. Irene is currently PI of the EPSRC-funded HAT Living Labs (HALL)/CONTRIVE project. She was PI of the £ 1.2m RCUK-funded HAT project, and a Co-I on the £1.5m RCUK NEMODE Network+ project. Irene has published numerous articles in the domains of management, marketing, engineering, economics, education and sociology and is the author of the highly-acclaimed *Value and Worth: Creating New Markets in the Digital Economy*, published by Cambridge University Press. An entrepreneur and academic, Irene is passionate about the link between practice and research, and advises digital business startups.

Jon Crowcroft

Marconi Professor of Communications Systems, Computer Laboratory, University of Cambridge

Jon's research interests include communications, multimedia and social systems, especially Internet-related. He is a Fellow of the Royal Society, Fellow of the ACM, a Fellow of the British Computer Society, Fellow of the Royal Academy of Engineering, and a Fellow of the IEEE. He was a member of the IAB 96-02, and went to the first 50 IETF meetings; was general chair for the ACM SIGCOMM 95-99; is recipient of Sigcomm Award in 2009. Jon is PI for the EU Social Networks project, the EPSRC-funded Horizon Digital Economy project, the EPSRC-funded project on federated sensor nets project FRESNEL, and a five-year project towards a Carbon Neutral Internet with Leeds. He is currently a Co-I on the EPSRC-funded HALL/ CONTRIVE project. Prior to joining the Computer Lab, Jon was Professor of Networked Systems at UCL. He has supervised over 45 PhD students and over 150 Masters students.

Mark Davis

Professor of Operations Management, Bentley College, Massachusetts

Mark worked as a manufacturing engineer for the General Electric Company and is a graduate of its Manufacturing Management Program. He was also a programs manager for the U.S. Army Natick Research Laboratories, where he focused on the design of military foodservice systems. Mark's primary research interest is in service operations management. He has published articles in journals such as The Journal of Operations Management, Decision Sciences and The Journal of Services Marketing. Mark is currently Vice-President at Large for the Decision Sciences Institute. He also served as Program Chair for the 2003 Annual Meeting, Secretary and as a member of its Board of Directors, and is a Past President of the Northeast Decision Sciences Institute. In 2000, he was named a Fellow of the Decision Sciences Institute. In 1998, Mark received Bentley College's Scholar of the Year Award.

Stephen L Vargo

Shidler Distinguished Professor and Professor of Marketing at the University of Hawaii at Manoa

Steve's primary areas of research are marketing theory and thought. He is seen as the founding father of Service-Dominant logic alongside Robert Lusch; their 2004 article in the Journal of Marketing, "Evolving to a New Dominant Logic for Marketing," is the most-cited marketing article published in the last 10 years. Steve has published in leading 4* journals including the Journal of Marketing, the Journal of Academy of Marketing Science, the Journal of Service Research and the Journal of Retailing. He also has two books: *The Service Dominant Logic of Marketing: Dialog, Debate, and Directions*, which he co-edited, and *Service-Dominant Logic: Premise, Perspectives and Possibilities* co-authored with Robert Lusch. For his work, Steve has received many awards, including the Article of the Year Award by the Australia and New Zealand Marketing Academy. In 2016, he was named as one of Thomson-Reuters' World's Most Influential Scientific Minds for the third consecutive year.

CADE 2017: Scientific Committee

Albrecht Fritzsche

Albrecht holds a doctoral degree in philosophy from TU Darmstadt and another in industrial management from Hohenheim University, Stuttgart. Albrecht can look back at 15 years of experience in the manufacturing industry as a systems designer and strategy consultant. Albrecht is currently affiliated with the Institute of Information Systems at Friedrich-Alexander University Erlangen-Nürnberg, where he teaches innovation strategy and various other topics concerning the organisational and technical conditions of socio-economic change. He is also involved in various industrial research projects concerning digital innovation, including the Service Manufactory JOSEPHS® project of the Fraunhofer Institute for Integrated Circuits.

Roger Maull

Professor of Management Systems, University of Surrey Business School and founder member, Surrey's Centre for the Digital Economy (CoDE)

Roger's current research is in the impact of digital technologies on future economic activity, including IoT, personal data, wearables and digital currencies. He has published widely in leading journals including the Journal of Operations Management and International Journal of Operations & Production Management. He is currently a Co-I on the HALL/CONTRIVE project, and was PI on the £1.5m NEMODE project which is an RCUK DE funded Network+, and PI on the CREDIT Cryptocurrency Effects in Digital Transformations project. Roger has a track record of working with industry, including commercial projects with Microsoft, Vodafone and DSTL. Prior to joining Surrey, he spent 16 years at the University of Exeter in various roles including Head of Department of Management and Director of the Centre for Innovation and Service Research (ISR).

CADE 2017: Organising Committee

Phil Davies

PhD Candidate, Service Systems group, WMG, University of Warwick

Prior to joining Warwick, Phil was an industrial designer for a number of small and medium enterprises, most recently a 3D printing and 3D scanning company working with clients such as Jaguar Land Rover, SSE, Aston Martin and Pinewood Studios. Since joining WMG as a doctoral student, he has developed a keen interest in 3D printing, the Internet of Things and the digital economy. Phil is the recipient of an EPSRC iCase award with BAE Systems Land (UK). The focus of his research is around 3D printing and modularity, investigating two main areas: the impact of designing for use and the impact reconfiguration for context has on product architecture; and how 3D printing can be used to provide an incomplete product platform for customers to tailor platforms to context. This is the second year that Phil is organising the CADE Forum; he has attended all previous events.

Max Green

PhD Candidate, Service Systems group, WMG, University of Warwick

Originally trained as a chemical engineer, Max joined WMG in 2011 to pursue an MSc in Process Business Management. During this time he developed a keen interest in the future of energy markets and following a break to complete his Yachtmasters, re-joined WMG as a PhD candidate under the Warwick Chancellor's Scholarship. Having worked with Intelligent Energy on business model optimisation (for the application of hydrogen fuel cells to the Indian telecoms industry) and more recently with InnovateUK to develop a business model innovation tool, Max's research now focuses on the transformative impact of digitalisation on business models. Complementary to his studies, Max has organised various events including an ESRC-sponsored seminar on servitization – recently publishing on the same topic in the International Journal of Production Economics – as well as the 2016 Service System Forum in Venice.

CADE 2017: About our Sponsors

Service Systems Group, WMG

The transdisciplinary research conducted by the Service Systems group at WMG lies in the understanding and design of complex service systems, which come in many forms. Its work has ranged from multi-party outcome-based contracts for Rolls-Royce engines to the Ministry of Defence, complex service and logistics contracts to deliver a bank of flying hours for the Tornado or Typhoon jets, to designing multi-sided platforms and markets like the HAT for personal data, and knowledge-based collaborative networks of partners such as hospitals and universities.

Led by Professor Irene Ng, the Service Systems group covers a wide range of specialisms, including decision theory, ontology engineering, consumer culture theories, modularity & architectural innovation, information systems, economics, supply chain, monetization of digital services, consumer experience and loyalty. Its research has been funded by the UK government through the Research Councils UK. The group also works closely with industry and the public sector, with partners ranging from manufacturing organisations in the defence and aerospace sectors transitioning into outcome-based service environments, to public sector organisations.

The Service Systems group, building on its expertise in the digital economy, has now organised the CADE Forum for the fourth year running.

Website: warwick.ac.uk/go/sswmg
Contact: sswmg@warwick.ac.uk

Centre of the Digital Economy, Surrey

The University of Surrey's Centre for the Digital Economy (CoDE) investigates the emerging patterns of the digital economy through a process of Collaborative Discovery that blends research, education, problem-solving and brokering. CoDE engages in this process with enterprises large and small, and researchers and students in its Business Insights Lab.

CoDE explores topics such as digital platforms, emerging business models, distributed ledger technologies, and agile innovation by combining cutting-edge business experimentation with classic methods of research. CoDE believe that Collaborative Discovery will help us navigate – together – a world that is uncertain, unpredictable and unrecognisable to traditional business models. In terms of research and development, CoDE is exploring the broad economic, organisational and behavioural changes brought about by the advance and spread of digital technology.

As CoDE aligns with the University of Surrey at the Surrey Business School, it is uniquely equipped to tap cutting-edge research across disciplines, and to help navigate a business world that is uncertain, unpredictable and unrecognisable to traditional business models.

Website: surreycode.com
Contact: surreyCoDE@surrey.ac.uk

Institute of Advanced Studies, Warwick

Established in 2007, the Warwick Institute of Advanced Study (IAS) is dedicated to enriching Warwick University's research environment by supporting its academics, hosting a number of international visitors and enhancing the experience of postgraduate students and early career scholars. Over the past nine years, the IAS has become an important part of the university, representing all faculties and departments, supporting collaboration across disciplines and representing Warwick both nationally and internationally.

IAS has supported innovative research at Warwick and interdisciplinary collaborations across all its faculties. In the past few years, the IAS has expanded its postdoctoral community and widened engagement with a number of Warwick's strategically important projects.

Website: warwick.ac.uk/fac/cross_fac/ias
Contact: ias@warwick.ac.uk

Hub-of-all-Things (HAT)

The HAT is a revolutionary new way of transferring data between individuals, private exchanges, market exchanges and organisations. It comprises an ecosystem that maintains a global network of users, developers, organisations and government bodies that subscribe to a world where individuals can exercise their rights and control over their personal data and be responsible for their digital futures. The use, collaboration and sharing of data in a privacy-preserving way enables value for ourselves and for the good of society.

The HAT is a personal data platform that can privately store anyone's personal information in a wholly-owned container that is accessible only to them, giving them the freedom to exchange as much or as little of it as they like with Internet-based apps and services. Created through a £1.2m research project spanning three years and involving six UK universities, the HAT helps different Internet services (including IoT devices with applications) to manage personal data securely by allowing their individual customers to become their own data controller, managing with whom they share their data with control and privacy.

The HAT is growing as a designed ecosystem, encouraging the transaction of as much information as possible through the trust-preserving infrastructure that the technology provides. The HAT is open to enquiries from those looking to develop their research on the HAT, or join its accelerator programmes to develop their technology or applications on the HAT.

Website: hubofallthings.com
Contact: jonathan.holtby@hatdex.org (HAT Community Manager)