

The Influence of Organisational Memory Mismatches and Coping Strategies on ERP Outcomes

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Abstract: ERP systems are intended to encompass and integrate functions of an organisation resulting in organisational efficiencies. However, during the ERP usage stage these intended efficiencies are not always realised. One cause of this is organisational memory mismatches and the resultant coping strategies employed. Organisational memory can be described as the capability of organisations to retain and transmit information from past to future members and is evident in the persistence of organisational features after the implementation of ERP systems. Therefore to realise operational efficiencies, organisational memory mismatches between organisational memory and the ERP system need to be addressed. This is not possible without an understanding of the causes of mismatches and the subsequent coping strategies employed. To address this need, this paper presents an analysis of these mismatches, their causes as well as short- and long-term coping strategies employed, and presents a resultant framework. This paper achieved its purpose through an interpretive case study of a large in-use ERP system. The main data source was in-depth interviews with users from 12 functional departments. The research identified causes of mismatches and the long and short-term coping strategies adopted as a result of these mismatches. Mismatches and short-term coping strategies were found to contribute to ERP underperformance. However, mismatches did not occur in isolation. Over time, coping strategies employed for one type of mismatch would result in another type of mismatch. In other cases coping strategies merely increased the mismatch. Only long-term coping strategies rectified mismatches, contributing to ERP efficiency. The findings argue for providing sufficient resources for ongoing organisational capacity for customising and upgrading the system as well as for the training and support of end users. While previous research has focussed on identifying organisational memory mismatches, little research has been done on identifying the causes and the coping strategies. These findings will be useful for ERP implementation teams as well as organisations struggling to achieve organisational efficiencies with their ERP systems.

Keywords: ERP systems, organisational memory, ERP usage, ERP customising, ERP training, enterprise systems

1. Introduction

ERP systems have gained popularity because of their potential to integrate functions of an organisation resulting in benefits such as improved operational efficiencies. However, even after an extended period of ERP usage, these intended efficiencies are not always realised (Ram and Pattinson 2009; van Stijn and Wensley 2001). One cause of this is the existence of discrepancies between existing organisational memory and the processes and structures embedded in the newly implemented ERP system. These discrepancies are referred to as organisational memory mismatches (Van Stijn and Winjhoven 2000). In order to achieve a successful implementation of an ERP system organisational memory mismatches need to be addressed. One of the ways that mismatches are addressed is the adoption of coping strategies. These coping strategies can either lead to further problems and underperformance or the successful adoption of the system and the realisation of operational benefits.

The understanding of the causes of organisational memory mismatches and the subsequent coping strategies employed can help to achieve success in the use of an ERP. Little research has been done on identifying these causes and particularly on the coping strategies adopted (van Stijn and Wensley 2001). This paper thus identifies causes of mismatches and, more specifically, the strategies used to cope with those mismatches in the ERP post implementation stage, referred to as the usage stage. These findings will be useful for ERP implementation teams as well as organisations struggling to achieve organisational efficiencies with their ERP systems during the usage stage.

2. Literature review

The potential benefits of a successful ERP implementation are much publicised and include operational benefits such as cost reduction, improved performance management, easier information

retrieval, procedure simplification and efficiency improvement (Federici 2009). Managerial and strategic benefits can include improved decision making and better sharing of information and coordination between business units, suppliers and customers resulting in better management of value and supply chains and reduction in working capital (Chen 2001; Ram and Pattinson 2009).

ERP systems are complex, their implementation can be challenging and risky, and ERP benefits are often not achieved (Iskanius 2009). There is an extensive literature on the critical success factors for a successful ERP implementation but this focuses on the factors for putting the system in place such as top management commitment and support, change management, BPR and software configurations, training and job design (Finney and Corbett 2007). Despite attention to the critical success factors of ERP implementation, user adoption issues have been found to be the major cause of implementation failure (Soja & Paliwoda-Pekosz 2009). Eight out of nine ERP problems have been attributed to performance related problems and not flawed technology (Gale 2002). It is surprising therefore that limited study has been conducted on the ERP post implementation or usage stage (Ram and Pattinson 2009).

Going live with ERP is the beginning of a longer journey that needs to be undertaken before the full benefits of the system can be realised (Chen 2001). It is during the stage after implementation, the usage stage, that the most significant operational benefits of an ERP system can be realised (Chen, 2001). Although management and strategic performance outcomes will only accrue to the organisation after three years, operational benefits are often achieved after the second year of implementation (Ram and Pattinson 2009).

The implementation of ERP systems alone cannot deliver business performance. These systems need to be adopted and appropriated by human users, integrated into their respective work-contexts, and effectively utilised before efficiency benefits can accrue (Malhotra, 2005). These outcomes can be constrained by mismatches between the organisational memory and the ERP and the strategies adopted by individuals to cope with these mismatches (van Stijn and Wensley 2001; Van Stijn and Wijnhoven 2000). The following sections will first discuss the concept of organisational memory, then outline how mismatches can occur and finally list the categories of coping strategies that are adopted to cope with mismatches.

2.1 Defining organisational memory

Organisational memory can be defined as the socially constructed accumulation of past solutions to frequently encountered problems (Ackerman and Halverson 2004). Walsh and Ungson (1991: 61) define organisational memory as “the stored information from an organisation’s history that may be brought to bear on present decisions”. Stein and Zwass (1995: 89) expand on this by including the element of effectiveness. They state that organisational memory is the means “by which knowledge from the past is brought to bear on present activities, thus resulting in higher or lower levels of organisational effectiveness”.

2.2 The nature of organisational memory

The contents of organisational memory are subject to acquisition, retention and retrieval (Stein and Zwass 1995; Walsh and Ungson 1991). Interpretations about organisational decisions and their consequences are acquired and retained in organisational memory in retention facilities or ‘storage bins’ and retrieved in ongoing activities in the organisation (Walsh and Ungson 1991). These ‘storage bins’, are described as ‘individuals’, ‘culture’, ‘transformations’, ‘structures’ and ‘ecology’ (Figure 1). The first of these storage bins, individuals, contains the recollections of individuals of their own experiences and observations. The second, culture, contains the shared experiences learned and transmitted in the culture of the organisation. The third, transformation, is particularly important to this paper and contains the logic that guides the transformation of an input to an output. The description of the transformation storage bin in Walsh and Ungson (1991) is remarkable close to that of a business process. The fourth, structures, contains the formally and informally agreed roles of the organisation that encode a particular set of behaviours that are incorporated into actions. The final storage bin, ecology, contains the physical structure and layout of the organisation. External archives are information sources but are not part of organisational memory.

Organisational memory can be embedded in and supported by systems and artifacts particularly information systems (Ackerman and Halverson, 2004; Walsh and Ungson 1991). Of particular

importance to organisational memory are information systems which provide rich and multiple possibilities to support organisational memory such as ERPs (Stein and Zwass, 1995).

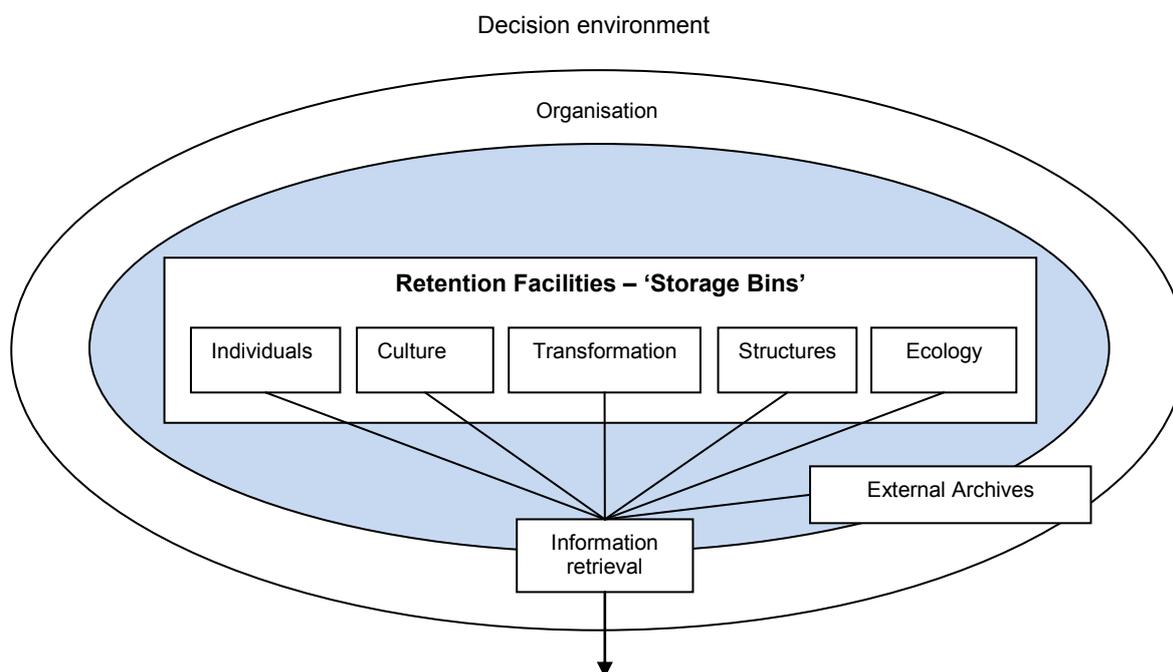


Figure 1: The structure of organisational memory (Walsh and Ungson, 1991)

2.3 ERP and organisational memory mismatches

The implementation of ERP systems results in the modification of organisational memory particularly as it relates to storage bins of structures, transformation and individuals (van Stijn and Wensley 2001). Over time the customary or standard way to undertake processes is recorded in a variety of ways within the organisation and in people's minds. An ERP can modify this standard way resulting in a discrepancy between the storage bins of organisational memory and the processes and structure embedded in the ERP system. Van Stijn and Wijnhoven (2000) and van Stijn and Wensley (2001) refer to these discrepancies as organisational memory mismatches under the three categories of under-redundancy, over-redundancy and inconsistency. The terms under-redundancy and over-redundancy refer to either missing or duplicated memory between the ERP system and any 'other retention medium' (van Stijn and Wensley, 2001: 189). These terms suggest that organisational memory contains data that can be missing or duplicated. The view taken in this paper is that organisational memory is a faculty or ability to retrieve details of past decisions, acquired and stored in retention facilities or storage bins so as to apply them to present decisions (cf. Walsh and Ungson, 1991). Supporting this view is the contention of Bannon and Kuutti (1996) that organisational memory is not merely a passive store but an active and constructive process of retrieval. Thus mismatches occur when the ERP prevents this faculty or ability from either working properly or at all. Mismatches are thus categorised with the terms 'lack of functionality' or 'inconsistency'.

2.4 Coping strategies

Organisational memory mismatches cannot be easily rectified. Individuals tend to use coping behaviour to deal with these mismatches (Van Stijn and Wijnhoven 2000). These coping behaviours include using old procedures, alternative information systems or manual workarounds. There are cases where users fail to abandon these workarounds and this may result in the under-use or non-use of the ERP system altogether (Tyre and Orlikowski, 1994; Markus and Tanis, 2000). Many coping strategies result in further mismatches particularly in the short-term (van Stijn and Wensley, 2001). Ultimately, organisational memory mismatches need to be solved by changing the organisational memory to incorporate the process knowledge and structures in the ERP or by changing the ERP system to incorporate the organisation's process knowledge and structures (van Stijn and Wensley, 2001). There is little research available that directly addresses the coping strategies adopted to deal

with organisational memory mismatches (van Stijn and Wensley, 2001). For this reason, prior research on the implementation and use of ERP systems will be drawn on to support the discussion of the findings.

3. Methodology

A qualitative research approach was adopted which involved interpretive techniques (Cavana, Delahaye and Sekaran 2001) to explore how mismatches occur during the usage stage of ERP systems and the coping strategies employed by users. The research approach was based on Miles and Huberman's (1994) data analysis model which has four steps: data collection, data display, data reduction and conclusions – drawing/verification. The sample was taken entirely from a City Council in South Africa that had successfully implemented a large ERP system. People interviewed included 12 business users from 12 different functional departments, 10 support staff personnel and 2 senior managers. Most interviewees had been using the ERP system for approximately 1 to 3 years. Two people involved in the same ERP module were interviewed at a time, one being a business user and the other the support person. Interviews were conducted using a semi-structured instrument and were recorded. The interviews were not transcribed but were listened to repeatedly and extensive notes were made. Using the notes and tape recordings from the interviews, major themes were identified. The process involved the researchers discussing, comparing and agreeing the major themes. To identify patterns and themes from the data, the notes were organised into clusters based on the main types of memory mismatches, lack of functionality and inconsistency, and the long and short-term coping strategies to cope with these mismatches. Three of the researchers produced the initial framework and then the other two revisited the material, confirmed areas of agreement and further refined the analysis and conclusions.

4. Results and discussion

The intention in the City Council was to replace legacy systems with the ERP but elements of the legacy systems continued to be available for some time. Some systems which were not to be replaced (referred to here as external systems) would continue to run with the ERP. Use was also made of Microsoft Excel and Access, termed productivity systems in this discussion. The availability of these four system groups provided the potential for mismatches discussed below. The interesting element was the efforts of the users to cope with the mismatches.

4.1 Lack of functionality

Lack of functionality is defined as the inability of an organisational member to undertake or complete a task due to a mismatch between the memory of the process in the rest of the 'storage bins' and the new system installed. When a required task was not completely catered for in the ERP, users found that they could not complete their day-to-day work. This lack of functionality arose in three ways. These were specific tasks or elements of tasks not catered for, modules not integrated and slow connection speed. In some instances there was not a lack of functionality, users merely perceived that there was a lack of functionality or did not trust the system sufficiently to acknowledge functionality.

4.1.1 Tasks not being catered for

In certain cases there were functions that the ERP could either not process at all or not process in the expected way. For example:

"...if we have to capture an alien... a non South African Citizen... we still have a problem with the ID number...because [the ERP] requires an ID number or a number in that format and it validates it... and their ID is in a different format to ours..."

"... [the ERP] does not capture all the procurement details... usually I could have acted on your requisition the next day, but now I have to wait another 5 days for you to see the email I sent you saying I actually don't know what kind of shoes you want..."

In other cases the data was in the ERP system but it could not be presented in ways that users wanted. For example, customised reports were not made available, reports were unable to perform some of the calculations or the ERP system produced multiple reports instead of one consolidated report.

4.1.2 Modules not integrated

An ERP system consists of a number of modules, with each module representing a different facet of the organisation. However, in this case, the organisation was still implementing modules and hence not all the modules had been integrated as explained by a technical support staff member:

"...Because the organisation is going through a re-structuring process, it's stopped a whole lot of other processes ..."

This led to the ERP not being able to cater for certain activities.

"... I need to access information from the [Module]... but no-one is linked to the [Module], so you can't use that functionality yet..."

Un-integrated modules resulted in lack of functionality and an inability to complete processes in the remembered way. This led them to use others systems to restore functionality. These problems led the users to feel that there was a conflict between the organisational memory of the way processes should have been undertaken and the way they now had to be undertaken.

4.1.3 Slow connection speed

The slow connection speed led users to use other systems so that they could retrieve the information during the peak periods when the ERP response time deteriorated to the extent that the system was not functional:

"... [the ERP] is very slow when everyone is on the [ERP]... you might need information and then it will hang in there. And you wait... and you wait, and this manager is on the phone and he wants the ... information [immediately]. Then I can go to my [legacy] system and get the information..."

There was an understanding that certain tasks needed to be completed quickly and this was not the case leading to a memory mismatch.

The three mismatches discussed above were mainly procedural mismatches. The memory bins of transformations, structures and ecology retain the means to find solutions and carry out tasks in the form of procedures, formulas, roles and technology (Walsh and Ungson, 1991). Here the users experienced a mismatch between those three memory bins and their use of the ERP system.

4.1.4 Negative system perceptions

In this study, users often incorrectly perceived that the ERP system was unable to cater for a specific task or that tasks were more complicated in the ERP system. System perceptions such as difficulty-of-use, inefficiencies and slowness have been shown to elicit emotional responses among ERP users (Seymour and Roode, 2008; Tyre and Orlikowski, 1994). Users have a great emotional investment in the established methods and this can lead to perception rigidity or inaccurate causal attributions (Akgün, Byrne, Lynn and Keskin, 2007).

Negative perceptions were in some cases due to a lack of understanding which could be attributed to insufficient training. In other cases the perceptions stemmed from a lack of trust. As the ERP system was often not available when the users needed to use it or offered incorrect results, the users' confidence in the system diminished. Even when the system was available, the users still entered the information into the old systems because they were not confident that the ERP would be available at a later stage when they might require information from it. The legacy system thus was used as a back up which doubled the work load of the users:

The following users' responses illustrate these perceptions:

"...Most people do not like [the ERP]...they are used to the old system and do not understand how to do everything in [the ERP]..."

"... One of the biggest problems especially when it comes to maintenance type orders is that staff are still more comfortable with their manual paper based systems than the new ERP route..." "... in many areas they still run both the paper based system and [then] place the information on [the ERP]... the main problem is that managers do not know the new processes and how to manage their workplace by making use of the system reports..." "

“... It's frustrating doing the same thing like ... if I do my time sheets, I capture it in [the ERP] and then into [the legacy system]... you can do all that thing in one day but now it takes two days because you have to duplicate it...”

These perceptions resulted in a feeling of dissonance between the users' memory of the process and the way they now needed to undertake them. The memory mismatch in this instance is argued to go beyond a mismatch with transformations and structures to be a mismatch with the individual and culture memory bins. Individuals and culture, even if they may distort them in the process, retain, aggregate and share memories of what has happened and how to apply these to future problems (Walsh and Ungson, 1991). The users perceived that the system was not allowing them to apply their past experiences to current situations. As a result, users experience a mismatch between what they know about performing a task and what the ERP expects them to do.

4.2 Inconsistencies

Inconsistency refers to the processes and structure embedded in the ERP system being inconsistent with organisational memory as represented by the storage bins to the extent that functionality is hampered. Whilst the lack of functionality or a perceived lack of functionality prevents a user from performing a task, inconsistencies hamper the performance of a task. The causes of inconsistencies identified in this paper are presentation inconsistency, incomplete and incorrect data and lack of synchronisation of multiple systems. The last of these inconsistencies frequently arises from short-term coping strategies.

4.2.1 Presentation inconsistency

A presentation inconsistency exists when users believe that they should be seeing a particular presentation on the ERP screen and the screen shows them a different view. The different presentations effectively cause a mismatch, since they create inconsistency between what users know and what they see in the ERP. An example identified was when a client would phone in with an invoice query to the call centre. The call centre ERP module would not allow the representative to view the invoice in the same way as the customer. It was thus difficult to discuss the invoice with the customer. Presentation inconsistency results in mismatches with the organisational memory, in this case the transformation and ecology bins, as the visual layout and, to some extent, the logic that guides the process are embedded into the system in a different way (Walsh and Ungson, 1991).

4.2.2 Incomplete and incorrect data

Three sources were found for incomplete and incorrect data. Firstly, inconsistencies due to incomplete data occurred in some cases because of missing data fields. Users needed to capture certain information but no provision had been made for this input. As one user pointed out:

“... There are lots of things we would like to capture onto the system, but obviously the [ERP] does not necessarily cater for it because of the limitation on the number of fields...”

Missing data fields could be traced back to the implementation stage of the ERP. Technical support staff described the process of establishing information requirements but there appears to have been problems with the process.

“...We went to consult them to find out what is the information that you want to put in the system and got it all signed off and we collected the information... but you cannot think of everything up front...”

However the following response points out the problem with this consultation process.

“...When the [ERP] started up, consultation did not take place with the users at the bottom, but maybe with the people higher up, who weren't aware of the user's needs ...”

Inconsistencies due to incomplete data also occurred when users did not complete all the data fields.

“...a lot of times they don't fill it in, which means it has to go back... [when the] deadline is [on the] same day...then we're running late, so there are delays when this happens...we don't do anything if its not filled in...”

A possible reason for this was that the users did not consider the omitted fields relevant to their work (Gale, 2002). One way of ensuring fields are completed is making them mandatory. However, the

support staff pointed out that not all fields can be made mandatory. Incomplete and incorrect data was also attributed to human error. This occurred often and ranged from spelling mistakes, to incorrect invoices being sent to clients for amounts that were thousands of times more than it was supposed to be. Much of this was attributed to insufficient training and lack of confidence.

When asked to what extent the information that was accessed from the ERP was incomplete, the majority of respondents agreed that this occurred quite regularly. A direct implication of this is that functionality is impaired as pointed out by the following user:

"... If the information is not on the system, then how do you do the reporting...?"

These errors caused mismatches in two ways. The first is inconsistency between individual memory and the ERP. The remembered field was no longer available. The second mismatch is between transformation memory and, to some extent, individual memory and the ERP. The unexpected absence or incorrectness of data not only is disconcerting to individuals but also hampers a match between transformations and the underlying ERP system when information is retrieved.

4.2.3 Lack of synchronisation of multiple systems

Non-synchronisation of multiple systems was a major cause of inconsistency. This was due to either incorrect transfer of data from one medium to another or the separate systems not being updated simultaneously. It was found that a lot of data exported from legacy systems to the ERP was poor in quality and completeness:

"...we converted data with an electronic data conversion tool. "...It was a case of junk in; junk out. The state of the data in [the legacy system] was absolutely shocking... people's names were captured in the wrong places, their addresses were captured in the wrong places... there weren't ID numbers..."

The existence of separately managed and processed instances of the same data sets resulted in information becoming inconsistent over time. This was due to either delays between updates or human error. As users explained:

"We took a lot of information on meter reading problems out of [the ERP] and then put it on to [the legacy system] to get the picture and I think they got a 70% map ...".

"...we keep an outside database for reporting... when we need to create a report we would just get the information from [the ERP] and put it in the database so that we can create the report...so the data in the external database was not always up to date..."

This mismatch is similar to the over-redundancy mismatch of Van Stijn and Wijnhoven (2000). The key difference is that the inconsistency is due to lack of synchronisation between two supporting systems of organisational memory.

4.3 Impact of mismatches on performance

Mismatches were found to contribute directly to ERP underperformance. As indicated, there was a necessity to maintain legacy and other systems and for staff to work overtime. This resulted in an increase in process costs and process times (van Stijn and Wijnhoven, 2000). The need to work with more than one system and to rectify problems meant that there was a lower level of efficiency. A hidden cost is in the level of frustration and anger that built up in the staff. This was frequently mentioned and must have impacted on productivity.

4.4 Short-term coping strategies

One of the coping strategies employed by users, using other systems and workarounds, was not only short-term but also potentially dysfunctional. This coping strategy produced further mismatches and the need for more short-term coping strategies.

4.4.1 Using other systems and workarounds

Users do not immediately forget their old ways of working when the ERP is implemented (Tyre and Orlikowski, 1994). This could be because they do not trust or completely understand the ERP. They may also not find all the functionality that they want in the ERP. As a result, they revert to the legacy system, external systems or productivity software when they want to do certain tasks or when they simply want to back up their work. To do this, users have to keep in mind the old business process for

performing a task as well as adopting the new processes in the ERP. This meant that the users had to develop what were virtually two perspectives on organisational memory. The users did not find this adjustment easy:

“... It’s frustrating doing the same thing like ... if I do my time sheets, I capture it in [the ERP] and then into [the legacy system]... you can do all that thing in one day but now it takes two days because you have to duplicate it...”

At times users employed quite creative methods to overcome inconsistencies due to missing data fields. Some users “bent” the ERP completely to cater for their data requirements by using it in a different way to what was intended. Users would then decide on a less-important field (such as a description field), ignore the data requirements of that field and use it to input their data.

“...so what [the business users] did was use the assignment description field to input the contract number... so the description field does not represent what it now actually does anymore...”

The implication of doing this is not always apparent to the user. Due to the silo-nature of some of the specific ERP system’s processes, the users did not know whether the fields that they are over-writing are important for someone else in another department. An ERP is designed to integrate all information across the organisation and users need to be informed of the implications of this integration (Gale, 2002). One interviewee agreed with this and added:

“... the [ERP] system was designed to kill off every other little system on the outside... there is a huge rule out that says you aren’t even allowed to have any other database ...”

Not all users seemed to be aware of this rule or even abide by it as illustrated by their use of productivity software. In some cases productivity software was used for reporting and not for data-entry. However, implications arose when data needed to be transferred from the ERP to the productivity software. Not only was it time consuming to transfer data, but it also allowed room for error. Furthermore, there was also the issue of maintaining this data.

4.4.2 Consistency checks

Due to mismatches and errors occurring in the system resulting from short-term coping strategies, a further coping strategy developed, termed “consistency checks”. Consistency checks were frequently undertaken by the users to ensure that the information was the same on all systems. For example, users frequently had to manually check two systems when searching for information to ensure integrity of data. This resulted in an increase in overtime and frustration.

4.4.3 Working overtime

The slow connection to the ERP during peak periods led to some users working outside office hours in order to capture information into the ERP. This added to the frustration with the system and led to errors as discussed above. This was either done first thing in the morning or late in the evening when there were less people using the ERP.

4.4.4 Sending notifications

A coping mechanism for dealing with inconsistency caused by incorrect functions, missing data fields, human error and incomplete data error was to send a notification to another user, either through a phone call, an e-mail or an ERP notification. Notifications served as requests to users to correct memory mismatches. The use of notification resulted in unnecessary time delays that negatively affected the rate at which tasks were completed. Notifications also created confusion among users since it was not part of standard practice. Users did not respond appropriately at all times resulting in further problems.

4.4.5 Coping strategies causing further mismatch

It was found that coping strategies that were meant to overcome one form of mismatch often increased the mismatch or over time led to another form of mismatch. The most common of these was that the use of other systems and workarounds resulting in further mismatches such as negative perceptions of the system, presentation inconsistencies and incomplete and incorrect data. It became clear that mismatches could not be solved with short-term coping strategies. This led to long-term coping strategies which are now discussed.

4.5 Long-term coping strategies

Long-term strategies either seek to incorporate the process knowledge and structures embedded in the ERP system into the organisational memory or change the ERP system so as to support the organisational memory (van Stijn and Wensley, 2001).

4.5.1 Training, help and support

When faced with inconsistencies due to incorrect functions, missing fields or lack of understanding, users would contact the help desk to request explanations. The users also received on-demand training from the help desk:

"...We are still inexperienced with the system. The technical support staff are still teaching us to use the tools in the system... to overcome a problem..."

Formal and informal training and support structures are essential elements of organisational support needed for the implementation of ERP systems (Seymour and Roode, 2008). But the initial training in this implementation focused on showing users how to perform tasks rather than understanding the system and how it correlates to the business processes (Gale, 2002; Somers and Nelson, 2001). When the cause of memory mismatch was lack of understanding, the users asked for retraining to help them understand why and how they were expected to do things in a different way in the ERP:

"... the [initial] training was very transactional; how to actually do something ... but [the users] didn't quite understand the impact... it wasn't made clear that what they do here affects somebody in that department ..."

Ineffective training could result in ERP underperformance in the usage stage and training should go on well into the usage stage of the ERP system (Al-Mashari, 2003; Chang, 2004; Markus and Tanis, 2000; Zhang 2002). It is very difficult for users to adapt to ERPs and the business processes, tasks and roles that result (McAdam and Galloway, 2001). If users do not realise why certain functions are needed within a process or how certain information would be beneficial to them or other colleagues, they will find means of working around the system, resulting in inconsistent information and a distorted perspective (Gale, 2002).

Training and support are also opportunities to build positive responses towards ERP systems (Seymour and Roode, 2009). The intention should be to show users how the new system has empowered them and convince them that it is the ideal way of carrying out their day to day tasks (Gale, 2002). This reduces mismatches particularly those stemming from lack of confidence or understanding and increases the effectiveness of the system.

4.5.2 Customisation and enhancements

The organisation introduced what it called "Process Owners". The task of the process owners, who were usually heads of departments, was to decide whether particular functionality was needed. If so, support staff would customise the ERP system. Hence the final decision to customise or add functionality was made by process owners rather than being dictated by "best practices". A support staff member stated:

"... we are definitely taking more ownership on our side... we do our own investigation ..."

Customisation of the ERP system has provided solutions to various problems arising due to mismatches.

"...we designed all our business processes and now people are saying 'ja – but that one is a bit clumsy' lets go through an improvement process...I think it has worked really well. We put in a base line, find out how to do that function... get it working, stabilise the system and then do the implementation changes..."

There are potential problems with high levels of ERP customisation, such as the need for rework after upgrades, and ongoing consultant dependency (Hawari and Heeks, 2010). Yet, customisation of the ERP system provided solutions to various problems arising due to mismatches. Customisation may be used to overcome the structural problems of an ERP and can thus be seen as a long-term coping mechanism. The concern is what the long-term implications will be of continuously customising ERP software, and the degree and quality of the customisations.

The intention of the long term strategies can be viewed as a form of organisational unlearning which endeavours to achieve alignment between the best practices inherent in the organisational memory and those embedded in the ERP (Akgün et al. 2007). Organisational unlearning involves changes to organisation memory in three ways. The first impact is on the individual and culture storage bins through training, support, discussion and communication. These actions impact on mental models, frames of reference, norms, values and knowledge (Akgün et al. 2007). Secondly, customisation, upgrade or enhancement of the system can impact on the routines, procedures and processes of transformation storage bin. Finally, changes can be made to the physical environment (ecology storage bin) such as documents, equipment, office or factory layout, computer systems or peripherals (Akgün et al. 2007).

5. Conclusion

ERP systems support and draw on organisational memory and their introduction into an organisation results in memory mismatches. This research identified mismatches due to lack of functionality and perceptions of lack of functionality. The research also identified mismatches due to inconsistencies. These were presentation inconsistencies, incomplete and incorrect data and not synchronising multiple systems (Figure 2). Of particular note, were higher process costs and process times, a low level of efficiency and high frustration and anger that built up in the users. When users become angry or frustrated, this affects their perception of the potential problems and opportunities. After a time, they cease to have any interest in the system and fail to adapt (Tyre and Orlikowski, 1994).

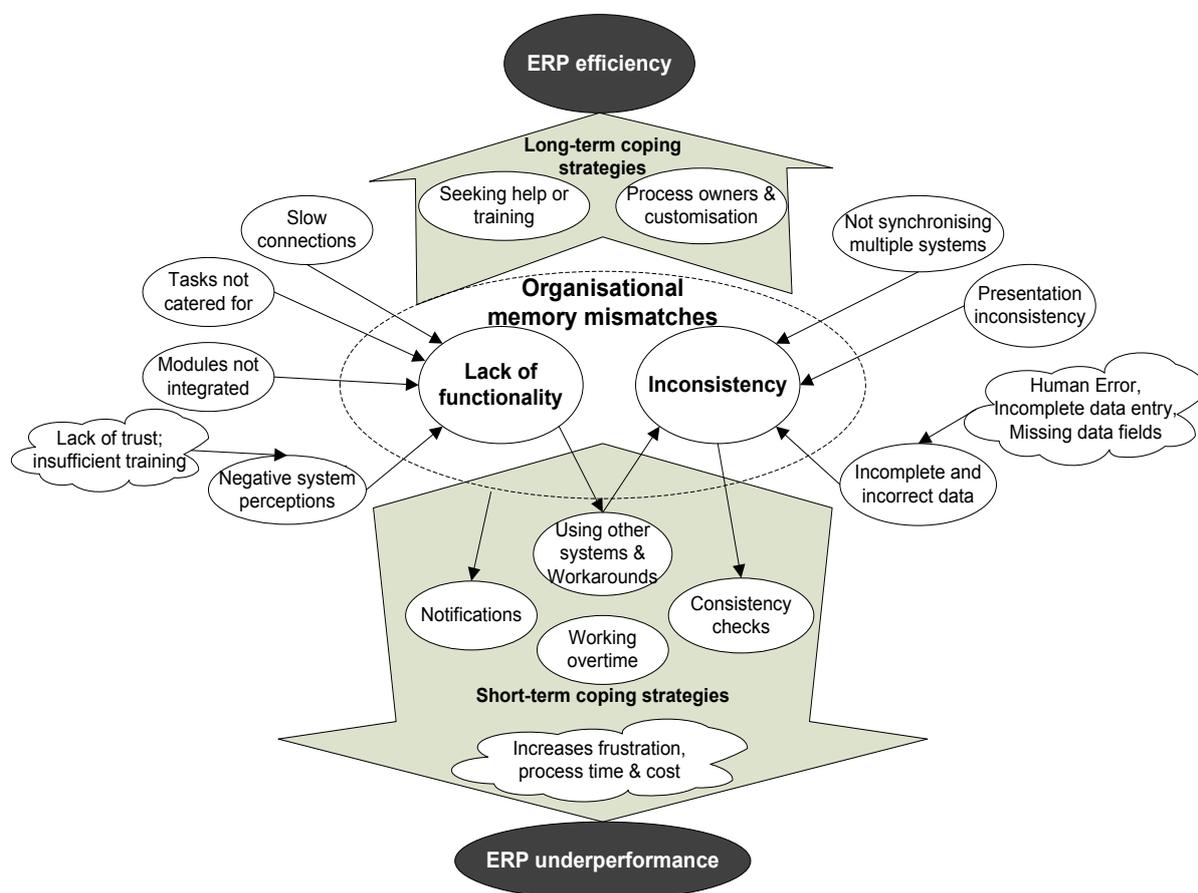


Figure 2: Resultant framework

Users who use short-term strategies to cope with problems may fail to abandon these strategies when the problems are fixed so as to escape having to learn the new ERP system capabilities (Markus and Tanis 2000; Tyre and Orlikowski, 1994). This may result in the under-use or non-use of certain functions of the ERP system. Persistence with short-term strategies could lead to further mismatches and further short-term strategies (Gale, 2002). The ERP system performance therefore degenerates over time. Tyre and Orlikowski (1994) point out that there is limited time to institute long-term coping strategies and recommend a concerted effort in the 'window of opportunity' rather than a stream of minor changes which can often prove ineffectual.

Long-term coping strategies are important to the achievement of ERP efficiency. It is only when information systems are routinised that efficiencies can be achieved (Butler and Gray, 2006; Tyre and Orlikowski, 1994). Routine use not only provides the opportunity for ongoing training but also is necessary for ongoing adaptation (Tyre and Orlikowski, 1994). However, should the organisation be unwilling or unable to make technology changes and upgrades and help the users to modify the organisational memory through training and guidance, the ERP could take on the role of the original legacy system it was intended to replace, but in disguise (van Stijn and Wensley 2001).

The findings argue for providing sufficient resources for ongoing organisational capacity in system customising as well as in the training and support of end users. It is hoped that future research could confirm these findings in other ERP implementation and potentially identify further long-term coping strategies that could contribute to ERP efficiency.

6. References

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