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Subverting Organizational IS Policy with Feral Systems: A Case in China

Abstract

Purpose: To investigate how selected employees in China deliberately subvert organizational IS Policy by developing feral working practices in order to gain access to the applications that they believe essential to work.

Design: Interpretive Case Study

Findings: Employees cannot accept the limited IT policy/environment imposed by corporate management and develop their own workarounds that subvert the organizational IT policy so as to ensure that they can get work done

Research Implications: We draw on elements of punctuated equilibrium theory to conceptualize our findings into four theoretical propositions. We encourage researchers to probe these organizational practices and solutions in depth.

Practical Implications: Organizations cannot expect their digital native employees to leave their social media culture at home when they come to work. Social media penetrates all aspects of their lives and in all locations. Therefore, organizations must find a way to permit its use at work.

Originality: Subversion is a rarely studied topic in IS research, or in business/management more generally. Our focus on the subversive behaviour of organizational employees is original and important for we suggest that subversive behaviour may be more common than the limited literature suggests.

Keywords: IS Governance, Subversion, Punctuated Equilibrium Theory, Feral Systems.

1. Introduction

The legitimacy of research into the dark side of Information Systems (IS) is now recognized in the literature (Zuboff, 1988; Turel et al., 2011; Tarafdar et al., 2015a, 2015b): resistance to IS is a respectable topic of study (Ignatiadis and Nandhakumar, 2009; Subramaniam et al., 2013). One specific instance of resistance to IS involves what have come to be termed as feral systems. A feral system is an information technology, system, application or solution that is developed for and by employees in order to get work done, but that is not formally approved, funded or controlled by corporate management. In a comparative sense, a normal information system is officially approved and maintained by the company. Therefore the primary difference between a feral system and a normal information system is not a technical or functional difference, but a political difference. A feral system is usually invisible to all except its immediate users (Kopper and Westner, 2016a). Feral systems are not only manifestations of resistance to corporate authority, but are also explicitly subversive as they undermine the formal authority of corporate management by ignoring the normative expectations embedded in IS governance structures and policy requirements. Feral systems are thus a form of anti-establishment practice and are rarely viewed in a positive light by corporate managers who quite correctly see them as a threat to their prerogative to establish IS policy and corporate norms (Weatherbee, 2010). Nevertheless, a spate of papers that describe various aspects of these feral systems has appeared in recent years (e.g. Haag and Eckhardt, 2014; Zimmermann et al., 2014; Mallmann and Maçada, 2016).

The extent to which feral systems are now being researched suggests that these informal, IS-supported working practices are increasingly common in practice (DesAutels, 2011; Chua et al., 2014). Digital natives, highly literate with respect to the use of digital technologies, are flooding into the workforce. We should expect to see more situations in culturally

conservative organizations where individual employees attempt to subvert organizational IS policies as they seek access to the applications they believe essential to their work (Chua et al., 2014; Davison and Ou, 2017; Shehadi et al., 2013). These employees may draw on the spirit of ‘bricolage’ (Lévi-Strauss, 1966) as they tinker with the elements of their ‘repertoire’ (Duymedjian and Rüling, 2010) in a problem-driven, spontaneous and experimental fashion, leveraging whatever resources are easily available and iteratively improving the designs of their feral working practices. However, despite an extensive search of the literature, we found very few examples of studies that probe the underlying factors contributing to employees’ deliberate subversion of organizational IT policies with their own feral working practices.

Nevertheless, this kind of employee behaviour is theoretically interesting because it differs from normative theoretical perspectives of technology adoption and use, most of which assume voluntary behaviour that conforms to organizational expectations. When behaviour is not so much voluntary as driven by necessity, only conforming where convenient, current theories are less helpful with respect to identifying the salient antecedents and consequences.

In our own prior research into the way employees leverage IS applications for work in Chinese organizations (references withheld for review), we have observed that even when organizations implement restrictive policies that limit which applications can be used and by whom, digitally literate employees are loath to abandon the social media applications upon which they depend for both networking and problem solving. In line with the literature, these employees oppose what they perceive as unreasonable corporate restrictiveness, often citing the normative climate of what is acceptable behaviour in the local milieu (Weatherbee, 2010). They refuse to follow managerially-approved, cliché-driven directives (cf. Weick, 1998) and instead choose to subvert organizational IS policy, creating ad hoc solutions to fit their immediate needs (DesAutels, 2011). Drawing on both the literature and our practice-based observations, we suggest that there is a significant gap in our knowledge about the subversive power of IS applications, as wielded by individual employees in organizations. This prompts our research question: How and why do employees subvert organizational IS policy at work?

In order to answer this question, we present an interpretive case study in which we explore how and why selected employees in China deliberately subvert organizational IS policies, violating both normative managerial expectations and formal IS governance as they strive to accomplish their work. In effect, they adopt a bricolage view of IS, crafting idiosyncratic solutions that incorporate whatever components they can access in order to facilitate the completion of both their regular work and additional ancillary activities that they deem critical to their positions and careers. Given the lack of corporate support, many of these activities are undertaken relatively covertly, being visible only to immediate users and in some cases their managers. In order to frame the way these employees craft their personal IS and make sense of the world they inhabit, we draw on Alter’s (2013) tools for the analysis of work systems, which we employ as an instrumental theory (Davison et al., 2012) in order to explicate a single revelatory case that illustrates how this subversive work is performed.

Following this introduction, we briefly introduce the relevant background literature that deals with IS policy in the context of IS governance, and subversive acts against IS policy, including resistance and bricolage. We also introduce Punctuated Equilibrium Theory, which will inform our later theorization. We then introduce our research methods and explain how we collected data. The case of employee subversion of organizational IS policy follows. In the discussion of the case, we draw on our case material and the literature to theorise how bricolage can lead to enhanced workforce productivity in organizations with rigid IS policies before concluding the article.

2. Literature Review

2.1 IS Governance

The IS policy that is the focus of subversive behaviour in this research constitutes a core element in the IS governance domain. Organizations enact IS governance policies in order to ensure that appropriate controls are exercised over corporate data, minimising the likelihood that that data will be corrupted or leaked to unauthorized parties (Weill and Ross, 2005). It is broadly accepted that internal employee expectations should be aligned with policy (Avison and Fitzgerald, 1995) if those same employees are to accept the legitimacy of the policy and therefore if strategic business objectives that are linked with the policy are to be achieved. This is consistent with Alter's (2013) work systems, where IS governance is part of the operating environment. However, Xue et al. (2011) have noted a tendency for this alignment to be weakened when the work undertaken at corporate HQ is very different from that at the local business unit, i.e. employees may not be consulted about policy at all: it is simply imposed on them. The tensions that arise in such circumstances are challenging to manage (Bartlett and Ghoshal, 1998).

IS governance is not a theory per se. The classical IS/IT governance represents "the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT" (Weill and Ross, 2004). When making decisions about what structure should be in place to maximize return on investment of IT, often the two basic design forms, centralized and decentralized, are discussed (Garrity, 1963). It is surprising that the headquarters of a corporation would opt for a greater control over IT standards across entities for the purpose of a greater opportunity to realize general economies of scale. However, from a practical perspective, the local managers and employees would much prefer a decentralized approach to IS governance due to the autonomy and locus of control (Brown and Grant, 2005). The need of different systems to accommodate the local business versus the strict centralized IS policy may lead to negative consequences such as resistance, subversion, and the development of feral systems as explained below.

2.2 Resistance, Subversion and Feral/Shadow Systems

We first distinguish the terms 'resistance' and 'subversion' before examining the recent literature on feral systems. According to the Oxford English Dictionary¹, resistance refers to acts of "resisting, opposing, or withstanding someone or something". In contrast, subversion refers to "the action or process of undermining the power and authority of an established system or institution"¹. Of the two terms, subversion is clearly the more aggressive or radical, yet it may be overt or covert, visible or concealed, acknowledged or ignored. In the entrepreneurship literature, e.g. Bureau and Zander (2014), and consistent with this distinction, subversion is acknowledged as a tactic employed to change the status quo and create opportunities for innovation.

Lapointe and Rivard (2005) synthesize the earlier literature on resistance to technology. Historically, this stream of literature has often viewed resistance unfavourably. For instance, resistance may be viewed by managers as a hindrance to strategic change (Ansoff, 1988) and motivated by employees' desire not to be controlled or monitored by management (Cook and Brown, 1999). Nevertheless, some scholars now view resistance more sympathetically: it is recognized that some IS applications are genuinely flawed and so resistance is reasonable (Kling, 1996; Ignatiadis and Nandhakumar, 2009). Indeed, resistance and its consequences may even be beneficial for the organization, for instance where these new working practices

¹ www.oed.com

are institutionalized as organizational routines (Pentland and Feldman, 2008). Lapointe and Rivard (2005) point out that the object of resistance must be specified, given the importance of the “content of what is being resisted” (Jermier et al., 1994). Thus, employees may resist either the implementation or the imposition of a specific technology, system, environment or policy (Joshi, 1991).

As Lapointe and Rivard (2005) suggest, when employees are confronted with a technology environment or policy that they dislike, several outcomes may occur. They may reluctantly or apathetically acquiesce to its demands and constraints, or they may enact a behaviour that to a greater or lesser extent rejects the new working practices (cf. Hirschman, 1970). It is these latter behaviours that interest us and in particular the ways in which employees create solutions that circumvent the new official status quo. Subversive behaviour that is counter-productive, harmful to the organization and disruptive to systems is likely to be condemned harshly by managers and subjected to severe penalties (Weatherbee, 2010; Griffin and Lopez, 2005). However, subversion is not limited to these harmful and disruptive variants. It can also be seen more positively, connected with organizational routines and facilitating the completion of regular work (Pentland and Feldman, 2008; Bureau and Zander, 2014). If undertaken discreetly, these subversive activities may remain below corporate management’s radar and so enjoy greater longevity. These activities are often highly innovative and embody the spirit of bricolage (Levi-Strauss, 1966), because employees create flexible yet robust solutions to their problems out of whatever resources are available for recombination in new forms (Des Autels, 2011; Senyard et al., 2014). Indeed, Duymedjian and Rüling (2010, p.135) suggest, following Weick (1993), that acts of bricolage facilitate “the resilience which enables an individual ... to overcome a crisis situation by maintaining both a coherence of identity and the capacity to act”. The resulting personal IS are thus not mere technologies-as-artefacts, but technologies-in-use (Orlikowski, 2000), adapted to the immediate context and reflecting the bricoleur’s resilient attitude to externally imposed change and versatile knowledge about what works, thereby contributing to self-efficacy (Bandura, 1977).

In the literature, a number of different terms are used to describe the systems that employees create in order to work around corporate working arrangements. Kopper and Westner (2016a) distinguish a complex array of these systems that can be used to identify different instantiations of the phenomenon. The overarching term is generally considered to be feral practices, which covers both misuse of existing resources and systems and the creation of new working arrangements designed to circumvent official working arrangements. The term feral systems is also used when specific IS resources are involved.

It is important to note that while feral working practices are premised on the creation and use of “any IT resource violating injunctive IT norms at the workplace as a reaction to perceived situational constraints with the intent to enhance work performance” (Haag and Eckhardt, 2014), they are not necessarily designed to cause harm to the organization. Thus, although these systems are subversive, they are not necessarily destructive.

An important distinction not made by Kopper and Westner (2016a, 2016b) relates to the visibility of feral systems. They may be concealed from management for the good reason that they violate corporate norms and so might lead to serious repercussions for their creators. However, feral systems need not always be concealed. There may be situations where they are in plain view, for instance where existing systems or devices are misused by employees, or where local managers authorize misuse of resources in violation of corporate IS policy in order to ensure that employees can complete their work.

Feral working practices are often encountered in the Enterprise Resource Planning (ERP) sector. Pre-ERP systems that have been operating successfully for extended periods of time

and to which employees are often fiercely loyal are very reluctantly abandoned in favour of centrally-governed, formalized systems. A high turnover rate among disaffected employees is likely (Worthen, 2002). Several authors (e.g., Houghton and Kerr, 2006; Kerr et al., 2007; Ignatiadis and Nandhakumar, 2009) have written about the tendency either to keep these pre-ERP systems, or indeed to create new feral systems as a response to the problems encountered with the newly implemented ERP.

The evolution of feral working practices and systems is an important consideration for researchers. Zimmermann and Rentrop (2014) note that it is necessary to engage in a detailed assessment of both official and feral governance structures in order to determine which is more efficient. They suggest, perhaps optimistically, that the benefits of feral working practices and systems should be identified with a view to mainstream the higher quality instantiations in the organization (cf. Pentland and Feldman, 2008). However, the eventual evolution of these feral working practices and systems depends on two key factors: the attitude of management and the extent to which the new system becomes indispensable.

2.3 Punctuated Equilibrium Theory

Punctuated equilibrium theory describes the process of revolutionary change in various phenomena. The origins of the concept of a punctuated equilibrium lie in the field of palaeobiology (Eldredge and Gould, 1972) where it was proposed as an alternative to phyletic gradualism, which emphasizes continuous, consistent and evolutionary change. Applied to studies of teams and organizations (Gersick, 1988, 1991), the concept of punctuated equilibrium was reworked in order to explain the processes involved in the transformation of an organizational ecosystem. Prior to any transformation occurring, a system functions within its own deep structure for a long period of time. A deep structure is “the set of fundamental ‘choices’ a system has made of (1) the basic parts into which its units will be organized and (2) the basic activity patterns that will maintain its existence” (Gersick, 1991, p14). The deep structure is accompanied by what are known as “equilibrium periods”, which are characterized by stable structures in the organization as well as patterns of activities undertaken by employees (Gersick, 1991). If change occurs in relatively small incremental shifts, the deep structural elements are not affected (Gersick, 1991). Conversely, on occasion there may be significant changes in the external environment that demand revolutionary change in the organization. This has the effect of punctuating or breaking up the deep structures. From the state of chaos that results, a new structure must emerge that can coalesce into a new equilibrium (Gersick, 1988; Romanelli and Tushman, 1994). As Gersick (1991) explains, this new equilibrium may not be superior to the former one: revolutionary change may lead to consequences that are better, the same or worse compared with the former state.

Punctuated equilibrium theory has seen limited application in prior IS research. Newman and Robey (1992) drew on the theory to explain how the relatively stable relationships between the users and developers of information systems may be interrupted by revolutionary events that disrupt the stability and drive work in new directions. Meanwhile Sabherwal et al. (2001) found that strategic alignment practices varied over time, alternating between periods of evolutionary and revolutionary change, corresponding to punctuated equilibrium theory. We see potential in the theory, given the way employees develop feral systems to punctuate the stable equilibrium of an organization’s IS policy and thereby create a new, more effective way of working.

3. Research Context and Methods

In order to explore how employees subvert organizational control with IS, we focus on the case of Valley, a global hotel management company with close to 3,700 hotels affiliated with

its brands in around 100 countries, spanning the entire range from one- to five-star properties. Valley is a major player in the Chinese market, operating over 150 hotels. In the majority of hotel properties, Valley is not the property owner, instead providing hotel management services. These services reflect Valley's corporate culture, branding and operating principles, including IS policy. During the course of this research (2011-2016), Valley's global HQ was in the process of promulgating its global IS platform to hotel property owners. This platform includes the provision of Internet-related services that are designed for use by hotel employees. Valley's systems are not intended for hotel guest use as each hotel owner makes arrangements with a local Internet Services Provider (ISP) to cater to guest needs.

The current paper is extracted from a much larger interpretive study (cf. Walsham, 1995) into the ways in which hotel employees leverage IS for work, drawing primarily on interview data from employees in hotels across China. We are attempting to understand the associated phenomena of subversion and bricolage as experienced and enacted by hotel employees. In order to accomplish this, we collected a rich set of data from a large number of employees in 12 hotel properties. Here, we report on a small fraction of this data (27 employees + 2 corporate executives: see Appendix A for details of hotels and job descriptions), focusing on the specific cases of employees who actively subverted Valley's IS policies through acts of bricolage in order to ensure that they could complete their work effectively. The interviews were conducted in a semi-structured fashion according to a protocol (see Appendix B) that addressed the wide variety of issues that were of interest in the larger project, viz.: the technologies used for communication and knowledge exchange, the role of interpersonal relationships (known as *guanxi* in Chinese) in work-related communication, the nature and impact of IS policies on the way work was conducted, and the ways in which employees subverted those IS policies that obstructed their completion of both work and other ancillary activities. Interviews lasted 30-60 minutes, were conducted in English and were not recorded, due to the sensitivity of the topic: employees freely described how they violated corporate rules. Instead, the interviewer made copious notes during and after interviews, then typed up these notes into transcripts immediately so as to be available for later analysis (Barley, 1990).

The instrumental theory (Davison et al., 2012) that we use to document and analyse the instances of subversion and bricolage that we recorded is Work Systems Theory (Alter, 2013). As Alter (*ibid.*, p.75) remarks "A work system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products/services for specific internal and/or external customers". In a work system, participants engage in work processes and activities using and creating both information and technologies in order to produce products and services for customers (who may be internal or external to the organization). The work processes and activities are undertaken in the context of a specific organizational environment, governed by the strategies of the organization and facilitated by infrastructural elements, including policy-oriented requirements. Participants undertake work and are influenced by that work. Work draws on information resources (whether held in formal databases, on the Internet, in paper-based documents, or even in the heads of other people) which may be updated as a result of the work done. A wide variety of technologies support work, and knowledge about how these technologies create value in specific situations is updated and retained by the participants for future application. Meanwhile, the participants create products/services for customers, who will provide feedback that is also retained by the participants. In our analysis of the way employees employ bricolage techniques to subvert IS policy and create their own personal IS, we draw on Alter's (2013) work systems framework, which permits an easy-to-record tabular presentation of the relevant data, ensures that we collect all relevant data, and thus guides our story telling.

4. Case Description

Valley takes a strict line where IS policy is concerned. Hotel back offices generally enjoy very slow Internet access with a bandwidth of 2 Mbps. Only software that is approved by the Global VP for IT is permitted. Social media applications (such as Facebook, YouTube, QQ, Weibo and Twitter) and file sharing applications (such as Dropbox) are explicitly blocked. The policy is enforced by the simple means of channelling all Internet communications through a proxy server/firewall in Shanghai (where Valley's regional HQ is located). Ostensibly, the reason for protecting the working environment so carefully is the need for information security. Valley's Global VP for IT made this very clear in a telephone conversation with the first author when he explained: "Security is paramount. ... All Valley hotels operate standard software, globally. There is zero tolerance for malware and the risks that malware would bring". A regional VP for Southern China was a little more helpful when probed about the prohibition against social media software, noting that, "There is no value in chatting. Social Media applications have no role to play in Valley's corporate culture", even though he agreed that Social Media applications were inextricably connected with the day-to-day life of citizens in China. It is important to note that while certain Western Social Media applications like Twitter, Facebook and YouTube are blocked in China, many others (both domestic and foreign) are freely accessible. A Front Office Manager in Beijing told us: "I am not allowed to use MSN². My relationship network has suffered and I have lost some contacts". Similarly, the Executive Assistant to the General Manager at a hotel in Macau reported: "I would like to be able to use MSN for communication as it would be faster and more natural".

Notwithstanding this strict IS policy that severely limits bandwidth and blocks access to social media applications, we found that certain hotel employees genuinely do need unrestricted access to Internet bandwidth in order to transmit large files to and communicate with a variety of primarily external customers. The IT Director of a hotel in Guangzhou complained: "The Sales Manager sends 10-15 emails, each with a 2 MB attachment, every afternoon. It slows down the whole network because we only have a 2 Mbps line to the Shanghai office for all emails". These employees typically work in the Marketing, Communications and Public Relations (PR) departments, though senior managers in any part of the hotel may also have similar needs. The slow Internet speed has a severe impact on employee productivity. The Marketing Manager in the same Guangzhou hotel reported: "A two minute task can take two hours. I simply cannot afford to waste so much time for so little work done. There has to be a better way".

Employees also need unrestricted access to social media because most of their customers and network contacts only use social media for all communication purposes. As a PR Manager in Wuhan reported: "Without QQ [A popular instant messenger application in China] I cannot work. I use QQ to contact many external parties, such as travel agents and government departments. These people refuse to use email and it is very hard to get hold of them on the phone. Therefore I must be able to use QQ". Meanwhile, the Sales Director of a hotel in Shanghai reported "I have several hundred work-related contacts on MSN, especially corporate clients, travel agents and ticketing consolidators. It is particularly useful that I can quickly identify if a person is online or not and hence available to talk". The purpose of this communication relates both to official hotel business and to ancillary activities associated

² MSN was a very popular instant messenger before Microsoft discontinued its availability in October 2014.

with relationship management, e.g. asking for help from their personal relationship networks and also helping others who ask them for help.

Given the inadequate infrastructural environment and the inability of local IT or General Managers to improve access to IS applications, these employees devise innovative solutions that enable them to secure access to both the bandwidth and the social media applications they need. Although these innovations subvert corporate IS policy, they are generally undertaken with the full support of local managers who are as much the victims of the IS policy as any junior employee. As the General Manager of a hotel in Suzhou commented: “Social media is part of life. We can’t block it. But we hope to encourage employees to use it responsibly”. In Table 1 (below) we provide a Work Systems snapshot characterization of the ways in which employees create solutions that ensure they gain access to the technologies they need (Alter, 2013).

Environment	Infrastructure	Strategies
<p>Valley provides a standardized set of IS policies for all the hotel properties it manages.</p> <p>One policy explicitly prohibits employees from accessing social media applications/sites such as instant messengers and microblogs.</p> <p>Beyond Valley, the local environment is one where access to high bandwidth is cheap and normal. Further, access to social media applications is a normal activity for most citizens.</p>	<p>The standard Internet bandwidth provided by Valley for back-office employees runs at 2Mbps.</p> <p>Valley also contracts with a local Internet Services Provider to provide Internet access for hotel guests. This is typically much faster than available for hotel employees, with speeds of 100Mbps to 1Gbps. The guest network is unrestricted by Valley, though it is restricted by Chinese government prohibitions which prevent access to applications like Facebook, YouTube and Twitter.</p>	<p>Valley has no plan to change its IS policy, which channels all Internet-based communications via a proxy server located in corporate HQ.</p> <p>All social media applications are blocked as a matter of corporate policy. Again, there is no plan to change this policy, which affects all hotel-based employees from the General Manager downwards.</p>
Customers (Hotel and Personal)		Products & Services
<p>Hotel clients (individual and corporate)</p> <p>Travel agents,</p> <p>Hotel suppliers,</p> <p>Hotel employees,</p> <p>Hotel Fans/Followers,</p> <p>Government Departments</p> <p>Personal contacts (members of the personal relationship network)</p>		<p>Marketing Materials for travel agents and corporate clients in the form of:</p> <p>E-Brochures</p> <p>PowerPoint Shows</p> <p>PR Information about the hotel</p> <p>Routine communications with hotel guests, fans and followers</p> <p>External relations with suppliers and government departments</p> <p>Solutions to hotel service problems</p> <p>Requests for information</p>

Subversive Work Practices (Bricolage Solutions to Ensure Access to Systems)		
<p>1. Employees access their desired social media applications via the hotel's guest network, which is normally accessible wirelessly across the hotel. They gain access with personal devices such as smart phones and tablets, though some may use notebooks or even the PCs located in the hotel's executive lounge.</p> <p>2. The guest network also permits the rapid transfer of large files to corporate clients.</p> <p>3. If the guest network is not available or cannot be accessed, employees may save the relevant files to USB, and then upload the same files to private microsites from home, informing their clients about the new content available on the microsite.</p>		
Interview Comments from Hotel Employees		
<p>1. Human Resources Manager, Macau: "It is easy to tap into the guest network with a notebook, tablet or smart phone in order to access these resources, but the same method cannot be used to access corporate systems".</p> <p>2. Marketing Manager, Guangzhou: "I have to use the guest network to send large files".</p> <p>3. Marketing Manager, Guangzhou: "My job is to communicate, but there are no tools to achieve this, so I have no choice but to use private, self-funded resources. I have set up an offshore microsite so as to communicate with different customers".</p> <p>4. Marketing and Communications Manager, Beijing: "I use the guest network for microblog marketing on Weibo [a microblog similar to Twitter]".</p>		
Participants	Information	Technologies
Hotel employees in: <ul style="list-style-type: none"> • Marketing • Sales and Communication • Public Relations 	Corporate documents and information Marketing information and e-brochures Personal work-related problems and solutions to others' work-related problems Transactive memory of who are the experts on particular topics	Guest Network (wifi Internet restricted to guests) Guest Network (Internet available in the Executive Lounge) USB + Offshore Microsites

Table 1: Work Systems Snapshot of Work Undertaken by Selected Valley Employees

5. Discussion

Our case analysis indicates that employee subversion of the strict IS policy is common among certain job positions in Valley, most notably employees working in public relations, corporate communications and marketing. In the scholarly literature, there is increasing appreciation of employee resistance to managerially-imposed change. This resistance often takes the form of employees refusing to use a new IS (such as a new ERP or Sales system) as it was designed to be used, either rejecting usage outright or modifying the way it is used so as to suit individual needs. In more extreme cases, employees may deliberately try to damage or sabotage the new system.

However, the literature does not cover the situation where employees, far from resisting IS, instead demand more IS, intentionally subverting the IS policy that denies them access to the IS applications that they assert they need. Such is the focus of the current paper, where we have examined how employees demonstrate a genuine need for specific IS applications, notably those often referred to as social media, as well as high levels of Internet bandwidth. Dissatisfied with the technology environment that management deigns to provide and unable to persuade management to change its IT policy, employees actively subvert organizational IS policy by creating ways in which they can access their desired IS applications. These acts of subversion entail elements of bricolage, i.e. leveraging whatever resources are available at hand. In this interpretive case study, we have explored the socially-driven world in which employees work and their consequent need for socially-enabling technologies.

As we analysed our data, we adapted Gersick's instantiation (1988, 1991) of the punctuated equilibrium paradigm to the context of IS policy and its subversion by some employees. We found that employees, in taking actions that subverted organizational IT policy, were in effect punctuating the steady state of the corporate equilibrium in order to attain a new, more appropriate equilibrium that would better support their work needs. We identify the elements of the deep structure as being associated with Valley's organizational culture that incorporates a strict enterprise governance structure and IS policy that are promulgated by the Global VP for IT and enforced by local IT managers. The deep structure is associated with an equilibrium of stable operating procedures: how IT-based work is done by Valley employees, including which IS applications are permitted. The revolutionary change that we have observed among some of Valley's employees can be traced to their need for various forms of social media, access to which is prohibited according to the norms of the current operating procedures. In effect, there is a tension between Valley's institutional norms or deep structures (strict IS policy), the organizational culture and equilibrium (standard operating procedures), employees' Internet requirements (high speed Internet access and social media tools to interact with both internal and external stakeholders) and the personal circumstances of employees (access to the ecosystem familiar to digital natives).

The tension first triggers some employees' to form the intention to subvert (punctuate) the IS policy (stable equilibrium) by creating feral working arrangements that facilitate both the solving of work problems and the engagement with affiliated social practices deemed essential to digital natives. When the feral systems demonstrate significant positive impacts on work performance, the original deep structure associated with IT governance structure may be threatened. If the feral systems are used by a small minority of isolated employees and are largely hidden from corporate management, they may persist over time in parallel with the official systems. However, if the feral systems gain traction among a wider variety and larger number of employees, then the threat to the stable equilibrium will grow, especially if employees neglect official systems altogether and rely only on the feral systems. If an official system is sufficiently neglected by a sufficient number of employees, it may cease to have any reasonable purpose, leading to a situation where either all feral systems are summarily shut down by corporate management, or the official systems are revised to include some or all of the functionality afforded by the feral systems, so long as these still support the completion of work routines (Pentland and Feldman, 2008). Following this exposition of the punctuated equilibrium paradigm in the specific context of this study, we next consider the theoretical implications of the study.

6. Theoretical Implications

In this section, we highlight the theoretical implications of the study. Drawing on our data, we develop four new theoretical propositions that relate to the development, adoption and

impact of feral systems. These theoretical propositions constitute a significant contribution to the literature on feral systems and also enable us to generalize our findings (Lee and Baskerville, 2003, 2012), since in future, researchers can test these propositions in new contexts so as to further validate them.

6.1 Environmental Pressure and Work Performance

Studies of change in organizations (e.g., Romanelli and Tushman, 1994) have demonstrated that there is a tendency to retain patterns of activities and governance structures if measures of performance are satisfactory. However, changes in the external environment may cause impacts on performance, disrupting work patterns, punctuating the stable organizational equilibrium and leading to fundamental transformations of working practices. Environmental pressures can include legal regulations, the working practices of peers and competitors, requirements from partners, suppliers and customers, and changes to the social context wherein the organization is situated. If current work patterns do not match requirements or if the governance structure is inappropriate in the context of environmental pressure, employees may feel the need to create feral working practices and systems in order to ensure that they can complete their work effectively.

If the creation of feral systems is prohibited and the prohibition is enforced, pressure will build on employees as they are likely to find it increasingly difficult to complete their work tasks effectively and efficiently. Alternatively, if the feral systems are permitted, at least by immediate managers, and if as a result employees can complete their work effectively and efficiently with improved levels of performance, then pressure will build for the feral systems to be more generally accepted by the organization. Either of these twin pressures will pose a challenge to the incumbent IT governance structure and may trigger fundamental organizational transformation. Oliver (1991) noted that when there is a combination of negative and positive perceptions related to work performance, this is likely to generate calls for punctuational changes to the equilibrium.

We observe a similar situation at Valley where employees in the marketing, communications and PR departments of different hotels experience pressure from their interlocutors in the external environment to adopt social media-based communication tools. It is important to point out that social media is ubiquitous in the local milieu in China. As a PR manager in Wuhan expressed: “Without QQ [A popular instant messenger application in China that is blocked by Valley’s IT access policy] I cannot work. I use QQ to contact many external parties, such as travel agents and government departments. These people refuse to use email and it is very hard to get hold of them on the phone. Therefore I must be able to use QQ”. Meanwhile, a front office manager at a hotel in Beijing complained: “I am not allowed to use MSN [an instant messenger application that was blocked by Valley’s IT access policy]. My relationship network has suffered and I have lost some contacts”.

Proposition 1: Environmental pressure from the work network and declines in individual work performance are central to the intention to develop feral systems.

6.2 Digital Literacy

Although the emergence of feral systems can be triggered by environmental pressure and declining performance, an individual employee’s capability with respect to digital literacy is also a key determinant of the creation of feral systems. Nowadays, the younger generation of employees is largely digital natives, for whom digital and social media applications are embedded in their daily life and work (Wang et al., 2012; Davison and Ou, 2013). They have cyborgized themselves with a variety of “external orthotic online personae” (Davison, 2012) from which they cannot at all easily be separated. As a result, communication via social

media is entirely natural. In China, social media applications are interwoven in work and social lives; knowledge professionals have already naturally embraced the utilization of various digital applications, including social media, in their daily work (Davison et al., 2013). As the Executive Assistant to the General Manager at a hotel in Macau reported: “I would like to be able to use MSN for communication as it would be faster and more natural”. While the social media phenomenon is rife in the social world, McKinsey reports that social media devices and applications are also gaining considerable traction in the organizational context (Bughin, 2015) where their networking and interactional power are leveraged in order to create value for a variety of internal and external stakeholders.

Proposition 2: Digital literacy is critical to the introduction of feral systems.

6.3 Informal Management Support

Ever since resistance behaviours were first reported in the literature, the issue of management’s attitude has been recognized as a major influencing factor on the longevity of any alternative arrangements to the status quo. Much of the early literature took an overtly negative stance, viewing resistance in terms of a rejection of managerial control (Cook and Brown, 1999), a barrier to strategic change (Ansoff, 1988) and even a regressive, neo-Luddite preference for less advanced technologies (Landry and Bristow, 1988) all of which needed to be removed (Kosseck et al., 1994). More recently, researchers have taken a more positive line, recognising that systems can be genuinely flawed and appreciating that resistance is a reasonable reaction that provides a means for users to convey their discomfort with an inadequate provision of IS (Ignatiadis and Nandhakumar, 2009). Haag and Eckhardt (2014) note that employee frustrations with organizational IS can trigger a search for new reference points from colleagues, especially supervisors, in order to guide their IT usage behaviour. With respect to social learning theory (Bandura and Walters 1963; Davis and Luthans 1980), employees consciously learn from others, especially from their immediate managers, either reinforcing or disconfirming their own behavior. If employees perceive their managers as being supportive, even informally, their use of feral systems may be framed as an endorsed group behavior instead of individual conduct. As a result, it is very likely that the feral system will be utilized in parallel with the formalized but dysfunctional system.

In the specific context of social media, a key element of concern for management is the potential for the leakage of confidential data, as well as the accidental infection of corporate computing devices with malware. Both of these concerns will raise red flags with security managers as they will run counter to IS policy. Nevertheless, we expect that more progressive CIOs may recognize that, given the realities of technology in the social environment and the increasingly digital connectedness of employees, social media cannot be held at bay for ever: at some point it will be necessary to grasp the nettle and embrace feral systems in order to both satisfy employees and prevent those same feral systems from running amok (White, 2016).

In the specific case of Valley, we spoke with hotel general managers (GM) who accepted that social media was not inherently a bad thing and could create value for employees in their regular work. The more liberal GMs appreciated the pivotal power that social media can bring, either condoning or facilitating its use, irrespective of corporate policy to the contrary, even providing functional managers with iPhones in order that they can more easily access social media for communication purposes when at work. A GM in Suzhou observed: “Social media is part of life. We can’t block it. But we hope to encourage employees to use it responsibly”. In practice, although we have primarily focused on the impact of inadequate IS for employees (including functional managers) in PR, Marketing and Communication, all employees in Valley hotel properties from the GM downwards are affected by the strict IS

policies. Thus, we were not surprised to see GMs, who are as much victims as anyone else, both using feral working practices themselves and supporting those of their staff who needed to do so. In one Beijing hotel, a communications manager was given permission to use the hotel's executive lounge, nominally reserved for guests of the executive floors, in order to access the hotel's guest network and complete her work effectively. This overt support for a work practice that subverted corporate governance requirements is perhaps remarkable, but also indicates the extent to which the IS policy is divorced from the reality of the work that is actually performed by employees.

Proposition 3: Informal support from immediate managers is critical to successful creation and operation of feral systems.

6.4 Revolutionary Changes to Deep Structures

When the environmental parameters shift, organizations need to adapt. The salient parameters in our case involve the ubiquity of social media as a mainstream communication medium by a generation of digitally literate employees. These employees expect to have access to social media in the workplace, irrespective of current or historical work practices, organizational culture and IS governance structures and policies. This is essentially non-negotiable for digital natives. Traditionally, junior employees are not in a strong bargaining position, but today's digital natives don't bother to negotiate: they act as bricoleurs, seeking out the resources that they require, drawing on whichever channels are available. The work that they perform in the organization is attuned to the application of social media, much of it involving various forms of interaction with external parties who also expect to engage through the same social media. When one's interlocutors insist on using social media to communicate, it is no longer effective to refuse, citing corporate policy: the external parties will take their business elsewhere. This is thus an issue of survival: either the organization changes its policy to permit the use of social media or it suffers the consequences.

Meanwhile, feral systems need not be destructive. In the case of Valley, we did not witness a single instance of employees seeking to harm the organization. In every case, they simply argued that they wanted to complete their work as effectively and efficiently as possible. However, they felt frustrated by an IS policy that perversely subjugated them to an inferior technological environment that resulted in a colossal waste of time. As a Marketing and Communications Manager in Guangzhou recounted: "A two minute task can take two hours. I simply cannot afford to waste so much time for so little work done. There has to be a better way". The better way often involved use of the hotel's guest network and thus posed no direct risk to the hotel or its operations. We characterize this employee behaviour as *constructive subversion*.

The feral systems that employees devise may remain in the shadows to corporate management and the Global CIO, but they are very much in the open at the local level, broadly supported by hotel GMs. As these systems spread, and we observed cases where functional managers would share their solutions with colleagues in other hotel properties, so a viral effect may unravel, with feral systems gaining widespread traction, irrespective of IS governance restrictions. This can then be expected to lead to significant pressures to reshape the legacy IS policy in favour of a more liberal policy that is acceptable to today's digitally literate employees. At the time of writing, slight shifts in the strict IS policy have been detected. Hotels are permitted to create private microsites where they can place marketing and PR materials. These sites are not hosted on Valley's corporate servers, but are outsourced to an independent web services provider. However, there is no change to the restrictions on access to social media applications via corporate networks.

Organizational activities are grounded on an equilibrium (Romanelli and Tushman, 1994). As a result of organizational inertia (Hannan and Freeman, 1984) and institutionalization (Meyer and Rowan, 1977), organizations develop coherent systems of shared understandings that support continuation of established patterns including expected behaviours for the use of IS. This state of inertia can bring organizations into a state of tension if the IS are inadequate for effective work performance and if corporate management are unwilling to bite the bullet of change. Breaking the vicious circle of inadequate IT systems and diminishing performance can be triggered in a number of ways. A new CIO or CDO (Chief Digital Officer) who appreciates the value currently provided by feral systems may be able to change corporate IS policy. Alternatively, the pressures wrought by declining work and organization performance may trigger a burst of reflection among senior managers, with the recognition that the current IS policy is not fit for purpose and so needs to be revised. High levels of turnover among junior employees who cannot tolerate the inadequate provision of IS may also trigger awareness of a fundamental mismatch between what is permitted and what is needed. Any of these events may be sufficient to prompt a strategic re-evaluation of how the organization manages technology and perhaps an appreciation for the potential of digital enablement (Baradwaj et al., 2013; Davison and Ou, 2017) rather than disablement.

Proposition 4: The substantial improvement in work performance enabled by the feral system may lead to the break-up of the deep structure of legacy IS policy. This can constitute a starting point to embrace and formalize feral systems into the formal technology landscape.

7. Limitations, Contributions and Future Research

Our findings are circumscribed by our context, a single hotel chain in China, but we would expect to see similar subversive behaviour in other Chinese organizations where restrictive IS policies are enacted. Our findings are particularly relevant for working professionals, notably those who work in such functions as public relations, marketing, sales and communications and who depend on social media applications as they engage in intensive communications with internal and external parties. We suggest that the phenomenon of employees subverting corporate IS policies may be widespread in practice. It is likely to arise whenever the prevailing values and norms of the organization differ from those of its employees.

Reflecting on the tensions between corporate IS policy and reasonable employee needs, we suggest that the rapid entry of digital natives into the workforce (Basso, 2008; Shehadi et al., 2013; Chua et al., 2014) must also be accompanied by an infusion of new attitudes towards technology, particularly the notion of always being connected and online, where the border between social and work environments is miscible and fluid. As digital natives encounter organizations, and their cultures, that were created and are managed by people who are digital immigrants at best, digital dinosaurs at worst (Davison and Ou, 2017), so tensions can be expected to arise with respect to what kind of technology use is permitted and how employees should engage in communicative acts with internal and external stakeholders. Digital natives, just like some of Valley's employees, are unlikely to take "No" for an answer, instead drawing on the tools and mind-set of the bricoleur who actively exploits repertoires of skills and resources, seeking to create solutions that meet immediate needs even if they subvert organizational control in the process.

From a theoretical perspective, punctuated equilibrium theory provides a good starting point to examine how organizations may change as they address the tensions between corporate IS policy and reasonable employee needs. By utilizing the lens of punctuated equilibrium theory, we conceptualized our case findings into four propositions, highlighting the underlying factors that contribute to employees' deliberate subversion of corporate IS policy with their own feral working practices and capturing the revolutionary changes to deep

organizational structures. As IS researchers, we need to search for new theoretical perspectives beyond the immediate few with which we are familiar. Theories of revolutionary change, such as punctuated equilibrium theory, are ripe for application in new domains such as the way employees react to inadequate provision of IS and the consequent implications for IS policy.

Delving into how acts of subversion occur is also likely to be a fruitful topic for future research, as also is how employees develop a bricolage mentality. We anticipate that employees will turn to whatever technology exists as they create their feral systems. In future, their repertoire may well include virtual reality and artificial intelligence systems, for instance. Such new systems may provide a wealth of opportunity for bricolage-inspired employees, yet simultaneously create a significant new problem for CIOs and other senior executives keen to avoid the destructive consequences that runaway bricolage might bring. Nevertheless, appreciating how subversive practices may not be deliberately destructive but instead represent a legitimate and constructive employee reaction to poorly designed systems and policies could provide a means of both resolving the tension and avoiding more serious consequences, if the CIO is willing to listen and modify corporate IS policy.

8. Conclusion

Employee subversion of corporate IS policy is not a topic that has received much attention from researchers. However, we suggest that this is a phenomenon that will become more salient as ever more digital natives enter the workforce and confront organizational cultures and values established under the aegis of senior managers accustomed to very different normative behaviours. Given the extent to which social media applications and other forms of IS are embedded into the lives of digital natives, it would be naïve to expect these same people to amputate integral parts of their lives and personalities: instead, we should expect them to fight to retain access to the same social media applications, whether for work or non-work purposes. Digitally literate employees have a considerable repertoire of resources and skills at hand to secure the optimal working environment, irrespective of corporate IS policy or mandate. In this paper, we have explored how digital native employees in the Chinese operations of a global hotel chain subvert a restrictive corporate IS policy, securing access to the resources they insist they need. We also identify some theoretical components of the phenomenon that merit future investigation. We anticipate the strong need for more research into the feral systems developed by bricolage-oriented employees who balk at nothing to gain access to the technologies that they deem essential to their work.

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APPENDICES:

Appendix A: Summary of Information About Firms Studied			
Firm Name	Number of Employees	Hotel locations studied in this research	Details of Interviewees
Valley Hotels	100-300 per hotel property	Beijing (3), Chengdu, Chongqing, Guangzhou, Shanghai (2), Shenzhen, Suzhou (2), Wuhan.	27 managers across 12 hotel properties + the VP for China and the Global VP for IT: Director of Revenue (2) Executive Assistant to the General Manager (1) Food and Beverage Manager (1) Front Office Manager (5) General Manager (5) Human Resources Manager (2) IT Manager (1) Marketing and Communications Manager (3) Procurement Manager (1) Public Relations Manager (2) Revenue & Sales Manager (4) Total = 29 interviewees

Appendix B: Interview Protocol

This semi-structured interview guide is organised in four sections. In each section there are a number of questions. However, depending on the answers given by interviewees, it may be appropriate to ask other related questions.

A. Interpersonal Knowledge Exchange (IKE)

1. How would you describe how you engage in IKE at work?
2. How does the IKE affect your problem solving at work?

B. Technology for IKE

1. Which information technologies (IT) do you use for IKE activities? Which IT applications do your interlocutors prefer to use?
2. In the context of IKE, how does IT help to ensure that you can complete your work effectively and efficiently?

C. Guanxi and IKE

1. How does guanxi relate to the way you engage in IKE activities at work?
2. Guanxi is traditionally developed over time in face-to-face situations. Is it possible to develop strong guanxi through IT channels? How?
3. How do guanxi and IT applications support each other in IKE activities at work?

D. IS Possibilities and Opportunities for IKE

1. Does your company specifically mandate that you should or should not use any particular IS applications?
2. How does company IS policy affect the way you engage in IKE at work?
3. How does company IS policy affect the way you develop guanxi that supports your work?