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Developing business advantages from the technological possibilities of enterprise information systems

Luay Anaya
University of Agder

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Luay Ahmad Anaya
University of Agder
Department of Information Systems
Faculty of Social Sciences
P.O Box 422, 4604 Kristiansand
Norway
www.shortbio.net/luay.a.anaya@uia.no

Abstract:
Organizations are increasingly implementing Enterprise Information Systems (EIS), and Enterprise Resource Planning (ERP) systems in particular. Despite the notable studies on the advantages of an EIS, many organizations are not satisfied with the benefits or advantages gained. At the same time, it is assumed that such systems with increasing innovations and technological enhancements would generate abundant business advantages, if organizations exploited these opportunities. The investigation in this work drew on the sociomateriality perspective, using imbrication notion, and focused on a telecomm case study to examine how organizations can exploit the technological possibilities of an EIS to create business benefits. The study findings suggest that business benefits can be achieved when the EIS as a technical system is interwoven with the organizational work in which both dynamically change in practice (not from the technical features of the system), when the system provides interesting and beneficial technological possibilities that attract organizations, and when the firm has the organizational capabilities to translate these possibilities into real business benefits.

1. Introduction

Nowadays, business work is highly dependent on the advanced technology and, in many cases, it is difficult to accomplish the business work without information technology [1]. Organizations are increasingly adopting Enterprise Information Systems (EIS), even if implementing the system is challenging and expensive, because they are looking for greater advantages and benefits that are usually not obtainable in smaller systems [2],[3]. Many organizations that have implemented such systems have revealed that the realized benefits from these systems did not meet the organizations' expectations [3], [4]. Actually, there are several studies that have been conducted on the benefits of enterprise systems and provided rich insights (e.g. [5]-[11]).

A review of numerous studies shows that some adopted a variance model [5], [6]. For example, Gattiker and Goodhue [6] used organizational information processing theory to show that high interdependence among organizational subunits can lead to more benefits from an EIS. However, other studies drew their research upon process-based investigations based on social theories. For example, Staehr et al. [8] used structuration theory to understand the business consequences of ERP use. Staehr [9] also used structuration theory to review the benefits of ERP systems, especially to extend the benefits classification model suggested by Shang and Seddon [7]. In a later study, Staehr [10] used structuration theory to study the role of top management in achieving benefits from ERP systems. Most recently, Staehr et al. [11] applied process theory to study the factors that affect the benefit realization from ERP systems after implementation.

Orlikowski and others (e.g. [12]-[15]) argued that studies that use the variance model or information system studies that use traditional social theories, based on emergent process investigations, are not sufficient to study the modern applications of the technology in organizational life, because they do not clearly show the role of technology. It has also been argued that investigations in information systems field should provide its identity to offer compelling explanations for the importance of technology, and not viewing information systems studies as an extension of the reference disciplines like social or management studies that are more focused on the social aspects [12],[16].

Accordingly, an investigation of the underlying theoretical bases adopted in many studies raises a question about the extent that these studies can clearly explain all types of benefits and the extent these studies adequately emphasized the technological facet of the EIS in business advantages or in the reorganization. Some of these studies were based on research perspectives or theories that deal with technology as an exogenous and autonomous driver for business impacts [5], [6]; other studies dealt with technology based on the social actions and interpretations within a process [8]-[11]. These studies may underestimate the role of EIS in reorganization, or may have had difficulty exploring and explaining all kinds of potential benefits from enterprise systems, especially the unintended benefits that emerge in the practice based on the possibilities and opportunities that the technology offers. For example, the benefits that emerge in the practice from system integration with other technologies such as mobile services, or the email system, or any other emerging benefits that the technology offers and the social agency exploits, and put abundant efforts to make them real business benefits like the benefits gained from the accumulated data.

Using a contemporary view of technology in organizations, this work shows that real business advantages emerge in the practice through the interwoven agencies that represent the two sides, social and technology. Therefore, to understand how some benefits can be realized by organizations whereas other benefits are not apparent to all organizations requires paying attention to the use of technology and practice, but not only in the social agency. In doing so, this paper suggests a model that can provide rich insights for exploiting instances of the potential possibilities of enterprise systems, and show how they become real benefits after being implemented. Thus, the research question that motivates this work is: how can an organization exploit the technological possibilities of the enterprise information systems to create business advantages after the system is implemented?

To answer this research question, we attempt to articulate a conceptual framework based on a discussion of sociomateriality, relationality, and imbrication, and based on arguments derived from extant literature, mainly Leonardi

[1]. We applied data from a telecommunication company that implemented an ERP system to provide insights for the articulated framework.

The rest of this paper is composed as follows: Section 2 explores the role of technology in different theoretical perspectives in information systems research. Section 3 discusses the sociomateriality. A conceptual model to view enterprise systems based on sociomateriality is introduced in Section 4. Section 5 presents the data to support the constructed model, followed by a discussion in Section 6. Conclusions are in Section 7.

2. Technology in different theoretical perspectives

Information systems (IS) scholars develop research based on different theoretical foundations. As illustrated by Orlikowski [14], at the outset, researchers in the information systems field drew on theories that dealt with technology as a material playing a role, and viewed technology as an exogenous and relatively autonomous driver of organizational change. Thus, technology has considerable and predictable impacts on various human and organizational outcomes; an example of these theories is contingency theory [14]. Then information systems scholars challenged this notion. Many scholars adopted emergent process that assumes technology is a material artifact socially defined and produced by the people who engage in this technology [14]. This stream adopted the socio-technical system perspective, focusing on the ongoing dynamic interaction between people and organizations from one side, and technology from the other side, over time in an institutional context. These interactions, therefore, were understood in the context of an emergent process. Such theories are process theory, socio-technical, structuration, and institutional theories among others [13], [14]. However, within this same research stream, there are different conceptualizations among different theories. For example, in process theory the structure or the agency was a human agent doing things (events or activities) at some point in time within a context; thus, the focus is on the actors and events. In structuration theory, according to Orlikowski's [17] view, human agents draw on and shape structure (rules and resources) in practice; thus, the focus is on the technologies-in-practice shaped by human agents [15].

Arguably, the second stream, which adopts the emergent process perspective, has also been challenged, according to Orlikowski [14]. Scholars have argued that the emergent process perspective underestimates the huge capabilities and affordances of technology that can affect organizational work [14]. For example, structuration theory or even process theory focuses on the social as agent and ignore the technological capabilities that can form the agency, whereas institutional theory ignores the agency [14], [15], [18]. Furthermore, studies that adopt the emergent process perspective show how technologies can serve as an occasion for social reorganization but not how the material technologies might, in part, constitute the reorganization [19]. This standpoint makes many scholars look for new ways to theorize how technology can provide widely applicable insights to shape organizations and their practices and routines (e.g. [12], [20]). This perspective differs from other traditional information systems perspectives, because, as illustrated by Hassan and Hovorka [16], "sociomateriality does not make a black box out of the IT artefact or any other material element. In fact, it makes the material a key focus such that it will be possible to theorize and elaborate on its significance and interaction with other elements in different contexts".

In contrast, Mutch [21] criticized the sociomateriality perspective, although he acknowledged the importance of bringing the materiality aspect to organization studies. He contended that sociomateriality, which refers to agential realism (e.g. [22]), which is grounded in science studies, is not appropriate for studying the combination of the social and the material that is pertinent to organizational life, which is related to social studies. He also raised problems that, perhaps, face information systems scholars in practice, when they endeavored to theorize based on this perspective. He argues that if the empirical work does not reflect the ontological constitution between the technology and the organization, the traditional socio-technical approach can usually provide more plausible explanations for the empirical world. Mutch [21] also argued that in strong sociomateriality scholars, most likely, lose the ability to draw on fundamental concepts in the socio-technical approach such as roles or structure which are difficult to separate from practice, because the sociological analysis is not present. Most importantly, Mutch [21] believed that sociomateriality is

not applicable to studying enterprise systems that are large, data-intensive systems, because when drawing on such a notion scholars are not specific about the technology, and perhaps, they neglect the broad social context.

Responding to Mutch [21], Scott and Orlikowski [23] stressed that although sociomateriality is inspired by agential realism, sociomateriality does not focus on the physical properties of the materiality but assumes the properties and boundaries are inherent. Therefore, the constitutional ontology is opposed to viewing materiality as an object separate from the social aspect, which suggests conceptual and analytical tools for viewing the world and making sense of its existence in new ways. Furthermore, a reasonable critique about the application of sociomateriality concepts in some works "cannot constitute credible evidence against the original" [23]. In response to Mutch's criticism of the application of sociomateriality to studies focusing on enterprise systems, Scott and Orlikowski [23] believed a larger body of evidence would be needed before having such articulation, as sociomateriality is in its infancy. In the same regard, Leonardi [24] also responded to Mutch. Leonardi considered sociomateriality a promising theoretical perspective, and he confirmed that sociomateriality is influenced by agential realism, but now sociomateriality, as a theoretical perspective, is broader than agential realism. Leonardi, also, argued that critical realism, which Mutch suggested differs from agential realism, and he suggested for scholars to decide which approach to choose based on their empirical work.

Accordingly, this work on sociomateriality aims to contribute on this debate, by drawing on sociomateriality to study enterprise system implementation. In particular, we suggest a model that can provide high level of understanding about the technological possibilities that enterprise systems offer. The sociomateriality perspective is described in more detail in the following section.

3. Sociomateriality perspective

Sociomateriality, as a way of theorizing research, is a new perspective or a new research stream [12]. Sociomateriality can also be viewed as a meta-theory that provides a high level of abstract understanding about the phenomenon under investigation, to exhibit a way of thinking about the world, and not as an empirically testable explanation of social behavior [15]. However, sociomateriality assumes that organizations, people, and technology are not self-contained entities but are mutually constituted and entangled [12]. This ontological constitution, which underlies agential realism, rejects any kind of separation between the social and the material, therefore, the quest is for their existence. In this view, the technological system is a technical component that has material properties organized with the social life, and they shape each other. Each one changes the other through interactions. The technological system in this case is an integral component of the social life, not an incidental or intermittent aspect of organizational life [12]. However, when an organization implements a new technological artifact, and deals with it as a response to specific organizational needs in certain circumstances, then the firm loses sight of "how every organizational practice is always bound with materiality" [12]. This means that focusing on specific organizational needs and on the expected advantages of an information system makes organizations lose the huge opportunities that can emerge from the adopted technological system.

Within sociomateriality, different tents hold different levels of the ontological constitution between the social and material parts; based on that, different terms are used in each tent. Entanglement is mainly suggested in studies by Orlikowski, Scott, and others (e.g. [12]-[14]). Orlikowski described entanglement as "how to take seriously the recursive intertwining of humans and technology in practice" [12]. Different terms are introduced in this view such as entanglement, sociomaterial assemblage, and inseparable constitution. There is also imbrication, which is mainly suggested in studies by Leonardi, Barley, and others (e.g. [1], [20]) focusing on "the entwining of the material and the social" [20]. Many terms are used in this view, such as imbrication and interwoven agencies. However, Leonardi's view, imbrication, allows for some kinds of separateness, because the two agencies are interwoven as originally they are separated, whereas Orlikowski's view, entanglement, does not allow for separateness because the two aspects, human and technology, are mutually constitutive. Authors such as Bratteteig and Verne [25] apply imbrication to suggest disentanglement to give space between the social aspect and technology to reconfigure the agency and improve it. This view, which comes from the design perspective, has been challenged by Kautz and Jensen [26] and by Leonardi and Rodriguez-Lluesma [27]. Kautz and Jensen [26] stressed, "As tempting as it may be to think that entanglements can be

disentangled into imbrications, this is misleading. Imbrications do not need to be 'disentangled', they do not need 'disentanglement' because imbrications are not 'tangled'. They are interlocked and, as such, they need careful unlocking, disconnecting, and separation."

4. Constructing a model to view enterprise systems based on the sociomateriality perspective

The literature argues that the enterprise system is not only a technical system but also a socio-technological artifact working in a social or an organizational context, and entails the engagement of many social actors [28], [29]. In addition, an EIS interacts with the social processes within organizations, and organizational factors shape the use of these systems [30]. Furthermore, such systems have serious implications for organizations, as they can form many organizational roles and practices [31], [32]. However, according to these conceptions, the enterprise system can be theorized based on the sociomaterial perspective. For example, Wagner and colleagues suggested that the enterprise system is part of the organizational life, and they mutually constitute each other [32]. Sociomateriality, here, is important to theorize upon, because it consists of two aspects: social and material. On one side, sociomateriality emphasizes that all materiality is social because it is created through social processes, and it is interpreted and used in social contexts. On the other side, all social actions are possible because of some materiality [1]. Accordingly, a technological information system like an EIS is a technical system that can offer material possibilities and act as a fundamental component in a social context to shape and be shaped by the organizational life.

In this regard, sociomateriality focuses on finding ways or patterns to bring to the foreground from everyday work practices to expand management knowledge in organizations, and to show a clear picture through the materiality of an information system [13]. Thus, these methods can make researchers aware of the system uses and the meanings of these uses for different people, to reveal the importance of the system in their daily work. Accordingly, investigators analyze how people appreciate the benefits that can emerge from the implemented enterprise systems. These uses and meanings are related to the system's benefits, because "[h]ow users choose to adopt and use these systems on an ongoing basis can significantly impact the organizational benefits associated with them" [30]. Thus, sociomateriality as a theoretical stance can exhibit a clear understanding about the potential benefits of an EIS from its capability of exploring the two parties that constitute the implementation of these systems: the organization, humans with work routines representing the social side, and the EIS representing the material side. In this regard, Leonardi and Rodriguez-Lluesma [27] agreed with Suchman [33], when she stated that "the technology acquires its meaning when embedded in social practice and, therefore, in relation to the agent(s) involved and other material elements". They stressed the relational view that entails not dissolving the difference between the social and the technology. Accordingly, to perceive the potential advantages of the enterprise system, the traditional view that theorizes the enterprise system should be abandoned since it has deterministic effects. However, this work suggests engaging in investigations to view the enterprise system implementation based on relationality formation between the main two sides organization and the technology.

4.1. Technological possibilities and organizational capabilities

Entities, whether technological or human, have no inherent properties, but what matters is how they are interconnected [13]. In sociomateriality, technologies have material properties that can provide different possibilities, giving humans the capacity to act upon and exploit the huge capabilities of these technologies [13]. These material properties are not static, but are multiple and dynamic over time [19]. In the later work there are examples of these material properties for technologies such as programmability, senseability, and communicability [34]. Thus, in some cases, humans and materials interweave to create or change business routines, whereas in other cases, the human and material components weave together to develop or modify technologies [1]. This interwoven relationship gives the constructed sociomaterial structure, which consists of both sides, the capability to act according to the relevant agency. Agency is considered by Orlikowski [12] the capacity realized through the associations of actors (human and nonhuman). However, Leonardi [24] considered agency a matter of intra-acting, or enactment, so it is not something someone has. Therefore, in

Orlikowski's view (entanglement), the relational is ontological between the social and the materiality, while the relationality is representational in Leonardi view (imbrication) [26].

However, according to Leonardi's view, people have agency, and technologies also have agency; both are enacted, but inevitably people decide how to respond to specific technologies [1]. This relational formation can be explained as "people who have goals and the capacity to achieve them (human agency) confront a technology that does specific things that are not completely in their control (material agency)" [1]. Saying that material agency means that nonhumans experience things does not mean revoking human contributions; people can adapt and appropriate what nonhumans do [1]. Drawing on that, an organization with its people including the routines represent social agency imbricated with the enterprise system that represents material agency. These two agencies, social and material, are illustrated in Fig. 1.

Accordingly, the potential benefits from EIS emerge when people interweave with the system in practice to generate various uses of the system, and when the EIS enables an organization to do what can be practically accomplished over time. Thus, the benefits generated from EIS are not inherent in the systems' material properties but emerge from how people experience their agency to change and adapt the systems for their needs. It is also based on how the material agency gives humans the opportunity to find new uses for the system, such as developing new practices or changing existing routines. To maintain relationality, Leonardi [1] suggests imbrication between technologies and organizational routines that require flexible technologies and flexible routines.

Fig. 1. Imbrication of the enterprise system model

4.2 Flexible technologies and flexible routines

4.2.1 Flexible technologies

It is assumed that the perceived net benefits from an EIS depend on how the system is used [36]. Within an organization, different groups of people are interested in different benefits; therefore, people use the system differently, and the system should be modified according to the group's needs [30]. For example, to ensure that these needs are embedded in the system, the implementation team needs to configure thousands of tables in a complex structural database [11]. These adaptations affect many system modules and functionalities to meet the organization's needs [11]. Thus, when the system becomes more flexible, its materiality offers wide possibilities, it will be more able to reflect the organization's needs and suggest new forms for use, and then it will be able to provide extreme benefits for the

organization. Conversely, when the system has difficulty addressing the organization's needs, people may not use it effectively. Thus, the benefits are minimal. According to the suggested model (Fig. 1), a technologically flexible EIS will enable the material agency that does many things to effectively imbricate with the social agency that has goals, and act to achieve these goals and to provide the maximum benefits through these material possibilities.

Accordingly, EIS should be flexible technologies (Fig. 1) to meet ever-changing business requirements and to effectively change the technology to respond to these requirements and needs. Here, the technological changes, when they are applied, are viewed as a response from the system that has materiality that can translate the organizational needs, which is the social component, to real business advantages within an imbrication process.

4.2.2 Flexible routines

It has been argued that organizations should change their business routines and business processes to realize the benefits from enterprise systems [37]. Wagner et al. [32] called for negotiated practices. It has also been suggested that many business processes or modules must be integrated with the core system, which is the financial module in the case of the ERP. In this way, organizations can obtain greater benefits from the enterprise systems, when the system integrates many business functions across the organization [5]. It is assumed that the changes in the social or organizational side are more extensive, and could influence wide areas inside and outside the organization. Staehr et al. [11] stated, "Although all IS projects involve some degree of organizational change, ERP implementation and use can be differentiated by the capacity to involve extensive changes across a number of functional areas in an organization." Davenport [38] identified examples of organizational change that can be introduced by the enterprise systems, such as a change in structure (e.g., shared services), changes to work practices right across the organization, and changes that affect external parties such as customers and suppliers [11]. However, business benefits accumulate when organizations change business practices or routines and when the enterprise system integrates many business functions across the organization. To do so, the business routines that represent the business logic should be flexible, because new forms should replace existing practices. Based on the suggested model, an organization that has flexible routines will enable social agency, which acts to achieve its interests and goals, to effectively imbricate with the material agency that does wide things, and can offer great possibilities to help the organization achieve the maximum benefits from the material possibilities.

Therefore, in Fig. 1, the organizational routines should be flexible to interweave with the EIS to produce new combinations or possibilities for the organization's work. This flexibility can allow organizations to introduce new routines or to change existing ones based on the possibilities of the enterprise system.

Now the question that can be raised is, which types of changes, technological or organizational, have priority? Using the sociomateriality perspective, "[b]y themselves, neither human nor material agencies are empirically important. But when they become imbricated—interlocked in particular sequences—they together produce, sustain, or change either routines or technologies" [1]. This formation also interweaves the technological development and the system adaptations, with the organizational changes and the process reorganizing; so they are no longer separate or distinct processes across the overall implementation phases [39].

5. Insights from practice

5.1 The case study

In our study, a company called B Mobile was investigated. The company, a leading provider of mobile telecommunication services in the Middle East, started operating in 1999. The company built consistent growth in the customer base, starting from 1 million in 2007 to about 2 million subscribers in 2010. By end of 2012, the company had about 2.5 million subscribers. B Mobile has an extensive network of 29 stores, more than 1,000 major and primary distributers, and hundreds of outlets in different areas. By the end of 2012, 950 employees worked in different locations. The company started implementing an Enterprise Resource Planning System (ERP) early in 2007, and the system was

ready for use in September 2007. This system has been viewed as essential, and company management considered it indispensable for doing the company's internal administrative work, which had increased over time. It was difficult to deal with the huge amount of the work generated by the large number of external parties: customers, suppliers, and distributers, without an enterprise system that manage all the financial and administrative issues for the company. The study investigations were conducted in July and August 2013, targeting different interviewees working at different business functions to represent different voices, but it was important to recruit interviewees worked in the system's implementation that had been conducted in 2007.

Table 1 provides details about the case informants, their business roles, and interview duration.

Table 1. List of interviewees with their roles and duration

Interviewee code	Role	Interview duration in minutes
B1	Head of Financial Department & Internal Project Manager (Company side)	70
B2	Reconciliation & Account Receivable Section Head	90
B3	Fixed Assets & Inventory Section Head	90
B4	Accounts Payable Supervisor	60
B5	General Accounting Section Head	50

5.2 Findings

5.2.1 Interwoven relation

Initially, the company had expectations based on its needs and requirements. These expectations mainly focused on implementing a comprehensive system that covers all business functions that can provide efficient and consistent data. The company was also interested in an ERP system to help the staff handle the increasing daily work in less processing time and with a minimum level of human error. Two years after the system was implemented, the company staff realized that these expectations, to large extent, had translated into real business benefits. When the company informants were asked about their level of satisfaction with the benefits, all reported that they were at least 70% satisfied from the system outcomes. The interviews revealed that the people were satisfied not only with the system implementation. The enterprise system became a comprehensive organizational practice that entailed a robust relation, and it became difficult to detach the system from their daily work. The head of the finance department (B1) said, "I cannot imagine the company without the system, because the system brings international and world-class business practices to the company, so now we can say we have a modern operation management and this is because of the system's implementation". In addition, the fixed assets and inventory section head (B3) mentioned, "The system solved the paper work problems, alone, I was using about five boxes of paper weekly, but now the whole department about 30 employees use this amount of paper". Further, the general accounting section head (B5) said, "It is easier for me to stay at home if I have to do the current work based on the old system and based on the old way of organizing". He also said, "The system is not complementary to our work, but it is a primary part of it". The reconciliation and account receivable section head (B2) said, "The system becomes part of the company, and if we remove it from the company that means we change our way for doing our work". Another informant said, "If you imagine how we were working before, you would know how much the system helped us and changed our work, and because of this I cannot imagine my daily work or imagine the company work without the system". During various different visits to the company, it was easy to observe that the staff offices did not perform much manual work, and there were no manual accounting booklets, for example. That means the system replaced the old manual work with new electronic practices.

5.2.2 Technological possibilities

The company informants were also satisfied because they realized many unexpected benefits. These benefits helped them do their work more productively and efficiently. An example is the use of mobile technologies to do and follow part of the business work using the ERP system. The company managers said that many times, for different reasons, accessing their offices was difficult. This challenge created delays in their work; the processes in the enterprise systems are integrated and served many business functions. A process such as the procure-to-pay cycle was fully implemented. That means the process would take care of procurement, stock control, finance, and budget, so their work depended on each other. The head of the finance department (B1) said, "When it became difficult to reach the company office, and I came into the office the next day, I might find a significant number of the system transactions that were pending and required approval". After the system was upgraded, the email system could be accessed with mobile phones to review, approve, or disapprove certain transactions. The email system and a mobile device could now be used to review warning messages that showed if an employee used the system to do something different from what was defined for him or her. This benefit was very important for people who work from home or attend many meetings outside the company. Company personnel had been unaware of these benefits in 2007 when the company started the implementation; however, after several years, employees knew about these advantages. These technological possibilities provided unexpected benefits.

5.2.3 Organizational capabilities

Investigating what the company did to ensure successful implementation and successful cultivation of the system advantages showed that management was very supportive of the system implementation, and worked hard to ensure successful implementation and exploitation of the system features that could create real benefits for the company. Further, the company had a strong, long-term partnership with the consulting company that implemented the system. The company also appointed many people experienced in ERP implementation, during and after the implementation. Furthermore, system logic was dominant in the organization, which means the company replaced many practices with new practices. For example, the system provided restrictions when people attempted to delete an invoice or settle an invoice in a currency different from the original currency, which had been acceptable before the system was implemented. Additionally, the budget process was completely changed. Instead of giving the head of the budget section the authority to approve a purchase order, the system now automatically generates approval if there is enough money in the budget for the department that had submitted the purchase order.

6. Discussion

In this work, we suggested analyzing the data based on the constructed model that adopts the imbrication notion [1]. In the case suggested by Scott and Orlikowski in consequent works [40], [41] on TripAdvisor, the authors used entanglement. However, we maintain that it is difficult to describe TripAdvisor as a social travel community without describing the technological part that constitutes the site's core business. In the enterprise systems implementation case, the system is very important, and it became difficult to imagine that a company that has huge engagements like outlets, customers, suppliers, etc., does not have an enterprise system. A company of that size could function without an enterprise system but would be less efficient. Thus, we examined how the technology agency is imbricated with the social agency to generate substantial advantages for the business. The focus was on the imbricated agencies that were interwoven and ontologically interlocked, but not entangled. Entanglement may create difficulties in analyzing ERP implementation, since it entails inseparable constitution between the social and material, which was not easy to capture in the empirical work of this study. This work examined the ERP implementation in a company, accomplished when two separate objects, the company that implemented the system (social aspect) and a technological artifact that can offer material possibilities, enact together. Before the implementation, these two aspects were separate. After the implementation, and when people started using the system, the two agencies became imbricated in the practice, which becomes difficult to talk about their business work after the implementation without mentioning the enterprise system, or even imagine their business with its complexity without an ERP system. As defined by Leonardi [1], "To imbricate

means to arrange distinct elements in overlapping patterns so that they function interdependently". On the other hand, entanglement may not be appropriate for studying this ERP implementation as Orlikowski believed in the ontology of inseparability, and acknowledged that from the beginning the social and the technology are entangled, so they exist together. Orlikowski [14] cited other scholars to express the ontology of inseparability: "Thus, the social and the technical are posited to be 'ontologically inseparable from the start' (Introna, 2007, p. 1) [42] and, as Suchman (2007, p. 257) [33] notes, 'the starting place comprises configurations of always already interrelated, reiterated sociomaterial practices'. On this view, capacities for action are seen to be enacted in practice and the focus is on constitutive entanglements (e.g., configurations, networks, associations, mangles, assemblages, etc.) of humans and technologies". Entanglement, based on Orlikowski's view, explains the ontological existence, human and technology, and rejects the ability to view humans and technology as distinct elements. In this regard, if an organization already has an ERP, and years later decided to replace it with other system, how could we analyze this empirical situation using entanglement, which rejects inseparability? However, imbrication, which assumes distinct elements are interwoven together, accepts careful unlocking, disconnecting, and insightful separation [26].

The study provided empirical evidence of an ERP implementation, of the model in Fig. 1, and an explanation for this model. This work shows that enterprise systems generate advanced business advantages, and provide a high value to organizations for the investment, through the following aspects: first, when the enterprise system becomes imbricated with the work, so they work together to achieve the organization's objectives by shaping each other (imbrication); second, when the system offers technological possibilities that attract the organization (material agency); and third, when the organization have capabilities that ensure successful exploitation (social agency). Details of these aspects are explained below:

- The advantages of EIS can be enriched when the enterprise system becomes imbricated or interwoven with the organization. From this study finding, it is clear that the company considers the system an important part of doing the business work, and the company staff stressed that they cannot imagine their business work without the enterprise system. The study showed that the company staff acknowledged the importance decreasing manual work, which was confirmed with observations of staff offices. The enterprise system converted all of the manual work into computerized practices, and this work became part of the EIS. Here, the enterprise system became not only a financial system but also a comprehensive organizational practice comprising all the details of the business work, and organized it in an effective and efficient practice. That means, one cannot talk or describe the current business work after implementing the ERP without referring to the system, which made the business work, that is, the organizational aspect acts upon social agency, interwoven with the technicality of the enterprise system (the materiality aspect). Therefore, the enterprise system, which was originally an IT product, became imbricated or interwoven with the organizational life, and became part of everyday practices. This formation supports many studies that theorized, based upon the sociomaterial perspective, that the information system is part of the organizational life and they shape each other, and is not an incidental or intermittent aspect of the organizational life [1],[12]-[14],[24],[32];

- The advantages of EIS form when the technological possibilities create an interesting use or a business advantage for the firm, and the firm has an interest in that advantage and values it. In this aspect, the study showed how unintended benefits emerged when the enterprise system provided the possibility to do part of the work with the email system and mobile devices. The company did not deal with the enterprise system as a response to organizational needs, because the need for incorporating mobile devices was not part of the requirements when the company started the implementation, but emerged after the implementation. This conceptualization is in line with other studies [1],[43] that assumed that the possibility for action is not pre-defined but depends on the context that helps achieve this possibility. This study also confirmed suggestions by Majchrzak and Markus [44] that assumed using the system does not mean exploiting all the potential of the technology, but organizations can exploit the potential of technology over time. However, this kind of exploitation would not be achieved without flexible technology, which was apparent with the flexibility of the system that allowed programming within the system and

integration between the enterprise system and the email system. Email messages were treated as transactions with the system. In addition, through programming the company developed appropriate validation rules when they were needed. This study also confirmed that the real benefits are not inherent in the physical features of the system, but in the materiality of the technology that can provide beneficial use [1]. However, configuring a complex system like an EIS with default values, or based on the consultant's habits in the system's implementation, will not provide distinctive features that can be obtained from the system possibilities. As a result, organizations will lose flexibility in their technology and, in turn, will not achieve huge benefits from the systems;

▪ The advantages of EIS could be achieved when the organization became capable of taking benefits from the technological possibilities. Thus, to integrate the system with another system, or with another device, the company used the benefit of experienced IT people who were available in the company, had the expertise, and were aware of many system features, and the management allocated funds to provide mobile devices for the company staff. Furthermore, the decision to approve a financial transaction on a mobile device, and budget items, required a strong management that considered the business routines flexible. These organizational capabilities are relational aspects through which the company exploited potential benefits of the enterprise system. Leonardi [1] argued that such relational aspects are not available in all organizations, and thus, some organizations can achieve the potential of the technology, whereas others face difficulties.

7. Conclusion

This paper discussed the sociomateriality perspective to provide an improved understanding for exploiting the potential benefits of an EIS. Sociomaterial structure or the imbrication between the enterprise system and the organization helps organizational work become an integral part of the materiality of the technical system. This structure allows researchers to understand how the EIS can shape organizations' work and be shaped by social adaptations, according to the organizational needs and the system possibilities. The relationality notion illustrates how the benefits from enterprise systems are not inherent in the systems' material properties, but based on the dynamic relationship between the people who experience their agency changing and adapting the enterprise systems for their needs, and the materiality of the system. This materiality provides new opportunities to develop new practices or to change existing routines. However, to answer the study question, the potential benefits of EIS can be exploited or realized when the EIS as a technical system is imbricated with the organizational work in which both dynamically change in the practice (not from the technical features of the system), when the system provides interesting and beneficial technological possibilities that the organization values, and when the firm has the organizational capabilities that enable it to translate these possibilities into real business benefits. Finally, this work used a single case study; therefore, in future research, a multiple-case study should collect a wide range of data to validate the research model. In addition, further empirical research should investigate the relationality factors that make some organizations more able than others to achieve the potential benefits of ERP systems or other enterprise information systems.

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Biographical notes

Luay Ahmad Anaya
A PhD Research Fellow in Information Systems at University of Agder in Norway. He received his master degree from the British University in Dubai, UAE. His research interests include enterprise systems, ERP project management, and benefits realization. Anaya has published in many academic outlets. He has also worked in different IT roles for many years in IT and consulting companies in United Arab Emirates, Palestine, and Jordan.

www.shortbio.net/luay.a.anaya@uia.no