IT In Context: A Relational Approach To Understanding Users’ Responses To Enterprise Information Systems

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Abstract
This study aims to examine how users respond to a newly implemented enterprise information system. In doing so, a relational perspective of human agency is proposed. A relational perspective to agency emphasises the relationship between actors and their environment, and views actors in multiple socio-temporal contexts, with varied orientations toward past practices, present contingencies, and future possibilities. The study utilised semi-structured interviews with participants from the project management, the IT department, and the functional business units. Findings of the study illustrate how structures at different levels interact with agency to produce practices that influence the project of IT-endorsed organizational change.

Keywords: technology appropriation, enterprise information systems, human agency, context, relational approach, organizational change

Introduction

The central role IT can play in organizational change programs has been widely recognized in the Information Systems (IS) literature (Markus, 2004; Orlikowski and Yates, 2006); yet IT-associated change is thought to be largely impacted by the actual practices of actors within organizations (Boudreau and Robey, 2005). Thus, studying micro-processes of IT systems’ use is important to understand the outcome of such change projects. Recent literature on IT use has contributed to a deeper understanding of IT appropriation patterns occurring through social interaction within specific organizational contexts. However, this literature focuses mainly on the immediate local context in which those micro-level interactions take place and has relatively underemphasised the role of broader structures and social relations in assessing and analysing these processes (Mutch, 2010). This study therefore aims to address this limitation by exploring the role the broader context in the exercise of human agency in the use of Enterprise Information Systems. EIS implementation projects are typically embedded in complex technical and institutional dependencies that produce a rich context for investigating multiple and opposing forces on technology use.
The empirical setting of this research is a large airline organization (Xlines) in one of the Arab Gulf Cooperation Council (GCC) countries. During the time of the study, the organization has been undergoing preparations for privatization (transformation from state to private-sector ownership and operation). Data are reported from the case of introducing a new training management system (SYSLEARN) in the technical training unit of Xlines, as part of a larger project of Enterprise Information System implementation across the organization. This study sets out to address the following research question: How do actors respond to the introduction of an enterprise information system? We investigate the actions of employees within an organizational unit that has been the subject of a technological change programme, and seek to understand stakeholder’s actions by adopting a human agency perspective on work practice that also emphasises the relationship between actors and their environment.

1.0 Theoretical Background

Over the last few decades, studies of technology in organizations have recognised the role of human agency against prevailing accounts that privilege the impact of structures on agents (Boudreau and Robey, 2005; Markus and Robey, 1988; Orlikowski and Baroudi, 1991). Alluding to the importance of attending to the ways human actors enact agency as they engage with new technologies and their associated organizational changes, scholars have proposed a number of specific theoretical perspectives including structuration (Orlikowski, 1992, DeSanctis and Poole, 1994), actor network theory (Walsham, 1997), and practice lens(Orlikowski, 2000). Each of these perspectives directs attention toward human agency and processes within organizations as influences on users’ appropriation of technology in organizations. An agency perspective on information technology is important because it raises important issues regarding technology-enabled organizational change; if information technologies are underutilised or appropriated for uses that were not intended, their ability to enable change may be limited (Boudreau and Robey, 2005).

However, explanations for the choices that actors make when confronted with new conditions have tended to undermine the importance of embedding agency in the broader institutional and organizational settings (Mutch et al. 2006, Mutch, 2010). Alternatively, it is important that the exercise of agency is seen in relation to the
varying structural contexts of action; a conceptualization endorsed by the temporal-relational theory of human agency (Emirbayer and Mische, 1998).

2.1. A relational concept of agency

Treatment of human agency as presented by Emirbayer and Mische’s (1998) is particularly relevant to studies of IT in organizations because it speaks to elements often associated with IT-mediated organizational transformations (Boudreau and Robey, 2005). Advanced information technologies are usually introduced with future promises of making organizations more efficient, integrated, and competitive. Yet, these new technologies are assumed to replace legacy systems and overthrow familiar work practices. Thus, the iterational element becomes relevant to technology-enabled organizational change because past work practices often operate as a force opposing future possibilities. In such situations, actors are presented with varied possibilities to judge and exercise agency. Emirbayer and Mische define agency as:

“the temporally constructed engagement by actors of different structural environments – the temporal-relational contexts of action – which, through the interplay of habit, imagination, and judgment, both reproduces and transforms those structures in interactive response to the problems posed by changing historical situations” (Emirbayer and Mische, 1998, p. 970).

Here, agency is put in a temporally situated process in which actors reflect simultaneously on the past, present, and future implications of their potential actions. In reference to the past, dispositions to continue comfortable and known practices are assessed against desires to overcome negative experiences. In considering the future, ambitions to change in positive directions are balanced with fears of the unknown. Finally, the evaluation of the present conditions may lead actors to adjust current plans to respond to emerging demands.

Moreover, Emirbayer and Mische’s (1998) articulation of agency asserts that contextual circumstances “support particular agentic orientations, which in turn constitute different structuring relationships of actors toward their environments” (p. 1004). It explicitly recognises that individuals are not passive entities; they try to influence the conditions they live in. At the same time, this definition of human
agency recognises that contextual circumstances predispose responses that privilege or exclude certain behaviours. This framework, therefore, presents an opportunity to show the extent to which, and the means by which, actors go along with or resist the introduction of technology and its associated organizational changes.

In order to understand the complex interaction between actors and their circumstances, Emirbayer and Mische (1998) put forward three elements of agentic orientation: iterational, projective, and practical-evaluative. These elements are described in the next paragraphs.

**Iterational element:** The iterational element refers to ‘selective reactivation by actors of past patterns of thought and action, as routinely incorporated in practical activity, thereby giving stability and order to social universes and helping to sustain identities, interactions and institutions over time’ (Emirbayer and Mische, 1998, p. 971). Emirbayer and Mische suggest that past social experience is schematized and becomes manifest when actors recall, select, and apply schemas of action developed in prior interactions. The iterational element of agency represents the tendency to repeat past routines and habits, thereby reflecting inertia rather than transformation of work practice.

**Projective element:** The projective element of human agency refers to the ‘imaginative generation by actors of possible future trajectories of action, in which received structures of thought and action may be creatively reconfigured in relation to actors’ hopes, fears, and desires for the future’ (Emirbayer and Mische, 1998, p. 971). In this aspect, human actors invent new possibilities and distance themselves from the schemas and habits of the past. Similar to rational choice theories, the projective element of agency reflects the potential of actors to transform work practices.

**Practical-evaluative element:** The practical-evaluative element of agency refers to the ‘capacity of actors to make practical and normative judgments among alternative possible trajectories of action, in response to the emerging demands, dilemmas, and ambiguities of presently evolving situations’ (Emirbayer and Mische, 1998, p. 971). This dimension of human agency entails the capacity of actors to make judgments in the present about past routines and future projects. Such choices are made in the face of considerable ambiguity, uncertainty and conflict, as means and ends sometimes
contradict each other, and unintended consequences require changes in strategy and direction. Unlike prior conceptions of human agency, Emirbayer and Mische’s articulation of the practical-evaluative element draws attention to the dilemmas that actors face in deciding how to act in the present.

2.0 Findings

In the following sections, the context of the technology implementation project is described, highlighting an envisioned strategic shift toward a desired business vision. This vision is confronted with complexities related to the heritage of a state-owned enterprise. The work context of the subject unit is then outlined revealing further influences associated with organizational hierarchy and relations with international accrediting bodies. The section that follows introduces the adopted system (SYSLEARN), followed by an account of the micro processes and local negotiations within the subject unit in relation to the implementation and use of the system.

3.1. Characteristics of the organizational context

Xlines’s is a public institution, and thus its operating budget is allocated by the state’s government. Due to such secured financial circumstances, the organizational objectives had not been steered towards profit-making; instead, strategies had been aligned with government plans of state’s development and citizens’ wellbeing, which involved the expansion of public sector employment. These policies have been reflected on the case organization in overstaffing, managerial problems, and low productivity. This direction, however, has seen a shift towards market-orientation when the government of the state declared its intention to ‘privatize’ the airline organization. In preparation for privatization, Xlines has commenced on an organizational restructuring programme coupled with a major change in information technologies.

The organizational restructuring programme involved Xlines acting as a holding company, with subsidiaries running its operational units. These operational units were designated as strategic business units (SBUs) before they assume their independent status as commercial companies. Share holdings in the new companies would be offered to strategic partners, ahead of domestic initial public offerings (IPOs).
The aim of change in IT systems was to improve the efficiency and performance of organizational processes so as to leverage its financial position in order to attract potential investors to its strategic business units. As such, the organization leadership sought to replace its legacy dispersed systems with an enterprise information system that links diverse business functions, integrates and streamlines its processes, and offers timely and reliable information to the organization management.

One of the challenges that privatization plan designers have struggled with was the heritage of excess number of workforce who varied considerably in their skills and proficiency. However, state’s government clearly demanded that no employee is to be dismissed, and benefits must not be affected negatively by the new arrangements. In response, owing to the state’s stable economic circumstances, Xlines introduced an attractive voluntary retirement scheme targeting elderly aged employees. Employees who have served for a specified number of years can choose to retire and earn an attractive package in return. This program was meant to dismiss lower-performing employees and reduce the surplus in workforce without violating the government strict regulations related to sacking national employees. On the other hand, the organization has sought to attract new skilled and younger employees on the basis of private-sector employment contracts. Contrary to public-sector, those contracts associate pay with performance, and provide management with wider scope to discipline work behaviour. As planned, the execution of the early retirement programme has resulted in significant workforce reduction but it had also resulted in other unintended consequences. In reference to the IT systems implementation project, the retirement of a number of key individuals had resulted, in several instances, in knowledge loss and project distraction.

3.2. Setting of the subject organizational unit

The subject organizational unit is the Technical Training Unit (TTU) of Xlines. TTU holds the responsibility of offering specialised training services to certain categories of the airline’s employees. In particular, the unit operates training for aircraft’s technicians (mechanics and aviation electronics specialists). TTU is a subunit of Technical Services organizational unit responsible of the maintenance, repair and overhaul of the airline's fleet. Technical Services has been assigned as a strategic
business unit (SBU) in the post-privatization organizational structure, and is set strategically to offer maintenance services to other airlines on commercial bases.

As mandated by industry regulative bodies, aircraft mechanics and aviation electronics specialists have to attend specific sets of periodical specialised training and pass their exams to maintain their licences and qualify to undertake particular tasks, and work on certain equipment of the aircraft. Violation of such regulations could result in the maintenance unit licence being revoked and consequently restrictions on the airline flights are applied.

Critical to TTU training plans, is to schedule courses in a way that doesn’t interrupt business operations. Further, an accurate record (database) of the status of qualifications and licences of each technician is to be maintained to provide updated reports to the technical services management, whom are subject to periodical audit by international regularity agencies.

The administration of the training process is achieved through a number of independent system applications, each of which covers a subset of the training activities. Data transfer between these independent systems would be executed manually. For example, all assessments and courses’ results are recorded on desktop application software which represents the legacy training management system. The legacy system had limited reporting functionalities and hence data are transferred manually to MS-Access database in order to generate tailored reports.

One of the main concerns in TTU work is the data accuracy and integrity, and hence the task of recording assessments results is being confined to the training control staff. Whereby, these employees receive the results documented by instructors, and signed by training departments’ managers, and then upload them into the legacy system. Employees at TTU have been quite satisfied with the level of automation delivered by the legacy system. TTU Training customers, in turn have not been concerned with the administration of the training process, as much as they worry about technicians are being trained, assessed, and then licensed to be able to conduct their job duties because they feel these administrative issues are less critical than the operational work they perform. The direction of Xlines’s top management, however, was that the new
system is to be utilised in order to provide the envisioned integration in organizational processes and units.

3.3. The Technology - SYSLEARN

SYSLEARN is a learning management system within an overall enterprise information system that manages training across the extended enterprise, track its completion and measure its impact. In SYSLEARN, the process of course registration is initiated by employees as they log on to the enterprise portal which contains details of the corporate training and education offering. From here, they can register for courses. According to company-specific regulations, an approval process is triggered and the registration request is routed to the employee’s supervisor for approval or rejection. If the registration request is approved, the control is taken over by the registration office at the training unit where the demand for training is analysed and the required courses are opened in the system and fed with the names and details of the trainees, and the assigned instructor, too. Trainers are then emailed with the details of the course. Upon courses completion, the instructors “follow-up”, i.e. insert the results of the course. These results need to be approved by department/section manager, the point at which the course is closed and ceased to be accessible by instructors for editing. The registration office, however, can still access the course to issue certificates, and provide a variety of reports and statistics. This process is maintained by well-designed access profiles, whereby each user of the system is only entitled to access the information and do the tasks defined by his role in the training process.

Successful implementation of such a sophisticated system would represent a departure towards resource utilization and efficient work process, and potentially expose the subject organizational unit to forces of demand and supply and thus stressing market-oriented operation in line with organizational strategy in post-privatization era.

3.4. Micro-processes of implementation

SYSLEARN implementation has not been initiated by TTU need for technological innovation or process enhancement. Indeed, the implementation was driven primarily by top management directions aiming to integrate organizational units and processes
via a unified enterprise system. A training section manager explains the situation as follows:

“The question is not whether the system is good or not! The question should be: do you need the system? ... Why would I hire a 50-seat bus if there is only a handful passengers?”

Therefore, while top management of the organization sees SYSLEARN as a part of the potential overall organizational change towards an integrated and efficient business operation, SYSLEARN implementation has been viewed within TTU as simply an "IT Project", imposed and supported by official directives. A member of the implementation project team explains the situation as follows:

“They didn't welcome the system at all...they always complain of the system and they said it's a waste of time...top management pressured on them to use the system...to them, SYSLEARN is double work and extra burden”

This view has resulted in less motivation to demonstrate ownership at the part of TTU, and less effort to realign business practices to parallel the processes inscribed in the new system. This view has spread amongst TTU employees, resulting in the lack of commitment to the project, and consequently the instability of TTU representation across different phases of the system implementation. During the first phase of the project, which is meant to gather detailed information about business processes and requirements, a member of the unit has been assigned, but a later phase of the project has seen this employee quitting the organization and opting for early retirement. In the phase that followed, "Test Phase", another employee took the role of TTU representation.

“The representative of [TTU] in the implementation project had applied for early retirement and quitted in the middle of the project, so management nominated me to participate in the project... They said to me: go to the IT, work with them and see what the issue there is”.
In Test Phase, users need to run detailed testing scenarios against the requirements defined in the first phase. In TTU, this process has not been carefully conducted due to the replacements of TTU members in the implementation project.

In the post-implementation phase, where all customizations are transported to live operation and users are supposed to undertake activities using the system, the utilization of the system has been confronted with technical challenges related to the configuration and use of the system, as well as other challenges associated with the assimilation of new work processes. For instance, the training on the system was considered largely ineffective, as stated by one of the users:

“They should provide proper training and also accept mistakes from users, and provide on-site support... but this didn’t happen. The training sessions we attended were not based on actual data; training was not connected to what we actually do. For example, they could have shown us the class attendance screen and teach us how to input data... but what they used to do is to talk virtually about these functions”

Further, administrative people have found that a number of critical work procedures are not supported by the system. Also, SYSLEARN has been found to be poorly configured to produce particular reports in the needed format mandated by accreditation agencies.

"It has been now three years since SYSLEARN is in production, but still there are critical requirements not doable by the system, so we had to revert back to the legacy system to cater for these requirements"

In terms of TTU management, the main concern was to have up-to-date reports about courses and trainees. The transition of data between the old and the new system has not resulted in the required integrity between historical data about assessments and qualifications and newly entered records. For TTU, the integrity of training data is considered more important than the integration of training activities with other organizational processes, which is apparently offered by SYSLEARN. For example, when an instructor records a registered trainee as “absent”, this action is automatically reflected in other HR systems, triggering further organizational actions (e.g. salary deduction). These integrative elements of the new system are crucial in the
organizational vision of control over business processes, but they are less important in the daily training work.

Furthermore, the emphasis on operational work and business continuity has given more credit to the flexibility of the legacy system in comparison to the controlling aspects of the new system. A member of the training control department explains the situation as follows:

"A technician who works in the evening shift would occasionally attend training courses in the morning time because, otherwise, he would have to wait for another month or so until these courses are rescheduled again. This practice was encouraged by technical management so that a technician remains licensed and can undertake maintenance duties. SYSLEARN, however doesn't allow this practice because any employee can either be "on duty" or "in training" on one particular day".

In terms of the new work processes introduced by SYSLEARN, key users such as training instructors, who are supposedly responsible of courses' results entry, have largely avoided using the system. The new system assigns extra duties to instructors such as entry of courses’ results, which have been, in the most part, unwelcomed. These employees also felt no threat because their jobs are not at stake. A training section manager who is genuinely in support of change comments:

“At the beginning, management encouraged use of the system... But users were not skilled enough in using the system, so there were lots of mistakes... no body was ready to take responsibility of them, and given that these mistakes could have impact on business operations, management ceased to encourage use except by the individuals of the training control”

Consequently, TTU continued to use the legacy system as the primary software to record training activities. SYSLEARN has been also used in parallel primarily by training control admin staffs due to the need for communication with other HR modules which can only be accomplished through SYSLEARN. A training control member of staff contends:
“We rely on the legacy system in our business but we have to fill SYSLEARN system with the results of the courses in order to communicate with HR master data so as to issue qualifications for trainees”

The situation turned out to be that two systems are simultaneously in operation. Training administration continued to be utilized via the old system; at the same time, training control staffs also populate SYSLEARN with the same data. The training cycle and work processes largely imitated old practices and distribution of roles.

3.0 Analysis of findings

This section aims to explain the practices associated with SYSLEARN appropriation by examining the agentic orientations of the key actors and locating them in the wider context of implementation. Viewing stakeholders’ practices through the temporal dimension shows how human actors continually reinterpret their orientation and action towards the past, the present and the future in response to emergent events.

4.1. Identification of human actor roles

The identification of human actor roles is presented with an effort to identify differential roles between users of the system. Eventually, the identification of roles illuminates the different perception and expectation of each group toward the technology. It also illustrates that different type of users are engaged with varied structural arrangements, that do not mechanically determine their responses, but present them with opportunities and barriers that shape their domains of action.

Within the subject unit, it has been possible to identify four main groups of users whose responses to SYSLEARN have had significant influence on the outcome of managerial strategy of IT-enabled organizational change. These groups are unit management, instructors, and administrative staffs.

- Unit management can use the system to generate training reports, monitor work, and oversee the unit performance.
- Administrative staffs are responsible for inputting courses and trainees, allocating resources to each course.
Instructors are expected to hold roles and responsibilities according to the work flow introduced by the new system. These roles include receiving their work load through the system, and inputting trainees' results when courses end.

In what follows, we provide an analysis of the agentic orientations of the main users of the new system.

**4.2. Actors’ agentic orientations**

In Tables 1, 2, and 3, we report an analysis of the agentic orientations of the three main groups that were expected to use SYSLEARN: TTU management, instructors, and administrative staffs. The iterational element of agency refers to the past, focusing on the participants’ habits and comfortable routines about system use in their work practice. The projective element refers to the future, focusing on the participants’ desires to change in positive directions, as well as their fears of the unknown. The practical-evaluative element refers to the present, focusing on the actors’ adjustments that respond to the emerging demands, dilemmas, and ambiguities of presently evolving situations.

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<tr>
<th><strong>Iterative technology use:</strong></th>
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<td>The iterational element reflects actors’ routines and habits in relation to technology use. Traditionally, TTU management would not interact with the legacy system, and would receive printed reports. The system would be used and maintained by employees from within the unit. Flexibility of the legacy system allowed accommodation of training needs that are not necessarily permitted by an integrated system.</td>
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<th><strong>Projective technology use:</strong></th>
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<tr>
<td>TTU management understood the potential for SYSLEARN to provide an efficient way to manage training activities, and thus utilizing resources and reducing expenses. They further appreciated the data integrity feature of the system which allows seamless communication with other organizational units. These ambitions have been also coupled with fears of improper system functioning, or misuse stemming from low hands on the system.</td>
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<th><strong>Practical-evaluative use:</strong></th>
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<td>Being primarily concerned with operations, migration to the new system was surrounded by uncertainty and fears of losing critical data required by regulatory bodies, and consequently feared they are held accountable if accrediting audits are not passed. But because organizational directives, mandated that SYSLEARN is being adopted, the response of unit’s management was to install the system, but not the work processes within the system, and eventually pass the responsibility of use to administrative staffs.</td>
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**Table 1. Interpretation of agency elements (TTU management)**
**Iterative technology use:**
Previously, instructors had not been taking responsibilities on the legacy system of training administration. Their use of technology was naturally integrated with their work practice in terms of courses’ development and presentation. Their professional identities were developed through planning and conducting training but not on the associated administrative work.

**Projective technology use:**
For instructors, use of the system entails learning new skills, and thus concurs with their occupation ethos related to the acquisition of knowledge. On the other hand it brings about extra duties and responsibilities.

**Practical-evaluative use:**
Due to lack of real enforcement on utilizing the work processes inscribed by the system, instructors didn’t feel obliged to take part in the use of the system, and thus have largely tended to ignore the new system

Table 2. Interpretation of agency elements (Instructors)

**Iterative technology use:**
For admin staffs, attention is focused on maintaining reliable data and making them available to their management, as such, previous work practices can comfortably be repeated, and other social actors (management) can be trusted to act in predictable ways in response.

**Projective technology use:**
Use of the new system is linked with positive expectations organizing work flow and minimising work load, but also associated with technical difficulties, and concerns about the availability of technical support.

**Practical-evaluative use:**
Being faced with the complexity of the new system, and the flexibility allowed by their superiors, administrative staffs accepted managerial prescriptions of system adoption, interacted with the system at minimal required level, and continued relying on the legacy system for operational work.

Table 3. Interpretation of agency elements (Administrative staffs)

4.3. A relational analysis of IT use

The practice of individuals and the local negotiations within the subject unit is now put on the wider picture of structural relations and organizational changes that surrounded the IT systems implementation by discussing the ways in which these changes have facilitated/impeded these patterns of appropriation.

TTU is a training arm of the technical services SBU (Strategic Business Unit). TTU represented a supportive department to the main business that provides maintenance services to Xlines and potentially other airlines. Thus, TTU employees were never in direct contact with real customers, and by extension to the market. Consequently, practices of organizational actors within TTU have largely reflected the long standing emphasis on delivery of services and less concern with cost reduction and resource
utilization that characterise a market-oriented operation. Also, changes at the organizational level meant that TTU is organizationally reporting to the technical services SBU, and is detached from Xlines and other operational units such as the IT department. The implication of such structural changes is that the leadership of the IT implementation project had no hierarchical power over the adopting unit, and thus TTU participation was dominated by the units’ own priorities. Furthermore, TTU relations with regulative bodies, which necessitated certain types of reports that nictitates historical data that IT specialists were not able to include them meaningfully in the new system (partially due to TTU imperfect participation in the realization stage of the project) represented enabling conditions that allowed TTU management to maintain previous work practices and processes.

Another aspect of the context that impacted the use of the system is the early retirement scheme which resulted in a key member quitting the project and undermining the potential of configuring SYSLEARN in a way that accommodates particular needs of the unit.

Organizational actors, in their part hand, have drawn on the context-specific understanding of member-organization relationship that is largely understood as citizen-state relationship offering wider space for negotiating their duties and responsibilities in reference to system use.

4.0 Conclusion

The findings of the study underline the importance of viewing responses to IT systems implementations as activates that are rooted in specific contexts of practice. By analysing the practices of key actors through an agentic orientation approach, this study offers an explanation of the response to enterprise information systems. The main argument presented is that the ability of senior management to identify the potential of IT intervention, and thus to directly control its implications in organization is effectually mediated by the capacity of local actors to reflect on their position in a wider institutional environment and pattern their responses accordingly.

References


