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THE CONSTRUCTION OF THE RELATIONSHIP BETWEEN ERP AND THE ORGANISATION THROUGH NEGOTIATION

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Abstract

This paper questions the relationship between the ERP and the buyer's organisation and the validity of the deterministic and social constructivism arguments in the ERP case. It follows the implementation of ERP in an international organisation and through the Actor Network Theory (ANT) analysis introduces the concept of negotiation as an account for the process of implementing ERP. The findings suggest that the relationship between the ERP and the organisation is constructed through negotiation that is not based on the pretext that one side would dominate the other. The issue then is not about domination but rather how the negotiation and controversy between them ends up. The paper ends by discussing the theoretical and practical implication of the findings.

Keywords: Social contructivism, Technology determinism, ERP, Actor Network Theory,

1   INTRODUCTION

ERP is usually presented to the business arena as a highly structured technology that can guide any organisation that acquires it to introduce the best 'world class' business practices. Its fixed logic, design, capabilities, and specifications are seen as the mechanism to create a predictable and controlled course of organisational actions.

This claimed sharp-edged precision and tight design of ERP, which works to strictly produce certain results, echoes a deterministic view of technology. That view was for long refuted by the social constructivism argument and empirical evidences that demonstrate the organisational and social capability to shape technology and determine its path. This paper questions the relationship between the ERP and the buyer's organisation and the validity of the deterministic and social constructivism arguments in the ERP case. It adopts Actor Network Theory (ANT) to provide a step out of this traditional dichotomy that could shed more light on how this relationship is constructed in practice.

The paper is organised into five further sections. The first provides a background on the technology deterministic and social constructivism argument in general and ERP in particular. The second presents the research methodology and a brief description of the guiding theory. The third presents the case study followed by another section for its analysis and the final section provide a discussion and conclusion to the paper.

2   BACKGROUND

The technology determinism perspective considers the relationship of society towards technological change as an adaptation dictated by the potential of the technology (Staudenmaier, 1985). It asserts that the inner capabilities of a technology causes specific predetermined social change. This means agency is imputed to technology itself, or to some of its intrinsic attributes. It also views technology as an independent entity that is autonomous from social influences (Smith & Marx, 1994).

The deterministic perspective of thought has been long debated in Philosophy, History of Technology, Sociology of Science and Technology, and more recently in the IS field (Kling & Jewett, 1994; Mackay, 1995; Bloomfield et al., 1997; Yates & Van Maanen, 2001). It is largely opposed by the"social contructivism" perspective, which includes the approaches known as social shaping of technology, social construction of technology (SCOT), and systems approach among others (Mackenzie & Wajcman, 1999; Pinch & Bijker, 1987; Hughes, 1986). The constructivism argument emphasises, with different degrees of strength, the role played by the social, political, economic, and organisational elements in shaping technology. It focuses on how social and organisational elements shape technology and determine its effect (see for example: (Markus, 1983; Robey, 1987; Monteiro & Hanseth, 1996; Avgerou, 2001; Avgerou, 2002).

Regarding ERP, the belief of its power to transform the organisation is shared by the media, business community, and most academic thinking (Foremski, 1998; Ross & Vitale, 2000; Manetti, 2001). This view is particularly fuelled by the ERP software vendors call on the buyer's organisation to follow the system logic and philosophy and not to try to change it. The SAP software vendor, for example, warns organisations buying its ERP product that this type of system "offers a particular philosophy about the way the business should be structured. Accordingly, in cases where a business and SAP disagree on the business approach to a particular problem, any business should seriously think about changing its approach to match that of SAP" (ASAP World Consultancy & Blain, 1996, p.727). This deterministic view of the package as a very rigid software that has the internal capability to transform the business and bring about several tangible and intangible benefits is usually unquestioned, either on the business side or in the majority of academic literature on the subject.

However, this view is contradicted by several reported stories from the field of ERP implementation. Many reported cases reveal that ERP - like other information systems – has had a considerable number of stories of failure in practice (Boudette, 1999; Davenport, 2000; Nash, 2000). Davenport, for example, has reported ERP failure stories in sound organisations such as Dell computers, Dow Chemicals, and Mobil (Davenport, 1998). Also, in Fox-Meyer, problems with its ERP implementation led to bankruptcy and litigation proceedings (James, 1997; Montoya, 1998).

Furthermore, recent academic research reveals the disparities in outcomes from the same ERP system implemented in different organisations in the same industry (Truex & Ngwenyama, 2000), and variations between different units of an organisation using the same ERP package (Markus et al., 2000). It also confirms that most organisations adopting ERP in reality do not end up with a fully integrated system as originally intended (Markus, 2001). Such reported experiences and empirical research findings shed doubt on the argument that ERP is technologically determined. Yet, they do not offer any explanation of how a rigid technology like ERP that represents a "recalcitrant technology" could possibly have room for its social construction (Kallinikos, 2002). They do not answer questions about the extent to which ERP is either socially constructed or driven by its inherent architecture during its implementation. This paper seeks to explicitly address this question.

ERP implementation could offer a distinctive story of IS implementation that contributes to the ongoing debate of technological determinism and the social construction of technology. This paper explores such questions and investigates whether the organisational and social elements have any

effect on the features of the ERP package and its embedded 'best practices' during the implementation or not.

3   RESEARCH METHODOLOGY AND GUIDING THEORY

This research adopts an interpretive approach of inquiry. This approach suits the research aim of understanding how the relationship between the package and the organisation is constructed. It helps understanding from the viewpoint of the participants and their social and cultural context (Kaplan & Maxwell, 1994; Myers, 1997).

This research is based on a case study of the implementation of a financial system based on SAP R/3 - the ERP market leader with a market share of over 30% of the total ERP market (AMR Research, 2004; SAP AG, 2004) - in an international organisation called here anonymously 'Posta'. Data was collected between February 2001 and October 2001 through participant observation including attending project meetings, most of the final configuration sessions, project conferences and social events, end-users training sessions, as well as speaking with people involved in the project informally over lunch and coffee breaks. Formal interviews were also conducted with thirty-four members of staff. Each interview lasted between one and three hours, with some people interviewed several times or contacted via e-mail or telephone to follow up progress regarding certain issues. Interviews were not tape recorded due to the sensitivity of the ongoing implementation at that time and notes were taken during the interview and extended directly after with any further observations and comments. This is in addition to reviewing project documentation, newsletters, company intranet, and being copied in most of the project e-mails.

To understand how the relationship between ERP and the organisation was constructed, this study investigates the various controversies that surfaced during systems implementation and how they were resolved in practice. Data was analysed through the Actor Network Theory framework that gained considerable attention in the IS field (Hanseth et al., 2004; Walsham, 2001; Monteiro, 2000; Bloomfield et al., 1997). The analysis aims to apply ANT in a way that captures the essence, the world view, and the orientation that ANT maintains (Latour, 2004; Latour, 2005).

ANT is occupied by unravelling the way societies come to accomplish certain goals (Latour, 1988). It views technology as a product of active negotiation and network building where its anticipation of what other actors, humans or non-humans may do (*program of action*) may not occur because those other actors have different program (*anti-program*) (Latour, 1999). ANT uses the notion of 'network' in a way that is fundamentally different from its standard usage in sociology, as it is not primarily concerned with mapping interactions between individuals. Rather, it is concerned with mapping how actors define and distribute roles, and mobilise or invent others to play these roles. Such roles may be social, political, technical, or bureaucratic in character; the objects that are mobilised to fill the roles are also heterogeneous and may take the form of people, organisations, machines, or scientific findings. A network metaphor helps to underline the simultaneously social and technical character of any social arrangements.   It is a metaphor for the interconnected heterogeneity that underlies sociotechnical engineering (Law & Callon, 1988). An actor power is determined by its connection; the bundle of *associations* it juxtapose itself with (Latour, 1999; Callon, 1993). The more associations and powerful entities an actor connects itself with, the less the chance of it loosing its power on front of other actors.

The ANT approach provides a performative view of the relationship between technology and society. It views the social and the technical as being enmeshed in a network built to achieve the network builder's goals. The role played by the social and the technical, and their effect on each other, is left

as an empirical matter that researchers should not decide upon *a priori*. This makes ANT capable of offering a better conceptualisation than other approaches of the actual processes of interaction between the technology and society. ANT could also be seen as a means of reconciling the technology determinism and social constructivism schools by providing an alternative way of looking at the social and the technical. It can provide a rich insight into the interaction between an integrated module-based packaged software and the organisations implementing and using it. In doing so, it responds to many researchers' calls for such studies and contributes to other efforts to synthesise the technology determinism and social constructivism schools of thoughts (Misa, 1994; Scranton, 1994; Hughes, 1994; Orlikowski, 1991).

4   CASE DESCRIPTION

This section presents some examples of the controversies surrounded the implementation of a financial system based on SAP R/3 modules in Posta. It was an organisation-wide implementation that was scheduled over 30 month time span and costs over £57 million. During the implementation issues regarding the system language, the system logic, and capability were surfaced as follows.

4.1   The financial system's accounting logic

The financial system's standard was to represent a profit with a minus and the loss with a plus. The system logic here was that each profit is a reduction of the target or planned profit and hence depicted by a minus. The business units' CFOs found this logic unacceptable, although consultants explained that this was the standard SAP language. The CFOs were not convinced that this was an understandable way of communicating information within the organisation, as the SAP system's demands were the opposite of what they and their staff were doing at that time. What is more, they had moved to their current method relatively recently and did not want to backtrack on that. A CFO explained that Posta "used to represent cost by plus and profit by minus [as for the SAP standard], but three years ago it decided to change to reflect a profit-oriented view rather than a cost view". The CFOs remembered that it took a tremendous effort three years previously to justify the earlier change as "a modern business practice" and to re-educate the finance staff and convince them that this was a more modern view of the business compared to the more conservative-oriented approach that prevailed before that change. CFOs could therefore not accept another change to the system logic that literally reversed to a view they had explicitly and strongly rejected in the past.

CFOs therefore asked for brackets to be put around the numbers that in reality represent losses for BUs on the SAP reports. Consultants replied that this was not the standard SAP and that the system's standard reports could not be changed as that might jeopardise the system's future upgradability. On the other hand, the consultants said they could develop some non-standard reports, but this would be expensive since developing one report takes on average "between five and ten ABAP[1] days".

CFOs asked the consultants to investigate the cost of customisation. However, the consultants and the financial project director had made a decision at an early stage in the SAP project to stick to the SAP standard and reduce customisation to the minimum. Hence, a senior consultant in the presence of a project manager argued: "this is the industry best practice, Posta is not different and should not be thought of as fundamentally different. You are having it [the system] to ensure having the international best practice, this is an international standard, most of the businesses out there follow it".[2] In response, CFOs angrily disagreed, using terms such as: "we need a report with the language

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[1] ABAP is the programming language of SAP.
[2] On this particularly critical issue, in one of the hot configuration sessions the consultants suddenly referred to the researcher's belonging to a certain institution and the researcher's herself who studied SAP in other international

we understand, we do that in Excel and would like to have it from the system [the new SAP financial system]"; "we want to have a report that could be used, I don't care about how it's developed"; and "we need an easy-to-use format, easy-to-understand vocabulary".

Consultants offered a detour that allowed the users to represent the data the way they like without compromising the standard reporting in SAP, by suggesting that, for representation purposes, departments could extract data from the standard SAP reports and manipulate it in Excel, where its presentation and layout could be changed for reporting purposes. This use of the system was later considered a failure and waste of time and resources by managing directors, who asked consultants to drop Excel altogether from the suite of systems available to end users in order to "compel" them to use only the SAP system.

Another controversy raised around the system logic related to accounting expenditure. When the SAP system receives an invoice, it creates an accounting document in the general ledger and a profit centre document in the profit centre accounting. This means that the system effectively accounts for the expenditure as soon as the invoice is received, without waiting for the actual goods or services to be received and inspected. Accounting staff found this system practice odd since the organisation might end up paying for faulty goods or for goods that it never receives. They explained to the consultants that they did not accept this as a good practice and that SAP needed to be amended in this respect. Consultants replied that changing the standard SAP was not an option for discussion and that "it is up to the business to be active and check for the good and faulty". Yet, the accounting staff did not follow SAP's procedures when the system later went live. They did not enter the invoices into the system before the actual receipt and inspection of good, as the system requires. Instead, they relied on the manual system for these procedures and posted invoices on the SAP system only after tracing the goods and their acceptability manually.

4.2   The financial system language

The language used by the SAP financial system was a shock for users. Terminology like "project", "capital", and "code for cost centre and profit centre" were completely unfamiliar to users. Configuration sessions typically started with a cautious statement such as "some of the language you may not know, [so] if you don't understand raise your hand and we will try to explain it in a different language".

The following users' questions (Q) and consultants' answers (A) illustrate the wide gap between the SAP financial system's language and the users' usual business language, revealing the extent of the users struggle to understand the system language.

Q: What is the 'vehicle cost'?

A: It is what you call the 'vehicle maintenance.

Q: And the 'staff cost'?

A: It is the 'agent cost'.

A: 'Profitability analysis' is what you call at the business 'revenue analysis'.

A: 'Sales organisation' is another SAP term. It is used for companies that have many branches. So the system call this sales organisation and would capture this so you can analyse by each site as well.

Q: 'Sales channel'?

A: It is the 'distribution channel'.

Q: 'Billing'?

A: Well, it's an American term for 'invoicing request'.

Q: 'Management accounting codes'! This is an inappropriate language; we call it 'general ledger codes'.

The finance staff, including top managers, found it difficult to understand and relate to the new system due to this significantly different language. Most of the time of configuration sessions was spent in explaining the system language rather than presenting the system's functionality. Realising the difficulties that the financial community in Posta was going through, and the need to substantially change its business terminology and learn a new language, the Chief Financial Officers (CFOs) of business units made points such as: "Can we have something to say this is the word, this is how the system understands it, and for example it is similar to the business term …" and "we need to have a dictionary, in particular because some units will go live earlier than the others and we want to reduce the migration risk, so we need to have a common language for business".

The communication manager of the financial project was enthusiastic about creating online guides, glossaries, and questions and answers, believing that "people [could] always go to learn how to do things" and that having paper copies of these things would be a waste of resources. Posta's intranet was quite new to the company and little was known about how to navigate through it. However, the project communication manager, among others, assumed that because it was available everyone was using it. The researcher could not find much, if any, evidence to support this assumption.[3]

Training in general did not capture the complexity of teaching users a different language, but users hoped they would understand the system when it went live. This language gap resulted later in enormous entry errors in the system, where users were posting data into the wrong fields.

4.3 Real-time reconciliation

The real-time reconciliation capability of the system which allows users to obtain online consolidations as frequently as they like - weekly, daily, etc. was not revealed to the users during the implementation and training. The project team responsible for the implementation of the system chose not to inform the users about the existence of such capability of the system fearing that knowing about it might complicate their understanding of the system. When the researcher asked about this capability, the answer from the project management was typically: "this is not the issue now, let's get our job done and let them have it [the system] first".

4.4 Billing function

When the financial system moved to its realisation phase, one of the technical components that had been taken for granted - the customer database was discovered to be held in the CRM system that was under implementation at that time. The issue was raised first with the SAP project board, who thought that the issue was "simple, we need it [the database] in a certain time, IS strategy will ensure this". The issue was then raised with the corporate IS strategy to "immediately resolve". IS strategy liased

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[3] For example, when the researcher asked the question "What is the organisation structure?" she usually got an answer like "I don't know, it keeps changing all the time". If she tried to suggest the intranet as a source of information about the organisation, most informants said they could not navigate it. To cover their embarrassment, a common response was "in fact, I don't know much about it".

between the ERP and CRM projects and organised several meetings with the two project management teams.

The timing of the delivery of the customer database continued to be a highly debatable issue between the two projects. For the CRM team, the "push forward" of the "customer engine" (the customer database) that the SAP project asked for was not possible.

The CRM issue shadowed most of the configuration sessions of the SAP financial system project. Senior users kept asking questions regarding the data and where it would be held. The arguments concerning what data would (and would not) be stored within the CRM system included statements such as: "there is no way that this [data] would be held there [in the CRM], it has to be in the financial system"; "we have to negotiate this with them [CRM project]"; and "let's clarify what they are doing". The financial system project board was also concerned about how much "visibility" (access) would be allowed between the financial system and the CRM. In particular, the position of the billing queries, part of the SAP system, needed to be clarified as this required access via a SAP front to a CRM database; hence, this issue was raised with the BU sponsoring the CRM. After some negotiation between the project and this BU, it agreed on "allowing full visibility between the SAP billing database and the details [of customers] on the CRM pricing database".

The SAP programme and the financial project initially believed that "it is indispensable" for the customer database to meet the SAP schedule, but after a lengthy process of negotiation it realised that the CRM "won't finish for the time [they] want". Thus, the SAP programme and the SAP financial project settled with doing "many interfaces with old systems" until the CRM project delivered the pricing engine, which was due nearly a year after going live with the first phase of the financial system.

5   ANALYSIS

The previous section presents - as figure 1 shows - points of controversy where the ERP program of action was interrupted by the organisation anti-program. They both entered a negotiation space where several trials of strength have been exercised. The results of the negotiation varied between siding the system, the organisation or achieving a compromise.
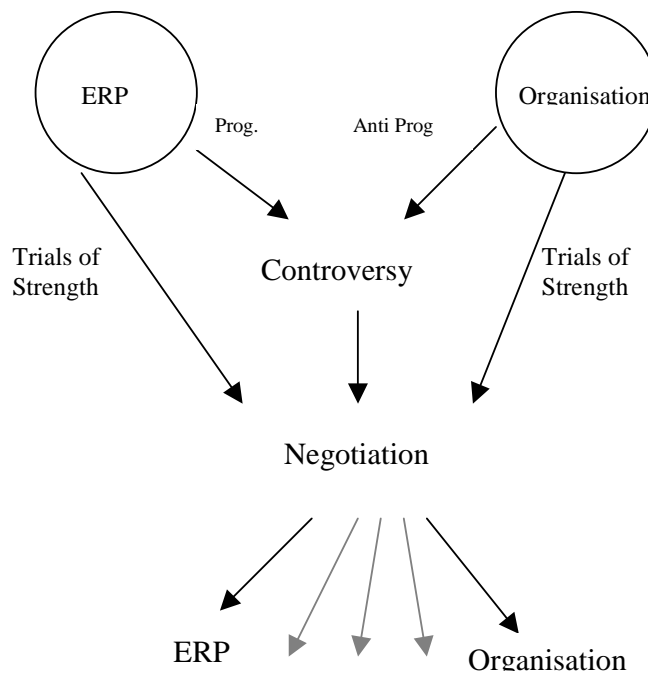
Figure 1: The negotiation between ERP and the organisation

It reveals that organisation does not always adopt the same operating logic as the logic of the system it is using, even for something as complex and rigid as an organisation-wide ERP system. For example, negotiations in Posta concerning the use of plus and minus signs when presenting profit and loss data in the SAP financial module ended up with a compromise that allowed the system to work in its standard way and the same time allowed the organisation to retain its work practices. In the trials of strength between the consultants and CFOs, the consultants associated many actors to the system program including SAP standard, project director, and the best practices. On the other hand, CFOs aligned themselves with a chain of association that included organisational practice, understandable communication norms, and the recently introduced accounting initiative to convince the consultants that SAP logic cannot be adopted as Posta's logic. As both programs were of equal strength, the decision was to retain both logics through the extraction of data from the system and paste it and manipulate it in Excel to produce the required reports according to the organisation's logic of data presentation. The negotiation then ended up by retaining both the inner operations of the system untouched and the organisation opposite logic for presenting financial data. This result of the negotiation does not support either a technology imperative view or a pure social construction since the system was also allowed to continue with its logic. It is rather a combination of both achieved through negotiation.

It is worth noting that the parallel use of Excel with SAP is considered a failure of SAP in the academic literature (see for example: Koh et al., 2000). Revealing the background of the Excel use to

complement SAP in the case of Posta shows that it was an agreed upon and organised activity that the organisation, the consultants, and the users accepted and agreed upon during the configuration of the SAP system, not a solution that emerged solely from the end users' side as it is portrayed in the literature (Koh et al., 2000; Wagner & Newell, 2004).

Although this negotiation ended up accepting and allowing both presentation logics, a negotiation regarding the logic of accounting expenditure had a different kind of outcome. Here the accounting staff anti-program was weaker than the consultants association with best practices and the organisational adoption of a more active approach for inspecting goods. Accounting staff could not juxtapose themselves to a powerful actor during the negotiation. Hence the system was configured according to the systems logic which the users completely rejected after it went live. The consultants involved in implementing the financial module maintained a strong position of sticking with the system logic, which denied the strong feeling in the organisation that the system's accounting practice regarding this matter was inappropriate. Accepting the system's way of working was therefore only superficial, and the organisation in effect manoeuvred around the system rather than engaging in confrontations. This provides another example of a negotiation that ended with the parallel co-existence of the system logic and the organisation logic, without a clear intrinsic capacity for domination by any one party and hence cannot be simply defined as either technology determinism or social constructivism.

The important SAP function of allowing the real-time consolidation of data as frequently as required was not used by the organisation, even though the capability was available in the configured system.[4] This failure to employ a valuable function came about because the configuration team and the project's top management feared that telling users about it might complicate their understanding of the system, so chose to "keep it simple" and not discuss it with users at all. This indicates that SAP could not impose the organisational use of such a rigid built-in function as it could be deliberately ignored by not telling users about its existence. In this regard the system failed to convince Posta's top management to engage in negotiation about it. Therefore, no negotiation was attempted and the top management decision to block out the function from end users went un-challenged stripping off the system from an important function. This end represents a case of social construction where social actors imposed on the technology a certain program of action.

Another controversy raised during the implementation; this time between SAP and another system implementation. Technically the billing function of the financial module of SAP needed to hold the customers' data in order to operate properly. In Posta, however, the existence of the rival CRM network raised a controversy around which system would hold the customer database and which system's implementation time frame would determine the configuration of that database. The CRM actors, including technology requirements and methodology, had a different time frame for developing this database to that of the SAP project network and refused to jeopardise its system. The negotiation, therefore, ended up with an agreement that the CRM system would hold the database and would configure it according to its time frame. This resulted in a serious delay in delivering the billing function of SAP, although this already existed and was capable of billing customers. However, the SAP function could not be activated, simply because no customers' data was held in SAP as the organisation had agreed to hold all customer data in the still-uncompleted CRM system. Another technology actor in the organisation, CRM, had contested SAP and, in this case, the negotiation ended in favouring that actor over SAP. This represents a case of negotiation between two non-human actors where one (the CRM) association and program of action was stronger than the other (SAP). This presents another negotiation that ends in a way that does not simply fall under any of the labels: determinism and social construction but rather stands in the grey area between them.

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[4] This function provides the ability to consolidate data daily, weekly, monthly or as frequent as required.

On the other hand, changes had to take place on the organisation side in order to accommodate the system. For example, the organisation had to learn the SAP system language. Members of Posta negotiated with the consultants and technical staff to change the business language used by the system to the one they were accustomed to in Posta. However, the consultants and technical staff were solid in their refusal to follow this request to change the system significantly. They were supported by the complexity of the system and the technical difficulty to attempt such a radical change in the system. The negotiation therefore ended up favouring the system's business language and staff were provided with a glossary to interpret SAP's terminology in relation to Posta's long-used business language. This negotiation ended up supporting a technology imperative view where technology dictates howit could be implemented and used.

6   CONCLUSION

The relationship between the ERP package and the organisation is constructed through negotiation that is not based on the pretext that one would dominate the other. No absolute domination of one side over the other was therefore found, and where one side dominated the other at one point, the situation could be reversed at another. The issue then is not looking at which side would dominate the other but how the negotiations and controversy within the organisation finally end up. In some instances, the outcome favoured the system's requirements and at other times it ended up siding with the organisational and social view. The outcomes of the negotiation were different in each issue raised, but in all cases neither the SAP nor the organisation side determined the resulting system. Their relationship was indeed constructed through negotiations.

The organisation capacity to shape the "recalcitrance" package is by no means "considerably limited" as previously suggested (Kallinikos, 2004, pg.155; Kallinikos, 2002). Yet, this capacity is not absolute, and could be constrained by some of the technical properties of the system. This is in contrast with a recent argument regarding ERP that invites IS researchers "not to include any consideration of material features of the technology" and to rely solely on the social "interpretative flexibility" concept of SCOT and SSK (Sociology of Scientific Knowledge) (Cadili & Whitley, 2005). Indeed, the relationship between ERP and the organisation is negotiated. The outcome of the negotiation between the system logic and the organisation logic, as the case study illustrated, could over-ride the technical requirement of the system, compromise it, or accept it. It could favour any party but could also reach a compromise and an array of different middle solutions.

This finding extends the critical view of the suitability of the business 'best practice' of the package in use (Wagner & Newell, 2004) and takes it a step further to question whether the ERP 's 'best practice' was delivered in the first place during the implementation or not. The paper invites practitioners to reflect on the findings and reconsider the deterministic view that the ERP package is capable of transforming the organisation and consider the implementation as a negotiation process that would determine in practice what the package would deliver.

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