

	Page
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Contents	
From the Faculty Editor Will Venters	2
The Requisite Variety of IS Research Attila Márton	3
Living in the Networked Times Editorial Board of iSChannel	4
Managing Knowledge or Knowing in Practice? A Critical Review of Perspectives on Knowledge Management Alexandre Koloskov	5
The Mainstreaming of Open Source Software and its Research Impact Jonathan Landau	10
Privacy Issues with Cloud Applications Vikas Ranganathan	16
Churn Management in Telecommunications Artur Khalatyan	21
A Conceptual Framework of B2C Website Loyalty Xiaowei Jin	27
Blood, Gold or Marriage – What gets you going? A Study of Personality Traits and in-game Behavior Daniel Winther	33

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EDITORIAL

From the Faculty Editor

The iSCHANNEL is five years old and continues to develop and gain in strength. From what started as a small project by a few MSc students is now increasingly seen by all LSE students of Information Systems as their journal. This is demonstrated by the increasing involvement of both MSc and PhD students in all aspects of the journals production. It is hoped that this will continue and that by working in partnership both PhD and MSc students can both learn and develop their skills. The involvement of PhD students is valuable as they are at the LSE for a longer period and can help provide continuity across the issues of the iSCHANNEL, in addition to helping to increasingly professionalise the reviewing and editorial process.

In particular I would like to thank Attila Marton for his role as Editor-In-Chief for this edition. He has led the editorial board throughout the process and has worked tirelessly this year to ensure a high quality edition of the journal is produced. I am also pleased that he has agreed to take this role on next year as well – and to help recruit another PhD student alongside him so ensuring the continuity of leadership that the journal requires.

Ironically one of the key challenges for developing the journal in the future will be to improve the back-office information systems. The journal desperately needs a support infrastructure to ensure that deadlines are met and that the whole team can keep on top of the process and keep track of the documents. In addition it would be nice to see the development of various authors-workshops or conference opportunities for students intending to publish in the iSCHANNEL to discuss their work. These are ideas I hope next years team will take on.

Dr. Will Venters
Faculty Editor

EDITORIAL- The Requisite Variety of IS Research

In the very first editorial of the iSCHANNEL in 2006, the founders and editors-in-chief Omer Tariq and Kabir Sehgal came to the conclusion that finding a theme for the first volume was a futile endeavour. The published articles did not revolve around a few centres of gravity but rather showcased a broad intellectual variety in terms of the conceptual viewpoints and topics discussed. Now, in its fifth year, this conclusion is more valid than ever. One of the reasons for such variety can be traced back to the field of information systems research itself that has been drawing on reference disciplines such as philosophy, sociology, economics, computer science and engineering as well as business, management and organization studies from its early days. Against the backdrop of these diverse ways of observing the human condition, information systems research has emerged into an inter- and multi-disciplinary but also multi-paradigmatic endeavour of understanding the role of information and communication technologies (ICT) in contemporary society and its organization.

On the other hand, the main research phenomenon - ICT - has gone through a remarkable process of development leaving the boundaries of the formal organization behind in order to be weaved into the very fabric of social interaction. Web 2.0, smart grid technologies and cloud computing are just a few of the recent examples for the informatization of human existence rendered ubiquitous and, perhaps more importantly, nearly invisible through information technologies. As a consequence, IS research is in a phase of transition as information systems become interconnected, interoperable and interdependent. In this sense, variety is not a symptom of a crisis or of a lack of cohesion and discipline within the field but rather a necessary increase of internal complexity in the face of immense and even volatile changes in the fabric of society. The phenomenon of study changes and becomes more complex and so must IS research.

We are reminded of Ashby's famous law of requisite variety and the limitations of scientific research in terms of attempting to "understand" a complex system; "for if "understanding" a system means having available a model that is isomorphic with it, perhaps in one's head, then when the complexity of the system exceeds the finite capacity of the scientist, the scientist can no longer understand the system - not in the sense in which he understands, say, the plumbing of his house, or some of the simple models that used to be described in elementary economics" (Ashby 1958:12). On the same token, information technology and the environment of seamlessly interwoven

information systems it affords cannot be understood like an advanced version of Charles Babbage's Difference Engine No. 2 – a picture of which is on the cover of this issue. Designed in the 1840s and built in the 1980s to be exhibited in the Science Museum of London, it was the first mechanical computer – its wheels and bolts directly accessible to human intervention and understanding. With today's ICT that is not the case. Access to and, consequently, control of ICT is mediated through symbols processed and presented by information technology making the phenomenon of interest increasingly complex (Marton 2009; Kallinikos, Aaltonen and Marton 2010). In light of this observation, it is not only futile to find a centre of gravity for IS research but it has become a sheer necessity to increase the variety in the concepts we use, the themes we discuss and the models we build. By now, one concept, one theme or one model, as elaborate as it may be, will never capture the whole complexity of what we came to call information and communication technologies.

This issue of the iSCHANNEL follows the tradition of offering a platform for variety and difference not only in terms of the topics of the papers but also in terms of the type of papers. The papers range from joining the classical and fundamental discourse on knowledge, the role of data in strategic alignment or e-business to rather contemporary issues on open source, cloud computing and virtuality drawing on diverse traditions and schools of thought in philosophy, social theory, psychology, legal theory, organization studies, innovation studies as well as business and management studies. The contributions involve reviews of academic literature, discussions of theoretical concepts, suggestions for practitioners, an elaboration of a hypothetical model for testing as well as a final research report. Given the variety of the articles, the selected authors reflect the intellectual diversity not only of the students at the Information Systems and Innovation Group at the LSE but also of information systems research at large. In this spirit, we hope for an enjoyable and interesting reading.

Attila Márton
Editor-In-Chief

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EDITORIAL- Living in the Networked Times

If there is one thing that the papers in the fifth volume of iCHANNEL collectively testify to, it is that we live in networked times. For sure, social life has always been a networked experience; yet, as new Information and Communication Technologies (ICT) continue to weave into social relations, the possibilities for expanding relationships across networks are amplified in an ever-increasing rate. Networked people, networked organizations, networked technologies and perhaps networked challenges. The collection of papers in this issue attempt, from different perspectives and approaches, to shed light on some of the new challenges of networked times.

The first paper, **Managing Knowledge or Knowing in Practice? - A Critical Review of Perspectives on Knowledge Management** by Alexandre Koloskov, however, doesn't start with addressing such challenges. Rather, it begins with the debates over management of organizational knowledge. Reviewing two alternative perspectives on the matter from the literature, the author highlights the ways in which these two perspectives complement each other. Koloskov concludes by reminding us of the opportunities that new technologies provide for developing knowledge management practices that draw on both views.

Shared knowledge and experience across networks of social relations is a given for the second paper which is a review of Open Source Software (OSS) literature. In **Mainstreaming of Open Source Software and its Research Impact**, Jonathan Landau reviews the two mainstream perspectives on OSS: the technical and the organizational. Pointing to the relative strengths and weaknesses of both views, the paper highlights that they both have largely ignored broader social implications of OSS.

In the third paper, titled **Privacy Issues with Cloud Applications**, Vikas Ranganathan draws attention to the emerging arrangements and practices of cloud computing and their implications for users' privacy. Drawing on privacy issues raised by social networking websites like Facebook, the paper demonstrates the technological and legal complexities which have to be addressed, if the full potential of cloud applications is to be realized. On the other hand, if these complexities are not adequately addressed, most of the users of such applications will be adversely affected by their limited understanding about the way their personal data is going to be used.

Addressing even more practical concerns, **Churn Management in Telecommunications - Challenging the innovative Capability of Data Mining Tools** by Artur Khalatyan challenges one of the most established practices of marketing in telecommunications industry, namely use of data mining for identifying churn-prone customer groups. Insisting on the importance of understanding customers' reasons for churning, the paper argues that data mining tools are insensitive to contextual factors that often shape these reasons. The paper then proceeds to provide an alternative framework for organizing and conducting churn management in the telecommunications industry.

In **A Conceptual Framework of B2C Website Loyalty**, Xiaowei Jin provides a conceptual framework for understanding and empirical investigation of customer loyalty in the online environment. Starting from the differences between the traditional loyalty and loyalty in the online B2C environment, the paper reviews the existing e-loyalty literature. Then, the paper draws on the Technology Acceptance Model to integrate some of the factors identified in the literature under a new, empirically verifiable model.

The final paper in this volume, **Blood, Gold or Marriage – What gets you going? - A Study of Personality Traits and in-game Behavior** by Daniel Winther, investigates the relationship between personality traits and motivations for playing Massively Multiplayer Online Role-Playing Games (MMORPGs). Building on Yee's pioneering work on gaming motivations, this paper attempts to clarify the relationship between personality traits and gaming motivations. The evidence provided in the paper show significant correlations between particular personality traits and motivations suggesting that what we look for in these environments is partially explained by our personality.

Thus, papers included in this volume range from literature reviews and practice oriented papers, to research framework and full research paper. Beyond the IS literature, they draw on management, legal, sociological and psychological theories and concepts to frame the challenges ahead in the new networked environment. As such, contributions in this volume are small steps towards ensuring that we are well-equipped for living in the networked times.

Editorial Board of iCHANNEL

Managing Knowledge or Knowing in Practice?

A Critical Review of Perspectives on Knowledge Management

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KEYWORDS

Knowledge Management
Knowledge Management
Systems
Communities of Practice
Organizational Knowledge
Knowing in Practice

ABSTRACT

The importance of knowledge to contemporary organizations is well understood but there is still an ongoing debate about how to conceptualise organizational knowledge in order to understand how it is created, shared and used and how information technologies are implicated in this. This review discusses literature from two contrasting perspectives: the techno-rational 'managing knowledge' view, which focuses on informing practice on how to maximise the value that organizations gain from their knowledge resources, and the social constructivist 'knowing in practice' view, which examines how the knowledge of organizational members is implicated in their work practices. It is argued that, although these views approach the study of organizational knowledge from different angles, the insights gained from both perspectives are complementary and valuable in achieving a deeper understanding of organizational knowledge and its relationship to information technology.

Introduction – Perspectives on Organizational Knowledge in the 21st Century

The strategic value of knowledge to organizations has gained increased prominence in mainstream management thinking and practice, and it has come to be widely recognised, by academics and practitioners alike, that knowledge management (KM) is a crucial activity in the organizational quest for success and competitive advantage (Grant 1996; Land et al. 2005). Despite the significant efforts of academics from various domains, the fundamental issue of conceptualizing organizational knowledge remains a contentious one. This should come as no surprise, given that knowledge has endured as a topic of debate in philosophy since the discipline's early days in the classical Greek era. While its contemporary instalment is as multi-faceted as knowledge, its elusive subject, two contrasting schools of thought play particularly important roles in shaping both the academic discourse on KM issues and managerial practice in this field in the 21st century: the techno-rational '*managing knowledge*' view and the social constructivist '*knowing in practice*' view, characterised by their varying conceptualizations of organizational knowledge.

What can not be disputed is the growing importance of knowledge to organizations, in the context of what Castells (2001) calls the dynamic and turbulent "New Economy," and the consequential need for a

better understanding, both in theory and in practice, of organizational knowledge, how organizations can actively leverage its value and how information technologies are implicated in this. Due to the complex nature of organizational knowledge and its necessarily inextricable relationship with humans and human activity systems, a variety of complementary and contrasting perspectives, grounded both in the positivist and the interpretivist research traditions, are invaluable in achieving this.

The aim of this review is to explore the above argument by analysing and critiquing the effects of embracing different conceptualizations of organizational knowledge on academics' thinking about and approach to the study of the challenges that organizations face in 'harnessing' the value of knowledge. Schultze and Leidner's (2002) framework, an adaptation of Burrell and Morgan's broader paradigms of social and organizational enquiry, for categorizing approaches to studying KM provides a significantly more comprehensive overview of the field. This review limits its scope to the examination of the two contrasting archetypal perspectives introduced above – '*managing knowledge*' and '*knowing in practice*'. This particular debate revolves around the study of the relationship between knowledge, information technology and organizational change. The approaches are discussed in terms of their theoretical underpinnings and assumptions and how these are reflected in contemporary research. In conclusion the ways in which these two lenses complement each other in guiding the study of KM are summarized.

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Managing Knowledge – Processes and Systems

“Knowledge Management refers to a systematic and organizationally specified process for acquiring, organizing, and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work” (Alavi and Leidner 1999: 6).

The above words capture the central assumption that drives the *managing knowledge* view of KM: managers can deliberately manage knowledge in order to increase or even maximize the value that can be gained from it by their organization. With a strong focus on informing KM practice in general, and the use of knowledge management systems (KMS) to enable and support it in particular, this is an instrumental view that is grounded in the technical/rational tradition of IS research. It draws on several theories in order to provide a comprehensive framework to guide research and practice.

The core is shaped by fundamental theoretical elements from the strategic management field, particularly the Resource-Based View and its elaborated derivative – the Knowledge-Based View of the firm. Thus, knowledge is conceptualized as “the most strategically important of the firm’s resources” (Grant 1996: 110) and this ‘reification’ has a series of implications. From a managerial point of view, thinking of knowledge as an organizational resource, albeit an intangible one with unique characteristics, suggests that it is subject to specific, controllable processes and supports the notion that, if managed appropriately, it can become a source of sustainable competitive advantage. Furthermore, these deliberate efforts to better leverage the value of the knowledge resource should occur beyond the everyday operations of the firm, as separate activities, through specific interventions and temporary or ongoing projects. Individual organizational members, given the right tools, and in the presence of the right motivating factors, can actively participate in KM processes that yield valuable new knowledge which can be “harnessed for increasing returns” (Garud and Kumaraswamy 2005: 10). What is taken for granted, however, are the learning processes that are at the heart of creating and sharing knowledge.

The resource-based view of the firm articulates a notion of intertwined organizational learning loops whereby generic resources can become capabilities which in turn can become strategically valuable core capabilities (Andreu and Ciborra 1998) but there is little consideration of the role of the individual and his/her immediate social context in these processes. Assuming that knowledge resources are made eas-

ily accessible, their appropriation and deployment in practice by individuals is seen as unproblematic.

The practical appeal of this view is reinforced by the capabilities information technologies possess in terms of storing, processing, and distributing information. Viewing knowledge as a resource or stock makes it easy to blur the line that distinguishes it from information, and technology can then be seen as a key enabler of KM processes – in practice, KMSs are in fact a central component of most of the projects and tools mentioned above (Alavi and Leidner 2001; Ruggles 1998). Fahey and Prusak (1998) argue that ignoring this distinction is a dangerous simplification that has led to a significant number of failed KM projects.

Adherents of the view refer to theory in order to address this issue. To manage the knowledge resource effectively, its characteristics must be defined. In this respect they draw on the ideas of an influential conceptual framework – a “taxonomic” (Tsoukas 1996) perspective of organizational knowledge, based on the seminal work of Michael Polanyi (1983), which proposes a distinction between explicit and tacit types of knowledge. Consequently, different issues and challenges, pertaining to the management of these two types are identified: for explicit knowledge the emphasis is on facilitating capture, storage and retrieval, while for tacit knowledge the focus should be on enabling the social connections and interactions that allow it to be communicated.

Finally, implementing KM initiatives ‘powered’ by information systems will necessarily lead to organizational change. In this regard, the line of reasoning embodied by this view closely resembles what Orlikowski characterises as the “planned change model” (1996: 64). The latter posits that organizational change is predominantly determined by management action. Thus, organizations are assumed to be generally stable and change is seen to be the result of a rational decision-making process implemented through planned interventions. Managers need to assess and understand the ‘state of knowledge’ in their organization and use this to establish a knowledge management strategy which can then be implemented (Alavi and Leidner 2001). Information technology, in turn, is seen as a resource that is picked from a generic pool and then customized to match the requirements of the specific KM initiatives. It is seen as given and research can thus focus on understanding behavioural and contextual factors which affect the willingness of individuals to use KMS to inform managerial interventions.

Alavi and Leidner’s (2001) extensive review of the study of KM at the turn of the 21st century has subsequently become very influential in guiding aca-

demic and practical pursuits. The authors show that knowledge management is widely recognized as a complex task that involves various cognitive and social processes at the individual, group and organizational levels. They propose that KM consists of four distinct but interrelated knowledge processes – creation, storage and retrieval, transfer, reuse. By untangling the complexity of organizational knowledge and classifying different aspects of KM into these analytical categories, their framework usefully permits the targeted consideration of how specific information technologies can be used to support each of these processes. Importantly, they suggest that as IT becomes increasingly sophisticated, its role in supporting KM may expand from its traditional focus on explicit knowledge to encompass tacit knowledge. While the authors acknowledge that these are a set of “socially enacted” and “dynamic and continuous” processes, the consequences of these characteristics are not explored any further.

On the basis of this framework, several studies (Gee-Woo et al. 2008; Kankanhalli et al. 2005; McLure Wasko and Faraj 2005; Subramanian and Pek-Hooi 2009) examine the problem of IT-enabled knowledge sharing at the individual level using predominantly quantitative methods grounded in the economic or administrative rationalities. For instance, Kankanhalli et al. (2005) model the processes of knowledge transfer as a social exchange, assuming that individuals weigh up the costs and benefits of sharing knowledge to make rational decisions about whether or not to contribute their explicit knowledge to Electronic Knowledge Repositories (EKR), a widely used type of KMS. Their study provides useful prescriptive insights, particularly in terms of which specific factors encourage knowledge contribution. The assumptions behind modelling this as a social exchange allow them to quantify individual behaviour but necessarily ignore political, cultural and historical factors which could have profound effects on EKR usage in a particular organization. Managers may encounter these factors as significant barriers to the success of KM initiatives.

Garud and Kumaraswamy (2005) take a broader scope in their analytical study of KM practices at a leading international IT services firm to understand how knowledge and learning processes operate at and across individual, group and organizational levels and the challenges that this poses for “harnessing knowledge”. Rather than attempting to generalize from a sample to a population, they adopt an inductive case study approach to develop a theory to better understand the dynamics of KM initiatives. They use a qualitative, longitudinal research methodology to observe the consequences and evolution of such initiatives over time. A sophisticated view of distinct and interrelated knowledge processes

occurring at different analytical levels allows them to appreciate the complexity of the task of managing organizational knowledge. Framing their results using systems theory leads them to make a differentiated conclusion. They show that management plans and actions – in this case trying to kickstart a ‘virtuous circle’ of KM – are only the start of a systemic process characterized by “dynamic complexity” that can subsequently degenerate into ‘vicious circles’ and lead to the failure of the whole initiative. Rather than making specific practical recommendations, they propose that, above all, managing knowledge requires an unorthodox, holistic mindset that “recognizes the web of mutually causal processes constituting the knowledge system” and that such non-linear thinking is best achieved by a team of “individuals with diverse epistemic leanings” (Garud and Kumaraswamy 2005). While the authors maintain emphasis on the agency of managers, their choice of research method and theoretical lens allows them to appreciate the dynamic nature of organizational change and recognise that emergent events can have profound impacts on rigorously and rationally planned and devised KM initiatives.

All of the above studies attempt to include an appreciation of the social context of organizational knowledge in different ways. This suggests that, even in the reductionist world of rational thought, there is a sense that knowledge comes with a ‘social baggage’ and that purely instrumental reasoning can not account for the consequences of this state of events. The wholly different perspective discussed below may be useful in forming a deeper understanding of such issues.

Knowing in Practice – Actors and Practices

“We must see knowledge as a tool at the service of knowing not as something that, once possessed, is all that is needed to enable action or practice” (Cook and Brown 1999: 388).

There are several prominent proponents of what Newell and Galliers (2006: 442) characterize as the “social constructivist view of knowledge”, which challenges a number of the above assumptions about KM. It is informed by a colourful ‘palette’ of theories from different reaches of social science, including Giddens’s (1984) structuration theory, Lave (1988) and Suchman’s (1987) anthropological studies of professional work, Wenger’s (1998) research into ‘Communities of Practice’ and Cook and Brown’s (1999) invaluable insights from their experiences at one of the world’s premier research and development laboratories. Through this lens, knowledge is seen as being constituted recurrently in the “ongoing and situated actions of organizational members as they engage the world” (Orlikowski 2002: 249)

and perform their work.

In an analytical paper, evocatively titled "Knowing in Practice", Orlikowski (2002) makes her case for the value of such a conceptualization of organizational knowledge. Eschewing a distinction between explicit and tacit knowledge, the author sees knowing and practice as inseparably intertwined. Furthermore, the knowledgetability and reflexiveness of human actors is emphasized and learning happens as they go about their tasks, monitor the consequent ongoing flow of action and obtain new knowledge or adjust and update their existing knowledge according to these new experiences. Based on an exploratory study of the work practices at a successful global software company, the author argues that competences or capabilities – knowledgeable practices that are valuable to firms – should not be taken for granted as given 'fixed stocks' that organizational members can readily 'deploy' as and when necessary. Instead they should be considered as actively and recurrently accomplished in the everyday practices of actors.

By developing and building on the 'epistemology of practice', a notion introduced by Cook and Brown (1999), the paper presents an elegant argument which highlights the vital role and value of 'knowing' to professional work and brightly illustrates the limitations of the 'managing knowledge' view. For all of its evocative power in that regard, it is unfortunately relatively limited in exploring the consequences of these insights for the role of IT in enabling and supporting KM. In a later essay, Orlikowski (2006) goes to some length in filling this gap by providing a brief but inspirational account of technology as a substantial element of the ongoing and emergent changes that happen as knowledge and practice continuously reconstitute each other. Inevitably shaping practices and knowing, all information technologies – even post-it notes (Topi et al. 2006) – that organizational members come into contact with and utilize in the course of accomplishing their work become KMSs. The uses of technology are shaped, in turn, by these practices, and organizational change emerges from this constant reflexive interplay rather than from the plans and intentions of managers. ICTs take on a more passive role, one of facilitating the accomplishment of knowledgeable practice and its diffusion, by becoming embedded in communities and allowing for interaction and collaboration across spatial and temporal boundaries (Brown and Duguid 1998). Obtrusive technologies which require people to make substantial changes to their work practices to share knowledge, such as EKR, may in fact inhibit knowing in practice (Newell and Galliers 2006).

Shifting the focus of enquiry from the actions of

managers to the everyday practices of individuals has significant implications for the study of KM. If knowledge emerges through practices and 'evolves' in a dynamic learning process, it is highly contextual, "provisional" and "virtual" (Orlikowski 2002: 253) and can not be stored, transferred or reused per se. Rather, recognizing in which contexts such skillful practice is more likely to be accomplished and identifying and understanding the collective practices that allow humans to enact their knowing in different contexts becomes more important.

Conclusion – The Value of Diversity

The managing knowledge view reflects the dominant epistemology of Western culture, what Cook and Brown (1999) refer to as the 'Cartesian view', in emphasizing the explicit and individual forms of knowledge and giving information technology a central role in the KM process. Knowing in practice suggests that, in order to understand organizational knowledge and the processes pertaining to it, we need a more sophisticated conceptualization, particularly in terms of its relationship with work practices. It also implies a more subtle role for technology, as more of a facilitator than a driver.

The insights gained through these lenses are complementary in enriching our understanding of organizational knowledge. Studying knowledge as an organizational resource has, among other things, provided many important lessons about how ICTs can be used to improve KM activities and has facilitated the development of efficient approaches to the management of explicit forms of knowledge. Nevertheless, the observation that many recent studies attempt to integrate significant contextual and social elements suggests that a purely techno-rational perspective is insufficient on its own. By virtue of its more fine-grained theorization of knowledge, the social constructivist approach lends itself to analyzing issues related to the management of other forms of knowledge which are no less important than the explicit one (Cook and Brown 1999). It is however, more difficult to directly translate the insights from studies in this vein into specific instructions for the development of KMS. Van den Hooff and Huysman's (2009) recent survey of knowledge-intensive organizations provides a good example of how an 'intellectual interaction' between the two perspectives can in fact constitute a more effective overall approach to KM.

As information technologies that facilitate distributed communication and collaboration, particularly the 'social' ones that are commonly collectively referred to as Web 2.0 applications, become more sophisticated, less obtrusive and diffuse into organizations to be deeply integrated into work practices,

both perspectives have important roles to play in guiding, informing and understanding their implications for the management of organizational knowledge. The industry seems to be convinced that such tools are the future of KM (Spanbauer 2006). An intelligent approach to knowledge management, which draws on both perspectives (and those 'in-between') and avoids uniformly favouring the epistemology of possession over that of practice, could enable organizations to become the knowledge-creating entities that Nonaka et al. (2000) speak of. This would be a promising future indeed.

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The Mainstreaming of Open Source Software and its Research Impact

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KEYWORDS**ABSTRACT**

Open Source Software
Information Systems Research

In just over a decade, a vast range of research on open source software has been published in the field of Information Systems. By tracing the development of IS research on OSS and categorizing the different views and debates, this paper aims to uncover the rationalities underlying mainstream OSS research. It identifies two distinct academic perspectives on OSS and distinguishes between two phases of OSS debates and research within the literature. Discussing these phases and perspectives in turn, the paper calls for a more pronounced consideration of the wider implications of OSS - a third perspective which is noticeably missing from the current IS literature.

Introduction

The emergence of open source software (OSS) as a research area within Information Systems (IS) has produced a variety of debates that are as lively today as they were a decade ago. Researchers, looking to grasp the concept of open source software as a technical and organizational phenomenon, have engaged in debates using various scientific methods, frameworks and rationalities. These debates are rapidly maturing; yet, as the following pages show, IS still struggles to make sense of the wider societal and political implications of the OSS phenomenon.

This paper is divided into three main sections. The first one examines the early phase of OSS research, presenting key scholarly debates, rationalities and methods from two broad perspectives on IS: technical and organizational. This initial phase is shown to be characterized by sharp disagreements about the usefulness of OSS. Next, the paper discusses more recent OSS writings, produced against the backdrop of the increased mainstreaming of OSS. Again distinguishing between technical and organizational research perspectives, the paper demonstrates that current research displays more balanced and subtle argumentation. However, it also highlights a third and final category of broader issues that have been largely neglected in research on OSS, and calls for their inclusion into contemporary IS writing. Table 1 provides an overview of the different phases, perspectives and key research characteristics.

Early IS Debates: Tackling the Emergence of OSS

Technical Perspective

The term OSS - denoting software that is developed collaboratively, often among widely distributed groups of volunteers, and for which the source code is freely available and modifiable - entered mainstream academic literature in the late 1990s (Fitzgerald 2005). It has been a matter of great interest to IS researchers ever since. Especially in the early years of OSS research (defined here as lasting roughly until the early/mid-2000s), scholars concerned primarily with the technical rather than organizational implications of IT found their area of enquiry dominated by a heated debate between advocates and critics of OSS (van Wendel 2005). While some scholars reacted skeptically to the idea of OSS as a software engineering revolution, its proponents hailed OSS as the "silver bullet" that could solve the decades-old "software crisis" (Brooks 1987). They emphasized the ways in which OSS represented a fundamental departure from, and challenge to, traditional methods of software development.

These discussions in IS drew on similar debates in more technical fields such as Computer Science. Thus, enthusiasts claimed that OSS enhances code security and reliability due to its peer review process, which consists of a much larger - and thus inherently more independent - pool of developers (Payne 2002). In other words, OSS would replace Brooks' Law that "adding manpower to a late software product makes it later" (Brooks 1975: 25) with what Raymond (1998) termed Linus' Law: "Given enough eyeballs, all bugs are shallow". Moreover,

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many scholars maintained that, because OSS creates a dual role of user-developer while traditional software engineering separates the two, OSS developers are more loyal and thus better at coding than their proprietary counterparts (Sharma et al. 2002). OSS communities were also said to react faster to the detection of software defects because their priorities are strictly technical, while commercial software companies tend to focus on business interests (Payne 2002).

Opponents of OSS countered that OSS code is inherently less secure than that of proprietary software, as its public availability invites hackers to seek and exploit vulnerabilities (Boulanger 2005). Others, looking to the future, warned that OSS may well fall victim to its own success, as thriving projects become increasingly complex and attract new developers who lack the skills of the initial coders (Fitzgerald 2005). Finally, some researchers disputed the self-image of OSS as a fundamental IS innovation: after all, peer review, configuration management, release management, daily builds, online collaboration and other key OSS concepts are well known to traditional software developers (Fuggetta 2002; Fitzgerald 2005).

Despite their stark differences, both sides of this debate shared at least three characteristics. First, the framework underlying much of the early technical debate was an engineering rationality, concerned with the construction of technical systems and the respective merits of different IS development approaches in achieving quality, reliability and efficiency. Second, a latent technological determinism could be discerned, since for all the above writers, the construction of OSS determines its quality - which, in turn, determines its potential impact. Finally, due to the novelty of OSS research, this period did not produce large-scale empirical studies, instead relying mainly on prescriptive approaches to software development, some of which bordered on speculative and even propagandistic. As will be seen below, this dynamic has now largely changed, as the debate has matured and become more nuanced. First, however, it is necessary to review the strand of literature that focuses on the organizational implications of IS, and how the emergence of OSS was tackled here.

Organizational Perspective

In the initial phase of OSS research, scholars interested in OSS as an organizational phenomenon generally looked at two distinct issues, namely the coordination of OSS projects and the motivation of OSS developers. The latter - understanding why people engage in behavior that seemingly contradicts long-held assumptions about *homo oeconomicus* - is regarded as the most common IS research question on

OSS (Scacchi 2007). One set of explanations stressed the importance of intrinsic factors in motivating developers. These include a desire for fun, feelings of obligation to and identification with the community, and - perhaps most controversially among both OSS skeptics and supporters - altruism (Lakhani and Wolf 2003; Rossi 2004). Conversely, authors employing more traditional economic models focused on the role of extrinsic motivators such as gaining a reputation, learning and improving skills to secure advantages in the job market, and meeting personal software needs (Hars and Ou 2002; Lakhani and Wolf 2003; Lerner and Tirole 2002).

Compared to the technical debates discussed in the previous section, these viewpoints gave much more weighting to the social factors of OSS production. What is more, both sides of the debate employed empirical methods such as developer surveys to make their case, though with mixed results; Hars and Ou (2002) arguing for the dominance of extrinsic motivations, Lakhani and Wolf (2003) doing the same for intrinsic ones. However, given that such studies by definition reflect the potentially distorted view developers have of themselves, the more interesting question seems to be how intrinsic and extrinsic motivators interact, both within communities and individual developers. For example, a useful synthesis might argue that intrinsically motivated developers get OSS projects started, while extrinsically motivated ones are necessary for the developer pool to achieve critical mass (Rossi 2004).

As mentioned above, the other early research question on the organizational implications of OSS dealt with the coordination of OSS communities. Here, different underlying rationalities informed two areas of discourse. The first centered on Raymond's (1998) oft-cited claim that OSS projects resemble bazaars, with a large number of individually motivated developers working under no centralized coordination process (though perhaps under the guidance of a "benevolent dictator"). This assertion, which implies a distinct lack of norms, was dismissed as too simplistic by some. Alternative models likened OSS groups to an academic community with informal rules akin to those found in science (Bezroukov 1999). Whether bazaar or academia, the rationality behind such metaphors was administrative, as they focused primarily on the perceived organizational structure of developer communities.

Though similar, the debate around the idea of OSS communities as gift economies tackled the issue using a more explicitly economic rationality. Van Wendel (2005) explains that this model identified gifts, rather than money, as the principal currency exchanged between OSS developers, who adhere to a latent principle of reciprocity. Counterarguments

were equally founded in economic theory, arguing that while gift economies presuppose resource abundance, coding talent is in fact a scarce resource (Iannacci 2002).

Current IS Debates: Acknowledging the Mainstreaming of OSS

The arguments and debates examined above - both technical and organizational - were formulated largely as a response to the emerging nature of OSS. Recently, however, OSS has undergone a number of significant developments. It has been commercialized, is widely adopted and enjoys broad success; in short, it has now become a mainstream phenomenon. Fitzgerald (2006) goes so far as to refer to the outcome of this transformation as "OSS 2.0". Naturally, this development has also reshaped the academic debate on OSS, which has matured significantly.

With a larger pool of evidence (including comprehensive case studies) to rely on, OSS literature has become less speculative, utilizing empirical methods to draw a more balanced and nuanced picture of OSS. Moreover, as the involvement of commercial entities in OSS projects intensifies, scholars now describe OSS as a business model rather than just a technology model (Krishnamurthy 2005). Finally, there has been an increase in analytical writing linking OSS to existing IS theories and methodologies (Sahraoui et al. 2007; Scacchi 2005; Warsta and Abrahamsson 2003). The following sections examine these and other recent developments in technical and organizational OSS research.

Technical Perspective

The current debate on the merits of OSS as a development method is less heated than it was immediately after OSS emerged on the IS academic radar. Examples such as Linux, Apache and Mozilla Firefox have demonstrated that OSS can indeed produce high quality products with wide market penetration; at the same time, thousands of projects hosted on SourceForge, a web-based code repository for OSS, remain undeveloped and abandoned (Fitzgerald 2005). Thus, OSS development is now rarely described as a panacea that, by its very nature, guarantees high-quality software. Equally, however, it cannot be dismissed as a mere fad or a poor man's version of classic software engineering, as even its most vocal critics admit (Glass 2005). A more even-handed consensus has developed, which views OSS as an "alternative community-intensive socio-technical approach to develop software systems, artifacts, and social relationships" (Scacchi 2007: 464).

Whether or not "OSS 2.0" projects produce better

software than traditional methods depends largely on the context of the project in question. In fact, according to some, the key success factor lies in an intelligent incorporation of well-established software engineering principles such as rigorous design and analysis (Fitzgerald 2006). Thus, rather than debating whether OSS is a revolution or traditional software development in disguise, a more compelling analytical question arises: what aspects of OSS can be employed to advance and expand existing IS methodologies?

Sahraoui et al. (2007), for instance, approach this issue from the perspective of agile software engineering. Using Mozilla Firefox and Apache as case studies, they discover marked similarities between the agile development process and that of OSS (although they maintain that the philosophical, motivational and economic considerations of the two methods vary considerably). By employing case studies and recasting OSS processes into existing frameworks, such analytical articles can foster the creation of new theoretical knowledge and hypotheses which can then be further tested - arguably a more useful avenue for the study of OSS as a technological phenomenon than earlier debates focusing solely on its technical merits.

Organizational Perspective

IS research on the organizational dimension of OSS has seen a similar shift in recent years. Again, one detects a growing realization that both the motivation of individual OSS developers and the coordination of their work is context-dependent. Thus, empirical research demonstrates that not all OSS developers fit the common perception of "hackers" using unstructured work methods (Weinstock and Hissam 2005), and that, at any rate, the motivational and indeed demographic homogeneity of the hacker community is greatly exaggerated (Ghosh 2005; Lin 2007). Similarly, it is now widely accepted that OSS projects exhibit a variety of social structures and avenues of communication (Crowston and Howison 2005).

Against this backdrop, interest in developer motivation has decreased somewhat, and closer attention is being paid to the commercial actors in the OSS arena and their particular interests. An increasing number of firms, from Amazon to IBM to the New York Stock Exchange, are supporting their business processes by employing OSS in some fashion (van Wendel 2005). Adding to this dynamic is the growing number of paid OSS developers. The lines are being blurred to such an extent that "Microsoft can appear to satisfy the definition of an open source company, while ... Red Hat can appear to resemble a proprietary software company" (Fitzgerald 2006). Such de-

velopments are best understood using an economic rationality, and as the following paragraphs show, this is indeed the case for recent research in this area.

Commercial motivation for OSS involvement is driven by a desire to gain strategic competitive advantage vis-à-vis other firms (Fitzgerald 2006). Companies may choose to develop and provide OSS themselves, adopt OSS products in the development of their own proprietary software, or simply use OSS development methods and practices (Ziemer et al. 2008). This variety has produced several options for commercial firms to make use of OSS, ranging from strategic partnerships in which the company provides customer support while an OSS community supplies the code (Krishnamurthy 2005) to promoting OSS adoption in order to undermine a dominant competitor (van Wendel 2005). What is becoming increasingly obvious is that earlier claims that OSS would struggle to achieve widespread market adoption - ostensibly because customers are more interested in "free beer" than "free speech" (Feller and Fitzgerald 2002) - have been refuted; most visibly by OSS products such as Mozilla Firefox, which is arguably successful not because it is free to download, but because its source code is open and allows extensive customization.

The discourse on OSS in a commercial context is still in its infancy, as researchers attempt to combine economic models and assumptions with the idiosyncrasies of OSS organizations. It is apparent, however, that the focus on straightforward explanations of individual motivation and all-encompassing metaphors and frameworks of OSS project coordination are being replaced by more subtle examinations of the organizational aspects of OSS and its growing commercialization. Yet the phenomenon of OSS has research ramifications far beyond the technical and organizational realms; it is to these issues, and the lack of IS academics examining them, that this paper now turns.

Missing IS Debates: Addressing the Wider Implications of OSS

So far, this paper has discussed IS literature that approaches OSS as a technical and an organizational area of study. It has shown that these two bodies of debate have matured since the emergence of OSS in mainstream IS academia. In addition to contemplating the benefits and drawbacks of OSS, scholars are increasingly utilizing case studies to support theoretical and analytical reviews of various OSS characteristics. This will, over time, lead to more a fundamental understanding of the various processes at work in the development and coordination of OSS.

However, despite a growing awareness of the sub-

tletries of many aspects of OSS, IS researchers generally continue to base their writings on the same underlying frameworks: an engineering rationality concerned with the construction of OSS as a technical artifact, and administrative and (increasingly) economic rationalities to understand the organizational structures of OSS actors, both commercial and non-commercial. However, the implications of OSS are wider than these research foci suggest. Perhaps because of its unexpected rate of success, OSS - and the ideas behind it - are routinely discussed in legal, socio-economic and political contexts. Yet IS scholars are largely absent from these debates.

This is not to suggest that there has been no IS contribution whatsoever in these areas of study. To give one example, some writers have closely examined the question of deploying OSS in developing countries (Camara and Fonseca 2007; Papin-Ramcharan and Soodeen 2007; van Reijswoud and Mulo 2007). However, most of these frame their arguments in technical terms, revolving around the implementation or evaluation of OSS systems in developing countries. Because of this, they fail to fundamentally depart from the engineering rationality described above. Critical IS papers on issues such as what development means, and what role OSS and information technology in general can play in this question, are not easy to find (Walsham and Sahay 2005).

Due to this gap, it appears that the discussion of the wider issues surrounding the idea of OSS - societal, legal and political - has been left to non-IS scholars (Benkler 2006; Lessig 2005; Weber 2004). Yet at the heart of this debate lies the phenomenon of OSS, and that remains inherently an IS issue. The absence of IS from the study of its wider impact is regrettable, even more so because the field would surely have much to say about the hints of technological determinism that characterize some of the legal and political appropriations of OSS research. Whether IS will take up this challenge in the future remains to be seen.

Conclusion

This paper has demonstrated how IS research on OSS has developed over the past decade. It has placed a particular emphasis on the impact of the mainstreaming of OSS on this large-scale debate and the main viewpoints, rationalities and research types employed in the literature. Two key perspectives on OSS have been presented: one the one hand, a technical framework that initially compared the respective values of OSS and proprietary software, and has since moved to a more nuanced appreciation of OSS in the context of existing IS methods; and on the other hand, an organizational understanding that focused on a discussion of motivational factors

and coordination methods before adding further considerations to its core debates, such as the commercialization of OSS and its business viability.

Needless to say, any attempt to neatly divide ongoing academic discussions into distinct phases and perspectives imposes artificial and sometimes arbitrary boundaries on distinctions that are inherently fluid and not always mutually exclusive. The scope of this paper did not allow for a thorough, methodologically rigorous review of IS literature on OSS; instead, a snapshot of relevant writing was employed to illuminate the state of affairs in a young research area. Nonetheless, the findings suggest that a more

detailed study would come to the same overall conclusions. Testing this hypothesis on a larger scale might be an avenue for further research.

At any rate, the considerable amount of IS research on OSS, produced over a relatively short time span, speaks to the rigor with which the topic has been approached in IS thinking. Yet, as the final section has shown, the IS field largely omits from its discussions key considerations on the broader socio-economic and political impact of OSS. Nevertheless, the debate on OSS remains highly dynamic and timely, and a dedicated IS debate on its wide-scale implications may yet emerge.

	Early Debates (until early 2000s)	Current Debates (since early 2000s)
Technical Perspectives	<ul style="list-style-type: none"> • Debates regarding merits of OSS as revolutionary development method • Disagreements on OSS security, reliability, sustainability and novelty • Latent technological determinism and lack of large-scale empirical data 	<ul style="list-style-type: none"> • More nuanced debates, balanced arguments and gradual consensus • Understanding of importance of project context • Usage of OSS concepts enhance existing IS theories and methods
Organizational Perspectives	<ul style="list-style-type: none"> • Discussion of intrinsic vs. extrinsic factors in OSS developer motivation • Administrative and economic metaphors of OSS coordination: bazaars, academia, gift cultures 	<ul style="list-style-type: none"> • Increased recognition of OSS diversity; de-emphasis of “hacker” culture and individual motivators • Focus on case studies of commercial participation in OSS
Wider Perspectives	<ul style="list-style-type: none"> • Traditional engineering, administrative and economic rationalities fail to account for legal, societal and political impact of OSS • Such questions are covered in other fields but remain under-represented in overall IS body of work on OSS 	

Table 1: Key Characteristics of OSS Research in IS grouped by Perspectives and Phases

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Privacy Issues with Cloud Applications

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KEYWORDS

Privacy
Cloud Computing
SaaS
Legal
Technology Law

ABSTRACT

This privacy review analyses the relevant laws, technological problems and literature on Software as a Service (SaaS). The advent of web applications within powerful web browsers has meant the consumer-oriented segment of the IT industry is evolving away from the server environment to an open field client environment. The article will debate the legal implications of the cloud on the privacy of the user and whether it is possible that technology will have to provide some of the solutions that the legal law cannot provide. At the end, the article concludes whether cloud computing is expected to deliver the benefits that it states it will provide in accordance with adequate regulation, security and privacy features required for its user.

Introduction

“The growth of personal computers and the Internet has made computing a mainstream activity” (Rappa 2004: 40). Cloud computing is developing as the new de facto method of providing a service for software development. Much hype is being placed upon cloud computing, such as “the battle for the clouds between these companies is going to reshape the ICT market structure as PC distribution did in the 80” (Etro 2009: 8). This notion was unthinkable a decade ago and has only become viable through the development of high-speed Internet connections and mobile access. Although cloud computing has many forms, we will be focusing on Software as a Service (SaaS). Popular web applications such as Gmail, Facebook, Twitter, Flickr and more are all SaaS applications. SaaS means “end users can access the service ‘anytime, anywhere’, share data and collaborate more easily, and keep their data stored safely in the infrastructure” (Armbrust et al. 2009: 4). This abstracts all the complexity, providing common users an alternative to a native running application on their personal systems.

Benkler (2006) assumes that the physical capital (computers, telecommunications infrastructures) required for the production of information goods is abundant and broadly distributed in society, thus enabling individuals to interact in an almost costless way. The popularity of SaaS is because the web browser has become more powerful during the last few years. Web applications have become more pop-

ular because “for most applications, the entire user interface resides inside a single window in a web browser” (Hayes 2008: 10). Moving from the early days of just providing information and data, they can now offer interactive applications with the same functionality as their desktop counterpart. However, the problem with these ‘web applications’ is that the web browser was never built to run desktop style applications. Developers use a method called ‘Ajax’ to provide this functionality, but this is actually a browser hack that was used previously for a completely different purpose. This means that there were no guidelines, protocols or regulations set for this functionality. Therefore the applications have multiple patch work systems working together to provide the end solution.

Introna argues that it is for the “good of society as a whole that privacy is preserved, even at the expense of legitimate social control” (Introna 1997: 273). Horrigan (2008) agreed with this notion and found that users were very concerned with their data, with over 90% of them very concerned if their provider sold their data to others and 80% of them very concerned if the organisation used their photos or other data in marketing campaigns. Further to this, “a recent report by TRUSTe, an organization that provides a seal to identify trustworthy online organizations, found that most (71%) online users are aware that third parties may collect information about them for advertising purposes, but that 57% were not comfortable with advertisers using such information to serve ads to them” (Horrigan 2008).

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Legislation

“Even when no laws or obligations block the ability of a user to disclose information to a cloud provider, disclosure may still not be free of consequences” (Gellman 2009: 11). Balancing the security of the public with the privacy right of an individual has always been a struggle especially since law usually lags behind technological innovation. In the case of cloud computing and its services this is proved true as many of the original laws view databases as simple storage spaces where ‘content’ is owned by the data controller. In the modern world, this does not solve the problems of the controller being the user itself or address the problems of the shifting nature of data ownership models and relationships between data controllers and processors.

When using cloud services, a legal contract is created between the user and the service provider on the rules of usage, service expectations and more in the form of Terms of Service (TOS), Privacy Policies and Service Level Agreements (SLA), which benefits both parties. However, the conclusion of the research into privacy policies by Carnegie Mellon University is that “reading online privacy policies would take an average of 10 minutes per policy and would cost \$365 billion in lost leisure and productivity time” (McDonald and Cranor 2008: 1). The main cause of this is that privacy policies are generally written in a ‘lawyer’ style language that is difficult for the public to understand. “Those risks may be magnified when the cloud provider has reserved the right to change its terms and policies at will” (Gellman 2009: 6). An example would be when Facebook changed their terms of use without public consultation or notification in February 2009, causing a public outrage and distrust in the community. According to a report from Forrester Research in March 2008, “Most cloud vendors today do not provide availability assurances. Service-level agreements are mostly non-existent” (Staten 2008: 9). The SLAs that do exist generally only cater to the uptime of the service, not whether the service met the expectations of its customers. The language and loss of clarity about these issues unfortunately devolves the debate around cloud computing and its applications into a simple balancing act between the various different parties involved.

The government is required to obtain a warrant in order to enter ones home and search or seize their assets. The Fourth Amendment to the US Constitution is part of the Bill of Rights and guards against unreasonable searches and seizures. It provides protection against Government intrusion upon the privacy of individuals and is historically property-based. The Supreme Court has failed to address the Fourth Amendment’s application to email and cloud

services and “once a user discloses information to the provider, the user relinquishes any Fourth Amendment protection in the information by virtue of losing the right to exclude” (Kerr 2004: 28). The statement therefore states that according to law the government does not violate the privacy of a user by requesting a third party (e.g. Internet Service Provider) to provide access to their private information.

There have been multiple cases involving email misuse including *Warshak v. United States* where the Department of Justice (DOJ) “illegally ordered defendant Stephen Warshak’s email provider to prospectively preserve copies of his future emails, which the government later obtained using a subpoena and a non-probable cause court order” (Electronic Frontier Foundation 2008). The government has found numerous ways to accomplish this misuse of their powers due to the out of date or inadequate laws that were enacted in the past.

The USA Patriot Act increases the ability of law enforcement agencies to search telephone, e-mail communications and other records. This eases restrictions on foreign intelligence gathering within the United States. One of the controversial invocations of the act was the use of National Security Letters (NSL) to retrieve data on residents and visitors of US citizens who are not suspected of any criminal investigation without the knowledge of the individual. “Those who receive an order to disclose information under these authorities are highly limited in their ability to reveal that they received the order” (Gellman 2009: 14). Therefore they were unable to challenge the case in court or inform their users in any form.

CBCNews (1996) discusses Lakehead University in Canada outsourcing its email to Google, causing concern by students and staff. This is due to their emails being stored in the United States and the contents would be vulnerable to the US Patriot Act. This case study raises the issue if non-US data should be allowed to be processed within the US. However considering most of the cloud service providers are all US based, it is hard to come to a conclusion.

Compared to the US, as discussed by the EUR-Lex (1995) the EU Data Protection Directive was enacted to regulate the processing of personal data within the EU. The lack of similar protection in the US caused major problems, since it deemed the export of personal data of EU citizens to third countries that do not provide ‘adequate’ privacy protection illegal. Therefore the US-EU Safe Harbor agreement was reached in 2000 as a streamlined process for US companies to export data from the EU. However, “the Safe Harbor Framework has been the subject of ongoing criticism, including two previous reviews

(2002 and 2004). Those reviews expressed serious concerns about the effectiveness of the Safe Harbor as a “privacy protection mechanism” (Connolly 2008: 4). The agreement failed to specify what the third countries are able to do with the data. Therefore once the data is moved outside of the EU, it is again under the weakened laws of the US.

Flow of data is a geopolitical issue and each country has different regulations and laws. Therefore individuals can be unsure of their privacy rights “as one has no good way of knowing where ones data is, how it is protected, or what other data and processing are going on in the same infrastructure. In fact, the provider probably does not know, and neither does the auditor” (Rash 2009). Due to the Safe Harbor complications, it is now accepted that if a third party as a data processor obliges its contractual agreements with the data controller, it is the national jurisdiction of the data controller that applies.

Technology

The legal issues discussed, prove that an absence of strong legal protections will continue to cause disruptions in the development of advanced cloud services. Until governments and third parties are limited in their methods of gaining access to data through abusing weaker measures, individuals will not take advantage of the benefits that are offered by cloud services. Therefore, it is possible that technology will have to provide some of the solutions that the legal law cannot provide.

“Encryption is one of the most powerful weapons in the security war, because it makes data useless when it falls into the wrong hands” (Stoller 2010: 37). Therefore data encryption is often considered as a solution to system vulnerabilities. “The RSA cryptosystem, named after its inventors Rivest, Shamir and Adleman, is the most widely known and widely used public-key cryptosystem in the world today” (Hinek 2007: 1). However, even the most secure of encryptions are susceptible to attack, and “of particular importance, RSA is one of the public-key cryptosystems used in the Transport Layer Security (TLS) protocol and its predecessor, the Secure Sockets Layer (SSL) protocol, which are used to provide secure communications on the Internet” (Hinek 2007: 1).

Researchers at the University of Michigan “found they could foil the security system by varying the voltage supply to the holder of the ‘private key’, which would be the consumer’s device in the case of copy protection and the retailer or bank in the case of Internet communication” (University of Michigan 2010). While gaining access to the power supply is unlikely at a large organisation, it showcases vulner-

abilities in these encryption systems, even those that are considered to be perfect.

Even when publicly used security protocols are available, not all cloud services ensure they are used. Accessing data without these security features in public areas such as coffee shops, universities and more leaves the user open to vulnerabilities. Google (2010) states that Google Mail only switched to the HTTPS protocol in January 2010 after the suspected Chinese attacks on Google Servers. Other cloud services such as Facebook, although have valid HTTPS certificates, do not use them and do not provide HTTPS encryption service to their users.

As previously stated, web applications are a combination of patchwork systems. One of these patchwork systems is to ‘identify’ each individual. Since the Internet was not build for authentication, developers have created a number of digital authentication systems, each with its own strengths and weaknesses. “Online identity theft, fraud, and privacy concerns are on the rise, stemming from increasingly sophisticated practices such as ‘phishing’” (Cameron 2006: 1). User authentication is a much more complex issue as shown by the problems users face when using these ad hoc systems such as the requirement to authenticate themselves multiple times with a number of services, lost passwords or disclosing extra data than actually required by the service.

Facebook - a social networking website - provides an integration authentication system called ‘Facebook Connect’. This is used by thousands of developers to access a user’s profile under consent. The Facebook API even provides methods to request ‘Extended Permissions’ from the user to read their inbox messages. These extended permissions for the illiterate user can be misunderstood as they may have no idea what permissions they have provided. They could accidentally grant access permissions to phishing websites (web forgery), causing major privacy breaches. These applications can be used to harvest a user’s data and possibly even for identity theft without any knowledge by the user.

The EU has already requested tighter privacy measures on social networks in their ‘Article 29’ on Data Protection, which was adopted in June of last year. A review of the guidelines in Article 29, states that social networks must have the highest security settings by default “in order to reduce the risk of unlawful processing by third parties. Restricted access profiles should not be discoverable by internal search engines, including the facility to search by parameters such as age or location” (European Commission 2009: 7). It continues to state that users should be informed of the “usage of the data for direct marketing purposes” and “possible sharing of the data

with specified categories of third parties” (European Commission 2009: 7). These clear guidelines should insure tighter privacy features of social networks within the EU.

As previously discussed in the Legal section, using the US Patriot Act, NSL’s gain access to millions of records of user activity. While a user’s online identity is restricted to the Internet, but the government can crawl through millions of records in order to find incriminating details and reveal their true identity. The problem is that most of these NSL have not provided any real proof of preventing any crimes and they seem to lower the privacy of individuals, not increase their security. There are methods available to protect oneself from being identified within these records and it is argued that the individuals, who have intent to cause harm, would employ such tactics to ensure they do not get caught, removing the benefits of the NSLs. Using these methods, crypto professionals can avoid traces, protect them and render such data retention mandates useless and expensive.

One of the methods used is Virtual Private Networks (VPN), this allows the user to only make a single connection to the VPN server and then all further data is encrypted through the VPN Server. Therefore the only communication recorded is between the user and the VPN, bypassing any detection. Similarly proxy servers are available to hide users history, but unless the user knows the provider of the proxy server, the user risks data collection and may be subject to traffic analysis. Other services including software such as Tor, JAP and I2P rerouting the user’s traffic through multiple proxies, so it becomes impossible to trace the user’s location and initial connection.

Conclusion

There are a number of legal and technological challenges that are present for cloud applications. The organisation that runs these services must understand that they must provide adequate and detailed information to users. The recent Facebook privacy problems showcases that even large organisation can have a poor understanding of user’s privacy rights and proves that large organisation cannot regulate and competing between themselves. On the same notion, Erdogmus (2009) discusses the ‘dream of platform independency’. These large organisations without governance could use cloud computing as a method to ensure that their propriety standards prevail. Therefore, privacy policy makers must understand the problems and solutions provided by technology to provide truly secure options and identify gaps to fill in current laws and technology. Cameron (2005), Microsoft’s Chief Identify Architect,

during a lecture at the London School of Economics (LSE) discussed his paper on ‘identity metasystem’, which is similar to the concept of users in the offline world carrying a number of identity cards and having complete control of which card they would like to provide. “It lets users select from among a portfolio of their digital identities and use them at Internet services of their choice where they are accepted” (Cameron 2006: 1). If a website requires a user to prove their age is over 21, the user can request one of their digital identities to provide a yes/no reply only, not the user’s actual date of birth. This describes the notion of ‘minimal disclosure’. This system is already being implemented by ‘Open ID’, but has yet to be widely accepted and is still unsecure to phishing attacks and other exploits. Once security protocols improve, however, it will hopefully become a standard for other systems to build upon.

Organisation such as Twitter and Facebook must be more responsible when providing developers access to their users’ data. Twitter has already made improvements by using an open protocol called ‘OAuth’. This system allows for the client and the server to exchange access tokens, therefore no username or password must be given. Although OAuth is limited in its functionality, it proves the importance of controlling access specifications for users when connecting to multiple amounts of third party applications.

Informing users of where, why and how long their data will be kept will be an important step in reinsurance. This could include the ability to opt out of service optimisation (therefore their personal data is stored in a single jurisdiction) or improve their own privacy policy wording so all their users can understand. It can be argued that ‘informed consent’ in the real world is nearly impossible to achieve. It’s important that users not only trust that their data will be private, but also that their data is secure. In the event of data loss, damage or theft, these services must have protocols in place to deal with such situation and not place the responsibility on users who are unlikely to have this knowledge.

“It is for the ultimate good of society as a whole that privacy is preserved, even at the expense of legitimate social control” (Introna 1997: 273). User trust is the most important part of any application usage. Therefore, involving the user at the deepest privacy changes becomes an important part of any service. Due to the EU Data Protection Directive, users must be notified of changes to their privacy policy, but US law does not require such action. If a privacy policy is updated without any notification, but is present on their website, it is deemed acceptable in the US. The US must take steps to protect its own citizens by providing guidelines and regulations to organ-

isations on privacy law. As discussed in Electronic Frontier Foundation (2010), it is reassuring to witness that in March, major organisations including Microsoft, Google, EFF, AT&T and more created a new campaign called 'Digital Due Process' requesting several major changes to existing law.

Only when US Law is updated and cloud service providers improve their encryption and identity technology, they will be able to provide truly secure options to their users. Until then, it's debatable if regulation is ready to protect users and if they can rely on the cloud for all their data needs without knowing the implications that are placed upon every action they perform.

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Churn Management in Telecommunications

Challenging the innovative Capability of Data Mining Tools

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KEYWORDS

Churn Management
Telecommunications
Technological Centricity
Value Network Analysis
Innovation
Data Mining

ABSTRACT

With growing competition in the telecommunications market, the mobile operators became “victims” of a structure inherited from happy monopoly times of a technologically centred nature, posing limitations that largely frame business values, functions and processes dealing with human behaviour. A good example are data-mining tools that use historical data generated by transactional, billing and contract management technologies for finding patterns of customer behaviour by applying various statistical techniques. This paper argues that a more reliable and sustainable way to reduce customer churn is to look at the reasons why customers churn, rather than which target group is prone to churning, as well as to make greater use of contextual data rather than historical transaction data. One of the ways to get closer to the implementation of such a visionary and complex task, associated with richness and constant emergence of contextual data analysis, is to fully separate the customer service function and break it into contextual groups, such as small firms, dealing with certain groups of customers. Following a discussion on two major problems with data mining tools and their inappropriateness to account for contextual data, the paper proposes a Value Network Analysis framework for the establishment of new market structures and business models for telecommunications operators, capable to cope with the uncertainty of customer intention to churn.

Introduction

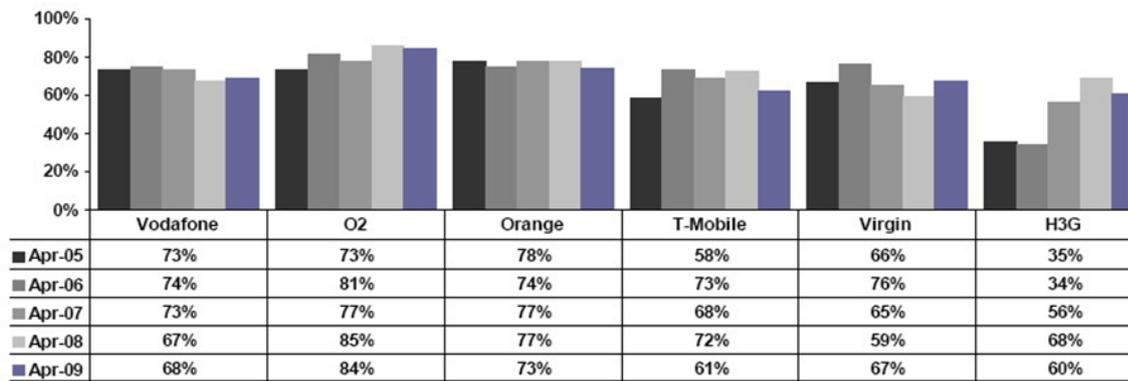
The strategic value of knowledge to organizations The introduction of “competition” in the telecommunications industry gave rise to many issues and situations that are quite “uncommon”, “unnatural” and maybe even “unimaginative” for a utility type industry. Originally vertically integrated, mobile carriers now have to carefully address the needs of millions of customers, understand their behaviour, predict their needs and design products and services that will at best address those needs. The competition becomes even more fierce with the penetration of mobile phone usage steadily reaching its peak, as attracting new customers becomes extremely difficult and losing existing customers very easy, although painful.

Customer churn is a common term used both in academia and practice to denote the customers with propensity to leave for competing companies. According to various estimates in European mobile service markets, churn rate reaches twenty-five to thirty percent annually. On the other hand financial analysis and economic studies are in agreement that

acquiring new customers is five times as expensive compared to retaining existing customers (Berson et al. 2000; Wei and Chiu 2002; Hung, Yen and Wang 2006; Ahn, Han and Lee 2006). In fact, customer churn is now reported in most of mobile industry surveys as an inseparable part of the current market structure in the way it accounts for future market share. “UK mobile user survey 2009” of Enders Analysis shows the dynamics of operator loyalty for five major UK operators for the period of 2005-2009, suggesting that for most of the companies the percentage of loyal non-churners is between sixty and seventy five percent, except for O2 (Harris and Barford 2009) (see Diagram 1).

Consumer data mining tools use various types of data, such as transactional, billing and contractual data, to find logical patterns pointing to customers with churn propensity. The overall aim is to provide guidance for future actions of telecom marketing and product innovation management, as to which customers to target in terms of retention and loyalty measures. Obviously, when a company generates huge amounts of data, as a result of its core activity, there is a need to think how that data can be turned into a competitive advantage. “Churn prediction through data mining” can be seen as the utilization of a by-product, created as a result of the main

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Base: All those owning a mobile phone.
[Source: Enders Analysis/BMRB survey]

Diagram 1: Share of current Owners expecting to keep the same Operator Brand (Harris and Barford 2009).

service provision and aimed to increase customer loyalty towards the company. The increasing use of data mining technologies by telecommunications companies for Customer Relationship Management functions speaks well for this phenomenon.

Academic literature on data mining tools for customer churn prediction, specifically concentrates on the use of techniques, such as association rules, classification, multiple clustering, decision trees, neural network and other algorithmic solutions for finding various relations between a variety of datasets in order to draw patterns of similar behaviour in the past to predict the future (Berson et al. 2000; Wei and Chiu 2002; Hung, Yen and Wang 2006; Ahn, Han and Lee 2006; Sohn and Kim 2008; Owczarczuk 2010; Bose and Chen 2009). Interestingly, all the above-mentioned studies are claimed to be successful and all the findings proved to be useful for telecommunications operators. However, an intuitional question rises, as to how success and failure are measured, when every case is a success? This paper argues that current approaches and data mining technologies, that use historical data for customer churn management in the telecommunications industry, have limited capability to innovate.

In the second section, this argument is supported by a discussion of the notion of economies of scale and the technological centrality of the telecommunications industry, revealing why “prediction of churners” is considered to be an efficient means to address the churn problem. Hence the first question: “Is predicting churners (instead of finding and elaborating on reasons behind customer churn) the right thing to do?” is identified and discussed (Baurdeau and Liebenau 2005; Davies 1996; Fontenay and Hogendorn 2005). In the third section, we will elaborate on the conflict between “innovation” and science in order to limit the aspirations of “data miners” to predict customers’ intentions based on historical data through the application of mathematical models, while ignoring the allmighty “context”, from which the second question emerges: “What ‘data is mined’

and how?” (Nightingale 1998, 2000; Sorensen and Pica 2005).

In “Meeting of Mice”, Armenian fabulist Khnko Aper tells a story of a gathering of mice to decide how to render a big cat harmless that was brought in by the owners of a grocery store to get rid of the mice. Finally, when the solution is found to hang a bell around the cat’s neck, so that everyone hears when the cat comes, the biggest issue turns out to be “who will hang the bell?” In the fourth section, an attempt is made to use technological centrality and the innovation/science directional conflict to propose a possible restructuring of the mobile market and to set an arena for new players that will actually take the responsibility to “hang the bell” i.e. understand the context of mobile interaction and use it to find the true reasons behind churning. Overall, the paper attempts to comment on the current state of affairs in churn management in the telecommunications industry by reviewing the relevant literature and by grounding them within two theoretical perspectives. It is obvious that for increased practicality and usefulness further research needs to be done and empirical evidence collected and analysed. At this level, however, the paper concludes with an idea about possible structural changes in the telecommunications industry.

Technological Centrality and the Notion of Churn Management

Churn prediction is a case in point in terms of the discussion on the efficiency of various tools and techniques of manipulating data. Hung, Yen and Wang (2006) present churn management as a framework of two analytical modelling processes: first, predicting “who?” are about to churn and, second, coming up with the most effective way to react to the targeted customers. Owczarczuk’s (2009) study of data mining models for identifying “betrayers” among prepaid customers in the telecommunications industry is another example, where the question of which client is to churn is called natural, hence remains un-

questioned. In summary, a common aspect observed in the literature is that the objectives of the studies and presented technologies or techniques are discussed to answer precisely the question of “Who will churn?”

It would be hard to disagree with Baurdeau, Liebenau and Savin (2005) that technological innovation in the telecom industry is not customer centric even in today’s free market, where addressing customers needs is an utmost priority. The authors clearly demonstrate the endogenous nature of innovation in telecommunications serving its internal objectives, addressing non-customer-driven rationales behind the choice of technology in telecommunications. One of these objectives is largely admitted to be the recovery of sunk costs, which is a result of a monopolistic business strategy, as a disincentive to invest in a new technology, as it may devalue the existing technology before it becomes obsolete (Davies 1996).

Customer churn analysis, which is a purely marketing and customer service functionality, is limited with and heavily dependent on the technological capabilities of the mobile service infrastructure in order to identify people predisposed to churn. It can be argued that infrastructure technology limits the interpretation of customer churn management to the prediction of who will churn rather why they churn. Davies (1996) explains growth in large technical systems, such as telecommunications, in terms of economies of scale and scope as a cost saving economic drive. On the other hand Baurdeau, Liebenau and Savin (2005) argue that economies of scale and scope, even in today’s “free” market telecommunications industry, are to be observed as characteristics of technologies that are designed and adopted by carriers. Not guided by market efficiencies, they are rather a response to existing market structures.

Notwithstanding an overarching perception in the industry that the vertical and horizontal integration of the mobile carriers has economies of scale and scope effects, it may not be significant at the retail level as delicately noted and mathematically proven by Fontenay and Hogendorn (2005). Even if we admit that telecommunications service infrastructure networks have economies of scale, it doesn’t necessarily imply that all networks of various mobile operators have aggregate scale of economies. Nor does it imply that the functionally integrated operation, innovation, sales and service dimensions can collectively make use of economies of scale and scope.

Churn management as a functionality evolved from the current market structure and its current interpretation as a technology dependent customer attrition prediction is not producing the desired result.

Diagram 1 shows that the problem of loyalty still remains one of the most vital problems. To address the current limitations of churn prediction technologies in terms of determining the right customers as well as on whom to spend retention and loyalty resources, the mobile carriers need to re-evaluate or redefine the notion of churn management. Analysing the reasons behind churning, rather than the customers with churn propensity, may raise issues of designing new technologies and of changing the operational and managerial strategies from a “business around technology” to a “business using technology” perspective.

The Science – Innovation Directional Conflict

All data mining techniques and tools described in the academic literature for prediction and management of churn mainly use historical transactional, billing and contractual data provided by the underlying technology for the purposes of metering, billing and the collection of the revenues (Wei and Chiu 2002; Hung, Yen and Wang 2006; Ahn, Han and Lee 2006; Sohn and Kim 2008; Bose and Chen 2009). A discussion of the kind of data used for churn prediction is very important since it is not based on data collected for that specific purpose but rather on databases designed for mobile service metering, billing and revenue collection purposes. Table 1 below is an example of used data, mining techniques and expected outcomes described by Wei and Chiu (2002).

We have now set the scene to discuss the “directional conflict between science and innovation” observed by the Cognitive Model of Innovation by Nightingale (1998; 2000). His basic argument is that science is going from “known starting conditions” through certain patterns to predict an “unknown future”. Whereas, innovation is headed in the opposite direction: from a “known end result”, the result we try to achieve by innovation, to “unknown starting conditions”. He concludes that mathematical models are not appropriate for predicting human behaviour.

This directional conflict is challenging the previous linear model where the output of science, e.g. mathematical models and methods that can calculate who is about to churn, can be directly applied to create innovative technologies, products, services or business propositions for retaining the churners. As noted by Nightingale (1998), this approach cannot explain key features of innovation, such as tacit knowledge. Tacit knowledge in churn prediction is primarily the contextual insight that is able to provide a key to the question of “why?” the customer is to churn. Another interesting dimension of the science-innovation directional conflict can be observed from an INPUT-PROCESS-OUTPUT perspective.

We can consider the customer’s positive “intention” (output) as our known and desired end result we are trying to reach by analyzing unknown starting points. In terms of churn prediction, we need to be careful about the first delusive impression, that our starting conditions (input) are well known since we seem to have all the data we need. Although, the statistics may show elements critical to service provision, metering and billing, they do not necessarily reveal the most important information; what was the “intention” behind using those services?

Type of data analyzed INPUT	Techniques used PROCESS	Data or patterns extracted OUTPUT
Contractual Data <ul style="list-style-type: none"> • Phone Number • Length of Service • Contract Type • Payment Type Call Details <ul style="list-style-type: none"> • Caller’s Number • Receiver’s number • Date • Starting/Ending time • Duration • Charge Applied 	Classification analysis based churn prediction Decision tree Decision rule AQ family CN2 Neural networks Evaluated by: Miss and false alarm rates	Churners Non-churners

Table 1: Type of Data and Analysis Techniques used to predict Churn (Wei and Chiu 2002).

The Context of Churning and its Complexity

A review of the literature reveals that studies on the – from a business perspective more important - question of “Why customers are churning?” are limited in two ways; limited in terms of resources allocated to this type of broad and complex analysis as well as limited in the face of the unlimited ways for answering this fundamental question (Berson et al. 2000; Wei and Chiu 2002; Hung, Yen and Wang 2006; Ahn, Han and Lee 2006; Sohn and Kim 2008; Owczarczuk 2010; Bose and Chen 2009). Finding the reasons for customer churn is a highly complex exercise for most of the businesses, as most of the decisions to churn, if not all of them, are situated in an uncountable variety of contexts. To understand the individual motivation for churning and not churning, we need to go far beyond examining the codified variables of service usage and customer’s demo-

graphics.

The discussion on the contexts of mobile interaction or usage of mobile services is an immense and vague theme, unless we concentrate on a certain group of customers with similar contextual attributes according to their professional life, demonstrated life style, or even activities around certain types of project (e.g. university life of students, work practices of real estate agents, construction of a building etc.). These groups may have common communication patterns and may be framed, for example, in terms of “rhythms of coupling and decoupling” with mobile services (Sorensen and Pica 2005).

Who Will Hang the Bell?

Technological centricity discussed in section 2 reveals how vertical functional integration frames the notion and effectiveness of data mining tools for churn management. Whereas, the Science – Innovation directional conflict observed in the section above underlines the importance of context that guides the customers’ decision to churn and why mathematics alone provides for limited capabilities to innovate in terms of customer retention and loyalty mechanisms. In this section we contrast the functional integrity of mobile operators against the richness and diversity of contexts in terms of the use of mobile services in order to demonstrate the deadlock that the telecommunications industry has driven itself into, while trying to compete with inherently monopolistic technologies. This contrast suggests that structural and functional unbundling, predicted long time ago by Davies (1996), becomes more and more necessary. Value Network Analysis will be proposed as an effective framework for telecommunications industry practitioners to consider while forming future strategies on churn management.

Given the diversity of contexts of the use of mobile services, one cannot imagine a single organisation to be able to collect and analyse all contextual data related to its customers and their intentions for churning or not churning. The bigger the company’s customer base, the more it relies on technology to guide management in terms of customer service and product innovation. One of the ways to fill the huge gap between technological limitations and prediction of human behaviour could be to demolish that big technological bridge in the first place and instead to rely on small companies and even individuals to build their own small bridges instead.

In Baurdeau, Liebenau and Savin’s (2005) terms, one of the best ways to do this is to desegregate all intermediate functions or “wholesale markets”. Thus, customer insight analytics and product/service in-

novation can be integrated with customer service functions rather than to be directed by technological limitations. However, functional desegregation should not be only a question of opening incumbent operator resources for new entrants, as it is discussed by the authors. New entrants, standing very close to specific groups of customers, should develop to an appropriate level in order to be considered as valuable resources for utilizing all the capacity of the network infrastructure.

In his attempt to trace major trends of changes in the telecommunications industry, Davies (1996) clearly substantiates the evolution of the telecommunications network from a hierarchical structure of the network towards, what he calls the ring or geodesic architecture. Davies supports this course of evolution with Noam's (1987) view that the development of services tailored to customer needs has undermined the system-wide economies previously attributed to centrally controlled telephone networks. Although Davies's discussion of pyramid and ring network architectures (see Figure 1) is primarily related to technological infrastructures, it can be a useful tool to depict how small customer service firms, concentrated on catering for a specific group, can make use of the architecture of customer databases by allowing information to be shared in a geodesic way.

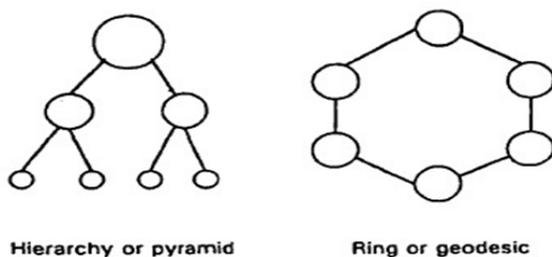


Figure 1: Competing Network Architectures by Davies (1996)

In the next section, the evolving framework of Value Network Analysis will be elaborated. Based on the work of Peppard and Rylander (2006), who aligned Value Network Analysis with the telecommunications industry, we will explore an alternative starting point to guide our mindset in the future discussions of reconstructing business models in the telecommunications industry.

Using Value Network Analysis to Pave the Way for New Players

Value Network Analysis is an alternative framework to the well-founded notion of value chains. The latter helps to depict the process of value creation and to signify the competences that companies need to develop in order to harvest the best results from a

clear understanding of their place on the value chain throughout the process of creation and distribution of a product or service. Value Network Analysis, is more suited, as described by Peppard and Rylander (2006), to the New Economy where the supply and demand chains are highly digitized urging managers to rethink traditional methods of analyzing their place and role in the process of production and delivery of services. The companies and their functionalities have moved from being integrated into a chain to a network of networks where value is co-created by interrelated players. Hence, the new strategy needs to address this change in the new ecosystem of services and production in order to be able to efficiently contribute, but also to be able to make use of others' contributions to the co-created value.

The transitional changes presented in Figure 2 address an explicit need for telecommunications companies to restructure their core functionalities according to Treacy and Wiersema's (1993) three value dimensions of "Customer Intimacy", "Product/Service Innovation" and "Operational Excellence". This paper is trying to argue, that competitive mobile carriers, due to their technological centrality, are not capable to reach an effective transition in most of these characteristics on their own, as they are highly dependent on detailed customer insight that cannot be analyzed with existing approaches and techniques applied to churn management.

The current vertical integration of all technological, commercial, financial and marketing functions of competing mobile operators leaves little hope for survival in the future. Currently the mobile carriers are a part of a much larger network of application providers, handset manufacturers and content generators. To address this variety of independent players, the new model requires a great deal of separation of infrastructure operation from the product and relationship marketing function. Customer behaviour prediction along with innovation of products and services cannot rely only on customer data generated internally. It should also account for data and contextual information created in the larger network of players. Clear separation of functionalities will make the vertically integrated mobile carriers more compatible to the network of free players that directly impact the way mobile services are consumed. Many application developers that create products for smaller groups of customers dedicate more resources to understanding the real communication needs of their customers in a variety of contexts - something no major mobile provider can afford to get too deep into, because of the large scale of customers.

Preparing for a new, purely free market can be the best strategy for telecoms to choose in the short run.

Major players can make use of all their partners to find out more about their customers, and move towards the establishment of smaller, customer context oriented functionalities, totally separated from technological constraints. To address new market structures these functionalities need to act as separate firms, concentrating on specific needs of very specific groups. By knowing customers' business drivers, their sensitivity to the external world and how the values are created in a specific group, mobile operators will be able to better understand the needs in terms of mobile connection, products and services.

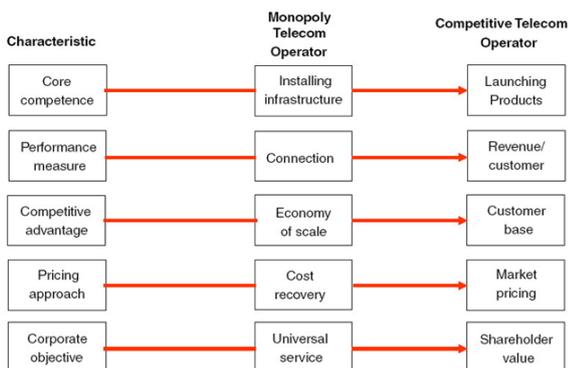


Figure 2: Challenges facing traditional Mobile Operators as they enter Mobile Space (Peppard and Rylander 2006).

Conclusion

With the growing competition among mobile operators, customer churn management has become a pivotal concern and major element of achieving a competitive advantage. This paper proposed to take a fresh look at the current practices in customer churn management in the telecommunications industry. The critique focused on the technological centrality and functional integrity of mobile operators, inherent in the ways data is used to predict customers' propensity to churn. Against the backdrop of the directional conflict between science and innovation, one can argue that the context affecting customers' decision to churn is disregarded. Instead the easily answered question of "Who?" will churn guides the management strategy, rather than the more fundamental question "Why?" the customer may want to churn. By arguing that the telecommunications industry in its current structure provides very limited place for innovative ways to deal with customer retention and loyalty mechanisms, the paper further suggests the Value Network Analysis framework as a useful approach for the functional unbundling of mobile carriers in the future. Obviously future research and empirical evidence is needed to add soundness and feasibility to such a suggestion.

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Acknowledgements

I would like to thank professors Carsten Sorensen and Jonathan Liebenau from LSE for their inspiring lectures, ideas and questions. I would also like to thank the anonymous reviewers for their valuable comments and constructive critique.

A Conceptual Framework of B2C Website Loyalty

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KEYWORDS

E-Loyalty
TAM
B2C Website
Driving Factors

ABSTRACT

In the on-line context, the representation of the loyalty between website and customer can be divided into two parts: the attitudinal loyalty and the behavioural loyalty. These two kinds of customer loyalty are affected synthetically by factors such as service quality, perceived value, customer trust, switching costs, brand, and so forth. Based on the TAM framework, this paper develops a model on customer loyalty in relation to B2C websites. The paper elaborates on the hypothesis of the relation between customer loyalty and its drivers. The conclusions provide reference for both academics and practitioners of B2C websites.

Introduction

Loyal customers' frequent purchases bring increased profitability to a firm and reduce costs of obtaining new customers. Consequently, building and holding customer loyalty remains a major topic for companies. However, knowing that "competing businesses in the world of electronic commerce are only a few mouse clicks away" (Srinivasan et al. 2002: 41), it is not as easy as before to maintain customer loyalty with B2C websites. Thus, generating e-loyalty is both more difficult and more important than for conventional commerce. Thus, an understanding of loyalty antecedents will promote B2C websites to develop and adopt their marketing strategies effectively.

Both academics and practitioners have attempted to determine the driving factors creating loyalty. Some of these studies have been carried out in the context of e-commerce, arguing that customer loyalty is related to satisfaction, trust, perceived value, user interface, brand, etc. (Anderson and Srinivasan 2003; Yoon 2002; Flavián et al. 2005; Gommans et al. 2001). Although e-trust, e-satisfaction, websites and other antecedents have been examined in relation to e-loyalty, it is also essential to distinguish between attitudinal loyalty and behavioural loyalty. In regard to this, Gommans et al. (2001) have proposed a conceptual framework. Nevertheless, there is a lack of empirical validation in their research. Meanwhile, other literature indicates how to build e-loyalty. For instance, with the help of advanced technologies, network companies have more capacity to meet their customer specific needs. In this regard, tech-

nologies provide great opportunities to obtain their customers and enhance customer lock-in (Mobasher et al. 2000).

The issues that determine whether, and to what extent, loyalty is different in the online environment have yet to be fully resolved. Responding to the situation of e-commerce as context, this paper conducts a new evaluation of some of the commonly accepted elements of loyalty and their influence. To be more specific; is a website's service quality important to loyalty? Does a website's perceived value influence online loyalty? Is there any relationship between the driving factors? How do brand and switching costs influence online loyalty? The current study seeks to deal with the above questions by adjusting the Technology Acceptance Model (TAM) considering the role of switching costs, brand, customer trust, perceived value and service quality in relation to B2C e-commerce. Loyalty antecedents are supposed to have a distinct impact on improving attitudinal loyalty and/or behavioural loyalty, which lead to customer e-loyalty. Thoughts on the empirical validation of the proposed model and the implications for B2C website practice are also presented.

This paper begins by synthesizing the existing studies. The next section constructs a modified model of understanding B2C website's customer loyalty. All the facts will be described in detail. Finally, this paper concludes with a discussion of the findings for both scholars and website managers.

Literature Review

Customer satisfaction theory indicates that customer

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loyalty is directly affected by customer satisfaction. The primary model is the American Customer Satisfaction Index (ACSI) (Kristensen et al. 1999). This model, which is based on consumption process of product and services, is an appropriate theoretical frame to measure and analyse customer satisfaction. ACSI, which is based on the expectancy disconfirmation theory (Tang 2009), indicates that customer satisfaction is an important antecedent for customer loyalty. The driving factors of customer satisfaction consist of perceived quality and customer expectation. These two factors actuate the forming of perceived value and jointly influence the customer satisfaction, which lead to customer complaint and customer loyalty.

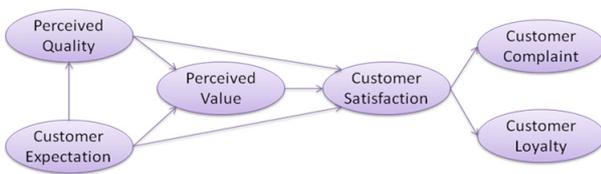


Figure 1: ACSI Model (Kristensen et al. 1999)

It can be seen from Figure 1 that ACSI studies loyalty by the use of intermediate variables (i.e. Customer Satisfaction). However, there is a lack of standard quantitative criteria to evaluate the products and services of an e-business website. This is mainly because there is a certain extent of uncertainty of the products or services in the e-commerce context. This paper thinks Perceived Value reflects the customer's attitude toward products and services of e-business websites, and it is also an important variable according to Customer Satisfactory Theory and Expectancy Disconfirmation Theory (Tang 2009). Given this, perceived value has been regarded as a key cause in this paper. Yan (2005) proposed a model of driving factors behind customer loyalty.

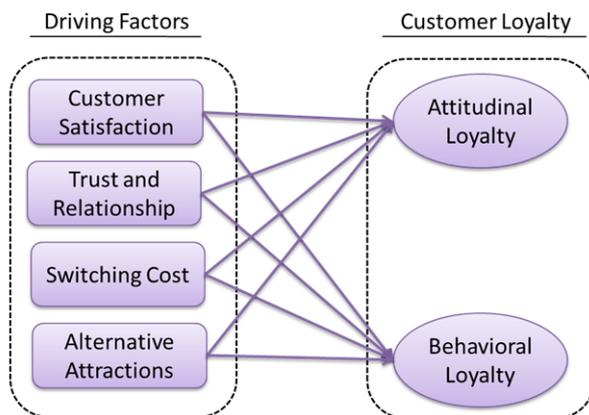


Figure 2: Yan's (2005) Model

His integrated model takes advantage of customer satisfaction theory, the expectancy-disconfirmation model and switch cost theory. Four driving factors

are adopted in his research; Customer Satisfaction, Trust and Relationship, Switching Costs and Alternative Attractions. Yan (2005) also divided the measurement of customer loyalty into two separate dimensions (attitudinal loyalty and behavioural loyalty) for analysing; each driving factor effect on customer loyalty is discussed separately. The result of an empirical test on the Chinese telecommunications industry corroborated this model. Although his research method brings instructive enlightenment to customer relationship management, the contribution of his paper is restricted to mobile communication firms in China.

Gommans et al. (2001) establish a conceptual framework of 'e-loyalty' and its underlying drivers in the context of B2C e-commerce. Combining customer satisfaction theory with customer trust theory, an exploratory research model on customer loyalty driving factors has been constructed. The underlying drivers consist of Value Propositions, Brand Building, Trust and Security, Website and Technology and Customer Service. More than that, it also considers attitudinal and behavioural aspects of e-loyalty. Taking advantages of the characteristics of e-commerce and related theory, this model is a significant reference for us to do further research on this topic. To be more specific, their model (e.g. variable selection and measurement items selection in terms of the nature of e-commerce) brings instructive enlightenment to the current study. However, empirical validation would have greatly enhanced the viability of this model.

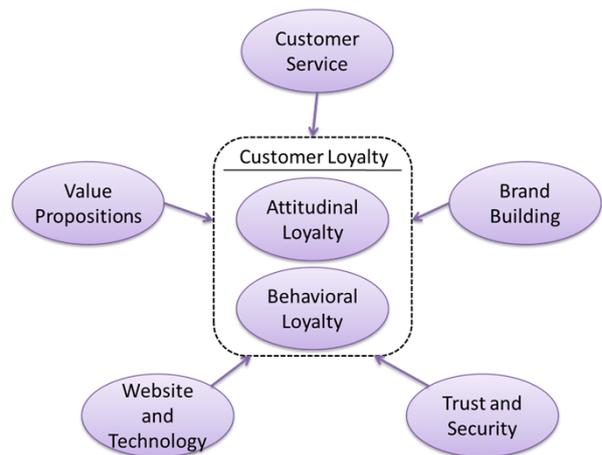


Figure 3: Gommans et al.'s (2001) Model

Lloyd and Mark (2004) established frameworks of perceived value, trust, satisfaction and loyalty within an online context. Combining customer satisfaction theory with customer trust theory, an exploratory research on customer loyalty driving factors has been conducted, which takes the quality of web services as the driving factor of perceived value, customer trust and customer satisfaction. Except for satisfaction, the other factors and their causal relationship have been

supported (see the solid lines in Figure 4). Taking advantage of the characteristics of e-commerce and related theories, this model is of significant relevance for the current research.

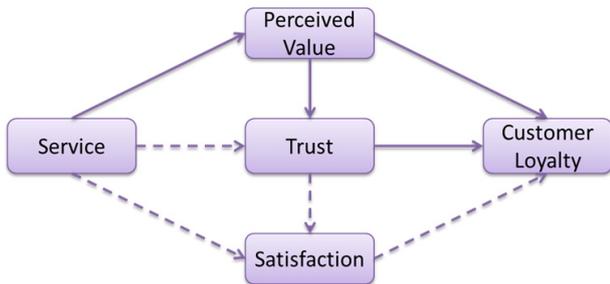


Figure 4: Lloyd and Mark's (2004) Model

A 'trust-attitude-loyalty' model is proposed by Lu and Lin (2002). As suggested in their research, customer satisfaction is affected by the content of the website, situation and infrastructure. By means of customer attitude, loyalty is affected by trust directly and indirectly. This model explains the relationship between confidence level and customer loyalty in virtual consumer markets. Although this model is building on the theory of trusting relationship, the factors are applicable for e-commerce and the model has been modified accordingly. Therefore, it provides a good starting point for studying loyalty driven by trust in the context of e-commerce. Similar to the ACSI Model, this model adopts satisfaction as an intermediate variable.

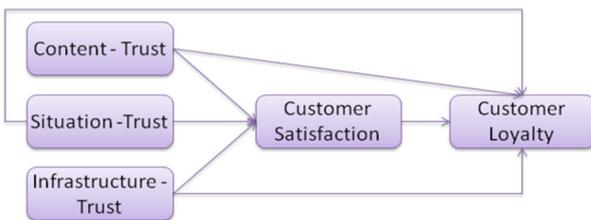


Figure 5: Lu and Lin's (2002) Model

Each model has its advantage and weakness. In the following section, some underlying factors of e-loyalty in the current study will be selected based on the models outlined above.

Conceptual Framework

Research Model

The Theoretical base for the modified model draws from the Technology Acceptance Model (TAM). As one of the most influential models, TAM is an extension of the Theory of Reasoned Action (TRA) (Malhotra and Galletta 1999). TAM replaces many of TRA's attitude measures with two technology acceptance

measures; Perceived Usefulness (PU) and Perceived Ease Of Use (PEOU). PU refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Malhotra and Galletta 1999: 6); PEOU is defined as "the degree to which a person believes that using a particular system would be free from effort" (Malhotra and Galletta 1999: 6). Attitude toward using (ATU) an IT artefact is determined by PU and PEOU. ATU and PU predict the Behavioural Intension (BI) to use the system. Finally, Actual Use of the system is predicted by BI (see Figure 6).

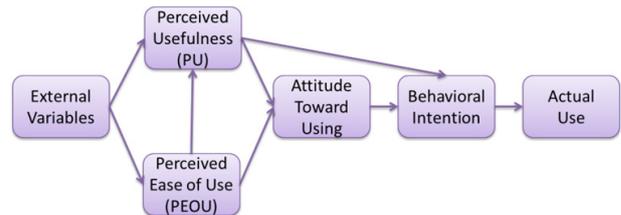


Figure 6: Technology Acceptance Model (TAM) (Malhotra and Galletta 1999).

To conduct further research on how to preserve customer loyalty in an e-commerce context, the current study presents a research model (see Figure 7). Taking advantage of the research models analysed above, this model modifies the Technology Acceptance Model (TAM) including the driving factors selected from the literature review.

B2C websites can be regarded as one kind of information technology; therefore it is valid to use TAM to conduct this research. Specifically, perceived value replaces the PU, brand building takes the place of PEOU, and the external variable is service quality. Furthermore, an element of switching costs is added to the model, as it is a vital factor (this will be covered later in this paper) especially in the e-commerce environment. Elements and causal relationship are provided.

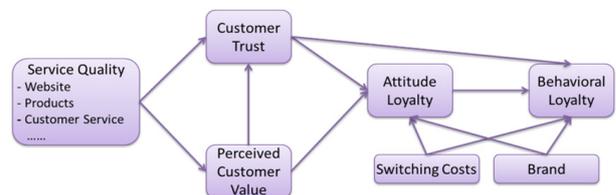


Figure 7: Proposed Conceptual Framework

Service Quality

Providing a variety of services with high quality is important for a B2C websites in order to compete with alternative sites. This research considers a global perspective of service quality. Five factors such as brand image, service performance, product quality, prices and security are important to the customers'

purchase intention and behavioural loyalty (Smith 2002). In the conceptual framework of e-loyalty, Gommans et al. (2001) indicate both a website's brand and customer services as major driving factors. In addition, other essentials such as value proposition, internet technologies, trust and security contribute to customer on-line loyalty as well. An empirical study on customer loyalty of electronic food retailers (Gregory and Kingshuk 2001) presents that factors such as ease of return, delivery performance, website design, pricing, goods information, and obtaining goods have positive influence on customer loyalty. Nonetheless, the underlying factors in all the above models can be simplified and reintegrated.

In addition, both perceived value and customer trust are influenced by service quality. Prior research has studied the relationships between service quality and trust. Sultan and Mooraj (2001) indicate that a number of service quality factors are linked to trust. Taking security as an example, customer trust will be improved due to advanced security technologies of a website. Besides, conceptual and empirical research that supports links between service quality and perceived value have been also conducted by Parasuraman and Grewal (2000) as well as Standifird (2001). Lloyd and Mark (2004) have synthesized and built on existing research into loyalty, trust, satisfaction, value and service quality. They concluded that service quality performs a vital role in both perceived value and customer trust.

Good service will lead to customer trust and improve perceived value. Moreover, service quality has an impact on loyalty. This research, therefore, assumes that services must be an original motivator variable that predicts the perceived value and customer trust.

Perceived Value

The concept of perceived value is a general judgment of a product or service associated with perceptions of expense and payback. It is the balance between the use-value of the products or services and the cost such as time, money and emotion.

Perceived value has a great influence with regard to both customer satisfaction and future purchase intention. For instance, Cronin et al. (2000) have examined some driving factors (e.g. perceived value, quality and satisfaction) and consumer behaviour. They inferred that the relationship between perceived value and e-loyalty is significantly positive. As highlighted by Zhang et al. (2007), perceived value is regarded as one critical factor to the success of e-loyalty. To be more specific, the perceived value which affects e-loyalty consists essentially of more personalization and competitive pricing. Hence, perceived value has a positive influence on the attitudinal loyalty towards

a B2C website.

Existing studies also elaborate on the linkage between perceived value and trust. Specific studies of e-commerce show the influence of perceived value on trust and satisfaction effects loyalty similarly (Anderson and Srinivasan 2003). Sirdeshmukh et al. (2002) find evidence that there is a direct relationship between trust and value. Thus, perceived value also has a positive influence on customer trust in a B2C website.

Customer Trust

Trust has often been studied in the electronic commerce context. It can be described as a customer's belief in the content and security of a specific vendor (Gabarino and Johnson 1999). The literature suggests that trust is an essential factor to consolidate purchase intentions, no matter whether it is in traditional commerce (Chaudhuri and Holbrook 2001; Sirdeshmukh et al. 2002) or in an e-commerce context (Park and Kim 2003; Pitta et al. 2006). However, different from the relationships between buyers and sellers in a bricks-and-mortar context, the exclusive interactive mode between shopper and vendor is through a website (Cyr et al. 2007).

Based on a survey on on-line shopping, CNNIC (2010) presents that 62.4% of customers will refuse on-line services as they are afraid of the lack of security in terms of their private information (e.g. credit card information and password). 42.3% of customers will refuse on-line services as they believe the Credit Rating of sites is less reliable. Accordingly, lack of trust is one key factor that results in potential consumers avoiding to purchase online. On the other hand, literature indicates that when trust is established, it is easier for customers to shop online (Flavián et al. 2005). For these reasons, trust has a positive influence on both the attitudinal and behavioural loyalty towards websites.

Switching Costs

Switching costs are an important segment of customer loyalty research. Literature has shown the strong relationship between switching costs and customer loyalty. Switching costs refer to the time, money or emotion that customers will spend when switching from one service provider to another (Chang and Chen 2008). In addition to economic expenditures, switching costs can be the result of emotional and psychological elements as well (Sharma & Patterson 2000; Wu et al. 2007). This paper regards switching costs as economic expenses or incorporeal costs when switching from one on-line shop to another.

Switching costs lead to consumers increasingly depending on a particular vendor. Still, although the

internet allows for easy and convenient comparisons of online offers, Srinivasan et al. (2002) indicate that the switching of online shoppers is not as frequent as among brick and mortar consumers. Few on-line consumers are willing to purchase at alternative optional websites (Reichheld and Scheffer 2000). Adamic and Huberman (2001) have studied on-line customer behaviour, claiming that the top 1% of websites obtain over half of all online transactions, suggesting that customers give allegiance to a limited number of well known websites.

Switching costs between websites is constructed by additional factors, such as learning costs, evaluation cost, social relation and value added service costs. Customers get accustomed to a specific website and its shopping flow. Customer Loyalty Card and Credit Rating systems as well as the costs of learning how to use new websites have enhanced the switching barriers gradually for customers. Hence, switching costs have a positive influence on both attitudinal and behavioural loyalty towards a website.

Brand

Brand has been studied in a wide range of disciplines, such as marketing, strategic management and economics (Aaker 1996; Fombrun and Shanley 1990; Shapiro 1983). It contributes to both tangible (Grewal et al. 1998) and intangible (Andreassen 1999; Yoon et al. 1993) benefits to a firm. A good and healthy company image can be a major asset for B2C websites, simply because customers have difficulties remembering websites without an impressive brand image, not to mention loyalty towards the websites they know little about.

Owing to the advantages of the internet, website brand building becomes interactive, while rapidly and extensively spreading reputation. In addition, new alternatives are available due to internet technologies. As a result, the importance of the brand for customer loyalty has increased in the context of e-commerce. Some research has been conducted on the causal relationship between brand and e-loyalty that supports the argument. Holland (2001) explores a conceptual model concluding that customer's brand loyalty has a significant association with predictable affective, cognitive and behavioural results. Other literature highlights that corporate image is connected to customer loyalty as well (Chia-Hung 2008). Gommans et al. (2001) integrated prior research on brand building associated with e-loyalty. After presenting a research model on e-loyalty and its influencing drivers, they underline that brand building is one vital element in obtaining and keeping e-loyalty. In this regard, brand may be another essential variable that affects customer loyalty.

E-Loyalty

Although the definitions of customer loyalty are similar in traditional and on-line contexts, they result in diverse characteristics related to on-line context and customer behaviour. E-loyalty or on-line loyalty is simply considered as the desire to return to a specific website and to purchase from it. E-loyalty is usually conceptualized in terms of customer behaviour intent (e.g. duration and frequency of a customer visit is easily measured). However, it is still not convincing to say those customers are behaviourally loyal. A considerable number of consumers visit particular websites in order to inform them but the purchase remains offline, which makes the concept of e-loyalty problematic (Wind et al. 2001). As the literature indicates, e-loyalty is considered as perceived loyalty towards an e-service or e-shop resulting in an increased likelihood to go back to visit and to purchase again. In addition, they will not turn to other alternatives (Flavián et al. 2005).

Conclusion and Limitations

In the current hyper-competitive e-commerce era, the importance of customer loyalty is prominent. Understanding the drivers of a B2C website's customer loyalty is critical to both academics and practitioners. Based on the review and analysis of the literature on e-loyalty, this paper proposes a modified model to seek out the association between e-loyalty and its driving factors. This may be a guidance to further studies on e-loyalty.

Some limitations of this research should be noted as well. Due to the fact that this paper needs the follow-up work, the validation of the model is still to come. Due to limitations in time, this paper does not distinguish between different product types: purchasing cheap products (e.g. stationeries) may differ from buying expensive or unfamiliar products (e.g. mobile phones). Consequently, future research must be conducted.

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Acknowledgements

I am very grateful to Attila Marton and other editors as well as to the anonymous reviewers for their extremely helpful and detailed comments on the paper, which helped to improve the work. Also special thanks to all useful insights from the LSE/ISIG staff, in particular Steve Smithson and Tony Cornford. I would also like to thank Dai Jiang (Southeast University, China) for his excellent assistance.

Blood, Gold or Marriage – What gets you going?

A Study of Personality Traits and in-game Behavior

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KEYWORDS

MMORPG
MUD
Big Five Personality Traits
Gaming Motivation
Gaming Psychology

ABSTRACT

The Massively Multiplayer Online Role-Playing Games (MMORPGs) genre attracts more players than any other genre of computer games today. This has led to a growing interest amongst researchers to understand why people play these games. Nick Yee has pioneered online gaming motivations research and offers a model suggesting how the individual benefits from playing in terms of real life satisfaction and how this creates different motivations for playing online games. It is still unclear, however, where these motivations stem from. This paper investigates whether there is a correlation between Yee's suggested gaming motivations and individual personality traits. The results showed several significant correlations, suggesting that personality traits do affect our gaming motivations, or in other words, personality traits partially explain why we play the way we do.

Introduction

Over the last two decades, having Internet access at home has become increasingly common. This led to an upsurge in the popularity of small, often privately designed and hosted, online text-based games that were accessible through a simple modem connection. These were called Multi-User-Dungeons (MUDs) and constituted the very first online multiplayer games. Since then, the MUDs have evolved into the MMORPGs that today constitute a growing multimillion dollar industry attracting more players than any other genre.

Traditional MUDs implemented a fantasy world where players could choose to play different characters, obtaining a set of specific skills or powers. MUDs differ from other computer games by their persistent worlds; when a player stops playing the world continues to exist and evolve. The object of MUDs is typically to slay monsters, explore the world, participate in a role playing story and progress with your created character. However, MUDs have also been used for distance education or virtual meetings, and also for the sole purpose of socializing. MUDs are entirely text-based and you act by typing out a description of what you are doing or what you want your character to do. During the early 1990s, the MUD genre gradually evolved into what is today known as the MMORPG genre, which is in essence a MUD with an added graphical interface. Just like in MUDs, each player in an MMOR-

PG assumes the role of a character and controls the characters actions (Anissimov 2007). Examples of popular MMORPG's are World of Warcraft, EverQuest and Anarchy Online. World of Warcraft is the largest MMORPG today and it alone has 11.5 million monthly subscribers (Blizzard Entertainment 2008).

Initial research on our presence in online environments was conducted by Turkle (1995). She contended that such online environments blur the boundaries between self and game, suggesting that the embodied life we live on a day-to-day basis bears no more legitimacy than the life we live in role-playing games on the Internet. This suggests that our behavior in the real world may not differ much, or at all, from our online behavior.

Prior research in the area of online behavior is thin, with The Daedalus Project being the most extensive research project to date. This project was founded by Nick Yee, and was an extensive survey project collecting data from over 40.000 MMORPG players over six years. Yee attempted to define and understand the motivations that make up in-game behavior in MMORPGs, with the purpose of bringing a further understanding to why people are in these online worlds to begin with (Yee 2005). His focus is on how the individual benefits from playing in terms of real life satisfaction and how this creates different motivations for playing online games. Yee's research has shown that every individual has her own unique reasons for playing MMORPGs. The underlying causes behind these motivations, why we play the way we do, is an area fairly unexplored. This is a key issue in understanding why people spend an increasing

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amount of time in these games, and also identified as one of the core questions in the larger picture of understanding the complex social phenomena that emerge from these virtual environments (Yee 2005). Personality traits are one factor that influences our behavior in the real world, but whether they also influence the way we act online is still unknown.

As such, the purpose of this paper is to examine if personality traits affect the way we play in MMORPGs. Participants were current or former players of MMORPGs, no discrimination was made on age, sex or demography.

Method

The study used a combination of two tests, one test for assessing gaming motivations and one test for assessing personality traits. Data was collected through online participation, among current or former players of MMORPGs. Participants were self-selecting through completion of a web-based form. The form was distributed through Internet-based channels such as the chatprogram MSN, the homepages Facebook (www.facebook.com), Elvenrunes (www.elvenrunes.com) and the World of Warcraft forums (forums.wow-europe.com). A total of 489 questionnaires were collected and none were excluded.

The test for assessing gaming motivations was the Yee Gaming Motivations inventory. It consists of 29 questions and is a self-assessment questionnaire designed to measure individuals’ different motivations for playing MMORPGs. The Yee Gaming Motivations test measures the answers on a 5-point scale, from “Strongly Disagree” to “Strongly Agree”. Each answer is graded with 1-5 points, and all points within the same category are later summarized to get a measurable result. The components measured were Achievement, Social and Immersion and their respective subcomponents.

The test for assessing personality traits is the Big Five Inventory (BFI), a scale created by Dr. Oliver P. John at University of California (1991). BFI is a self-report inventory designed to measure the Big Five personality traits. BFI measures the answers on a 5-point scale, from “Strongly Disagree” to “Strongly Agree”. Each answer is graded with 1-5 points, and all points within the same trait are later summarized to get a measurable result. The traits measured were those of the original Big Five personality traits: Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism.

The Yee Gaming Motivations inventory and the BFI were combined into a single form. Respondents were asked to go to a website and complete the questionnaire (<http://www.my3q.com/home2/271/>

magiska1/62952.phtml). The form took less than 15 minutes to complete. Data was collected over a 36 hour period. Correlations between each component and the Big Five personality traits were calculated in SPSS.

Theoretical Framework

In the last six years Nick Yee has studied players of MMORPGs and their interaction in virtual environments through The Daedalus Project. When asking players why they played MMORPGs, Yee found a great variation of motives. He suggests that MMORPGs may be appealing to many players because these games offer a great variety of play styles (Yee 2007). From the qualitative data gathered from his surveys, he created a list of questions that related to gaming motivations among players of MMORPGs. This inventory, in this paper referred to as the “Yee Gaming Motivations inventory”, provides a foundation for future quantitative research in MMORPGs by providing a model to assess gaming motivations of players.

The Yee Gaming Motivations model consists of three main components, each consisting of several sub-components. The subcomponents focus on different aspects of play but are not seemingly related to each other. The different subcomponents co-exist and together reveal the motivations of a player (Yee 2005).

Achievement	Social	Immersion
Advancement	Socializing	Discovery
Mechanics	Relationship	Role Playing
Competition	Teamwork	Customization
		Escapism

Table 1: The components of the Yee Gaming Motivations with their related subcomponents (Yee 2007).

The first component is the Achievement component, with subcomponents Advancement, Mechanics and Competition. The common denominator of these components is power, or harnessing power. For the Advancement subcomponent the greatest motivators are progress and status, for Mechanics it is about planning, optimization and creating templates to maximize your gains. Players who fall under the Competition subcomponent enjoy the derivation of power that comes from competing with and challenging other players.

For some individuals the greatest motivation for playing is spending time in an environment where you can always find someone to talk to. The Social component consists of the subcomponents Socializing, Relationship and Teamwork. Some people just want to chat casually for the sake of chatting (Social-

izing), while others have a desire to form personal relationships (Relationship). A third category of Social players are those who gain satisfaction from collaborating within a group (Teamwork) (Yee 2005).

The Immersion component is about getting immersed into the gaming environment, living in the game for a little while. Discovering new areas of the game, knowing things that other players do not, and finding hidden things are all parts of the Discovery subcomponent. Players who fall under the subcomponent Role Playing enjoy being part of the storyline and creating well-developed backgrounds for their characters. The Customization subcomponent is about creating a character that is appealing to you by customizing its appearance through different hairstyles, skin color or clothing. Finally, the Escapism subcomponent is about leaving real life behind for a while and letting your mind become fully absorbed by the gaming world, perhaps to relax after a tough day at work.

The Big Five Personality Traits

Personality traits can be defined as habitual patterns of behavior, thought, and emotion (Kassin 2003). These traits are relatively stable over time, influence behavior and differ among individuals. An individual has more or less of every trait, and the traits are more prominent in some individuals, and less prominent in others. For example, some people are open and outgoing, others are shy. Both behaviors are related to the Extraversion trait where the outgoing person has more of the trait, and the shy person has less. There is potentially an unlimited amount of traits, but many psychologists believe that five traits are sufficient to adequately describe human personality (Costa and McCrae 1992); these are commonly referred to as the Big Five personality traits.

First mentioned in 1933 in the American Psychological Association by L.L. Thurstone, the Big Five Model is considered to be the most comprehensive data-driven enquiry (Benet-Martinez 1998). The model is a descriptive five factor model of personality that relates words and behaviors to personality traits. The five traits in the Big Five model are Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. The five traits each consist of more specific correlating traits. For example; Agreeableness includes such related qualities as having a tendency to be compassionate and cooperative. Extraversion has qualities like sociability, impulsiveness, excitement seeking, and positive emotions included (Benet-Martinez 1998). Though the model has met some critique concerning the factor analytical approach used to arrive at the five distinct traits (e.g. Block 1995), such critique has been responded to by several authors suggesting that the model is

based on far more empirical evidence than a factor analysis on the data set (e.g. Goldberg and Saucier 1995; Costa and McCrae 1995).

An individual who registers high in Openness generally has an appreciation for art of various kinds and is often creative. They tend to be adventurous and appreciate a variety of experience, have unusual ideas and a vivid imagination. A person high in Openness is more likely to be aware of their emotions and intellectually curious (Benet-Martinez 1998).

Conscientiousness is marked by a tendency to act dutifully and make plans rather than show a spontaneous behavior. People who register high in Conscientiousness have a tendency to show self-discipline and aim for achievement. They are generally successful, since they have purposeful planning and are tenacious in what they do (Benet-Martinez 1998).

People who are high in Extraversion are generally confident and they have a tendency to seek stimulation in the company of others. They have a lot of energy and spread positive emotions around them (Benet-Martinez 1998).

Individuals who score high on Agreeableness have a tendency to be compassionate and like to cooperate with others. The trait is marked by a wish for social harmony and they value to get along with others. They are willing to compromise, are helpful and generally trusting in other people (Benet-Martinez 1998).

An individual high in Neuroticism experiences unpleasant emotions easily and the emotions tend to be more persistent. They tend to feel anger, anxiety as well as depression and are more likely to find situations threatening. Individuals who are high in Neuroticism are emotionally reactive and this trait is sometimes called emotional instability (Benet-Martinez 1998).

Results

This section will present the correlations between the Yee Gaming Motivations in relation to the Big Five Personality traits.

Extraversion correlated positively and significantly with the Social component and all Social subcomponents. Extraversion also correlated negatively and significantly with Escapism. Agreeableness correlated negatively and significantly with the Achievement component and the Advancement and Competition subcomponents. There were positive significant correlations between Agreeableness and the Social component and the Socializer and Team-

work subcomponents. Conscientiousness correlated positively and significantly with the Mechanics subcomponent and negatively and significantly with the Competition subcomponent. There were positive and significant correlations between Openness and the Social component, the Socializer and Relationship subcomponents. Openness also correlated

positively and significantly with the Immersion component and all its subcomponents. There was a negative and significant correlation between Openness and the Competition subcomponent. Neuroticism correlated positively and significantly with the Relationship subcomponent, the Immersion component and all its subcomponents.

Motivations	Extraversion	Agreeableness	Conscientiousness	Openness	Neuroticism
Achievement	.072	-.277**	-.007	-.046	.026
Advancement	.067	-.171**	-.011	-.027	.084
Mechanics	.037	-.077	.142**	.030	.050
Competition	.057	-.397**	-.133**	-.106*	.005
Social	.220**	.299**	-.044	.183**	.078
Socializer	.188**	.347**	-.023	.242**	.013
Relationship	.115*	.047	-.071	.134**	.156**
Teamwork	.142**	.220**	.011	-.017	.024
Immersion	-.035	.069	-.051	.313**	.277**
Discovery	-.019	.059	.001	.264**	.215**
Role Playing	-.021	.037	-.067	.294**	.219**
Customization	.027	.035	-.051	.168**	.173**
Escapism	-.118**	.087	-.034	.141**	.203**

Notes: * = $p < .05$; ** = $p < .001$
Main components in bold.

Table 2: Pearson Correlations for Extraversion, Agreeableness, Conscientiousness, Openness and Neuroticism with the Yee Gaming Motivations (n= 489).

There were positive and significant correlations between Openness and the Social component, the Socializer and Relationship subcomponents. Openness also correlated positively and significantly with the Immersion component and all its subcomponents. There was a negative and significant correlation between Openness and the Competition subcomponent. Neuroticism correlated positively and significantly with the Relationship subcomponent, the Immersion component and all its subcomponents.

Discussion

This chapter will initially mention the weaknesses of the present study, and then continue to discuss the validity of the measurements used. Finally, it will discuss the correlations between the personality traits and the Yee Gaming Motivations. A weakness of this study was that the participants all came

from similar forums, with a majority from the World of Warcraft forums. This was a necessity since the participants had to have MMORPG experience. Unfortunately, this makes our sample group quite homogeneous. The sample is not spread out over all World of Warcraft players, but those who actively browse the game related forums and are interested in answering questionnaires. It is possible that such players may have similar preferences or personality traits, perhaps being more Extrovert than the average player. However, there was nothing in our results that indicated that Extroverts, or any other group, were over represented in the sample.

Yee took a factor analytic approach to creating a model for assessment of gaming motivations. It was included in this study because it provides a validated model for measuring gaming motivations, and to further examine the proposed differences between

Yee's and Bartle's models. Finally, the BFI was included because the Big Five model of personality traits is the most comprehensive assessment of personality traits available. Despite receiving some criticism, no one has as of yet presented a model that is considered more valid for its purpose.

Extraversion

The focus for an individual high on Extraversion is to obtain gratification from what is outside the self, and she enjoys being the center of attention. Our results suggest that an Extrovert individual acts similarly in real life and while playing games; always maintaining a focus on social contacts. The correlations between Yee's Social component and the Extraversion trait are both significant ($r = .190$, $r = .220$). Our result further strengthens the theory behind a social motivation for gaming and suggests that the Extrovert personality trait transfers to gaming environments.

Agreeableness

The positive correlation between the Agreeableness trait and the Social component ($r = .299$) is explained through the interest in people and what they have to say. An Agreeable individual strives for social harmony and cooperation within the group or community. A distinction can be made between the Extroverted Socializer, ($r = .220$) who is more focused on satisfying her own social needs, while the Agreeable Socializer is content with simply coexisting in harmony with others.

More surprising was that Yee's Relationship subcomponent did not correlate significantly with Agreeableness, and though there was a positive correlation, it was weak ($r = .047$). One explanation could be that forming a relation with another person requires much more than just a desire to do so, or more than just a trait that supports this behavior. A wish from both players is needed to get along and develop a relation, common interests to discuss, perhaps similar experiences or cultural backgrounds to better understand each other. These are factors that may not always exist, and even an Agreeable person may not find many people to form strong relationships with in games. Another explanation is that forming relationships may not be a true motivation for playing, rather it is a side-effect that occurs through sheer coincidence. For example, you may come across another player while doing a difficult quest. Together you assist each other in completing this quest, and while cooperating and talking about the quest you find out that you actually enjoy talking to this person or have a lot in common. This could be the beginning of a new friendship, formed through random interaction and without thought or intent.

There is also a third and perhaps more plausible explanation. Yee (2007) describes the Relationship subcomponent as having a desire to form strong relationships. This makes the player active in her pursuit of forming these relationships. The Agreeableness trait is more of a passive trait, where people high on it are kind and pleasant, not necessarily in pursuit of new friends. The Relationship-seeking behavior is more of an Extrovert action, and indeed the correlation between Relationship and Extraversion is both positive and significant ($r = .115$).

Conscientiousness

Conscientiousness does not correlate significantly with any of the gaming motivations. This was surprising, since the Conscientiousness trait and Achievement motivation share many characteristics. For example, an individual high on Conscientiousness is hard working, goal oriented and has a need for achievement. This definition is similar to Yee's Achiever type, who does everything to reach certain goals. But the result shows no direct correlation between the two. It is possible that this personality trait does not transfer to a gaming environment, perhaps because playing games does not satisfy the need for structure and self-discipline that individuals high on Conscientiousness want. Perhaps their aim for achievement is not compatible with only achieving things in a gaming environment. It is worth mentioning that the subcomponents of Achievement correlated both positively (Mechanics) and negatively (Advancement, Competition) with Conscientiousness. With this in mind it is more understandable that the overarching component showed no correlation at all. This result raises a question of the construct validity of this component. Do these subcomponents really fit under the same overarching motivation?

Neuroticism

Individuals who score high on Neuroticism may use MMORPGs as a way to escape from reality, the correlation is positive and significant ($r = .277$) with the Immersion component and all subcomponents. For these individuals life can be troublesome due to their neurotic tendencies, and it is possible that they use games to relax and forget about their stressful real life situation for a while. Also, if a stressful or emotionally intense situation occurs in a game, you can quit or log off until you feel stable and have the situation under control again. In everyday life this is a problem for those high on Neuroticism, difficult situations occur but you can not just log off. This makes the Internet and MMORPGs a safe haven for these individuals where they have control and can relax.

However, this is not always a good thing. Turkle (1995) suggested that while there is a certain amount of healthy immersion through exploration and creativity, many apparently find unhealthy escapism instead. Empirical research supports this notion; Internet use increases as people are put under more stress in real life (e.g. Ko et al. 2006). Also, Caplan, Williams and Yee (2009) showed in a later study that the correlation between Immersion and Internet addiction is twice as strong as with any other motivation.

Following this reasoning, it is perhaps not surprising that Neuroticism correlates positively and significantly with the Relationship subcomponent ($r = .156$). Meeting new people or making friends is an emotionally intense situation and if you tend to get nervous easily this could inhibit your attempts to get close to other people. Being safe behind a computer screen while interacting with other people may facilitate the forming of new relationships for someone who in real life finds such situations uncomfortable. This makes MMORPGs an ideal place to form new relationships, even more so for an individual high on Neuroticism.

Openness

For someone who scores high on Openness, an MMORPG offers the perfect environment to try new things and experiment with ideas. With this in mind it is not surprising that the Openness trait correlates positively and significantly with the Immersion component ($r = .313$) and all subcomponents. If you are into creating a new history for your character, exploring a new world or following an exciting storyline, MMORPGs are the perfect place for you.

Notable is that Openness did not correlate significantly with the Teamwork subcomponent, rather there was a weak negative correlation between the two ($r = -.017$). It may be that as an individual high on Openness it could be troublesome to be dependent on other people. If you are part of a group, every decision will usually be made in accordance with the wishes of a majority. This could effectively keep someone who wants to try something new from doing so, since she has to go with the group decision. A person high on Openness may therefore prefer to not be dependent on teamwork, as it could be a hindrance to their discovery of new things.

Conclusion

The result of this study indicates that personality traits do affect why and how we play. The study also offers an explanation to why different players exhibit different motivations when playing. Since every individual has more or less of each personal-

ity trait, and personality traits affect how we play, every player will be as unique in her play style as we are unique in our personality. However, it is important to keep in mind that knowing what traits are stronger in an individual does not necessarily reveal the whole spectrum of her play style. Just like our personality traits do not reveal explicitly who we are or how we act in real life, neither will they reveal explicitly how we act in-game. Our actions are still for us to choose, they are not predetermined.

Knowing that personality traits affect how we play brings us to the conclusion that we transfer part of our real life characteristics when we enter an MMORPG. This notion is supported by prior studies suggesting that for example gender roles transfer to virtual worlds. Yee (2005) found that women tend to take on supportive roles (e.g. healing) far more often than men, and he also found the Mirroring effect showing that people tend to customize their characters in accordance with their physical appearance (e.g. taller people choosing taller avatars). While Yee's discoveries suggests that physical attributes and behaviors transfer to the gaming world, our results indicate that psychological aspects, in this case personality traits, are also transferred. The knowledge that we transfer parts of our personality into the game brings us to the question of how much of our experiences in the gaming world we bring back with us to the real world, and what consequences it could have. For some people it may bring positive experiences by allowing them to be part of a group of people and cooperate towards a common goal. This could have a positive effect on your real life confidence and encourage a person to try doing similar things in real life. There are studies suggesting that making more online friends could have a positive effect on your offline social life as well (e.g. Axelsson and Reagan 2002), but empirical research has also shown mixed results.

On the other hand, it could also have a negative effect if you have a humiliating experience. If you make a fool out of yourself in a game, people are not more accepting or forgiving than in real life. Taunting, bullying and ostracizing are not only a real life phenomenon, it happens just as much or even more on the Internet, and games are no exception. It is important to keep in mind that your actions towards others in a game will affect them in real life to some extent. The extent of the effect may vary depending on personal factors such as self-confidence, but also depending on what game you play. Games like MMORPGs where the player typically spends a lot of time and effort in creating their character, gaining levels or equipment may cause greater distress and feeling of loss when dying. This is an area that future research should explore further, to examine what factors can affect the extent of the psychological ex-

periences you bring out from the gaming world. Another area where our study could prove useful is for educational purposes. Depending on the students' different personality traits the teacher could tailor a method to better accommodate the students' needs. If you could tailor a method to specifically appeal to a student high on Openness, for example by setting up a play depicting a historical event rather than studying them out of a book, they could be more motivated to learn. At the same time, an Achiever might not need a specific method to be motivated to study ancient history, because the knowledge that they can get that A grade is enough to keep them going.

On a final note, there still remains the fundamental question that arose from Turkle's research back in 1995, a question that poses an interesting challenge for future research. Where exactly do we draw the boundary between real and virtual, and should we? Since 1995, the Internet has become even more integrated with our everyday life. Is it still prudent to suggest a distinction between real and virtual, or is our "virtual" self becoming an integrated part of our "real" personality as a result of the increased use of the Internet in society? The result of this study may also support the notion that our real and virtual self is becoming intertwined, that the boundary between real and virtual is being increasingly blurred. This would offer another explanation to why we find correlations between gaming behavior and personality traits, namely because offline and online behavior is becoming increasingly similar. Perhaps we should no longer talk of personality traits, social norms and behavior as "transferring" to the virtual world. Perhaps we should consider the notion that our "real"

self may be almost completely intertwined with our "virtual" self today, in an age where the Internet has become such a fundamental part of our life.

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