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Mohamad Taha Ijab  
*University, Melbourne, VIC, Australia*, mohamadtaha.ijab@rmit.edu.au

Alemayehu Molla  
*School of Business Information Technology, RMIT University, Melbourne, VIC, Australia*, alemayehu.molla@rmit.edu.au

Vanessa Cooper  
*School of Business Information Technology, RMIT University, Melbourne, VIC, Australia*, vanessa.cooper@rmit.edu.au

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Green Information Systems (Green IS) Practice in Organisations: Tracing its Emergence and Recurrent Use

Mohamad Taha Ijab
RMIT University
mohamadtaha.ijab@rmit.edu.au

Alemayehu Molla
RMIT University
alemayehu.molla@rmit.edu.au

Vanessa Cooper
RMIT University
vanessa.cooper@rmit.edu.au

ABSTRACT
This paper discusses the emergence and the recurrent use of Green IS practice in organisations. The theoretical construct of “field” adopted from Bourdieu’s theory of practice is used in explaining the Green IS practice phenomenon in a case organisation called Acadia. In particular, the study investigates the relationships between local actions including the historical and internal processes in Acadia against the external origins that shape and reshape Green IS practices in Acadia. The findings indicate that Acadia’s Green IS practices emerge and are recurrently used due to a number of internal and external factors, as well as the power relationships of the human actors within Acadia. In addition, the ability to manage and allocate resources by the powerful actors enables Green IS practice to become tangible in the company. The “field” construct also sheds light on the conflict and conflict resolution among actors occupying the different Green IS subfields in the course of Green IS practice formation.

Keywords

INTRODUCTION
The use of information systems to enable individuals, groups, organisations and society in achieving eco-sustainability goals is a topic that is developing much interest among information systems researchers (Melville, 2010; Chen et al, 2011). This has resulted in the phenomenon of Green Information Systems (Green IS) research, a study on the use of IS for supporting eco-sustainability practices (Dedrick, 2011; Hasan, 2010; Chen et al, 2011). For the purpose of this paper, we refer to Green IS as the use of IS and IT for “greening” organisations and for making them more sustainable (Chen et al. 2008; Watson et al, 2010). In the discussion of Green IS use, the transformative power of IS to increase and manage energy efficiency has been proposed (Watson et al, 2010). Further, IS is also said to shape the beliefs of individuals and organisations in improving their environmental and economic performance (Melville, 2010). In these extant works, IS researchers mainly focus on the utility of IS rather than the IS-enabled eco-sustainability practices that have emerged and become recurrent in organisations. The existing Green IS body of work also provides limited investigations of how organisational actors, attitudes, fields, dispositions and resources interrelate in order to translate into a successful Green IS practice.

The study of contemporary organisational practice is increasingly understood to be “complex, dynamic, distributed, mobile, transient and unprecedented” (Feldman and Orlikowski, 2011, p. 1), hence requiring approaches such as a practice-lens to theorise the indeterminate and emergent phenomena. A practice-oriented research helps investigate how individual and collective activities are produced in a historical and social context, which gives structure and meaning to what people do and to the outcomes that they can achieve (Levina and Orlikowski, 2009). A practice-lens is also able to facilitate the articulation of particular theoretical relationships that explain the dynamics of everyday activities, how these are generated and how they operate within different contexts and over time (Feldman and Orlikowski, 2011). In the field of Green IS research, the examination of Green IS from a “practice” perspective may provide a useful lens to garner deeper and holistic understanding of the information systems that organisations develop, deploy, use and integrate for eco-sustainability (which we call Green
IS practice) and how Green IS practices emerge and become recurrent. This is an area of work in Green IS that is not well researched and has potential to enhance further, the theorisation and understanding of the topic of Green IS. In addition, there has been a call by Siedel et al (2010) for more Green IS research using the practice perspective. Further, this practice-lens research inquiry is in line with the arguments of Labatut et al (2012) and Feldman and Orlikowsk (2011) who suggest the need to link institutional and practice-based approaches to further the understanding on the “how and why” questions relating to the origin of new practices in organisations.

Drawing primarily from the “field” construct of Bourdieu’s (1977) Theory of Practice, and several other concepts, this paper aims to investigate the local actions set against the external origins which shape and reshape Green IS practice in the case organisation, “Acadia”. In the quest towards understanding the emergence and recurrent use of Green IS practice, we are also looking at the formation of the “Green IS field”, a social space which allows “Green IS practice” to occur. The field set forth in the context of an organisation will be used as the unit of analysis in this research. Therefore, the research question posed is “How does Green IS practice emerge and become recurrent in an organisation?”

The paper starts by introducing the conceptual background based on the Theory of Practice’s construct of field, capital and habitus; the institutional environments perspective for understanding external origins of internal practices; as well as the concepts of eco-sustainability practices and Green IS practices. A conceptual framework is then proposed based on this discussion. We then proceed to describe the research methodology carried out in undertaking the research. Based on the empirical data, we analyse the findings using descriptive analysis and explain the data based on the proposed conceptual framework. To conclude, we discuss the outcomes of our analysis, the contribution of this research to theory and practice, the limitations and planned future research.

CONCEPTUAL BACKGROUND

The Theory of Practice: Focus on the Concept of Field

In this paper, the Theory of Practice’s construct of “field” (Bourdieu, 1977) serves as the main concept to help explain the emergence and the recurrent use of Green IS practice in organisations. In the Theory of Practice, the concept of field is regarded as the focal area of study as the relationships within the field are more important than the individual actors (Rhynas, 2005).

The Theory of Practice provides the lens to explain how individual and groups act in their social world, how the social groups in the field are formed and interact, what the groups’ positions in the field are, and how the relationships among them determine their power and struggle to access the field’s capital. Practice can be defined as “the outcome of a dialectic relationship between a situation and a habitus, being understood as a system of durable but transposable dispositions” (Bourdieu 1977, p. 261). Levina and Vaast (2006, p. 15) assert that a focus on practice means, “being attentive to people’s recurrent, everyday activities”. Practice can also be understood as clusters of recurrent and structured human activities informed by shared institutional meanings in order to get work done (Schatzi 2005). In order to understand practices in the context in which they occur, Bourdieu proposed the core concept of field and two other related concepts of capital and habitus (Bourdieu and Wacquant 1992), which will be briefly covered in this paper.

A field can be described as, “a distinctive social space consisting of interrelated and differentiated positions, a configuration of objective relations between positions, a space of objective relations between individuals or institutions who are competing for the same stake” (Bourdieu and Wacquant 1992, p. 97). In other words, a field is a structured social space in which struggles over the resources, systems of meaning and value (such as technology) take place; and each field has its own rules and its own relations of power (Kvasny and Keil, 2002). Myers and Klein (2011) in their review of Bourdieu’s concept of field mentioned that each individual occupies a position in a multidimensional social space known as a field. Within this dynamic field of forces, an individual is not defined by social class membership, but by the amounts of each kind of capital (or resource) he or she possesses. Further, fields are not fixed entities: the boundaries of fields are imprecise and shifting, and fields can be located within other hierarchically structured sets of fields. Examples of fields include politics, agriculture, religion, education, information systems (IS) and eco-sustainability.

For the concept of capital, Bourdieu identifies capital as all goods, whether material or symbolic, “that present themselves as rare and worthy of being sought after in a particular social formation” (Bourdieu 1977, p. 178). Bourdieu argues that, it is possible to convert one type of capital into another. For instance, if individuals increase their wealth (economic capital) they may begin to move in a new circle of useful acquaintances (social capital); if they increase their cultural capital through academic achievements, they may also increase their economic capital through higher paid employment. In the context of an organisation, capital can be viewed as any form of resource such as position within the company, fund and budget, knowledge and technological expertise.
The concept of habitus is a general disposition that generates practices, perceptions and attitudes; is largely unconscious and predisposes people to act in certain ways (Bourdieu 1977). Habitus is a product of social conditioning through which individuals classify the world, coming mainly from early socialisation in the family but changing according to life experiences. Someone’s background plays a major role in defining his/her habitus. On a primary level, habitus is influenced by family, parents and friends. On a secondary level, habitus is influenced by education and jobs. Taking the interactions of all the three constructs, practice can then be seen as the product of the relation between the habitus and capital within a specific social context (field). This is also figuratively shown as \((\text{habitus}(\text{capital})) + \text{field} = \text{practice}\) (Bourdieu, 1984, p. 101).

**Tracing the External Origins of Internal Practice using Institutional Environments Perspective**

Existing literature on organisational studies have the shortcoming of emphasising only the local action at the expense of broader historical, internal processes and external origins of internal practices (Labatut et al, 2012). In response to this call to action, this paper aims to explain the external origins that shape the local actions (i.e. organisational Green IS field and practice) using insights from the integrative model of institutional theory and sense-making perspectives proposed by Butler (2011). Specifically, we are interested in Butler’s idea of the institutional environments perspective. In his work, Butler (2011) articulates empirically-based theoretical propositions to explain how Green IS can support organisational sense-making, decision-making and knowledge-sharing. Combining institutional theory and organisation theory, Butler (2011, p. 8) conceptualises that “the institutional environmental and organisational fields shape and influence business strategies and related objectives, as well as organisational structures and processes.”

In his analysis, Butler (2011) utilises the institutional environments perspective, drawn from institutional theory, to explain the external (exogenous) influences, being regulative, normative and cultural-cognitive. Examples of regulative influences include those of regulatory and legal compliance and imperatives that may involve national, regional and international regulations. This may include compliance to certain environmental laws, eco-labels or greener practices advocated by bodies/agencies such the Restriction of Hazardous Substance (RoHS) Directive, or the European Union’s Waste Electrical and Electronic Equipment (WEEE) Directive. The normative and cultural-cognitive influences are also shaping organisational responses and this is clearly seen when most large corporations are now addressing the triple-bottom line and giving greater focus on improving their environmental performance (Butler, 2011). For instance, it is also claimed that the use of ISO14001 Environmental Management Systems (EMS) has become normative in its adoption allowing companies to comply to rigorous environmental performance indicators. In addition, other normative signals include compliance to the Environmental Protection Authority’s (EPA) Energy Star program that looks into energy consumption of products in use by corporations. The use of the Electronic Product Environmental Assessment Tool (EPEAT) is also seen as a normative influence enabling companies to promote compliance to greener product selection for internal procurement and deployment. Other examples of normative influence that shape organisations’ Green IS field is the formation of industry associations such as the Climate Savers Computing Initiative, Global eSustainability Initiative (GeSI), and The Climate Group, which according to Butler (2011), advocated for greater eco-sustainability awareness from organisations. The examples of cultural-cognitive signals include the voluntary disclosure made by organisations of their CO₂ emissions and climate change avoidance strategies as advocated by the Carbon Disclosure Project (Butler, 2011; Melville, 2010). The disclosure of environmental performance indicates the signal sent from organisations to their investors, customers, vendors, suppliers, regulators and competitors that they are indeed taking actions in greening their business operations. Butler (2011) also mentioned the cultural-cognitive influences exerted by non-government organisations (NGOs) such as Greenpeace, the World Wildlife Fund (WWF) and Friends of the Earth, pressuring organisations into adopting greener business practices and thus, shaping organisational Green IS field.

**Eco-Sustainability Practices and Green IS Practice**

For implementing eco-sustainability initiatives, organisations follow several eco-sustainability practices. Eco-sustainability practices according to Hart (1995) are those practices aimed at minimising emissions, waste and water, improving efficiency and minimising the total environment footprint of a business. Thus, Hart’s (1997) and Hart and Milstein’s (2003) natural resource-based view driven eco-sustainability strategies can provide a structured conceptual foundation to explain organisational eco-sustainability practices. These eco-sustainability practices can be classified into three interconnected practices of (a) pollution prevention, (b) product stewardship and (c) sustainable development practices. Pollution prevention focuses on the control and prevention of polluting emissions and effluents during and after production and operations processes (Hart, 1997). Product stewardship requires environmental impacts to be considered throughout the entire lifecycle of the organisation, including raw-material sourcing, product design and development processes (Hart, 1995, 1997). Sustainable development encompasses the use of technologies to transform business processes by implementing practices that conserve resources, are energy efficient, non-polluting and low waste (Hart & Milstein, 2003). While Hart’s (1997) and Hart
and Milstein’s (2003) eco-sustainability practices are not mentioning or even targeting any specific Green IS, this research aligns itself with the view of Chen et al (2011) by offering specific instances of Green IS practices as the means to achieve Hart’s eco-sustainability practices. Green IS practices, according to Chen et al (2011) can be classified into three categories: (a) Green IS practice with a focus on pollution prevention; (b) Green IS practice with a focus on product stewardship, and (c) Green IS practice with a focus on sustainable development. Green IS practices focusing on pollution prevention refer to the innovation and use of information systems (such as enterprise carbon and energy management systems) to reduce pollution generated by business operations. Green IS practices focusing on product stewardship refer to the innovation and use of IS (such as enterprise digital platforms and communication and collaboration systems) that enhance the environmental friendliness of upstream and downstream supply chains (Chen et al, 2011). Green IS practices focusing on sustainable development refer to the innovation and use of IS (such as sustainable product development and sustainable knowledge and learning management systems) that transform business operations.

**CONCEPTUAL FRAMEWORK**

Applying the insights from the above conceptual discussions of Bourdieu's (1977) field; Butler’s (2011) institutional environments perspective; Hart’s (1997) and Hart and Milstein’s (2003) eco-sustainability practices; and Chen et al (2011)’s Green IS practice, Figure 1 below shows our proposed conceptual framework of how Green IS practice emerge and become recurrent in organisations.

![Conceptual framework showing the emergence and recurrent use of Green IS Practice](image)

The proposed conceptual framework suggests that organisational Green IS practices emerge and reemerge as a product of the local actions represented by the dynamic interactions among actors’ dispositions and control over certain resources within the organisational Green IS field. Green IS practices also emerge and are recurrently used as a product of the interactions between the local actions of the organisational actors with the external influences. The time dimension also plays an important role as the adoption of Green IS (as any other IS) within the organisation may take several years to become recurrently used (institutionalised practice) from the point of its entrance to the company. The time dimension also indicates the historical aspect (either a long or short tradition) of being green and eco-conscious within the company’s value systems. We will revisit the proposed conceptual framework and demonstrate the utility of the framework using empirical data to explain the emergence and recurrence of Green IS practice phenomenon in the Findings and Discussion section.

**RESEARCH METHODOLOGY**

**Research Design and Research Setting**

This study uses a single case study approach with multiple sub-cases of Green IS practices within one organisation. By employing a case study approach, a researcher is able to gather rich depiction of the social phenomenon being investigated (Yin, 2003). The method also allows the researcher to investigate various eco-sustainability practices and Green IS used to support those practices in the actual setting. Studying organisational eco-sustainability practices is an intricate undertaking.
because the practices are surrounded by complex organisational activities and processes, work culture, historical background as well as different organisational actors within the socio-organisational context in which it occurs (Eisenhardt, 1989). In addition, the study of internal practices situated within an organisation needs to consider the investigation of its external origins as well (Labatut et al, 2012).

Acadia (a pseudonym), the company where the study takes place is a telecommunications conglomerate in one of the Asian countries. The firm operates high-speed broadband services and fixed line telephony to both enterprise and retail customers. It has a workforce of more than 20,000 people nationwide and a small number of staff members working in its international offices around the world. Acadia has been quite vocal in communicating its ambition to become an eco-conscious company and this message has been mentioned in its various public news releases and company reports, such as annual reports and sustainability reports. The top leadership of Acadia (i.e. the Group Chief Executive Officer) has his own blog on the company’s Intranet and on a few occasions has focused his thoughts and ideas on further “greening” the company. Acadia has won a couple of prestigious awards such as the “CSR and Green Initiatives” Award in September 2011 and the “Honourable Mention” in the country’s Prime Minister’s CSR award in December 2010. This national-level recognition is attributed to Acadia’s corporate responsibility (CR) initiatives on protection and conservation of the natural environment. In Acadia’s eco-sustainability journey, the company’s leadership often mentions the broad-level eco-sustainability practices. These practices include the adoption of best practices across systems, processes and infrastructures, which are executed through initiatives such as usage of energy-efficient equipment, increasing reliance on electronic communications in order to reduce dependency on paper, and other relevant steps in reducing energy requirements, hence reducing Acadia’s carbon emissions.

Data Collection and Data Analysis Methods

This paper reports an investigation based on a larger research project. For this particular paper, the data collection was carried out for a period of six months in 2011. The data collection employed qualitative data collection approaches including semi-structured interviews and document collection. Fourteen formal interviews were conducted: three with the Unified Communication and Collaboration (UCC) developers, seven with system users (three UCC users, two eView users, two Sustainable Development and Application Management (SDAM) users), two with the Corporate Responsibility managers and two IT Division staff. Organisational documents such as the sustainability and annual reports were collected in order to establish historical trajectories of eco-sustainability practices within Acadia. These documents also give additional insights into Acadia’s processes and casual relationships of past and current events in the company pertaining to Green IS practices. All interviews were audio-recorded and transcribed.

For data analysis, interview transcripts were then manually coded using a grounded theory approach (Strauss and Corbin, 1998) for establishing codes emerging from the data. Organisational documents were coded and analysed using content analysis focusing on sections on eco-sustainability practices and Green IS in action. To facilitate the coding process, a list of content codes was developed, a priori based on the concepts from the literature and the Theory of Practice’s constructs. These were appended with additional codes that emerged from the fieldwork. To ensure credibility and dependability of the analysed data, the main researcher sent the summarised findings to a few interviewees for their validation.

FINDINGS AND DISCUSSION

Green IS Practices in Acadia

From the findings, there are three different Green IS practices that have emerged and are recurrently used in Acadia to support the company’s eco-sustainability practices. These surround three Green IS: (a) UCC; (b) eView; and (c) SDAM. A brief profile of these Green IS are presented below.

UCC as Green IS Practice for Pollution Prevention

The UCC system is a suite of enterprise communication and collaboration tools. The features of the UCC include chat, fax, multiuser video conferencing, VoIP Internet Telephony and file transfer. The objective of the UCC is to enable Acadia’s staff members to communicate and collaborate seamlessly without having the need to travel, thus reducing carbon emissions. Being a telecommunications company, Acadia is dependent on electronic communication and aims to reduce its carbon emission via IS. Traditionally, communication in Acadia has been conducted via paper-based circulars, letters, reports, newsletters, face-to-face interactions and phone calls. While these communication methods are still in use, the company has adopted an enterprise-wide unified communication and collaboration (UCC) tool to facilitate more effective internal communication.
In 2008, after conducting detailed market and technological evaluations, Acadia’s top management commissioned its subsidiary company to develop the UCC software in-house. The subsidiary company is generally the research and development (R&D) arm of Acadia and therefore had the expertise in developing such solutions in a cost effective manner. In 2009, when the first version of the UCC was completed, the company via its IT Division, recognised the benefits of using the UCC to reduce the company’s carbon footprint. Thus, when the company rolled out its Green IT initiative (which combines aspects of both Green IS and Green IT), the use of the UCC was slated as one of the end-user computing applications that could assist the organisation to manage and prevent carbon pollution. Despite the need for more computing power to operate the UCC system, the net benefits gained from the UCC to offset Acadia’s carbon footprint through its many features, enable a range of greener practices. Following this, the use of the UCC is reappropriated (Ijab et al, 2010) as a Green IS practice for pollution prevention.

In terms of the diffusion of UCC within the company, the Assistant Manager of the IT Division interviewed claimed that the use of UCC is getting wider acceptance. This is due to numerous awareness sessions to introduce the UCC and the associated green benefits Acadia may gain from the recurrent use of the UCC. The staff members are also able to download the UCC application directly from the internal company website and have the UCC installed, or get assistance from the UCC Support Team to guide the installation where necessary. In terms of the company-wide usage of UCC, one of the UCC developers mentioned, “We track the usage of the UCC. Generally, we have usage data for daily, weekly and monthly basis. Based on the data, we have about 800-1200 staff using the UCC at any one time. While the figure is still not so encouraging, with more awareness, we expect to see the number to increase.”

**eView as Green IS Practice for Product Stewardship**

eView is a digital publication service offered by Acadia to its customers, ranging from retail to enterprise customers. The objective of eView is to enable the customers to get access to information anytime anywhere in a paperless environment. eView has been around and commercially marketed by Acadia since 2006. eView is currently bundled up with the high-speed Internet access that Acadia is selling to its customers as a value-added service (VAS). With the marketing tagline of “Save the Planet By Going Paperless”, eView offers thirteen of the country’s mainstream daily newspapers in various languages, sixteen titles of popular magazines targeting various market segments, and two different titles of comics for children. The customers can subscribe to eView on either monthly, quarterly, half-yearly or yearly basis subscription plans. eView as a digital publication service offers up to 60% savings compared to physical publications and most importantly, it is environmentally friendly, saves space and energy. eView basically captures the entire content of a real newspaper or magazine and has the capabilities to flip the pages, clip and save pages, present in mosaic and landscape view, zoom in/out and offers a panning effect. As eView is a commercial product and is used in promoting a greener lifestyle among its customers, eView can be categorised as a Green IS for product stewardship.

Internally within Acadia, eView is offered to the company’s staff nationwide. The Corporate Communication Division distributes and controls the allocation of the free accounts on the company’s Intranet, while the New Media Division, the division responsible for eView, manages the provision of the free service. While the number of free accounts for Acadia’s employee population is limited to approximately 50 accounts, staff who have access are advised not to “hog” access to eView and to make the account available for others to use once their reading is done.

**SDAM as Green IS Practice for Sustainable Development**

SDAM is an Internet platform for sharing documents and applications allowing automation of business workflows and applications development. The objective of the SDAM system is to enable long-term changes in staff behaviours towards conserving the natural environment. This is done through automating various business workflows originally done on paper forms. SDAM also allows applications to be built on top of it and then run on a single common platform. Consequently, the use of SDAM reduces the headcount of servers required to host Acadia’s numerous business applications, and at the same time, reduces energy consumption and e-waste.

The use of SDAM provides some evidence of the claims made by the top management in Acadia’s sustainability report. In particular, Acadia’s management aims to reduce dependency on paper, energy consumption and carbon emissions. One of the ways to achieve this is by sharing documents and applications on the company’s Intranet enabled by SDAM. This implies that the organisation is using SDAM as a Green IS practice for sustainable development. While an Intranet has been a technology used in Acadia for quite sometime, previously it was not leveraged for sharing documents and as a single application development platform. Acadia has been using the SDAM since 2007 to power its internal portal, which enables the users to create divisional websites and document collaboration services. The practice of using the SDAM to develop applications and share documents on a common platform provides two-prong environmental benefits: reduction in energy
consumption and reduction in e-waste. One of the SDAM users claimed, “We use less servers now as new applications are developed to run on the single platform which is SDAM. Before, we had many servers and some are even kept under the developer’s desk! With SDAM and server consolidation, we reduce the hardware need, hence reduction in energy consumption and e-waste”. The use of SDAM has also made document sharing and workflow management become more efficient and effective. The provision of a common platform on SDAM to share documents and e-forms has resulted in the receipt of less email and the need to print fewer documents as the information is now available online. Another SDAM user stated, “With MySite capability in SDAM, staff can share documents. For example, I can just upload the documents there, set the permission level and let my colleagues know where to find the document. Similarly, some paper-based forms are now made it into e-forms using the capability of SDAM to support simple workflow process management. So we see less forms and documents printed or left uncollected at the printers these days.”

External Origins of Green IS Field and Green IS Practices in Acadia

In part, the formation of Green IS field and practice in Acadia has external origins. From the interviews with the research participants, there are a number of institutional environmental factors being gathered from their inputs. The findings concur with Butler’s (2011) view of the external influences and Labatut et al’s (2012) external origins of internal practices. Our data suggests that the elements of regulative-legislative (R-L signals), normative (N-signals) and cultural-cognitive (C-C signals) are sent from the external environment which shape the formation of Green IS field within Acadia, and from the internal interactions, the company provides their responses back to the external environment in one way or another, discussed in the following subsections.

Regulative-Legislative Signals

Being a telecommunications company offering mainly telecommunication services, Acadia does not consider itself a big polluter but they are generally an eco-conscious corporation. The claims made by a number of research participants support this argument. For example, one of the General Managers stated, “We are not a manufacturing company. We don’t really take that much from the natural environment, pollute the air, the water streams, cut the trees. In fact, in our line of business, we help reduce the impacts by enabling digital communications. Nevertheless, we as a responsible corporate citizen, we do care about the natural environment and our future generations.” As a service-based company, Acadia does not operate in a highly regulated environment pertaining to accordance with specific environmental laws or guidelines such as the RoHS or WEEE. This being the case, we can generally argue that, at the moment, Acadia has limited regulative pressures for the company to respond to. It is important to note that while Acadia has an ISO14001 certification, the company does need to adhere to the country’s environmental acts. However, the ISO14001 is a voluntarily initiative and therefore, it will be discussed under the normative signals in the following subsection.

While regulative norms may appear to have little impact to Acadia, emerging data (and themes) indicate Acadia is getting itself ready for a certain future legislative order. This finding is similar to Butler’s (2011) and Scott’s (1995, 2004) research which identifies that besides regulative pressures, ‘organisational field’ and its constituent organisations, are also shaped by legislative coercive mechanisms originating in government departments, state-sponsored agencies and judiciaries. In the case of Acadia, the country within which Acadia operates has been committed to environmental protection, conservation and climate change since 2002. The Prime Minister of the country has pledged that the nation will adopt a voluntary reduction of up to 40% of emissions of its gross domestic product (GDP) by the year 2020 compared to 2005 levels. This pledge is in line with the policies introduced by the country such as the National Policy on the Environment mandated in 2002 and the National Climate Change Policy and the National Green Technology Policy in 2009. However currently, these national policies are not translated or legislated into law. Despite this, officers in Acadia were adamant that in future, most major corporations must announce their commitment to carbon emission reduction in order to support the country’s ambition. One of the Corporate Responsibility managers claimed, “We are anticipating that Acadia will have to commit and have our own carbon reduction target which at the moment we have none. Fact be known, while we are a public company, we are also a government-linked corporation. Therefore, we must support the national agenda especially for something as big as carbon reduction plan. To be ready for that, we are planning to have a comprehensive Carbon Management Plan in the coming years.” The Assistant General Manager of the IT Division when interviewed on the reason for the formation of the IT Division-led Green IT initiative mentioned, “We are having this initiative just to be ahead of the regulation.” These claims signal the proactive stand and the local actions taken (or planned to be taken) by the organisational actors in complying with the external normative pressures.

Normative Signals

From the telecommunications industry standpoint, the country where Acadia is operating is a member of the regional economic group Asia Pacific Economic Cooperation (APEC). Members of the APEC economies have partly endorsed the 8th
APEC Ministerial Meeting on the Telecommunications and Information Industry’s (Telmin8) Okinawa Declaration. The Telmin8 encourages the regional telecommunication players to cooperate with organisations such as the International Telecommunication Union (ITU) and the Organisation for Economic Cooperation and Development (OECD) on the development of methodologies and practices using ICT to mitigate environmental footprint.

In becoming normative to these pressures, Acadia’s officials actively participate in the national and regional initiatives and share information with government representatives and industry partners about Acadia’s effort to reduce its environmental footprint while at the same time, learning best practices from others. The interaction, engagement and dialogue held between Acadia and its industry associates can be considered as the platform for Acadia to have two-way communication. This in turn can be seen as a mechanism that enables the shaping of Acadia’s green IS field and practices, while at the same time, Acadia too, is reshaping the external environments, making knowledge sharing on organisational eco-sustainability field more enriched and fertile via such active interactions.

In becoming normative towards having voluntarily actions in reducing its environmental footprint, Acadia embarked on its ISO14001 journey in 2007. The company received the coveted ISO14001: Environmental Management Systems (EMS) certification in 2008 under the scope of building and facilities operation. Following this, a comprehensive EMS had been launched together with an Environmental Manual for reference by the staff that are directly involved in activities with the potential to degrade the natural environment.

Acadia’s IT Division in its Green IT initiative are in the process of devising a Green Procurement Policy which will enforce green buying practices in the near future. For example, for the purchase of new computers and network equipment, consideration must be made on buying products that are Energy Star compliant. The new procurement policy will also make use of EPEAT audit checklists throughout procurement practice to ensure equipment purchased is made from non-toxic materials, are energy efficient in use, and have after-life support programs such as take-back support from the vendors or manufacturers. However, at the moment, Acadia is not a member of any industry associations (such as GeSI) in championing and/or actively participating in shaping the industry’s green agenda.

Cultural-Cognitive Signals

The leadership of Acadia claimed to lead the company towards adopting best practices across its systems, processes and infrastructure. These initiatives are designed to realise the ambition of becoming a more eco-conscious organisation. While this commitment is mainly to drive internal motivation and local actions, Acadia is in fact listening to the cultural-cognitive pressures put on them from the external forces. Investors, customers, business partners, technology consultants as well as competitors are pushing Acadia towards responding to these cultural-cognitive norms. Operating in a volatile and dynamic telecommunications business, Acadia engages a number of technology and market consulting firms to help it tread the challenging business landscape. For ideas and direction on eco-sustainability initiatives enabled by IS, Acadia listened to the advice from top consulting firms such as Gartner. The Assistant Manager of IT Division stated the following, “We engage quite a number of big technology consulting firms. We made it a point to get the opinions from one of the main experts in Green IT like Simon Mingay to advise us on how we are able to use our ICT assets for greening our business”. This statement provides evidence on how technology consultants are playing their role in shaping the local agenda of an organisation, in this case towards greener business operations.

Similarly, in answering the calls for actions from the investors, customers and business partners, Acadia has released three Sustainability Reports (SR) since 2008. The SR itself is the manifestation of Acadia’s Corporate Responsibility agenda. These reports detail Acadia’s internal eco-sustainability initiatives and report its environmental performance. The reports are prepared according to the Global Reporting Initiative (GRI) framework. Further, the reporting approach is in line with the United Nations Global Compact (UNGC), as Acadia is a signatory of this global compact. Being member of the UNGC, Acadia is also committed to aligning its operations and business strategies to the ten principles of the UNGC, with three of the principles related to natural environment. For example, principle seven requires the support of a precautionary approach to environmental challenges; principle eight encompasses undertaking initiatives to promote greater environmental responsibility; and principle nine addresses the development and diffusion of environmentally friendly technologies. Findings from this empirical study provide evidence and support of the efforts made by Acadia in adhering to these three environmental principles of UNGC.

Acadia’s initiatives to fulfil customers’ demand on greener products and services are translated in a number of products, one being eView. In fact, the fibre-optic high-speed broadband network that Acadia is offering is frequently promoted with energy savings capability when compared to the old copper-based network technology. Acadia is also working closely with the local chapters of non-governmental organisations (NGOs) such as the World Wildlife Fund (WWF) and the National Nature Society (NNS) in organising programmes that will increase the awareness of the protection and conservation of
natural environment. The Corporate Responsibility manager mentioned, “For the past few years, we have been working closely with the WWF and NNS. The programmes involve our staff members as well as school children with the objective of increasing their awareness on the care of Mother Nature.” In responding to external influences, Acadia’s promotion and disclosure of its (a) corporate eco-sustainability initiatives and (b) environmental performance, are examples of mimetic isomorphism to cultural-cognitive forces (Butler, 2011; Jennings and Zandbergen, 1995; Reid and Toffel, 2009).

Local Actions in Shaping Green IS Practices in Acadia

The discussion above has shown that the Green IS field in Acadia has emerged through critical instances occurring in the institutional environment, indicated in the regulative, normative and cultural-cognitive pressures or signals. These institutional pressures, later becoming institutional norms, are the social context and outside triggers which shape the internal realisation of the company’s Green IS practices. We now present the findings pertaining to the phenomenon we consider as the local actions shaping the formation of the Green IS field, ultimately, influencing the recurrent use of Green IS practice in Acadia.

Green IS Field and Subfields

In explaining the local actions, we draw from Bourdieu’s concept of field. From our data, the social space or organisational field in Acadia where the eco-sustainability initiatives takes place, can be called the “Green IS field”. To ease the discussion and analysis of our findings, we divide this larger Green IS field into smaller subfields, namely the top management; environmental stewards and IS managers and professionals. The concept of subfields emerged in many of the interviews whereby the research participants consistently mentioned the various people in different divisions being related to how Acadia is implementing and practicing its eco-sustainability practices. These subfields generally represent the main groups of organisational actors who interface with the external environment and have their own roles within the organisation. Having interaction with the external environment via mechanisms such as fora, dialogues, debates and discussions, they later regroup, share knowledge, make sense and decide (Butler, 2011) on the appropriate responses in addressing the signals received from the external environment.

The subfield of top management consists of the company leadership (i.e. the senior and middle management teams) that has access to resources. The company leadership is able to allocate these resources according to the high symbolic power that they own (i.e. due to their higher hierarchical position within the company). Members of the company leadership, too, have their own set of dispositions towards eco-sustainability issues and views on the roles of IS in managing eco-sustainability. Based on our data, the senior management team is represented by the Company Chairman, Chief Executive Officer and Vice Presidents of corporate functions. Staff members with the post of Assistant General Manager and General Manager formed the middle management team responsible for managing the company at the business function levels.

Another subfield is that of the environmental stewards which consists of the green champions, who could be staff working in eco-sustainability roles, green initiative owners, internal green team members or any other staff members who have strong inclinations towards seeing the company go the greener way. Our data shows that the environmental stewards to be the end users of Green IS practices, the owners of eco-sustainability initiatives, and the staff working within the Corporate Responsibility team. The actors within this subfield have substantial resources in terms of eco-sustainability knowledge but tend to have limited access to other types of resources such as economic and technological resources. The environmental stewards also have their own disposition towards eco-sustainability and being stewards, they arguably have a stronger orientation towards eco-sustainability issues, such as environmental protection and combating climate change and global warming. They may also have a strong belief that IS has an important role in minimising environmental impacts. Another subfield is that of the IS managers and professional subfield. This comprises the organisational actors who have the greatest know-how, access and control to technological resources, including the IS deemed appropriate for enabling eco-sustainability (Green IS) practices. Actors within this subfield also have their own set of dispositions towards eco-sustainability and how IS under their control could or could not be used to enable the company’s eco-sustainability agendas. Our data shows that the people in this subfield comprise of the managers and professionals in the IT Division, and the staff in Acadia’s R&D arm who develop applications such as the UCC.

As indicated by Bourdieu, the fields (and the subfields) are not fixed entities and they are dynamic. Thus, an actor located in one subfield may also occupy another subfield and share the dispositions and values of those occupying the other subfields. For example, the company’s Chief Executive Office (CEO) while having the top position in the top management subfield, he or she may also show great leadership in championing the company’s eco-sustainability agendas. Similarly, some IS managers and professionals may also occupy a place in the top management subfield to help decide the company’s direction.
pertaining to its IT strategies. They may also have a strong disposition towards environmental protection, qualifying them to also be viewed as environmental stewards.

**Recurrent Use of Green IS Practice From Green IS Field Interactions**

The Green IS field as represented by the three subfields has a complex and complicated life of its own. However, this complexity can be unpacked by understanding the power differences, resource management, conflict and conflict resolution aspects. While it is obvious that each subfield occupy different hierarchical level in the organisational field, it is due to these power differences the crises may occur. In addition, the crises may arise due to differences in belief and value systems. In Acadia’s case, the findings show that the interviewed participants generally subscribe to the same disposition—valuing the natural environment, wanting to see radical actions to be taken and believe technology has a major role in addressing eco-sustainability issues. For example, one of the UCC users claimed, “I personally believe in climate change, global warming and whatever things related to this topic.” The company’s top management, while not met for interviews, made their opinions heard in the company’s documents. For instance, Acadia’s inaugural Sustainability Report mentioned the vision of the GCEO of making Acadia a “greener” organisation and an “environmental-savvy telco”.

Differences in the amount and access to material resources could also lead to conflict. For example, in the case of UCC, while the top management shows a positive disposition towards eco-sustainability issues, their opinions are not translated into solid actions. They are generally not keen to allocate resources by purchasing readily available UCC solutions. Instead, the Assistant Manager of IT Division mentioned, “We have evaluated many commercial solutions. They are expensive of course. But the management wanted us to either develop it internally or find cheaper alternatives.” In this regard, the dispositions made known to the external environment and mentioned on many occasions in internal engagement, are not reflected in action—by allocating sufficient budget in commercial UCC solutions. This conflicting view is contradictory and does not align well with the messages sent across internally and to external parties. However, when the UCC was rolled out company-wide, the recurrent use of the system is increasing steadily. According to one of the UCC developers who monitor the UCC usage, there were up to 1,200 active connections at any given time. More awareness on the technology itself and a “lead by example”, approach where the top management themselves use the UCC for their internal communication is recommended, to ensure recurrent and institutionalised practice. From the recurrent practice of UCC, the system could be further enhanced with more green features to amplify the green benefits and improve environmental performance for Acadia.

Another example of conflict is shown in the allocation of free accounts to eView. While the number of staff employed at Acadia is close to 20,000, the allocation of 50 accounts is only a small percentage of this population. According to the eView manager, “At the moment, there is no direction from the management to allocate more accounts.” While Acadia promotes eView to its customers, many divisions within Acadia are still subscribing at least one paper-based newspaper each everyday. Another eView manager said “We realise that the internal market alone is pretty significant. Even if eView was just used by our own people, the subscriber-base would grow significantly. But there is still no direction from the top for divisions to drop traditional subscriptions and move to eView which is cheaper and also eco-friendly.” For eView to get recurrent use and become an institutionalised practice, the suggested solution is to open up more free accounts or even making it compulsory for each division to go the eView way and abandon paper-based newspaper subscriptions. As noted by the eView manager, this situation could be resolved by leveraging the power available to top management to change the non-sustainable practice to a greener practice alternative, i.e. by having a policy on mandatory eView subscription by each division.

Based on the findings and discussion in this section, Figure 2 illustrates the emergence of the Green IS field as a result of interaction between organisational actors with external influences. It also shows how Green IS practice becomes recurrent as a result of local actions and the dynamic interactions among actors within the Green IS field.
CONCLUSION

This study draws on Bourdieu’s field construct and Butler’s institutional environments perspective to explain the emergence of the Green IS field and recurrent use of Green IS practice. The supporting concepts of eco-sustainability practice and Green IS practice are also covered. The exogenous factors are sent as regulative, normative and cultural-cognitive signals in which the organisational actors must be cognisant towards these stimuli and ready to take appropriate actions. Within the organisation, local actions happening in the Green IS field demonstrate the complexity of organisational environments. In unpacking this complex and indeterminant processes, we delve into the phenomenon using the practice lens with the analytical tools of field, habitus, resources and interactions. In supporting this conceptualisation, the study’s findings describe the shaping of Green IS field and the recurrent use of Green IS practices of UCC, eView and SDAM in Acadia. Evidence from this empirical work provides practitioners a way of understanding the complexity of practice phenomenon rarely revealed, in academic or practitioner literature. For IS researchers, this research demonstrates the capability of investigating the internal dynamics of new practice creation without discounting the broader socio-political processes commonly captured from the institutional environment perspective. This study also contributes towards adding new knowledge to the emerging ‘practice turn’ research in general, and to the broader Green IS research specifically. The paper has a few limitations. Firstly, the proposed conceptual framework is not tested and validated against a larger research involving multiple case organisations with multiple Green IS practices. Secondly, the study was conducted in the context of an organisation that arguably has a short tradition of eco-sustainability culture. Future research could be devised around testing and verifying the framework on a larger scale and utilising a longitudinal research approach. Additionally, further investigation of the topic in organisations with a long history of eco-sustainability may yield different and revelatory insights.

REFERENCES