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# An Extended Framework for Comparing Expectations and Realized Benefits of Enterprise Systems Implementations

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## ABSTRACT

Realizing business value and identifying the benefits arising from implementations of enterprise systems remains a significant challenge for both research and practice. A review of existing work on enterprise systems benefits reveals that current frameworks pay limited attention to contextual and temporal variations, socio-technical and business change, and levels of benefit realization. This research study investigates the complex mix of expected and realized benefits specifically arising from ERP systems. The aim is to address the limitations of current frameworks and extend theoretical understandings to provide a richer picture of ERP benefits and their contextual variation. Drawing on data gathered from more than 60 case study organizations of differing size, maturity and industry sector the study adopts an iterative content analysis to empirically derive a comprehensive benefits framework. The extended classification and the methodology used to construct it are presented and discussed along with their implications for future research and practice.

## Keywords

Enterprise Systems, ERP Systems, ERP benefits frameworks, Benefits classification, Expectations, Content analysis

## INTRODUCTION

Enterprise systems remain a significant area of investment and activity for many organizations. A recent survey of CIOs (in 1500 organizations across 30 industries and 48 countries) representing over 138 billion US\$ of IT spending identified enterprise applications as the second most significant IT priority for 2009 (McDonald, 2009). Another survey (of 629 CFOs) reports that in 2008 levels of Enterprise Resource Planning (ERP) activity increased over corresponding levels in 2007. Thirty-two percent of responding organizations indicated some form of current ERP activity (such as a new implementation in progress, expansion to include further modules, or upgrade to a new release) and a further 12 percent of organizations have new implementations planned for the next year (CSC, 2008). Both surveys also indicate that understanding and improving the benefits and returns from enterprise system investments is a significant activity.

The topic of enterprise systems benefits has also been widely discussed in the scholarly research literature (Legare, 2002; Murphy and Simon, 2002; Shang and Seddon, 2002; Staehr, Shanks, and Seddon, 2002; Staehr, 2007). However, research findings continue to point to the fact that organizations do not always achieve the benefits they desire from their enterprise systems implementations (McDonald, 2008; Staehr et al, 2002; Grant, Wailes, and Wright, 2006; Quattrone and Hopper, 2001). Against this background, this research contributes to the reframing of research into enterprise systems benefits. We argue that, notwithstanding significant advances in knowledge, current frameworks for understanding the benefits of enterprise systems are limited in scope and a more holistic and detailed level of analysis of benefits is required to: (1) assist organizations locate and understand the benefits of their enterprise systems activities and (2) to contribute to extending current theorisations about the business benefits of enterprise systems. We report on work being conducted in a long-term programme of research into the benefits and business value of enterprise systems. In this paper we focus specifically on ERP systems and on the development of an extended framework for identifying and understanding ERP systems benefits.

The paper is organised as follows. The next section provides a discussion of existing research and an analysis of the scope of current frameworks for understanding ERP benefits. We identify a number of limitations of existing work and present an argument for the development of a more holistic benefits framework. Subsequent sections explain the methodology for deriving the framework and introduce the extended framework and its dimensions. The final section discusses our progress to date, the extent to which our identified research imperatives have been achieved and outlines our plans for future research.

## ERP BENEFITS: BACKGROUND AND LITERATURE

Several authors provide reviews of research into ERP benefits (*cf.* Esteves and Pastor, 2001; Esteves and Bohorquez, 2007; Staehr, 2007). Rather than re-iterate the content of these reviews we present a synthesis of the literature according to the different interpretations of the concept of ERP benefit. We identify three distinct areas of focus: nature of ERP benefits; benefits as success; and benefits in context.

### Nature of ERP benefits

Research literature in this area seeks to identify lists of ERP benefits and to classify them into groups or categories. For example, O'Leary (2004), drawing from a database of vendor success case studies compiled a list of ERP benefits achieved by organizations, distinguishing between tangible and intangible benefits. Shang and Seddon (2002) provide a more comprehensive classification of ERP benefits. Again, drawing from a database of vendor case studies they compile a list of ERP benefits (sub-dimensions) and classify them into five groupings (dimensions) operational, managerial, strategic, IT infrastructure and organizational. Research in this area is largely descriptive or prescriptive and outcomes focused. It does however provide useful insights into the diverse range of ERP benefits organizations are seeking to achieve and in the case of Shang and Seddon's work provides a framework for organising them and tools for considering the timing of ERP benefits.

### Benefits as success

A second area of research incorporates ERP benefits into studies focusing on the phenomenon of IS success. Here attention is focused on critical success factors (Nah, Lau, and Kuang, 2001; Al-Mashari, Al-Mudimigh, and Zairib, 2003; Sammon and Adam, 2008) or on measurement models of ERP systems success (Gable, Sedera, and Chan, 2003; Sedera, Gable, and Chan, 2003). Attention is placed upon description and measurement of success and defining generic dimensions of success; limited attention is given to contextual factors or to how success is defined by individual organizations. This work is very much grounded in concepts of IS success, assuming that success can be defined similarly for all organizations and is largely unchanging. As Dery et al. remind us what is also required "is a recognition that the perceived 'success' or 'failure' of an ERP system is itself socially constructed reflecting issues of organisational politics, power, discourse and agency" (Dery, Grant, Harley and Wright, 2006, p: 210).

### Benefits in context

A third research area considers benefits in context and draws attention to the situated nature of ERP implementations and focuses on in-depth analysis of individual ERP projects (Williams and Hardy, 2006; Grant, Hall, Wailes and Wright, 2006; Quattrone and Hopper, 2001; Staehr, 2008). This research provides greater insights into how benefits are achieved (or not) and is underpinned by a range of different theoretical and analytical lenses such as discourse theory (Grant et al., 2006), theories of socio-technical change (Williams and Hardy 2006) and structuration theory (Staehr, 2008). This work seeks to make sense of individual implementations and serves to remind us that there is significant variation in the motivations for, and nature of, ERP related projects, a fact that is largely unacknowledged in the previous two areas of research.

### Limitations of existing frameworks and research on ERP benefits

In each of the three areas of research summarized above progress has been made towards understanding the nature of ERP benefits. Such work provides a strong foundation for future development, however there are a number of limitations in current theorizations of ERP benefits. These limitations are outlined below (*c.f.* **Error! Reference source not found.**) and a research imperative is provided in response.

#### Motivations and ERP benefits

Existing studies of ERP benefits provide little insight into the variations in motivations for undertaking an ERP project and how this might shape the expected or realized benefits. As Markus and Tanis (2000 p: 180) observe "[i]t is important to take into account these wide variations in motivation to adopt enterprise systems when attempting to assess or explain their impacts and downstream consequences". Most studies and frameworks are outcomes focused and consider the actual benefits achieved; they provide little insight into whether, or to what extent, these benefits match the expected/desired benefits as described in the original business case.

**Research imperative:** to extend current work and develop an improved benefits framework that incorporates information about an individual organization's motivations and intentions for undertaking a specific ERP project.

<p><b>Modality of ERP benefits and change over time</b></p> <p>In depth case studies have clearly identified that change is constant and therefore ERP benefits may be emergent and changing over time (Quattrone and Hopper, 2001; Dechow and Mouritsen, 2005). Existing ERP benefits frameworks make little distinction between time of benefit in terms of whether it is a desired/perceived benefit, an emergent benefit or one that is realised (or unrealised).</p> <p><b>Research imperative:</b> to view ERP benefits realisation as a process, open to being shaped by business change and to incorporate theories of business and socio-technical change in to the study of benefits realisation.</p>
<p><b>Spatiality, the reach and scope of ERP projects</b></p> <p>An ERP project can vary in reach from a project focused in one functional area to projects that may span organizational boundaries, involving integration with suppliers, customers and strategic partners. This raises questions about the locus of benefit and to whom the benefits apply.</p> <p>Projects also vary in scope from full suite implementations, implementation of a single module, expanding or upgrading an existing system etc. This has implications for the expected benefits. For example, in a smaller project the benefits may be more modest or narrowly focused and therefore, one might argue, more achievable and measurable, whereas in a larger project the benefits may be more systemic, subject to variation (successful in one area and not in another) and harder to evaluate. Existing ERP benefits studies tend not to distinguish between the scope of projects.</p> <p><b>Research imperative:</b> to extend current work and distinguish between the reach and scope of individual projects in order to understand variations in benefits profiles according to project type. Further work is required to also clearly distinguish the locus and level of benefits within individual organizations.</p>
<p><b>Research data</b></p> <p>Existing studies, in particular those focusing on developing classifications of ERP benefits and critical success factors have largely drawn their data from previous literature or from short vendor case studies. There are a number of limitations in terms of the depth and richness of this secondary data. For example, it is not possible to distinguish the reasons why each project was initiated (motivations) the type of ERP project (reach and scope) or how benefits have changed over time. Further, existing frameworks and classifications are limited to only two levels (a category heading and category elements) as the data is not rich enough to provide details of the nature or change in the benefit profile over time. Studies conducted in the third research area provide rich interpretations from single or small numbers of in-depth case studies. However, given the differing theoretical lenses being applied and therefore the different levels of analysis and interpretation it is not a straightforward matter to compare or combine findings due epistemological incommensurability.</p> <p><b>Research imperative:</b> to gather a richer set of empirical data, that is deeper and richer than that used to develop existing frameworks and includes greater contextual and project specific information. This can be used to develop a more comprehensive and empirically derived framework and taxonomy of ERP benefits that accommodates benefits change over time.</p>

**Table 1. Limitations of existing studies of ERP benefits and research imperatives**

In summary, current research is largely descriptive, or prescriptive, containing lists of benefits as outcomes and with a focus on their measurement. Existing frameworks do not seek to understand the varying contexts within which ERP projects are situated. Limited attention has been given to benefits management and benefits realization as a process and to integrating the differing levels and loci of ERP benefits.

This research programme responds to these limitations by investigating project motivations and the expected and realized ERP benefits. Our aim is to extend theoretical understanding and provide a richer framework for investigating and explaining the complex mix of motivations for implementation of ERP systems and the expected and realized benefits arising from such implementations.

The first stage of the research is to provide a *comprehensive, heterogeneous, empirically derived classification* of the drivers and benefits of ERP systems implementations. Such a framework will extend current research by:

- deriving an extended classification to track benefits in context and over time
- providing insights into the range and complexity of motivations and provide a framework for mapping and discussing the ERP motivations and benefits in the context of individual implementations
- identifying and (where they exist) describing and explaining variations within and between organizations, for example in organizations: in different industries; of different size; in different stages of maturity; and with different project motivations and goals.

In the remainder of this paper we discuss the development of the extended ERP benefits framework.

## RESEARCH METHOD AND RESEARCH STEPS

In the following sections we describe our research approach, data sources used and the details of our research steps.

### Methodology

We use an explorative research approach to develop the benefits framework. A longitudinal research project underway since 1999 in a partner network among Swiss and German Universities (the *eXperience initiative*, Schubert and Wölfle, 2007), has developed more than 120 *case studies* of real-world IS implementations. The majority of these cases deal with enterprise systems implementations. Drawing on this extensive source of detailed data we performed a comprehensive and in-depth content analysis applying techniques described by Miles and Huberman (1994) and Krippendorff (2003). Case studies are particularly suitable for understanding phenomena within their organizational context (Yin 2003). Klein and Myers (1999, p: 68) performed a study and concluded that “case study research is now accepted as a valid research strategy within the IS research community”. Bonoma (1985) points out that case studies in social sciences have been used for both (1) validating existing theories and thus deducing empirical consequences and (2) building theory by using inductive principles. Our approach falls into the second category as we use case studies to derive a benefits framework for ERP implementations. The research team comprises three researchers with different academic backgrounds (information systems, computer science, business administration) located in different Universities in three different countries (Denmark, Australia, Germany). Two of the researchers are German native speakers; one is an English native speaker. All three have at least a basic understanding of both languages; which is important since the case material only exists in German and the research is carried out in English.

### Data Source: eXperience Database of IS Case Studies

The eXperience methodology (Schubert and Wölfle, 2007) has been specifically designed for the collection and the transfer of best practice experiences in enterprise systems projects. The methodology provides a toolset containing templates for (1) the *writing* of case studies, (2) the effective classification and storage in an *online database* (Web platform), and (3) ways of organizing workshops and events where first-hand experience is being presented (*knowledge transfer and teaching*). A *common classification scheme* is used for all cases to record the project experiences which make them an ideal source for a structured cross-case analysis.

The core eXperience case (research case) includes an in-depth description of an existing enterprise system solution and respective practices in an organization. It encompasses

- a description of the organizations and actors involved as well as the national regulations;
- the business scenario, partners, and company strategy;
- the objectives, expectations, and desired benefits;
- the actual outcome of the project (enterprise system solution);
- the advantages achieved and the shortcomings observed (learnings).

The eXperience case study database is the largest case study platform in the German speaking area. As of February 2009, there are 373 case studies in German, 64 in English, and 13 in French available online ([www.experience-online.eu](http://www.experience-online.eu)). Before being published, all case studies go through a rigorous data validation and editorial process to ensure veracity and quality. With the help of a *common template* and the use of a *uniform terminology*, the editorial team ensures that the case studies are

comparable and can be cross-analyzed. As a result, the eXperience database provides an increasingly vast, empirically derived dataset for case study research which can be accessed free of charge by the community of IS researchers. The case studies communicate experiences from practice. They show how and why something was done and what resulted from it. Independent authors obtain the contents of the case studies directly from the representatives involved in the IT project in the portrayed companies. Documentation is carried out with the help of a standard template (the case study grid). The interviews are conducted with the project managers who are in charge of the introduction and maintenance of the enterprise system (ERP system) in the portrayed company. The authors visit the selected company and gain insights from project managers, users, as well as from the responsible IT partners. The interviewees grant access to non-sensitive internal documents relating to the project management, including investment plans, roll-out time, statistics, and so forth. In addition, information is collected from later e-mail correspondence regarding feedback on the texts written, archival records, and publicly available Web pages. These in turn help the researchers to validate and enrich the information gathered from the interviews. Each interview lasts for about two hours. Data is gathered using a combination of voice recording and contemporaneous notes. The transcription takes place at a later point in time when all material is compiled. Member checking is conducted; interviewees are asked to give their consent to the final (proof) version of the case study.

### Uniform Case Study Structure

The rough structure is the same in all eXperience case studies. In the first chapter, the background of the portrayed company is presented, its business sector, the products it offers, its target group as well as its vision. In the following chapter, the reasons for the project are presented. In this context the significance of information technology in the company strategy, the interplay between the ERP system and Internet applications (if existent) as well as the involved partners are also shown. Chapter three describes the actual (software) solution and outlines the solution from the following views: business, process, application, and technical view. Following this, the implementation aspects are addressed. The steps towards the creation of the software, as well as the technical platform, are outlined briefly.

In the fifth chapter, experiences from the operation are described. Here, the task allocation for the operation of the entire system becomes clear. Costs, benefits and profitability of the solution are evaluated according to the achievement of objectives. The concluding chapter summarizes the important factors that are necessary for success. The specialties of the solution, the decisive changes as a result of the implementation project and the lessons learned by the people who were involved in drawing up the case studies are exemplified.

Figure 1 shows the uniform case structure and highlights the two chapters which were primarily used for the development of the benefits framework. *Chapter 2.1* describes the original situation of the company and the reasons for the new software implementation. In this chapter the authors write about the expected benefits and the ex ante view on possible results. *Chapter 5.2* of the cases, on the other hand, presents an ex post analysis of the implementation. It discusses if all objectives were met and the changes that arose after some time of using the new system. One of the basic requirements of the eXperience methodology is that the solution has to be in operation for at least one year. In the process of coding the case studies, an emphasis was put on these two chapters (2.1 and 5.2) but the other chapters were also scanned for possible indications of expected benefits and resulting outcome.

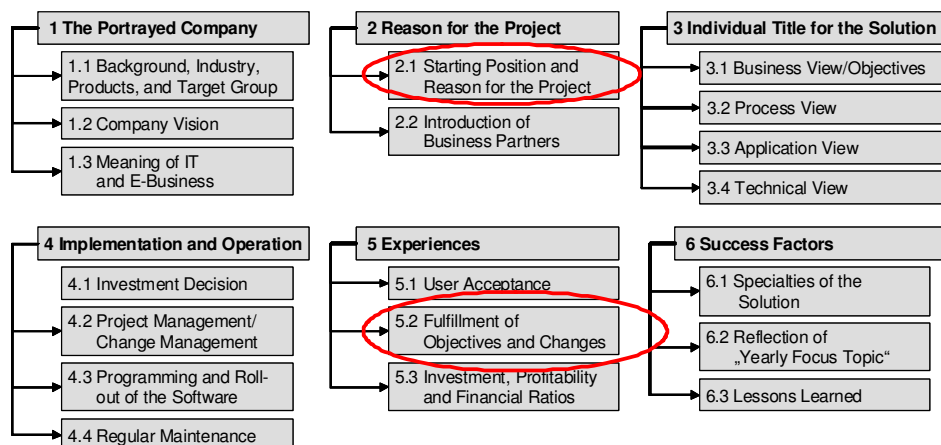


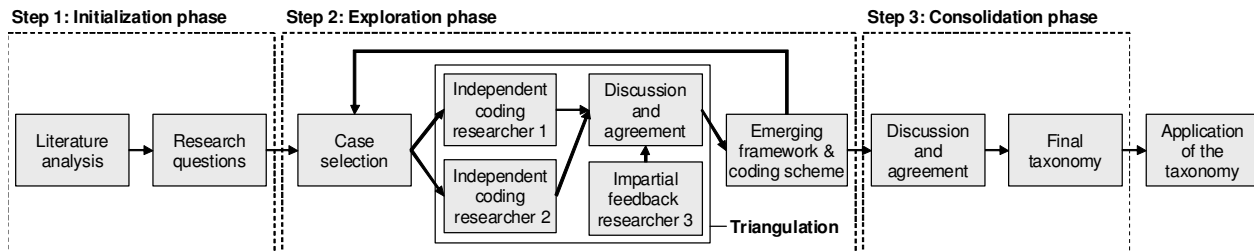
Figure 1. Uniform case study structure and selected chapters

## Research Steps

The process of deriving and developing the benefits framework consists of three main phases. The *first phase* is a preparatory phase where the literature was reviewed and analysed to motivate the research and formulate key research questions.

The *second phase* encompasses a *cyclical process*, which is performed to iteratively code the research data. The project researchers use text analysis and coding. Cases are coded independently and a subsequent coding review is conducted to develop the basic framework. Every time agreement about codes has been achieved, the next set of cases is coded and the results are added to the framework.

In the *third phase*, the results are consolidated and the final taxonomy is agreed upon. An objective of the broader research programme is for this taxonomy to be applied in the research investigation and to provide a framework to assist practitioners evaluate their ERP initiatives. The research steps are displayed in Figure 2 and explained in more detail in the next sections.



**Figure 2. Research steps for the development of the benefits framework**

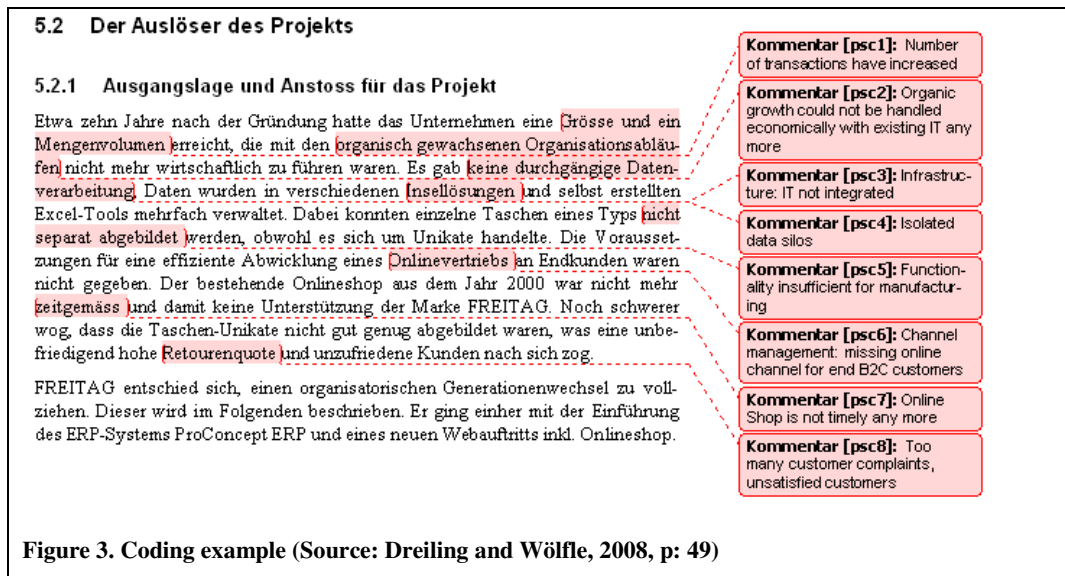
### Step 1: Initialization Phase

In a first step (*initialization phase*) the authors performed a comprehensive literature review and analysis. Some of the results have been discussed in the introductory section of this paper. From the literature and the authors' own experiences with implementation projects we identified the need for a more holistic benefits framework (as discussed above) and a series of initial research questions.

### Step 2: Exploration Phase

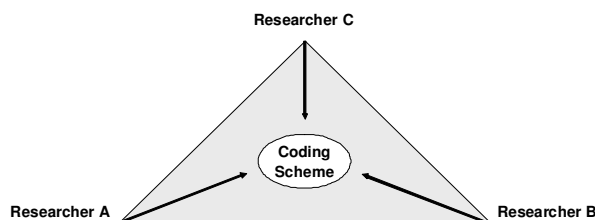
The actual research (*exploratory phase*) is a cyclical process which is still ongoing at the time of writing this paper. Two researchers initially selected three case studies dealing with the same topic and performed an independent content analysis on the source text. The text was analysed and coded to derive classification items which were collected and consolidated into an initial framework.

Both researchers started with a blank Excel sheet developing a coding scheme in an inductive process of going through the case study materials. Figure 3 shows an example of the coding in the original text (Case Study "Freitag", Dreiling and Wölfle, 2008, p: 49). After completing the work on the first three case studies, a first discussion took place in which the third researcher was involved to provide a degree of impartiality; to add additional ideas and to mediate and resolve any coding conflicts. This provides a degree of triangulation and interpretive validity (Miles and Huberman, 1994, p: 266) and was used to ensure that evidence for the derived code could clearly be identified in the empirical data.



The result is an initial basic framework consisting of five main categories (1. Business Design, 2. Company Management, 3. Business Function, 4. Supply Chain, 5. Information Technology). The code items contain three dimensions (1. Business Area, 2. Aspect, 3. Criterion). The elements of the framework are explained in more detail in the next section.

The two researchers who did the primary coding independently identified that the codes needed three dimensions. This is in contrast to previous benefits frameworks which usually only comprise two levels, e.g. the “Updated D&M Success Model” (DeLone and McLean, 2003) and the “IS-Impact Measurement Model” (Gable, Sedera, and Chan, 2008). The researchers concluded that two dimensions were not sufficient to describe the benefits expressed and reported by the case study respondents. In the first review workshop the researchers discussed the main categories and the dimensions (i.e. the actual codes) which they had derived and applied. The result of this workshop was the starting framework containing the five categories and the three code dimensions together with a common understanding of the terms used in the framework. This starting configuration (initial framework) served as input for the next cycle in which a further five case studies were coded. After this cycle another workshop was held and new codes were added to the framework following a process of verification. The coding process will continue over the next months until all case studies have been processed. After each coding cycle the framework will be refined and (where necessary) new items will be added.



**Figure 4. Triangulation for the development of the coding scheme**

The basic framework with its five categories and three dimensions remained unaltered in the consecutive coding cycles. At the time of writing this paper, the five main categories continue to be adequate for the first 15 cases. After the 8th case study the second dimension also appeared to be fully developed. Whereas the first two dimensions serve for classification purposes, the third dimension contains the qualitative or quantitative value that each item takes (e.g. in the empirical data the item “speed” was described by the values “increased” or “decreased”).

As already pointed out earlier, the coding process is still ongoing at the time of writing this paper however the framework has proven stable with no new codes emerging. We are following a *special triangulation approach* (cf. Figure 4) which involves three independent researchers. Two German native speakers in Denmark and Germany are conducting the coding. The third researcher from Australia takes part in the review discussions, performs plausibility checks, gives feedback and compares the items of the framework with previous approaches in order to insure validity and completeness.



It was interesting to observe that once a basic set of codes was in place Intercoder Reliability (Lombard, Snyder-Duch, and Campanella Bracken, 2005) was high. The agreement between the two coders was approximately 80%. The “disputes” were resolved in the consecutive discussion so that the final agreement was always 100%.

### *Step 3: Consolidation Phase*

Once all case studies are coded, there will be a final workshop for discussion and agreement between the researchers which will result in the final coding scheme for the classification of benefits (the exp-ben-taxonomy).

### *Step 4: Answering the Research Questions: Application of the Taxonomy*

Once the final taxonomy has been developed it will be published and available for wider use. The framework and the exp-ben-taxonomy are important research outcomes in themselves. The data from the coded case studies will be used to derive quantitative results. The coded case studies will be analysed in order to answer our research questions. There are two different possibilities for the analysis of the data:

1. Analysis of the codes used in the case studies (searching for patterns in the codes themselves)
2. Profile analysis (looking for patterns in the profile information of the cases)

Regarding the first possibility, we will be able to show patterns arising in the code structure. For example, we will be able to identify:

- Benefits which are most often/least often expected by companies
- Expected benefits which are most often/least often realised
- New, unexpected benefits which result from the implementation of a new software (“side effects” or unintended consequences)

The second possibility is a cross comparison with company profiles. We profiled each case according to its demographics and characteristics regarding industry sector, size, age, level in supply chain, etc. The cross-analysis between the coded cases and the profile information will show benefit profiles and assist in answering questions such as:

- Are there typical expected benefits in certain industries?
- Do benefits vary according to company size? (and if so how?)
- Are newer companies more successful in fulfilling their objectives than older ones?

## **RESEARCH OUTPUT: FRAMEWORK AND TAXONOMY**

In this section we describe the extended benefits framework and the dimensions of the coding scheme in more detail.

As mentioned earlier, the taxonomy was developed in an exploratory approach. In the process of coding, the authors identified five different categories in which expectations and benefits could be grouped. Figure 5 shows these five main categories and their elements.

### *Business design:*

The area of “Business Design” contains all factors relating to the processes and the functional structure of a company. Typical criteria for this area are automation, complexity, effectiveness, and efficiency.

### *Company management:*

The business area of “Company Management” looks at the resources of a company which are essential for running the business. Typical criteria for this area are cost, awareness (missing skills), productivity, satisfaction, time, and availability.

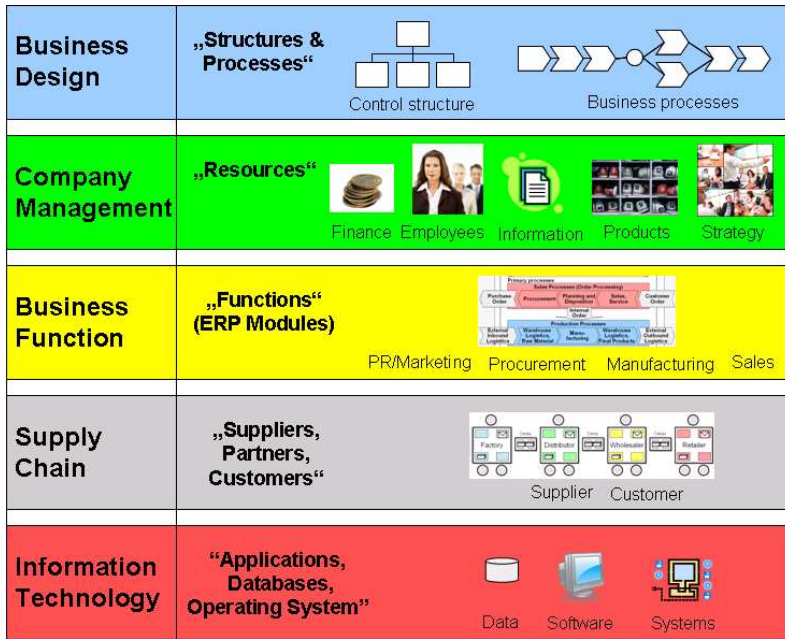


Figure 5. The emerging framework

*Business function:*

The business functions relate to the different departments of a company. Since the traditional view of ERP systems has been a functional one it is not surprising that the business functions correspond to modules typically provided by ERP systems. Examples of criteria for this area are transparency of the process, complexity, number of transactions, sales opportunities, and turnover.

*Supply chain:*

Whereas the other business areas represent an internal view of the company, the “supply chain” looks at the external view, namely at the interaction with customers and suppliers. Typical criteria are customer loyalty, integration, quality of service, satisfaction, and time.

*Information technology (IT):*

The area “Information Technology (IT)” deals with the actual enterprise systems landscape of the company. Objects under consideration are applications, databases and operating systems. Typical criteria for this area are integration issues, adequate functions or functionality, customisation, usability, use, availability, complexity, flexibility, reliability, and stability

**The Taxonomy of ES Expectations and Benefits**

Table 2 shows an excerpt of the taxonomy with its dimensions. The final column contains examples of each benefit as it is identified in the coded case studies. We include this column as part of our validity checking and audit trail. No code can be added without at least one pointer to an instance of that code in the empirical data.

Business Area	Aspect	Criterion	CODE	Examples
business design	processes	efficiency	BDE-PRO-EFI	Missing functionality in online channel for end B2C customers
company management	corporate finance	costs	COM-COF-COS	Increased...cost pressure
company management	employees	productivity	COM-EMP-PRO	Increase in the performance of the sales force
company management	information	availability	COM-INF-AVA	Availability of detailed customer information
company management	products	availability	COM-PRO-AVA	Increased product availability

company management	strategic management	competitive advantage	COM-COF-ADV	Possibility of differentiation from competitors...
business function	manufacturing	transparency of process	BUF-MAN-PRC	Improved traceability of products
business function	procurement	bundling	BUF-PCM-BUN	Open up synergies via the bundling of the procurement across the group...
business function	public relations / marketing	marketing actions	BUF-PRM-MAC	Analysis of customer behaviour for managing the sales promotion
business function	sales	new sales channel(s)	BUF-SAL-CHA	New sales channels
supply chain	customers	quality of service	SCH-CUS-SER	Improved customer service
supply chain	suppliers	integration	SCH-SUP-INT	Integration of suppliers for benefiting from the economies of scale
IT	data	integration	ITE-DAT-INT	Isolated data silos
IT	software	functions	ITE-SOF-FUN	Functionality insufficient for manufacturing
IT	systems	availability	ITE-SOF-AVA	Complete availability of the system

**Table 2: Excerpt of the emerging exp-ben-taxonomy (based on the first 15 case studies)**

## DISCUSSION AND OUTLOOK

Our work addresses the research imperatives stated in the introductory section in the following way:

### *Motivations and ERP benefits*

Our research looks at the reasons for implementing business software to solve current business problems. We analyse ex ante experiences comparing them with realized ex post benefits. This way we explicitly look at the match between expectations and outcomes. The resulting extended *benefits framework* incorporates information about an individual organization's motivations and intentions for undertaking a specific ERP project. It is derived from case studies of actual ERP projects and includes only factors which have actually occurred in real-life settings.

### *Modality of ERP benefits and change over time*

The attributes and the code structure that are used to assess the benefits in our framework clearly position and locate the benefits on a timeline. They reflect the realization of benefits as a process which is open to being shaped by business change and which is influenced by unplanned outcomes that might arise as a consequence of socio-technical change in the organization. Using our code structure, it is always possible to identify the differences between a desired or a perceived benefit, an emergent benefit (which might not have been expected ex ante) or one that is realised (or unrealised).

### *Spatiality, the reach and scope of ERP projects:*

The cross-analysis of benefits and company profiles can reveal patterns in the reach and scope of projects. Looking at the datasets from more than 60 case studies it will be possible to query the data for questions of difference in scope (e.g. number of ERP modules which are implemented) or reach (e.g. number of subsidiaries where the software was installed).

### *Research data*

The eXperience database of case studies on business software implementation projects offers a vast amount of data. We will be able to draw our research findings from more than 120 real world case studies which were all written in a common methodology which provides a common structure. The editorial board overseeing the eXperience initiative performs an exacting quality control process that ensures the basic data are authoritative and reliable. If questions regarding the statements in the text arise it is always possible to undertake a process of member checking with the original respondent. This high quality data has been used to develop a more comprehensive and empirically derived framework and taxonomy of ERP benefits that accommodate benefits change over time.

Against the backdrop of the current worldwide economic crisis and the further need to measure performance, companies will look for means to measure (gauge) the impact/outcome of their IT investments (Weill and Ross, 2004). We will continue to refine the exp-ben-taxonomy and document it so that others can use it. Future research will review this framework in the

context of previous models such as the “Updated D&M IS Success Model” (DeLone and McLean, 2003), the “IS-Impact Measurement Model” (Gable, Sedera, and Chan, 2008), or the “Enterprise System Benefit Framework” (Shang and Seddon, 2002).

There were several challenges in this research. In particular, the three researchers involved in the project stem from three different countries with different disciplinary backgrounds. In the beginning, we needed to find a common language, a common understanding of terms and most importantly develop an interdisciplinary understanding of the phenomenon of ERP benefits. In the end, this diversity turned out to be a major strength as it helped to develop a richer, more detailed taxonomy than is evident from previous studies.

Unlike previous approaches (e.g. by Sedera, Gable, and Chan, 2003 or DeLone and McLean, 2003) which propose models for measuring success, our taxonomy was developed in an explorative way analysing the expectations and realized benefits of *real-world* companies. Our analysis will eventually incorporate data from the actual experiences of more than 60 companies. The results will provide valuable insights into what companies usually aim to achieve when they implement new systems and in how far they feel they have been successful in their pursuit. This is particularly important given that less than 10 percent of the companies included in this study made a quantitative calculation of their return-on-investment (ROI). Most of them simply generated a list of qualitative objectives which were to be realized. The success/realization of the expected benefits was rarely explicitly measured. The responsible managers rather “felt” if or if not the company’s objectives had been fulfilled. This implies that the measurement of the fulfilment of objectives in projects is only possible on a qualitative and rather descriptive level since in most cases it is not possible to measure concrete success figures because the objectives have not been set accordingly.

In our future analysis of the data, it will be possible and interesting to identify whether there are typical benefits that were realized in projects but not expected or planned by the companies beforehand. The cross-analysis of company profiles and the codes for expectations/benefits will hopefully reveal interesting patterns (e.g. typical outcomes in SMEs or typical objectives which could not be met in certain industries).

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