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AN EXPLORATION OF INFORMATION SYSTEMS ADOPTION: Tools and Skills as Cultural Artefacts— The Case of a Management Information System

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Abstract

This paper explains the development of a skills-focused approach which can assist organizations to better anticipate hurdles to successful information systems adoption. This approach is utilized in an interpretive field study in an Australian information technology company. From a perspective that views information systems as tools, the approach is used to analyze the management control skills required to use a specific management information system. A skills match between the set of management control skills assumed by the tool maker and the skills possessed by the tool user shows why a group of users with a high degree of match adopted the tool, while another one with a low degree of match did not. The study demonstrates that the skills-focused approach is a valid and effective way of determining the appropriateness of an information system.

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1 INTRODUCTION

Research indicates that many information systems and information technology implementations are not to the satisfaction of the adopting organizations. Larsen and McGuire (1998) reported that half of all implementations are deemed unsuccessful or inappropriate. Unfortunately, the research into IS diffusion has not yet achieved very fruitful outcomes for the IS community, in academia or industry. Research into this area suffers from weaknesses, including bias and fragmentation (Kautz et al. 2005).

Taking a step back from current research directions, Bunker (2001) explored IS adoption through an anthropological perspective. She argued that IS/IT are tools in context and are created and used within a cultural framework. Tools inherit the cultural values and assumptions of the creator's culture. As tools and the skills to use them are closely related (Ayres 1978), the tool's cultural characteristics are manifested in skill sets. Difficulties could thus emerge if the tool maker's assumptions about the context in which the tool is to be used are not matched by the tool user's actual context. On this background, we outline a skills-focused approach to analyze tool maker and tool user contextual differences through the comparison of assumed and actual skills, which can assist in anticipating hurdles to successful IS adoption.

This paper examines the validity of the approach by documenting an interpretive field study of an IS adoption in an Australian IT company. In particular, the approach is used to analyze the management control skills required to use a management information system. Three questions guide this research:

- (1) What is the outcome of a skills match between the set of management control skills assumed by the tool maker and the skills possessed by the tool user?
- (2) What factors in the user's process of tool indigenization appear to contribute to the resulting skills gap, if any?
- (3) Is the skills-focused approach a valid and effective way of determining the appropriateness of an information system?

The remainder of the paper is organized as follows: Section 2 provides the theoretical background and introduces the main concepts of the framework. Section 3 presents the research approach and method. Section 4 describes the setting of the case study and section 5 includes and discusses our findings. We finish the paper with some conclusions in section 6.

2 THEORETICAL BACKGROUND AND FRAMEWORK

The current fragmented status and limited value of IS diffusion and adoption research motivated us to explore alternative models for understanding IS adoption. Scandinavian researchers (Ehn and Kyng 1984; Kammersgaard 1988) suggested a tool perspective on the development and use of computer-based information systems. Bunker (1998, 2001) specifically applied this perspective to IS adoption. Based on an anthropological approach to research in information systems, she developed an argument that views information systems as tools that are created in a context, with a particular set of cultural values and assumptions underpinning their creation. These cultural values and assumptions are manifested in skill sets.

2.1 Tools, Skills, and Organizational Culture as Their Context

Man is incomplete as a species and without tools—devices that aid in accomplishing a task or instruments used to perform an operation or necessary in the practice of a vocation or profession—**is unsustainable compared to any other species** (Stahl 2002). Technology is a sophisticated type of tool that is able to extend human capacity and even act as a substitution to achieve goals (Stahl 2002). Tools are created and used in context and are a reflection of human capacity and human culture (see Latour 1987; Winfield 1991; Winner 1986). They inherit the cultural values and assumptions of the tool maker's culture and consequently the intent and use of the tool is defined by that culture. It is a challenge for a tool user of a different culture to fully appreciate the original intent and representation of the tool.

For any tool, the mutual contingency of tools and skills is of importance for an understanding of technology as a function of human behavior (Ayres 1978). A tool requires skills not only to use it but also to understand the intent behind it. Ayres argues that technology not only involves the use of tools designed to complete an objective but also the set of skills that accompany tools. There is a natural affinity between tools and skills; human skills and the tools by which and on which they are exercised are inseparable. Skills always employ tools, and tools are such, always by virtue of being employed in acts of skill by human beings. A person's skills set is derived from the culture of which the person is a member (Bunker 2001). The same cultural derivation applies for tools. Thus, for a tool user to possess the skills to truly understand the intent and use of the tool, the user would have to subscribe to the cultural values and assumptions that are inherent in the tool (i.e., assumed by the tool maker). If tools are a visible manifestation of the assumptions and values that the IS discipline embodies, then information systems are those tools.

The term skill is commonly seen as the ability and knowledge used in order to achieve or do something. In the labour literature, skills are seen as the driver of job tasks, which then define job roles (Frizzell 1991). Jones and Whittaker (1975) comment that the mechanistic nature of the labor-industrial perspective on skills is constraining the proper examination of a person's skills set. Skills are a goal-directed, well-organized behavior that are acquired through practice with economy of effort (Proctor and Dutta 1995). The types of skill can be physical, motoric, and partially perceptual; or mental, cognitive, and perceptual; or a mixture of both (Jones and Whittaker 1975). Proctor and Dutta (1995) argue that the context partially determines skills acquisition. Skills go beyond the labor literature's mechanistic and physical portrayal and come as a dual-faceted entity featuring a mechanistic, technical dimension and an organic, cognitive component in which contextual, cultural factors play a role.

Sincoff and Sternberg (1989) report that contextual factors receive significant attention in psychology research. Here, Rosenbaum et al. (2001) argue that perceptual-motor skills are affected by context and the perceptual, cognitive, and motor domains work together to achieve skill acquisition and skilled performance (Carlson and Yare 1990; Jones and Whittaker 1975). Given that skills are defined by mechanistic and organic components, it follows that a person's skills are embedded in the context in which they are learned. The context shapes the skill through its organic component. This again raises questions about the transferability of skills in other contexts.

In an IS environment, skills are critical. Zuboff (1988) talks of the IS environment as a "computer-mediated" environment where certain realizations about organiza-

tions' capabilities must be made. Information systems are not neutral tools and they embody essential characteristics that are bound to alter the nature of work within our factories and offices, and among workers, professionals, and managers. The profound effect of information systems on organizations and the strategy to deal with this relates to the type of skills present in the user organization: Mastery in a computer-mediated environment depends upon developing intellectual skills.

Tools and their associated skills are developed and used in context. Cultural values and assumptions are inherent in tools and, consequently, their intent and use is defined by that culture. Organizational cultural theory helps to articulate precisely what is meant by culture and context, and how this impacts on IS adoption. Schein (1984) conceptualizes an organizational culture as having three distinct layers. The first layer holds the basic assumptions possessed by all members of that culture. These assumptions concern members' fundamental values of reality, human relationships, human nature, and the environment. They are taken for granted, subconscious, invisible, and most difficult to change. The second layer holds the values to which members subscribe but are espoused, overt, and debatable, unlike basic assumptions. In the third and most visible cultural layer, labeled artefacts and creations, visual and tangible manifestations of culture are found, such as technology, art, and visible and audible behavior patterns. Schein's three layers of organizational culture form the contexts of both the tool maker and tool user in our model and complete the building blocks of our framework.

2.2 Management Control as a Significant Dimension of Organizational Culture

Culture is a multifaceted, complex phenomenon (Conner et al. 1987). Regrettably, prevailing IS research has taken a more for-granted view of the concept of culture (Avison and Myers 1995), which strips away the richness of this socially constructed phenomenon. While our research adopts an anthropological approach to studying information systems and organizational culture, it would consume more than one project to conduct complete cultural research. For that reason, the cultural focus undertaken here is further refined to a single yet important dimension of organizational culture, that of management control.

Inspired by Hofstede's (1991) work on dimensions of organizational culture, our analysis of the tool maker's and tool user's contexts has been confined to the culture of management control and the management control skills used with the tool under study—a dimension originally termed the loose versus tight control dimension. This is for two reasons. First, in the case study, the management control agenda of the tool user is most pertinent to its decision to adopt a practice management information system. Second, there is validity in concentrating on issues of management control because it complements the nature of the tool. The tool centers the time-based accounting of human resources, where standards of performance are monitored, analyzed, and set. To properly investigate the management control agenda in both the tool maker's assumed culture and the user's actual culture, we performed a further literature study to unearth common dimensions that could be used to provide specific focus for our investigation. Here, the work of researchers in organizational culture, organization theory, and organizational management was considered. As a result, five dimensions of management control were discovered,

Table 1. The Five Dimensions of Management Control

Dimension of Management Control	Literary Sources	Description
Standardization	Burns and Stalker 1966; Langfield-Smith 1997; Mintzberg 1979; Robbins 1983	The implementation of rules, standards, policies of engagement and operation
Policy compliance	Hofstede 1968; Mintzberg 1979; Tricker 1976	The measurement of performance and compliance, and the systems in place to motivate performance and compliance
Communication, interaction, behavior, and reporting	Burns and Stalker 1966; Hofstede 1968; Mintzberg 1979; Tricker 1976	The nature of the interaction and communication amongst members of all levels within the organization
Group divisions and its formalization (structure)	Burns and Stalker 1966; Mintzberg 1979; Robbins 1983; Tricker 1976	The formalization of organizational structure and job roles, the locus of decision making
Attitude toward control	Langfield-Smith 1997; Mintzberg 1979; Robbins 1983; Wieland and Ullrich 1976	Management and employee attitudes to meeting objectives and controlling resources, uncertainty, and variability

namely standardization; policy compliance; communication, interaction, behavior, and reporting; group divisions and its formalization; and attitude toward control. Table 1 provides details on each of these dimensions, including its literary sources and a brief description.

3 THE RESEARCH APPROACH AND METHOD

The research strategy reflects the researchers' relativist and constructionist assumptions. The research questions focus on the exploration and understanding of IS adoption using a skills-focused approach. Thus, the need for contextual respect is an influencing factor on our research strategy. Culture is not something that can exist as meaningful entries independently of consciousness and experience (Crotty 1998). Rather, culture is historically determined, related to anthropological concepts, and socially constructed (Hofstede et al. 1990). Hence, an abductive research strategy is used, its view of a socially constructed reality and use of thick descriptions (Blaikie 2000) enable the researchers to deal with all three research questions and properly respects the contextual and cultural aspects of this research.

As understanding human subjects and the world in which they live are only achievable through the interpretation of what subjects understand about themselves and their world (Lee 1994), we opt for an interpretive study. We gained an understanding of the IS adoption situation in the tool maker and user organizations by hermeneutically interpreting the text that was gathered in the data collection phase (Boland 1991) by

attempting to make sense of the confused, incomplete, cloudy, and contradictory views (Myers 1997) of people through text-analogues in the form of transcriptions of all interviews and documentary texts. Data collected from in-depth interviews took the form of experiences, anecdotes, feelings, and statements of respondents. Eventually, following the hermeneutic circle of interpretation led us to a rich understanding of the tool maker and user contexts, the IS adoption that took place, and the skills required.

The strategy of inquiry was a case study featuring a tool user organization adopting a practice management information system developed by a tool maker organization. The research was conducted between the second-half of 2001 and the first-half of 2002. In-depth interviews were performed with four representatives of the tool maker (mainly consultants) and seven employees of the user organization (some managers using the information provided through the tool and other employees who, as timekeepers, were supposed to supply the tool with time information about their work). Documentary artefacts assisted with understanding the issues brought to the surface through the interviews. They were used as a way of triangulating the data, to verify the results. Artefacts included e-mails, memos, minutes of meetings, user manuals, presentations, training guides, and product marketing material.

A skills checklist was devised to facilitate the skills matching process. Using the checklist, the tool user's actual skills were checked against the tool maker's list of assumed skills. The checklist was categorized into the five cultural dimensions of management control.

4 THE CASE STUDY SETTING

4.1 The Tool User

Dataware¹ is a company spanning a number of sectors of the IT industry employing over 1,200 employees around Australia. The company had grown significantly from its inception in 1987 and had achieved a solid reputation. Its success in the 1990s attracted a multinational IT company, which bought it in 2001. Along with the purchase came a change in identity and management structure as well as a rationalization of existing divisions and the creation of new divisions. Every area of the company was affected by the downsizing.

Dataware was an esteemed employer. This was a reflection of the familial culture that existed before the purchase. The culture was reflective of a loosely controlled organization, where sticking to budget was not a priority. The company was very results-oriented, which contributed to its lack of concern for controlling costs while increasing revenue. Another characteristic of its culture was its enthusiasm for technological innovation. There was no hesitation in adopting new technologies that could assist it in its operations.

The major shake up in the company's size, structure, and identity after the purchase changed the organizational culture. The change was evident in the use of words. Rather

¹On request to protect any identities, the names for the tool maker, the tool user, and the tool itself have been invented.

than describing the culture as *family* as before, terms such as *governance* and *company corporate* were used. There was a profound effect on employee morale after the purchase. With the downsizing continuing, the atmosphere was one of uncertainty. The company's **ITS (IT Services) Division** was not targeted intensely during the rationalization. It was responsible for the entire IT infrastructure and covered networking and communications, hardware, operating systems, and system applications for internal use. The staff were segregated into groups according to their function or service: a **Project and Development Group** managed all IT projects which dealt with the development of system applications for internal use; and a **Support Group** had the responsibility of supporting these applications and was in charge of maintaining and enhancing the networking infrastructure, operating systems, and hardware.

The division was mainly made up of system developers, system administrators, IT architecture specialists, project managers, and network engineers. The culture was similar to the rest of the company. The familial culture of optimism lingered for some time after the start of the rationalization process. However, with the introduction of a new practice management system, the culture transformed.

4.2 The Tool Maker

SixSoft is a publicly listed Australian company that has the practice management system called **STM** as its flagship product. Its services go beyond its systems to the technology, consulting, and training domains. The company boasts a global presence of over 1,600 employees and a client base of accounting and legal professions, the government sector, small and medium businesses, and large enterprises.

4.3 The Tool and its Adoption

STM was adopted by the commercial areas of Dataware in late 2000 to fulfil its requirements for supporting timekeeping. STM is designed for professional services firms to manage financial administration. It allows firms to record the time their employees spend on client work and subsequently bill the client based on those hours. Although SixSoft proclaimed that the system could be used in any professional services firm, it is interesting to note that it was originally authored as a solution for the legal profession.

During the initial adoption, the ITS Division was not part of the rollout because it did not charge for work performed for internal customers. In mid-2001, ITS management decided to implement a new version of STM for itself and installed the timekeeping module. It was seen as a way of formally monitoring staff with respect to their time at work. Instinctive and possibly unfounded management perceptions were meant to be replaced by official and factual evidence. The tool required all ITS staff to enter the time spent working.

As a tool for management, it would have been expected that ITS management would involve itself heavily with its introduction. Instead, hindsight made them realize how they failed to give the project the appropriate amount of managerial attention and significance. There was insufficient effort to define precisely what they wanted from the

system, and how to go about achieving these objectives. The urgency of a timekeeping solution had put pressure on them to arrive at a resolution on time category definitions. Once STM was operational and staff entered their time into these categories, the definitions were found to cause confusion and subsequently underwent a series of revisions. Our analysis explains the phenomenon in more depth from the tool and skill perspectives.

5 FINDINGS AND DISCUSSION

We now present the tool maker's assumptions and the user's skills with regard to management control. We could not, however, identify any common assumptions and skills related to the group division and its formalization.

5.1 Skills Assumed by the Tool Maker SixSoft

Related to *Standardization*. The respondents stressed the importance of having organizational rules and policies that govern the way that business is conducted and employees work. They believed that the rules and policies must have clarity and be uniformly applied to the entire organization or organizational unit. They spoke about the need for a standard, accepted basis for recognizing business entities and events in order to record, control, and measure them properly. It was stressed that a common denominator has to be determined and used as the basis of performance measures in two critical aspects: budgeting and human productivity.

Clarity and uniformity are required for policies concerning where and how decisions are made and ratified. Without explicit conventions about executive powers, important decisions may be delayed, which could harm productivity. Based on these responses about standardization, the user must have the skills to develop clear and uniform measures of performance and decision-making policy.

Skills Related to *Policy Compliance*. SixSoft assumed that the tool user would have formal programs that motivate employees to enter their time sheets accurately and expeditiously. Any employee time that is either not calculated accurately or entered in a timely fashion represents an opportunity cost. The sales representative alluded to the use of key performance indicators (KPI) in order to motivate employees to time keep properly, accurately, and effectively. Any KPIs created to motivate timekeeping must be applied uniformly to all employees. In summary, the assumed policy compliance skill on a divisional level involved the setting up of motivational programs for timekeeping.

On the managerial level, managers are assumed to play a pivotal role in the division's financial and human performance. They are the visible manifestation of the division's policy compliance framework. They are there to enforce and encourage employees to time keep accurately. Managers should regularly review their staff's time sheets as the quality of their decisions is contingent on the data derived from their staff and they should be able to set and track a budget. Budgets are seen as a complex but critical goal. This is indicative of an ambitious culture where they "do it right and not just get it done." The budget will determine the scope with which employees can per-

form work. Budget performance is a key indicator of the organization's health. Managers need to understand how to spot trends, how to analyze data, and how to read the data analysis. This skill is about whether or not managers can act upon the information generated by and for them.

Managers have the need to know what their staff members are doing at all times. This requires managers to constantly monitor and review the projects and jobs that their staff members work on. Managers are assumed to be responsible for the completion of jobs and projects and, hence, should demand to know what staff are doing. STM provides managers with the visibility to examine employees' activities in an indirect and less inhibiting way. The constant monitoring and review of employees' work is also performed to detect obstacles that can be detrimental to the goal of productivity or chargeability. Information from STM and other sources should assist managers to foresee obstacles that lay ahead for their staff.

The four managerial skills related to policy compliance thus are review time sheets, set and track budget, monitor projects and jobs, and detect and clear obstacles to productivity.

Skills Related to *Communication, Interaction, Behavior, and Reporting.* Managers should be coaches and while being in a position of authority they should be in a mentoring role in order to support employees. Managers should be able to provide feedback to employees about their work performance. The managers' feedback provision follows from the view that they take interest in their employees and are keen to improve them. They should also communicate with the frankness of an open culture. Implementing a time accounting system can bring an atmosphere of mutual distrust, if the system and its introduction are not managed carefully. This can be avoided if STM is made open for all to access. Employees are then able to access and interpret issues using the same information as managers, who must be honest about financial and human performance. This enhances their relationship and facilitates mutual trust.

The three managerial skills here are being a coach and mentor, providing feedback to employees, and being frank about time accounting performance.

The respondents gave similar responses when asked about how staff members should do timekeeping. There are two steps to this process: to keep track of work each day and to enter this information into the system. For the first step timekeepers must recognize the work they performed "just a minute ago, an hour ago." They must be able to break down their day into pieces of work and understand the amount of time spent on each piece. The second step entails the processes that the timekeeper must think about in order to transfer a timed record of work into the system. The most difficult part of this process is to classify the time spent on each piece of work. The classification step involves identifying each piece of work, determining the client for which the piece was performed, and the type of work it was. Timekeepers are then asked to provide a description about each piece of work in the form of a narrative that allows others to be informed about the performed work.

While the skill of timekeeping appears mechanistic in nature, there is a context in which timekeepers record and enter their time. Timekeepers must understand that timekeeping is both in their own and their organization's interest. They are accountable to management, the organization, and to their clients.

Skills Related to *Attitude Toward Control*. Based on the assumption that STM is a tool with information open and visible to everyone, the user should not have any qualms over sharing information among employees. The idea behind such visibility is that an open culture encourages trust between management and employee and stimulates performance. Related to the user imperative to align revenues and costs closely to budget forecasts in an environment where professionals sell their expertise, the user must be aware of how much revenue is being generated through employees and how much cost is incurred. This information should then be compared with a budget to determine the user's performance.

In summary, the tool user must have two attitudinal skills: promoting information visibility and aligning revenues and costs to a budget.

5.2 Skills Possessed by the Tool User Dataware

Our analysis revealed that the ITS Division was split into two different subcultures: the Project and Development Group (PDG) and the Support Group (SG). Respondents who worked in the PDG, who performed project work lasting a longer period, saw significant benefit in STM. But respondents who worked in the SG had a consensus that STM's implementation was misguided and that it was not of much value. In terms of management control, differences were discovered between the subcultures in every sub-dimension.

Skills Related to *Standardization*. The implementation of STM was part of a broader objective for the division to become more regimented in the way it conducted its operations. ITS had an image problem for a few years as being disorganized and slow to act. The problem was exacerbated because ITS was a collection of teams, each with different responsibilities and goals. The solution was to find some common ground on which the teams could all interact successfully and appear as one to the organization.

In line with other projects to formalize the processes of the division, the STM implementation resulted in another formal standard. The focus was on how staff should identify pieces of work and classify them appropriately for timekeeping. The effect of introducing these rules was positive. Productivity increased and the organization started to appreciate the division's work. Accordingly, ITS appeared to possess skills of developing and disseminating policies, including those on decision making.

In terms of uniformity in performance measurements, however, ITS differed from SixSoft's assumptions. There was no suggestion of common measures using information from STM across the division. It appeared that the nature of each team's work shaped each manager's idea of performance. Only the PDG was concerned with the financial and human aspects of performance. This was indicative in the reports that project managers generated for their use and to show clients.

Overall, the division did not possess the skills of developing uniform standards for performance measurement. The varied nature of its work prevented it from reaching agreement on how performance should be defined. If we look at this situation from the perspective of the two ITS world views, only the PDG had its own uniform measures of performance that bear resemblance to SixSoft's assumed ones.

Skills Related to Policy Compliance. ITS used a KPI program for employees as its method of motivating employees to time keep. But the approach taken was fairly simplistic. Management enforced one KPI, which monitored whether each timekeeper submitted weekly time sheets by a certain deadline. The rationale behind this was not so much ensuring that timekeeping was observed; it was to diffuse the initial backlash from some staff about the new “Big Brother” tool and to demonstrate that management was serious about timekeeping. The tool maker’s assumption that time capturing is a critical activity was generally not relevant to ITS. The PDG used time as a measure in managing their projects; for other work, timekeeping was secondary. The SG manager went as far as stopping the recording of his time. The division did not have the skills to effectively instill timekeeping in employee’s KPIs.

Managers in the PDG were involved in ensuring that their employees complied with the timekeeping policy. They had an interest because the information they gained from employees through STM assisted them in managing their projects. One compliance approach was to review the time sheets to check that the allocation of hours was in line with the budget set for each project.

Budgets were crucial to the PDG. They defined the scope with which projects were performed in order to reach the organization’s goals. The managers demonstrated skills of tracking budgets to check that project performance was to expectation and their skills in reviewing time sheets and tracking budgets reflected the discipline of project management. The managers recognized that they were accountable to the company and their clients, and they employed their skills as part of efforts to keep themselves and others informed. Hence, managers in the PDG possessed three of the four skills assumed: regularly reviewing staff time sheets, setting and tracking budgets, and monitoring and reviewing projects.

A different picture emerged from the SG. There was no management review of time sheets or monitoring of employees work on a daily basis. Trust and intuition of employees were the two major values that underpinned this management style. This went against the values of monitoring and reporting, which were manifested in STM. Furthermore, the SG did not charge for work or run explicitly to a budget. ITS’ STM implementation had little bearing on SG work. This demonstrates that the SG did not possess the first three managerial skills that were assumed by SixSoft. Their work simply was not congruous with the type of structure and discipline expected.

With regard to the managerial skill of detecting and clearing obstacles, only the PDG managers seemed to possess it. Their concern for performance made it necessary to watch the welfare of their staff, using STM to detect possible anomalies in the staff’s productivity patterns as an indication of possible delays to projects. The SG managers too were interested in the welfare of their staff; however, the rationale had less to do with maintaining performance and was more related to the camaraderie that existed in the teams.

On the whole, the PDG possessed all assumed skills in policy compliance on a managerial level. The SG did not possess any of the assumed skills.

Skills Related to Communication, Interaction, Behavior, and Reporting. ITS staff did not necessarily require a mentor or coach to guide them. Staff consisted mainly of senior professionals. The team managers promoted autonomy and self-guidance rather than dependence. This is not to say that no interest was taken in staff welfare. The managers

believed that they and their staff were in teams where support was given to each other. This arrangement appeared to work well for most operations. From a timekeeping perspective, the lack of guidance had a negative impact. The hands-off approach to dealing with staff exacerbated problems with the classification of work in STM and the managers of both groups did not exhibit the assumed mentoring or coaching skills.

In terms of feedback to employees about performance, the nature of the PDG management meant that it was implicit in the policy compliance skills of monitoring, review, and budget tracking. Employees were kept up-to-date about their contributions with respect to the progress and performance of projects. On the SG side, STM was not used to prepare feedback for employees. Any feedback that was given appeared to only recognize workers of long hours. In conclusion, only the PDG possessed SixSoft's assumed skill of providing feedback on performance.

The assumed skill of talking openly about performance matters is related to the skill of providing feedback as it presumes that managers access and use STM. Hence, only the PDG managers possessed this skill.

The timekeepers from the PDG had a similar timekeeping style, which they performed according to the ITS standards. They recorded (on paper) the amount of time they spent on work in blocks of 15 minutes. Then, they identified the type of each piece of work, which was one of four standard types in ITS work. Next, they determined how to classify each piece according to the array of projects, clients, and codes set up in STM. The timekeepers also had a common view of the reasons for timekeeping. Timekeeping was focused on what their manager and client expected. This was what SixSoft assumed.

The SG timekeeping behavior followed a less stringent process. The first step normally saw a rough estimate on the amount of time to be spent on the work. The next step, the classification of work, was made simple. The bulk of work was allocated to only two categories—*support* and *administration*—with an aggregated time for each and no explanatory narrative. The way in which staff entered hours was more their decision than a process that management prescribed. The apparent flexibility in timekeeping in this group was indicative of the assumptions and values underpinning this skill. Essentially, it came down to the fact that the SG work was not financially focused. Another issue with STM in the SG was that it was viewed as a tool of scrutiny, which elevated an atmosphere of mutual distrust between management and some in the SG. The team was suspicious of management's motives behind STM. They felt that management had put a system in place to police them.

Ultimately, the analysis demonstrated that timekeepers in the SG were lacking timekeeping skills. Despite fulfilling the mechanistic system requirements, their incompatible organic view was at odds with the assumed skill sets for the use of STM.

Skills Related to *Attitude Toward Control*. There was a difference of opinion when the topic of visibility and open culture was raised with some respondents. One PDG manager was convinced that STM made more visible (for everyone) what all staff were actually doing, providing managers sanctioned access. However, it was only the ITS managers who were privy to most of the information. This went against the expectation of the company's CIO, who held the belief that all information related to time accounting should be made freely available to everyone in the company.

In ITS's STM implementation, the developer, who was responsible for determining the access list to information, decided on her own, not to make the reports freely avail-

able to all staff, in spite of a clear mandate from the CIO. The reasoning was that in an open culture, information could be abused. So far, no one has challenged this decision. To see visibility as a negative feature goes against SixSoft's assumption that openness to information creates an atmosphere of mutual trust between management and staff. Consequently, ITS failed to possess the skills of promoting visibility and an open culture.

With regard to the topic of budgeting and its importance in ITS, the split between the PDG and the SG was clear. Budgeting was a central part of the PDG's mission. For the SG, project and budget plans were irrelevant to their work and, therefore, their concerns for these issues were minor. While the PDG dealt with performance in terms of budgets using STM information, the SG did not. The divide between the two groups on the importance of budgeting highlights another split in skill sets. Only the PDG, motivated by issues that were assumed to drive budgeting, possessed the skill of promoting budget importance.

6 CONCLUSIONS

The contrast in the actual skills possessed by the two ITS groups highlights that the tool was only appropriate for one group (PDG) and explains some of the problems accompanying the adoption of this technical innovation. The organization faced a choice: change the tool to suit the SG or reconfigure the SG to suit the tool.

Beyond this result, the study demonstrates that the skills-focused approach is a valid and effective way of exploring IS adoption and it represents a step in a new direction for IS adoption research. The concept of skills, as a manifestation of organizational culture, could be used to articulate the differences in tool maker-tool user contexts.

The approach also has favorable consequences for industry. Tool users have an enhanced measure to determine the appropriateness of information systems. The assessment could assist them in devising proper indigenization plans with the intention of eliminating any skill gaps. For management of the potential tool users, the approach could become a tool to assess the organization's skill sets on varying levels of the organization and will allow management to be aware of the culture and capabilities that exist in the organization. This could be of benefit to their decision making. There are also positive implications for tool makers. They can become considerate of contextual factors that may inhibit customers' adoption of their products. The approach could arm them with a technique to assess the difference in their customer's skills and context compared to their own assumptions. This could influence how they design and implement the process of transferring their systems.

Our research on the tool maker side was not directly informed by the actual developers of the tool, but by the consultants responsible for its sale and implementation. Although this resulted in valuable insights about the skill-based assumptions made by the tool makers, the study might have benefitted from the involvement of the actual developers. Another limitation is that the research focused on a single dimension of organizational culture: management control. Expanding the cultural scope, especially with regard to other types of information systems, is a task for the future. There are opportunities to study IS adoption that employ different indicators for management control as used in this study. Future research could take on more dimensions of organizational culture. Learning about the impact that other cultural dimensions have on the skills-focused approach would be a constructive contribution to the overall development of the approach.

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