Latvijas Universitāte

PROMOCIJAS DARBS

Rīga, 2017

University of Latvia

Faculty of Economics and Management

Jürgen Alexander Gollner

IMPACT OF KEY USERS' MOTIVATION ON ENTERPRISE RESOURCE PLANNING (ERP) IMPLEMENTATION PROJECT SUCCESS

Doctoral Thesis

Submitted for the Doctor's degree in Management science (Dr. sc. admin.)

Subfield Business Management

Supervisor,

Dr. oec. Ilona Baumane-Vītoliņa

Riga, 2017

Annotation

During Enterprise Resource Planning (ERP) implementation projects in medium-sized companies, most project members usually have to fundamentally change their workflows, work massively overtime or even forego vacation to achieve the organizations' main goal of having a successful productive start of the new system. For all employees involved in such at least one year lasting projects, there are even more reasons, why a high amount of motivation is very important getting the exhausting job of implementing a new ERP system done.

Since the middle of the last century, a lot of scientific studies dealt with issues related to motivation, its sources and development. In 1998, Barbuto and Scholl developed the theory of *Motivation Sources Inventory*. To validate an inventory to measure the determined five different sources of motivation, empirical testing of the taxonomy has been done.

The purpose of this thesis is to investigate the sources of motivation, as conceptualized in the theory of *Motivation Sources Inventory*, within the context of ERP implementations. Therefore, more than 200 finished ERP projects have been empirically investigated in order to determine possible correlations between the motivation of project team members and ERP project success. As the implementation of ERP projects is an extreme situation for employees, an even more stringent expression of results compared to daily business work is possible. Results underlying this study suggest that selected sources of motivation have a positive impact on ERP project success.

This thesis provides an alternative perspective on the five sources of motivation, applied on employees during ERP projects in medium-sized companies in Austria and Germany. Original studies have been made with students, agricultural workers or cross cultural - this empirical research is done with companies, which actually have finished full circle ERP projects. This application and combination of cited theories is a novelty, as an empirical evaluation of project team members' motivation was not a subject of previous scientific studies before. The analysis and findings can provide significant conclusions for an emerging topic of Business Management, the management of ERP project situations.

Contents

List of Abbreviations

e.g.   exempli gratia (for example)

ERP   Enterprise Resource Planning

et al.   et alii (and others)

H   Hypothesis

IS   Information System

IT   Information Technology

LISREL   Linear Structural Relations

MRP   Material Requirements Planning

MRPII   Manufacturing Resource Planning

MSI   *Motivation Sources Inventory*

p.   page

PMI   Project Management Institute

pp.   pages

SME   Small and Midsized Enterprise

SPSS   Statistical Package for Social Sciences

T   These

List of Figures

List of Tables

INTRODUCTION

Actuality of the Topic

Business enterprises are permanently facing challenges that encourage them to reconsider and adapt their structures, goals, processes and technologies. To maintain their competitive advantage and to operate better in dynamic business environments, companies have implemented Enterprise Resource Planning (ERP) systems as enablers to facilitate related changes.[1][2] An ERP system is a business management software that combines different software components with the purpose of operating, integrating and optimizing all business processes within an organization. ERP systems are one of the most widespread information technology (IT) solutions in organizations[3], as ERP systems were implemented worldwide to leverage business performance.[4]

Implementation of new ERP software within a company is usually seen as an economical and technical topic, as cost-benefit calculation is mostly the trigger for deciding on that kind of projects. Concerning employees, mostly considerations about missing or limited resources and insufficient knowledge are made. For many employees an ERP implementation is the first and probably the only one in their professional career, and therefore it constitutes an unusual situation apart from the daily business. It is necessary to anticipate that the focus of this study is on the influence of motivation of so-called 'key users', who are basically project team members with important tasks and responsibilities. Key users are decisive project team members who represent the professional interests of their respective department during the ERP implementation. A more comprehensive explanation of this role will be provided later in this thesis and the selection of this specific group of employees for evaluating motivation will be justified. The term key user is very common in German speaking countries where the study was carried out, and is increasingly used in scientific literature on ERP projects.[5][6][7]

---

[1] Beheshti, H.M. (2006): What managers should know about ERP/ERP II. In: *Management Research News*, volume 29, issue 4, pp. 184.

[2] Kwahk, K., Lee, J. (2008): The role of readiness for change in ERP implementation: Theoretical bases and empirical validation. In: *Information & Management*, volume 45, p. 474.

[3] Al-Mashari, M. et al. (2003): Enterprise resource planning: A taxonomy of critical factors. In: *European Journal of Operational Research*, volume 146, pp. 353.

[4] Beheshti, H. M., Beheshti, C. M. (2010): Improving productivity and firm performance with enterprise resource planning. In: *Enterprise Information Systems*, volume 4, pp. 445.

[5] Gunson, J., De Blasis, J. (2003): ERP implementation project management: An art as well as a science. (332/658), *Retrieved from http://archive-ouverte.unige.ch/unige:5806*, p. 14.

[6] Wua, J.H., Wang, Y.M (2005): Measuring ERP success: The key-users' viewpoint of the ERP to produce a viable IS in the organization. In: *Computers in Human Behavior*, volume 23, issue 3, pp. 1582-1596.

[7] Zhang, Z. et al. (2005): A framework of ERP systems implementation success in China: An empirical study. In: *International Journal of Production Economics*, volume 98, issue 1, pp. 56-80.

It is important to mention that ERP projects in medium-sized companies, which are later characterised, usually are implemented within a time span of more than one year. Especially for key users, the project period is filled with all types of emotions ranging from early enthusiasm inspired by new possibilities, frustrations caused by setbacks and exhaustion in the final phase.[8] As a result, steady support by upper management and permanent leadership from project management should try to increase the morale of project team members.[9]

An extensive system like ERP brings numerous changes, making key users fear accompanying drawbacks. Some employees are uncertain whether they can do their jobs as well as they did in the old system. In consequence, project team members may assume that the new system will make their jobs more difficult, reduce their importance, or in worst case cost their jobs. A more modern system is usually also better with reporting of revenue and expenditure numbers, allowing management to keep better track of what employees are doing and what money they are spending. The realization they are being more effectively monitored makes many people feel uncomfortable.[10] Especially veteran employees fear negative effects of innovations like a new ERP software. They are forced to share information that once was closely guarded, make business decisions they were not required to make so far and must create new work relationships. If not managed properly, this kind of changes leads to resistance, confusion, redundancies and errors.[11]

These all are reasons why a high degree of motivation for all project members takes such a high importance. Literature concerning ERP project management states that motivation is a central factor in ERP projects. No project manager can succeed without or against his or her team in the long run. As a result, management and especially project-management have to focus on providing a long time motivation for their employees during that difficult time span.

Nevertheless, it is often difficult for organizations' management and ERP project-managers[12] to show a corresponding behaviour in their everyday work. It is not only important to develop a great behavioural repertoire, they must also be able to adapt their behaviour by supporting and developing the employees which are involved in the ERP project. Otherwise they do not

---

[8] Häkkinen, L., Hilmola, O.P. (2008): Life after ERP implementation: Long-term development of user perceptions of system success in an after-sales environment. In: Journal of Enterprise Information Management, volume 21, issue 3, pp. 285 - 310.

[9] Bingi, P. et al. (1999): Critical issues affecting an ERP implementation. In: *Information Systems Management*, volume 16, issue 3, pp. 7-14.

[10] Umble, E., Umble, M. (2002): Avoiding ERP implementation failure. In: *Industrial Management*, volume 44, issue 1, p. 27.

[11] Appleton, E. (1997): How to survive ERP. In: *Datamation*, volume 43, issue 3, March, pp. 50-53.

[12] Authors' note: a detailed differentiation between these two terms will be provided later in theoretical part.

reach the overall goals, which are often influenced by motivation or frustration of key users. ERP project managers should ensure that departments fulfil their function within the organization, employees develop the skills to complete their tasks and show enough commitment to do that successfully. To ensure commitment, employees have to be motivated. This thesis assumes that during ERP projects, motivation of key users occupies a significant role.

Concerning the dependent variable, ERP project success, literature shows that research in that area is just beginning to appear.[13] Most studies focus on larger companies, only few studies were concerned with medium-sized enterprises.[14] According to Nicolau (2004), an investment in ERP represents a significant commitment of resources and it has a dramatic effect on all operational aspects of a company.[15] For Willcocks and Sykes (2006), implementing ERP is competitively and technically a must do, but economically, it causes costs which are difficult to justify. Further, it is hard to achieve a long lasting business advantage with an ERP implementation.[16] This can be reasoned with the fact that competitors will likely follow up with new ERP systems as well.

There are not only benefits that can be achieved from an ERP system implementation. Despite widespread adoption of ERP, exploiting the full benefits of ERP systems is only accomplished by a minority of companies.[17] There is evidence of failure in projects related to ERP implementations which is found in the literature.[18] According to different studies, a lot of ERP projects do not reach the expected results or even worse, lead to the complete failure of the project. For example, the study of Cooke et al. (2001), listed 117 companies which implemented ERP and had the following results: [19] 25 percent of all the projects were out of budget, 20 percent of the projects were abruptly discontinued for various reasons, and 40 percent of the remaining 55 percent stated that they did not reach the defined goals within one year after the official project ended.

---

[13] Gable, G.G. et al. (2008): Re-conceptualizing information system success: The IS-impact measurement model. In: *Journal of the Association for Information Systems*, volume 9, issue 7, pp. 377.

[14] Shehab, E. et al. (2004): Enterprise Resource Planning: An integrative review. In: *Business Process Management Journal*, volume 10, issue 4, pp. 359-386.

[15] Nicolau, A.I. (2004): Firm Performance Effects in Relation to the Implementation and Use of Enterprise Resource Planning Systems. In: *Journal of Information Systems*, volume 18, issue 2, pp. 79-105.

[16] Willcocks, L. P., Sykes R. (2000): The Role of the CIO and IT Function in ERP. In: *Communications of the ACM*, volume 43, issue 4, pp. 32-38.

[17] Ha, Y.J., Ahn, H.J. (2014): Factors affecting the performance of enterprise resource planning systems in the post-implementation stage. In: *Behaviour and Information Technology*, volume 33, issue 10, p. 1065.

[18] Davenport, T.H. (1998): Putting the Enterprise into the Enterprise System. In: *Harvard Business Review*, volume 76, pp. 121-131.

[19] Cooke, D., Gelman, L., Peterson, W. J. (2001): ERP Trends. In: *The Conference Board*, pp. 1-28.

High failure rates of ERP implementations have been widely published, but not discouraged companies from making huge investments in ERP systems. Since the market for large companies became saturated, slimmer designed ERP solutions encourage medium-sized enterprises to invest. Although some of these failures arise from technical aspects, the majority of these problems result from ERP project management, social and organizational issues within the companies. Both companies' management and ERP project management can promote motivation, and motivation is both a social and organizational aspect. For a successful ERP implementation, these issues must be considered because there are multi-layered challenges for organizations during ERP projects. Bingi et al. (1999) describe 10 critical issues that contribute to the success of an ERP implementation, namely top management commitment, reengineering, integration, ERP consultants, implementation time, implementation costs, the ERP vendor, selecting the right employees, training employees, and finally employee morale.[20] It remains to be proven whether motivation is actually a significant factor during the period of an ERP implementation. Further, it needs to be evaluated what kind of motivational behaviour helps to achieve a more positive result.

This doctoral thesis focuses on the motivation of employees in ERP projects implemented in medium-sized businesses. Over the last years, ERP vendors shifted their focus on enterprises of smaller size, developing less complex and specially designed software[21], resulting in medium-sized companies now frequently implementing it.[22] Particularly for medium-sized companies, an ERP project remains a big challenge,[23] as constraints like lack of information technology expertise, limited resources and insufficient software knowledge exist.[24] This makes an ERP implementation a very critical issue, as the impact of a bad IT investment has an even bigger influence on economic performance of companies of that size. These limits make it more difficult to overcome an ERP project failure compared to large enterprises.[25]

An application of a scientific approach of motivational theories on ERP project success is an evident topic, as there had not been conducted such study based on statistical analysis before.

---

[20] Bingi, P. et al. (1999): Critical issues affecting an ERP implementation. In: *Information Systems Management*, volume 16, issue 3, pp. 7-14.

[21] Koh, S. C. L., Simpson, M. (2007): Could enterprise resource planning create a competitive advantage for small businesses? In: Benchmarking: *An International Journal*, volume 14, pp. 59.

[22] Snider, B. et al. (2009): ERP implementation at SMEs: analysis of five Canadian cases. In: *International Journal of Operations and Production Management*, volume 29, pp. 4-29.

[23] Olson, D.L., Staley, J. (2012): Case study of open-source enterprise resource planning implementation in a small business. In: *Enterprise Information Systems*, volume 6, pp. 79-94.

[24] Thong, J.Y.L., Yap, C.S. (1995): CEO characteristics, organizational characteristics and information technology adoption in small businesses. In: *Omega*, volume 23, pp. 429-442.

[25] Poba-Nzaou, P., Raymond, L. (2011): Managing ERP system risk in SMEs: A multiple case study. In: *Journal of Information Technology*, volume 26, pp. 170.

Aim and Tasks of the Research

This dissertation targets at investigating the impact of employees' motivation on ERP project success. The extensive implementation of ERP by medium-size organizations has attracted particular interest in recent times. This expansion of ERP software has taken place because of the increasing need of organizations to integrate their internal processes as a requirement to remain competitive.[26] The analysis of the so called 'ERP revolution' causes interest of researchers not only from the information technology (IT) discipline, but also from the major disciplines in business research.[27] Consequently, this research is touching economical, technical and social context, and its scientific basis refers to ideas from psychology, management and computer science.

The study gives more insight about motivation across ERP projects in medium-sized companies located in Austria and Germany. To assess the sources of motivation, the theory of *Motivation Sources Inventory* by Barbuto and Scholl (1998) is applied on finished ERP implementations. This typology basically subdivides motivation in five sources, namely *intrinsic process motivation, instrumental* motivation, *self-concept external* motivation, *self-concept internal* motivation and motivation by *goal internalization*. The theory has been tested in several articles[28] and has been found to be reliable and valid in predicting the different sources of employees' motivation in various areas of application.[29]

The main aim of this thesis is to find out whether there is a positive relationship between different sources of key users motivation and ERP project success in medium-sized companies in Austria and Germany. A probable cognition could be the identification of a dominant source of motivation during ERP project implementation phase, which leads to an improved project and product performance. This is to be measured and validated with empirical data from at least 200 finished ERP projects.

Furthermore, this research aims to determine what kind of project team members' motivation results in increasing ERP success. In doing so, it will address various elements that can help ERP managers and project sponsors to achieve this mission. This doctoral thesis tries to make

---

[26] Ross, J., Vitale, M. (2000): The ERP Revolution: Surviving versus Thriving. In: *Information Systems Frontiers*, volume 2, issue 2, pp. 233.

[27] Wieder, B., Booth, P., Matolcsy, Z., Ossimitz, M. (2006): The impact of ERP systems on firm and business process performance. In: *Journal of Enterprise Information Management*, volume 19, issue 1, pp. 13-29.

[28] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011-1022.

[29] Barbuto, J.E., Story, J.S. (2008): Relations between locus of control and sources of work motivation amongst government workers. In: *Psychological Reports*, volume 102, p. 336.

a contribution for understanding the significance of motivation for ERP projects. During empirical research, different medium-sized companies from Austria and Germany are examined. The reason for that limitation lies in similar working conditions and organizational structures for employees in companies of that size. Furthermore, historically based there is a very close economic and cultural similarity between Austria and Germany. As this field of study is heterogeneous concerning their field of activity, it is planned to create a research base for further investigations, which can further focus on specific branches or organizational types. The gained insights can also be applied on the use of leadership styles in future ERP projects. Related to the underlying research, the following major tasks have to be fulfilled:

- Carry out extensive secondary research on the state of knowledge related to motivational theories and its implications on ERP project success.

- Analyse aspects regarding the dimensions of ERP projects and its measurements of implementation's success. Further, assess the applicability of measurement models.

- Develop and validate an inventory of statements to measure the success of ERP projects;

- Conduct expert interviews with ERP experienced chief executive officers (CEOs) to select and clarify items describing ERP project success dimensions. Subsequently, design neutral questionnaires.

- Collect anonymized data with online surveys on ERP project success completed by CEOs of over 200 companies.

- Collect anonymized data with online surveys on sources of motivation filled out by ERP project team key users.

- Match all completed surveys of per company, eliminate statistical outliers.

- Perform statistical analysis within the scope of quantitative research. Employ main component factor analysis to check and reduce dimensions of ERP project success. Apply multiple linear regression analysis to find out whether dominant sources of motivation exist during successful ERP project.

- Perform reflection on findings from literature review, qualitative expert interviews and results of statistical analysis of quantitative survey in order to draw conclusions and formulate suggestions.

Main Hypothesis and Research Question

The main hypothesis of this dissertation has been summarized as: "Main sources of key users' motivation have a different impact on overall ERP project success."

Resulting from primary and secondary analyses, main theses for defence were established:

1. ERP project success can be measured by five dimensions, which are project management, user satisfaction, time and budget, ERP system quality and economic value.

2. ERP project success is positively influenced by key users' *self-concept internal* motivation.

3. ERP project success is positively influenced by key users' *goal internalization*.

4. ERP project teams with high focus on reaching of goals and enthusiasm for challenges are more successful than teams which are motivated by rewards, reputation and fun.

For this thesis' operationalization, the following research questions have been formulated:

1. Which dimensions contribute to the measurement of ERP project success?

2. Is there a correlation between motivation of project key users and the success indicators of ERP projects?

3. What is the impact of each of the five sources of motivation on ERP project success?

4. Does the shaping of certain sources of motivation lead to more successful ERP projects?

5. Which sources of motivation are most important for employees during successful ERP implementations?

Methods and Sources used

In order to solve the underlying research questions, scientific research requires a systematic, controlled, empirical and critical investigation of the research problem, which has been operationalized by various hypothetical theses.[30]

---

[30] Kerlinger, F.N. (1986): Foundations of behavioral research. New York, 3rd edition, Holt, Rinehart and Winston, p. 10.

This dissertation generally follows the quantitative research paradigm, however it also involves qualitative elements to set up understandable surveys and to justify quantitative findings. Data were collected by using standardized questionnaires, which were distributed via web links per email. The sample did consist of key users participating in ERP implementations revealing their sources of motivation and CEOs rating the success of ERP projects in their respective organizations. To find out the statistical population of medium-sized companies' ERP projects in Austria and Germany, a brief survey with ERP experts was carried out. For statistical data processing, analysis was conducted using 'IBM SPSS Statistics 21' software.

Factor analysis was used to reveal the underlying dimensionality of measurement of ERP projects success, related to the construct's composition. Multiple regression analysis was used in order to investigate the impact of the five sources of motivation on ERP projects performance.

Concerning the secondary research of this dissertation, articles in academic journals, theoretical books and reports by international organizations were considered.

Main Results

The following main results have been found by the underlying research within this thesis, contributing new aspects to the academic discourse on employees' motivation and its impact on ERP project success:

- It is proven that motivation of project team members has a partial impact on ERP project success.

- It has been revealed that measurement of ERP projects' performance can be provided with a five dimension model including project management, user satisfaction, time and budget, ERP system quality and economic value.

- ERP project success is significantly positively related to employees' aspects of *goal internalization* and *self-concept internal* motivation.

- The aspect of motivated team members cannot be seen as the most important factor of ERP projects' success, but statistical analysis suggests that certain kind of motivated employees are more success promoting. As a result, recommendations for setting up ERP project teams and managements handling of key users can be made.

- Various aspects of employees' motivation within ERP projects have been investigated empirically, which draw a picture regarding the significance of certain attitudes and goals chosen team members should have. Implications for project management and CEOs during ERP implementations have been formulated.

Novelty

Based on findings from research, the following aspects constitute the novelty of this dissertation:

- An empirically tested model of ERP project success measurement has been created, which newly combines dimensions from existing models. In this respect, a modified theory related to the determinants of successful ERP implementations has been elaborated.

- An inventory of items for measuring ERP project success has been elaborated, especially in the context of medium-sized enterprises.

- For the first time, a model of correlation between *Motivation Sources Inventory* and ERP project success has been created, which newly involves the dimension of people's motivation as an integral element for ERP project success.

- The motivational source of *goal internalization* has been identified as a particular personal quality for successful projects in ERP environment.

Limitations

The geographical focus of the surveys is limited to Austria and Germany, providing some cultural constraints for the research. The study is also limited to finished ERP projects, regardless of its success. The ERP projects which have been cancelled or failed at all cannot be investigated. Furthermore, only those key users and CEOs were involved in the research, who are still working in the same company they have implemented the new ERP system with.

The total number of ERP implementation projects for medium-sized companies in Austria and Germany per year was not statistically observed in any journal or literature so far. This could be understood as a limitation to this study. To find out the general population, 11 expert interviews with company sales representatives and researchers of the ERP market were conducted. A mean number of 650 full ERP implementations per year was the result, which means the number for the researched time span is close to 2000. Even this numbers are not empirically proven and a result of expert estimations, the sample represents at least over 10%

of the total population. Therefore, the achieved sample size can be seen as considerable and fitting for statistical analysis.

Furthermore, a limitation can be a distortion between indicated reality and the actual situation. The fact that the surveys were carried out by people on high managerial level should weaken that restriction. A problem implicated by online surveys is also the missing certainty that the questionnaires were personally filled out by CEOs, as often managers in that position give away that kind of work to assistants. To lower that risk, the author was in vital contact with the managing directors. As the target group are medium-sized companies, this objection can be seen as less critical, as in companies of that size CEOs are usually more involved in daily business and do more tasks themselves. It can also be assumed that only executive managers with vital interest on the structure and results of this study participated at all, as many responses hinted their curiosity on this topic.

Commonly, generalization of scientific research results is possible in principle. That is based on the belief that the general resides in the particular and that what has been learned and discovered in a particular case may apply to other situations as well.[31] But present result can only be interpreted as partial explanation of supposed correlations. Although an impact of motivation on ERP project success was found, there are more influencing factors which were not evaluated in this study. The sources of motivation of key users approximately explain just more than 10% of ERP project success. Other aspects like management support, project management, key users' know-how, technical aspects, communication or quality of external consulting are not statistically evaluated in this research. Furthermore, it has to be stated that conclusions of this research are restricted to considerations related to management of ERP projects and motivation of its team members. As a result, additional conclusions on economic aspects like finance, materials management, sales or human resources cannot be conducted.

Approbation of Research Results in Scientific Conferences

Gollner, J.A.: Sources of motivation for employees in ERP projects implemented in medium-sized companies. 2012 International Conference for Business and Economics - Innovative Approaches of Management Research for Regional and Global Business Development. August 3rd - 5th 2012, Kufstein, Austria, University of Applied Sciences Kufstein Tirol International Business School.

---

[31] Eisner, E.W. (1981): The Educational Imagination. New York, NY: Macmillan, p. 7.

Gollner, J.A.: Defining successful ERP projects. Interdisciplinary Scientific International Conference for PhD students and assistants QUAERE - session Management and Marketing. May 20th - 24th 2013, Hradec Kralove, Czech Republic.

Gollner, J.A.: Defining successful ERP-projects. 2013 International Business and Economics Conference - Current Approaches of Modern Management and Strategy Research. November 29th - 30th 2013, Kufstein, Austria, University of Applied Sciences Kufstein Tirol International Business School.

Gollner, J.A.: Motivational theories applied in SAP projects. 72th Annual Scientific Conference of University of Latvia - Impact of globalization to national economies and business, February 5th 2014, Riga, Latvia.

Gollner, J.A.: Motivation Sources Inventory (MSI) and its application for ERP implementations. The 3rd Virtual International Conference on Advanced Research in Scientific Areas (ARSA), December 1st - 5th 2014, Zilina, Slovakia, University of Zilina.

Gollner, J.A.: Success factors of ERP projects. The 2nd Virtual Multidisciplinary Conference (QUAESTI), December 15th - 19th 2014, Zilina, Slovakia, University of Zilina.

Publications

Gollner, J.A. (2013): Defining successful SAP/ERP projects. In: *Reviewed Proceedings of the Interdisciplinary Scientific International Conference for PhD students and assistants QUAERE*, Hradec Kralove, Czech Republic, ISBN 978-80-905243-7-8; pp. 2379-2388; available online at: http://www.quaere.econference.cz/english/volume-2013_en.html

Gollner, J.A. (2014): Success factors of ERP projects. In: *Proceedings of the Conference of Business Management, Consulting, and Sales of the 2nd Virtual Multidisciplinary Conference QUAESTI*, Slovak Republic, ISSN: 1339-5572, ISBN: 978-80-554-0959-7, pp. 38-42; available online at: http://www.quaesti.com/archive/?vid=1&aid=2&kid=160201-96

Gollner, J.A. (2014): Motivation Sources Inventory (MSI) and its application for ERP implementations. In: *Proceedings of the Conference of Business Management of the 3rd Advanced Research in Scientific Areas Conference ARSA*, Slovak Republic, ISSN: 1338-9831, ISBN: 978-80-554-0958-0, pp. 35-40, available online at: http://www.arsa-conf.com/archive/?vid=1&aid=2&kid=60301-45

Gollner, J.A. (2015): Motivation Sources Inventory (MSI) and its application for ERP implementations. In: *Sci-pub - Journal of Management and Marketing*, volume 3, issue 1,

ISSN: 1339-4896,   pp.   27-36;   available   online   at: http://www.sci-pub.com/archive/?vid=1&aid=2&kid=120301-4

Gollner, J.A. (2015): Evaluating success factors of ERP projects. In: *Sci-pub - Journal of Management and Marketing*, volume 3, issue 2, ISSN: 1339-4896, pp. 44-54; available online at: http://www.sci-pub.com/archive/?vid=1&aid=2&kid=120302-1

Gollner, J.A., Baumane-Vītoliņa, I. (2017): Measurement of ERP project success: Findings from Germany and Austria. In: *Journal of Engineering Economics*, volume 28, issue 1, print ISSN: 1392-2785,   online   ISSN: 2029-5839,   pp.   1-11;   available   online   at: http://www.inzeko.ktu.lt/index.php/EE/issue/archive

Structure of Doctoral Thesis

The underlying research paper is structured in three main chapters. The first chapter deals with organizational theories and elaborates the aspect of motivation. It focuses on models explaining employees' motivation and analyses methods to measure forms of how people are motivated. Furthermore, the development of models describing motivation and their characteristics are worked out. To make the dependent variable of this thesis transparent, dimensions and characteristics of projects and its ERP environment particularities are discussed. Subsequently, different approaches describing and measuring ERP project success are analysed.

The second chapter puts context in reality and analyses previous experience in the field of motivation during ERP projects. Firstly, the critical factors of ERP implementations and the issues with its measurement of success are outlined.[32] Secondly, the status quo of motivational theories applied in ERP projects is presented. In this respect, the importance of motivation as a dimension to stimulate project performance is explained in the concrete context of ERP launches.

The third chapter follows up with research methods used and exhibits results from primary research. The underlying research model is presented after identifying its independent and dependent variables. The research strategy with its instruments for both qualitative and quantitative methods is explained. Thereafter data collection, research participants, sampling procedures and underlying analysis methods are introduced. Finally, the results from qualitative   and   quantitative   research   are   presented,   including   the   outcome   from   expert

---

[32] The words 'project' and 'implementation' are synonymously used by the author in this thesis. Both terms have the same meaning in context of ERP. Also see: Parr, A., Shanks, G. (2000): A model of ERP project implementation. In: *Journal of information technology*, volume 15, issue 4, p. 289-303.

interviews, followed by results from factor analysis relating to the dimensionality of a new measurement model in context with ERP project success. In particular, the results from regression analysis on the impact of the five sources of motivation on ERP project success are outlined. Subsequently the findings are interpreted and its significance for different aspects of the underlying topic is reflected. After ultimately summarizing the key findings, conclusions are drawn. Subsequently, general suggestions, suggestions to project managers and CEOs of ERP implementing companies are addressed. At last, implications for further research and thematic recommendations are formulated.

Words of Gratitude

1. THEORETICAL APPROACH TO MOTIVATION AND PROJECT MANAGEMENT WITHIN ERP CONTEXT

This section of the dissertation deals with definitions, dimensions and models from a literature review perspective. The focus is on concepts of motivation, ERP and its project success. Also reasons for choosing certain theories or definitions will be provided.

1.1. Development of Motivational Approaches

This chapter gives an overview about the most influential theories dealing with organizations. The author is aware that especially the classic theories are widely known even on lower academic level. Nevertheless, because development of organizational and motivational theories was an evolutional process, a short summary is useful. Before starting to focus on different views of motivational theories, it is necessary to clarify terms and briefly break down the development of organization concepts. The theories on motivation were a result of different views on organizations and its employees. At the end of this chapter, reasons for selection of the best fitting theory for this thesis' are given.

Motivation and Motives

The term *motivation* generally describes the striving of people for goals or desired target objects, based on emotional and neuronal activity.[33] According to Ciompi (1997), motivation can describe human behaviour, as it describes impulses defined as impulses for certain behavioural programs. These programs are immanent in all functional feeling, thinking and acting programs.[34] Motivation is the drive that pushes people to work harder, a characteristic which is exceedingly significant if things are not going well. In crisis, it can be seen as the energy that gives people the strength to get up and keep going. A situation which happens particularly often in job or project circumstances. Simon (1964) approached a similar way explaining motivation with 3 aspects of human behaviour. Direction describes the choice of behaviour, intensity the energy which is used and persistence stands for endurance used for reaching goals.[35] Motivation can also be described as the total of motives leading to readiness to act are called.[36] Jost (2000) describe motives as the reasons for actions.

---

[33] Ledoux, J. (2009): Das Netz der Persönlichkeit. Düsseldorf 2006, p. 338.
[34] Ciompi, L. (1997): Die emotionalen Grundlagen des Denkens. Entwurf einer fraktalen Affektlogik, p. 85.
[35] Simon, H.A. (1964): On the concept of Organizational goal. In: In Administrative Science Quarterly, volume 9, issue 1, pp. 9-10.
[36] Pschyrembel, W. (2002): Klinisches Wörterbuch. Edition 259, de Gruyter, Berlin, p. 1087.

Motives include certain goals and the willingness to behave in a certain way.[37] Psychology sees motives as a relatively stable personality trait, which describes how important certain types of goals are for a person. Motives can be used as components of self-guidance which enable creative and flexible satisfaction of needs. Motives support the endeavour of fulfilling self-perception, defined goals, social roles or individual and cultural values. To emphasize the delimitation of these two terms, motivation is a variable and time-dependent readiness to act, motives are the reasons for these actions.

Studies on how people are motivated go back to ancient Greek philosophers. General principles of that approaches are similar to modern views. It was assumed that human beings naturally try to seek pleasure and avoid pain. The origin of research on motivation in the context of employee motivation goes back to the first half of the twentieth century, especially with studies in the disciplines of Management Science and Organization Theory. After pointing out the characteristics of organizations, an overview to the most influential Motivational Theories are given, sorted under chronological and contextual aspects.

Organization

Scott and Davis analysed the common features of organizations, pointing out that most analysts see them as 'social structures created by individuals to support the collaborative pursuit of specific goals.'[38] Based on that definition, all organizations have to deal with similar tasks. They must define and also redefine their goals and objectives. They need participants to contribute services and these contributions need to be controlled and coordinated. Resources must be collected from organizations environment and products and services need to be distributed. Participants, usually employees need to be selected, trained and sometimes replaced.

Investigators also differ in the level of theoretical analysis, which means their primary attention is given to the behaviour of individuals, of organizations, or of systems of organizations. Three different basic levels of analysis can be seen as social psychological, organizational and ecological.[39] The social psychological level is focusing on the behaviour of individuals or interpersonal relations involving individual participants within organizations. The organizational level is focusing on the structural features or processes that characterize

---

[37] Jost, P.-J. (2000): Organisation und Motivation. Eine ökonomisch-psychologische Einführung, p. 20.

[38] Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education, p. 11.

[39] Blau, P.M. (1957), Formal Organisation: Dimensions of Analysis. In: *American Journal of Sociology*, volume 63, pp. 58-69.

organizations. And finally the ecological level is dealing with characteristics or actions of the organization viewed as a collective entity operating in a larger system of relations.[40] To define what kind of dimensions organizations have, Scott and Davis point out on the 'Congruence Framework' (figure 1-1) initially designed by Nadler and Tushman (1997).[41] It consists of:

- Environment (resources, opportunities and constraints)[42]

- Strategy (prospectors, defenders or analysers)[43] and goals

- Work and technology[44]

- Formal and informal organization

- People

People are described as organizational participants making contributions to the organization in return for a variety of inducements.[45] Several characteristics like knowledge and skills, fit for tasks, needs and preferences, or demographic aspects, are highly relevant for organizations.[46]
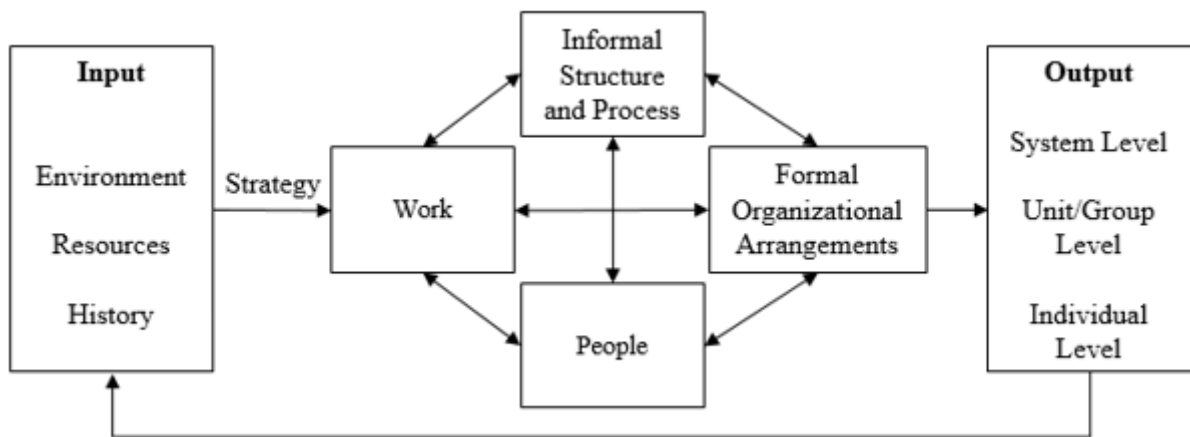
Figure 1-1: Congruence Framework by Nadler and Tushman
Source: created by author from Nadler and Tushman (1997)[47]

---

[40] Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education, p. 18.

[41] Nadler, D., Tushman, M.L. (1997): Competing by Design: The Power of Organizational Architecture. In: Scott, W.R., Davis, G.F. (2007): Organizations and Organizing, p. 19.

[42] Porter, M.E. (1980): Competitive Strategy. In: Scott, W.R., Davis, G.F. (2007): Organizations and Organizing, p. 21.

[43] Miles, R.E., Snow, C.C. (1994): Fit, Failure, and the Hall of Fame. How Companies Succeed or Fail. In: Scott, W.R., Davis, G.F. (2007): Organizations and Organizing, p. 21.

[44]44 Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education, p. 21.

[45] Simon, H. A. (1997): Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations. In: Scott, W.R., Davis, G.F. (2007): Organizations and Organizing, p. 24.

[46] Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education, p. 24.

[47] Nadler, D., Tushman, M.L. (1997): Competing by Design: The Power of Organizational Architecture. In: Scott, W.R., Davis, G.F. (2007): Organizations and Organizing, p. 20.

Organizations can be seen as systems of these elements and each of these elements affect the others and are affected by the others. In addition, no element can be seen isolated, which means when focus is just on one single feature, the essence of organization is missed.

According to Parsons (1960), the development of organizations is the principal mechanism by which, in a highly differentiated society, it is possible to get things done and to achieve goals beyond the reach of the individual. Organizations also affect society in terms of influencing the psyche and personalities of its participants, even shaping the products and services they produce, behaving as actors in their own right as 'corporate persons' and providing the setting for a wide variety of basic social processes.[48]

Scott and Davis introduce three main views on organizations, namely rational, natural and open system. Applying the rational view, an organization is a community pursuing specific goals and showing a relatively high formalized social structure. According to the natural system view, organisations are collectivities whose participants are little affected by the formal structure or official goals, but they share a common interest in the survival of the system. An open systems view describes a coalition of shifting interest groups that develop goals by negotiation. The structure of the coalition, its activities and its outcomes are strongly influenced by environmental factors. Today's organizations seem to have all 3 aspects of this model in different characteristics.[49]

Concerning the following motivational theories, theories associated to organizations as rational systems are Scientific Management from Taylor (1911), Administrative Theory from Fayol (1949) and Weber's Bureaucratic Theory, which was originally developed in the mid-1920s before being translated to English over 20 years later. An example for describing organizations as natural systems is the behaviour-theoretical Human Relations theory from Mayo (1945).

Classic Approaches

This chapter shortly describes the historical evolution from strictly organizational theories to theories which focus on the aspect of motivation as the key to better performance of employees. What all these theories have in common is the purpose, an increased production of individuals and reached organizational goals. Figure 1-2 gives an overview over important theories selected by the author.

---

[48] Parsons, T. (1960): Structure and Process in Modern Societies. Glencoe, OL, Free Press, p. 41.
[49] Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education, pp. 28.

Classic organizational	Behavioral / Content	System / Cognitive	Personality
Taylor - Scientific Management	Maslow - Hierarchy of Needs		Deci/Ryan - Self-determination
Weber - Bureaucratic model	Alderfer - ERG theory		Barbuto/Scholl - Motivation Sources Inventory
Fayol - Administrative theory	Herzberg - Two-factor theory	Vroom - Expectancy theory	
Mayo - Hawthorne Studies	McClelland - Achievement motivation	Adams - Equity theory	Kuhl - PSI

Figure 1-2: Evolution of Motivational Theories
Source: created by author, based on literature review

Frederick W. Taylor's (1911) *Scientific Management Theory* described the possibility to scientifically analyse tasks performed by individual workers in order to discover those procedures that maximize efficiencies. The main idea is to increase production efficiency and productivity by separation of the duties by workers and managers by four principles.[50]

- The creation of a scientific method of measurement

- Emphasis is placed on the selection and training of workers by the management

- Cooperation between managers and workers to ensure the principles are met

- Equal division of labour between managers (thinking/planning) and workers

Taylor was one of the first researchers to indicate employees' motivation as an important aspect to pursuit economic efficiency. Taylor considered the well-being of the workers as a major factor for more productivity. Derived from the four principles, Taylor suggested higher wages, more know-how and a better working environment to increase workers performance.[51]

The *Bureaucracy Model* by Max Weber (1922) focuses on the importance of rules and documentations for organizations.[52] It emphasized on the type of authority relation that associates superiors to subordinates in the administrative structure. The idea of bureaucracy provides an office hierarchy consisting of super- and subordination, stable and learnable written rules, and training and specialization of the office management. Management, whose power results from laws and rules, is neutral and makes decisions towards rational and objective targets. No verbal agreements are accepted, and consequently, all official decisions,

---

[50] Taylor, F. W. (1911): The Principles of Scientific Management. New York, Harper.
[51] Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education, pp. 41.
[52] Weber, M. (1947): The Theory of Social and Economic Organizations. New York, free press.

explanations and orders are documented in writing. When bureaucracy is implemented, accountability, responsibility, controls and consistency is provided within an organization. The hiring of employees is seen as an impersonal and equal procedure. Webers' approach promotes efficiency, but is often criticized for ignoring human needs, potential human errors or the variability of work performances. Although Weber used historical contexts and its analysis required for understanding subjective motivations of individuals[53], aspects of employees' motivation played in fact no role in the Bureaucracy Model.

Beginning of Human Relation View

Henry Fayol's (1916)[54] *Administrative Theory* was one of the first comprehensive statements about a general theory of management. It described the general principles of administration and management. These principles are no fixed rules, but more like guidelines. Fayol proposed that there are five primary functions of management to (1) forecast and plan, (2) organize, (3) command or direct, (4) coordinate and (5) control.

The theory also states 14 principles of management, with most of them continuing the structural and disciplinary thoughts of his predecessors. Principles like 'division of work', 'authority', 'discipline', 'unity of command or direction' emphasize that. But he also describes 'remuneration' as workers must be paid a fair wage for their services, an aspect which is later seen as hygienic factor or *instrumental* motivation. 'Equity' states that managers have to be kind and fair to their subordinates. Especially the last two principles should foster motivation. 'Initiative' describes the concept that employees who are allowed to originate and carry out plans will exert high levels of effort. Furthermore, the principle 'esprit de corps' states that promoting team spirit will build harmony and unity within the organization. Fayol's work has been shown to be relevant and appropriate to contemporary management. The criticism about the rational system theory is that it completely ignores the huge impact of the environment on the organization. It also leaves out the aspect of behavioural structure (actual behaviour) against the normative structure (expected behaviour).[55]

The defining question of Floyd Henry Allport's *Organizational Behavior* is how people behave as individuals, in groups, organizational units and in organizations due to their perception, thinking and feeling. This concerns in particular the creation and securing of

---

[53] Calhoun, C.J. (2002): Classical sociological theory. Wiley-Blackwell, p. 166.

[54] Fayol, H. (1949): General and Industrial Management. London: Pitman.

[55] Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education, p. 58.

social rules, processes, functions and structures. To investigate that, theoretical constructs such as role expectations, interaction, adaptation or creation of meaning are operationalized and examined empirically. For example, the effects on business value by communications and decisions are studied.[56] The aspect of expectations still plays a major role for today's employees' motivation.

The research Elton Mayo conducted under the *Hawthorne Studies* of the 1930s showed the importance of groups and environment in affecting the behaviour of individuals at work. A number of investigations to look at ways of improving productivity were carried out, for example changing lighting conditions in the workplace. What was found out was that work satisfaction depended to a large extent on the informal social pattern of the work group. Where norms of cooperation and higher output were established because of a feeling of importance, physical conditions or financial incentives had little motivational value. People form work groups and this can be used by management to benefit the organization. Mayo concluded that people's work performance is dependent on both social issues and job content. As a result, a tension between workers' 'logic of sentiment' and managers' 'logic of cost and efficiency', which could lead to conflict within organizations, was suggested.

The results of the Hawthorne Studies pointed out some aspects which are relevant for further issues of this thesis. Monetary incentives and good working conditions are less important to the individual than the need to belong to a group. Informal or unofficial groups formed at work have a strong influence on the behaviour of those workers in a group. Managers must be aware of these 'social needs' and cater for them to ensure that employees collaborate with the official organization rather than work against it. The recognition of these studies resulted in numerous studies on leadership, workgroup behaviour, employee personality attributes, job redefinition et al. which are today flourishing fields of research. The 'Hawthorne effect' proved individual workers were not just mechanical economic actors but were complex beings driven by motives and feelings.[57]

Content Theories

Following the Human Relations movement, Motivation Theory evolved as a research direction with human behaviour as the object. It is mainly researching the relationship between motivation and frustration, satisfaction and performance.

---

[56] Allport, F.H. (1933): Institutional Behavior, Chapel Hill, University of North Carolina Press Institutional Behavior.

[57] Mayo, E. (1945): The Social Problems of an Industrial Civilization. Boston: Graduate School of Business Administration, Harvard University.

The first theories primarily concerning motivation that were formulated in middle of the 20th century are widely known. In the following, the most important motivational theories are described, as these theories are the basis for a modern theory like *Motivation Sources Inventory*, which will be applied in this thesis.

The *Hierarchy of Needs* is a theory in psychology, proposed by Abraham Maslow in his 1943 paper 'A Theory of Human Motivation'.[58] It is a theory of human developmental psychology, all of which focus on describing the stages of growth in humans. Maslow describes the pattern that human motivations generally move through. The hierarchy is shown in figure 1-3 in form of a pyramid.
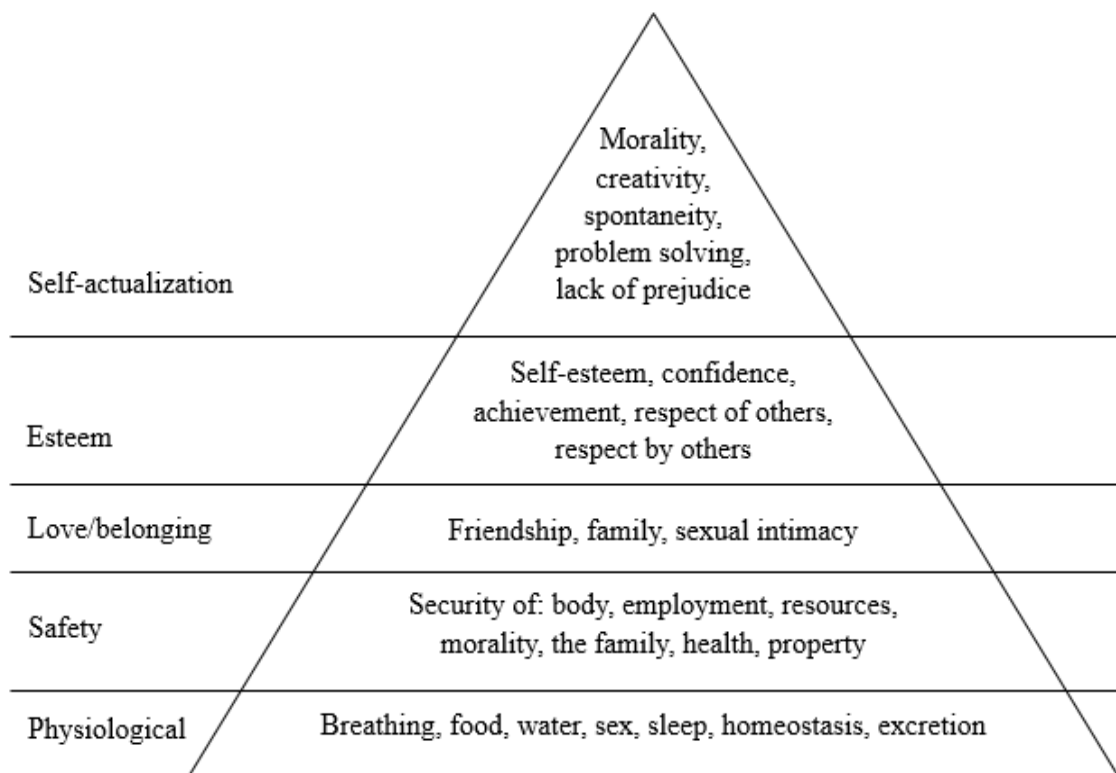
Figure 1-3: Maslow's Hierarchy of Needs
Source: created by author from Maslow (1943)[59]

Criticism on the theory of Maslow is a lack of empirical evidence and theoretical foundation. Further, there is no explanation how needs are satisfied over longer terms. The pyramid of needs cannot be applied cross-cultural and newer models deal with correlations more differentiated. For the purpose of this thesis, empirical prove and long-term motivation are important aspects, therefore it is not useable.

---

[58] Maslow, A.H. (1943): A Theory of Human Motivation. In: *Psychological Review*, volume 50, pp. 370-396.
[59] Maslow, A.H. (1943): A Theory of Human Motivation. In: *Psychological Review*, volume 50, pp. 373.

Based on Maslow's model, Clayton Alderfer (1940) revised and realigned this hierarchy of needs, and developed the *ERG theory*.[60] ERG stands for three needs, namely existence, relatedness and growth. Hersey et al. stated that compared to Maslow, existence corresponds to Maslow's physiological and safety needs, relatedness corresponds to social needs like love or belonging, and growth corresponds to esteem and self-actualization.[61]

The *Two-factor theory* proposed by Frederick Herzberg, which is also referred to as motivation-hygiene theory or dual-factor theory, states that job satisfaction and job dissatisfaction act independently of each other.[62] The main message from this theory states that there is one set of job characteristics or incentives which lead to satisfaction at work, while another and separate set of job characteristics lead to dissatisfaction at work. This theory suggests that to improve motivation on the job, managers must recognize both sets and not assume that an increase in satisfaction automatically leads to decrease in dissatisfaction.[63] The Two-factor theory distinguishes between motivators, coming from intrinsic conditions of the job itself, and hygiene factors, which are described by extrinsic aspects. Motivators like challenging work, responsibility or recognition give positive satisfaction, while hygiene factors like salary, work conditions or job security lead to dissatisfaction results if they are absent.[64]

David McClelland is credited with developing the *Achievement Motivation Theory* commonly referred to as need achievement or n-achievement theory. McClelland believed that workers could not be motivated by the mere need for money. As a result, extrinsic motivation like money could extinguish intrinsic motivation such as achievement motivation. Achievement motivation can be broken down into three types.[65] Firstly (1) achievement seeks position advancement, feedback, and sense of accomplishment. Further (2) authority describes the need to lead, make an impact and be heard by others. And finally (3) affiliation characterizes need for friendly social interactions and to be liked.

---

[60] Alderfer, C. (1969): An Empirical Test of a New Theory of Human Needs. In: *Organizational Behavior and Human Performance*, volume 4, issue 2, pp. 142-175.

[61] Hersey, P. et al. (1996): Management of Organizational Behavior: Utilizing Human Resources, 7th Edition, Prentice Hall, p. 84.

[62] Herzberg, F.W. et al. (1959): The Motivation to Work. John Wiley. New York.

[63] Herzberg, F.W. (1968): One more time, how do you motivate employees? In: *Harvard Business Review*, pp. 53-62.

[64] Hackman J. R., Oldham, G. R. (1976): Motivation through design of work. In: *Organizational Behavior and Human Performance*, volume 16, p. 251.

[65] McClelland, D.C. (1965): Toward a theory of motive acquisition. In: *American Psychologist*, volume 20, pp. 321-333.

Table 1-1 gives an overview and comparison of aspects of motivation on the 4 theories. Paul Hersey integrated them and made 3 general conclusions.[66] People seek security, social systems and personal growth. It can be summarized that these 3 basic human need categories need to be addressed by management to give employees a motivating environment.

Table 1-1: Comparison of four Content Theories of Motivation

Maslow	Alderfer	Herzberg	McClelland
Self-actualization	Growth	Motivators	Need for Achievement
Esteem	Growth	Motivators	Need for Power
Social	Relatedness	Hygiene Factors	Need for Affiliation
Safety	Existence	Hygiene Factors	
Physiological	Existence	Hygiene Factors	

Source: created by author, based on literature review.[67]

Theory X and Theory Y by Douglas McGregor (1960)[68] picture two contrasting models of employees' motivation applied by managers. 'Theory X' emphasizes the importance of strict supervision, external rewards and penalties, while 'Theory Y', highlights the motivating role of job satisfaction and allows employees to approach tasks creatively. In order to achieve the most efficient production, a combination of both Theories may be appropriate. It is likely that a manager will need to take both approaches depending on the evolving internal and external circumstances and personalities.

Cognitive Theories

The *Expectancy theory of motivation* was described by Victor Harold Vroom (1964)[69] with the concept that motivation is based on the expectation of desired outcomes. It can be associated to process theories, as it is not focusing on the contextual aspects but on the dynamics of motivation. It examines the how motivation comes about and which rules do motivational processes have. The theory is based on path-goal approaches, which means that the individual always evaluates the needed effort (path) with importance of desirable goals.[70] The theory is basically stating that motivation is equating valence, expectancy and force.[71] Valence is describing the attractiveness of potential rewards or incentives. Expectancy is a

---

[66] Hersey, P. et al. (1996): Management of Organizational Behavior: Utilizing Human Resources, 7th Edition, Prentice Hall, p. 84/85.

[67] Northcraft, G.B., Neal, M.A. (1994): Organization Behavior: A Management Challenge, 2nd ed., Fort Worth: Dryden Press, p. 113.

[68] McGregor, D. (1960): The human side of enterprise. New York, McGraw-Hill.

[69] Vroom, V.H. (1964): Work and motivation. John Wiley & Sons, New York, pp. 15.

[70] Nerdinger, F.W. (2001): Motivation. In: H. Schuler, Lehrbuch der Personalpsychologie, pp. 354.

[71] Skemp-Arlt, K.M, Toupence, R. (2007): The administrator's role in employee motivation. In: *Coach & Athletic Director*, pp. 28-34.

person's belief whether they will be able to reach the desired result. And finally, force is each humans' motivation to perform. Vroom also points out a concept of motivational decision before starting efforts. For companies, the theory indicates that it is useful to connect individual goals with goals of the organization. Its' mathematic formulation made the *Expectancy theory* empirically useful and very good applicable for researchers. The limitation is clearly its focus on sections of the process of performance and motivation. Vroom's model is assuming rational employees, which is not the case in practice. Additionally, not every action is calculated, there is also a lot of routine activity doing business.

Another motivational process oriented approach is the *Equity-Theory* from John Stacey Adams (1976).[72] As the name indicates, people strive for fair return on efforts in their social relationships. Individuals try to find a balance between their inputs and outputs relative to others. That means the thinking process by which one makes a decision to exert effort is a function of social comparison. The decision is based on individual perceptions of outcomes (e.g. money), job inputs (contribution, effort) and perceptions of a referent person. Inequity has to be removed, by compensation in the case of underpayment, or upgrading or downgrading of others. If equity exists, no tension is experienced and current level of effort persists. The model is questioned to be practically applicable, as many demographic and psychological variables affect human's perceptions of fairness and interactions with others.[73]

Personality Theories

Motivation depending on different kind of personalities is becoming an increased attention business and psychological science. Three modern theories of that category, namely (1) self-determination theory by Deci and Ryan, (2) *Motivation Sources Inventory* by Barbuto and Scholl and (3) PSI-method by Kuhl, are described below.

1. **Self-determination Theory (Deci and Ryan)**

Key studies by Deci and Ryan on *'Self-determination theory'* focuses on the degree to which behaviour of individuals is self-motivated and self-determined.[74] Research on this theory

---

[72] Adams, J.S. et al. (1976): Equity theory: toward a general theory of social interaction. New York: Academic Press.

[73] Huseman, R.C. et al. (1987): A New Perspective on Equity Theory: The Equity Sensitivity Construct. In: *The Academy of Management Review,* volume 12, issue 2, pp. 222-234.

[74] Ryan, R.M., Deci, E.L. (2000): Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. In: *American Psychologist*, volume 55, p. 69.

evolved from studies comparing the intrinsic and extrinsic motives, and from growing understanding of the dominant role intrinsic motivation played in an individual's behaviour.[75]

As a basis for personal growth, 3 basis needs were identified, namely Competence, Relatedness and Autonomy. In addition to these needs, positive Motivation can be differed into intrinsic motivation (natural, inherent drive to seek out challenges, personal development) and extrinsic motivation (comes from external sources). Studies have shown that especially when using this theory on life-goals, intrinsic motivated goals like health or performance can improve Motivation and well-being long term.[76]

Self-determination also tries to explain 'over-justification effect', which occurs when an expected external incentive such as money decreases a person's intrinsic Motivation to perform a task. Once rewards are no longer offered, interest in the activity is lost; prior intrinsic Motivation does not return, and extrinsic rewards must be continuously offered as Motivation to sustain the activity.[77]

2. Motivation Sources Inventory (Barbuto and Scholl)

By integrating previous motivational theories, Barbuto and Scholl (1998) developed a holistic approach which classifies sources of motivation. After a test arrangement for measuring motivation, they developed a typology consisting of five different sources of motivation.[78]

Intrinsic process **motivation**

Intrinsic process motivation is the driving motive for people who are motivated to perform certain kinds of work or to engage in certain types of behaviour for the sheer fun of it. The work itself, and not the outcome of their tasks, is the driver on what they are doing. As a result, individuals who are primarily motivated by *intrinsic process* motivation will only engage in activities which they consider fun. These persons are often diverted from tasks that are relevant to goal attainment in order to pursue tasks which are intrinsically more enjoyable. As long as team tasks are enjoyable, *intrinsic process* motivated individuals will be given a strong impetus to continue working effectively in the context of the team. While intrinsically

---

[75] Lepper, M.K. et al. (1973): Undermining children's intrinsic interest with extrinsic reward: A test of the 'overjustification' hypothesis. In: *Journal of Personality and Social Psychology*, volume 28, pp. 129-137.

[76] Vansteenkiste, M., et al. (2003): Motivation persistence, deep level learning and achievement: The synergistic role of intrinsic goal content and autonomy-supportive context. In: *Journal of Personality and Social Psychology*, volume 87, pp. 246-260.

[77] Lepper, M.K. et al. (1973): Undermining children's intrinsic interest with extrinsic reward: A test of the 'overjustification' hypothesis. In: *Journal of Personality and Social Psychology*, volume 28, pp. 129-137.

[78] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011.

motivated individuals do not react on social and task response, such feedback will not serve to increase continued performance. *Intrinsic process* motivation was previously characterized as physiological needs (Maslow, 1954), early existence needs (Alderfer, 1969) or as intrinsic motivation to obtain task pleasure (Deci, 1975).[79]

Instrumental **motivation**

Instrumental motivated persons are susceptible to measures like financial incentives or promotions at work. Rooted in exchange theory, the basic assumption is that individuals and organizations constitute an exchange relationship. A fundamental observation is that these individuals and their organizations constitute a balanced give and take. Expectancy and equity theories are currently accepted models of motivation based on exchange relationships. This form of motivation is similar to what McClelland (1961) refers to as a high need for power, Maslow (1954) describes as need for safety or Alderfer (1969) defines as later existence needs. At that time, Deci (1975) simply described *instrumental* motivation as extrinsic motivation.[80]

Self-concept external motivation

Individuals, who are mostly *self-concept external* motivation driven, want to meet the expectations of the organization. They behave in ways that elicit social feedback consistent with their self-concept. The satisfaction of reference group members is the driver of that type of behaviour. To achieve that, the first step is to gain acceptance and secondly secure status. When positive task feedback is obtained, the individual finds it necessary to communicate these results to members of the reference group. These two needs, for acceptance and status, are similar to McClelland's (1961) need for affiliation and need for power. The individual continually strives to earn the acceptance and status of reference group members. This status orientation usually leads to an ordinal standard of self-evaluation that it is important for the individual to be first, best, or other indicators of superiority over others. This source of motivation pursuing reputation and status can also be compared to terms like needs for love, affection and belongings (Maslow, 1954), relatedness needs (Alderfer, 1969) or extrinsic interpersonal motivation (Deci, 1975).[81]

---

[79] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1012.
[80] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1012.
[81] Ibid.

Self-concept internal motivation

Individuals with a pronounced *self-concept internal* motivation do have high internal standards to form their own ideal-self. This is done with high internal standards on characteristics, skills and values. They get their motivation out of tasks, which confirm their internal standards and expand their competence.[82] This need for achieving higher levels of competency is similar to what McClelland (1961) refers to as a high need for achievement.[83] Further transcriptions are need for esteem (Maslow, 1954), growth needs associated with developing one's potential (Alderfer, 1969) and intrinsic motivation to overcome challenges (Deci, 1975). The motivating force for individuals who are inner-driven and motivated by their self-concept is task feedback. It is important to these individual that their efforts are vital in achieving outcomes. In addition, their ideas and actions are instrumental for a good job performance. Providing reinforcing feedback is not as important as it is true for other-directed individuals.[84]

Goal internalization motivation

Persons motivated by *goal internalization* are more committed, if the content of work corresponds with their own value system. The individual believes in the issues of the business, and therefore is willing to work towards the goals of an organization supporting this common cause. Decisions and actions are guided by value-based principles. In opposite to the other four sources it features the removal of self-interest.[85] This source is similar to the motive self-actualization (Maslow, 1954). Deci (1975) described goal internalization as internal valence for outcome.[86]

Barbuto and Scholl claim that the developed taxonomy provides a 'framework for understanding individual behaviours and decision making'.[87] An overview on *Motivation Sources Inventory* and a keyword for each motivational source is shown in figure 1-4.

---

[82] Barbuto, J.E. (2001): Testing the underlying motives of organizational citizenship behaviors: a field study of agricultural co-op workers. In: *Published at 28th national agricultural education research conference*, pp. 542.

[83] McClelland, D.C. (1961): The Achieving Society. New York: Van Nostrand Reinhold.

[84] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, p. 1013.

[85] Barbuto, J.E. (2001): Testing the underlying motives of organizational citizenship behaviors: a field study of agricultural co-op workers. In: *Published at 28th national agricultural education research conference*, pp. 543.

[86] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, p. 1014.

[87] Ibid.
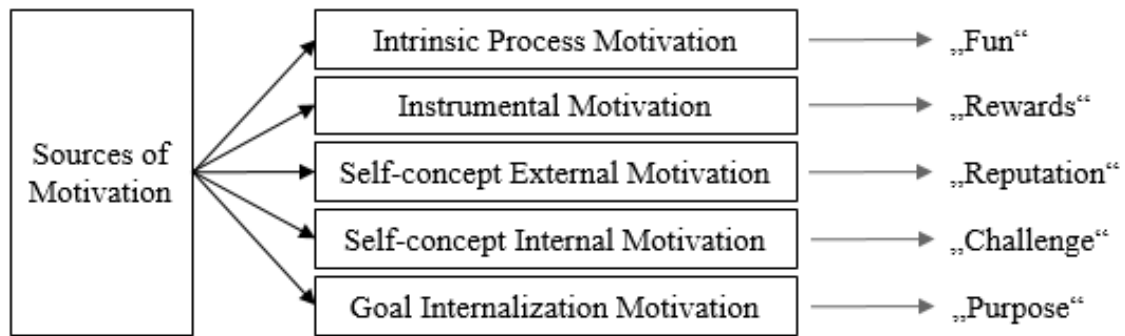
Figure 1-4: Five Sources of Motivation
Source: created by author from Barbuto and Scholl (1998)[88]

The development procedures produced five subscales with a predefined number of unique loading items per subscale that seem to capture the domains of interest for each source of motivation. Based on the integrative taxonomy of motivation sources, scales were developed and also tested.[89] The varimax-rotated component pattern proved that for all five sources of motivation at least six unique items exist. An a priori definition specified that factor loadings for .40 or greater could be used. As a result, a list of questions/items meeting these conditions had to be made. To evaluate the goodness of fit of one of the five sources of motivation subscales, a confirmatory factor analysis was performed. Using LISREL[90] maximum likelihood confirmatory factor analysis, it was possible to discover and evaluate the goodness of fit of a factor structure to a set of data. Therefore LISREL analyses were conducted on the items of the revised scales. It was initially specified that the five subscales were not independent. The resulting goodness of fit was measured with Coefficient 'α', and was calculated for each source of motivation.

It is important to understand that each source of motivation exists in various proportions in each person or employee, but in varying degrees. No person is motivated exclusively by just one source of motivation, and everybody has a different weighting between intrinsic and extrinsic motives. Each individual sets its' own standards of values and traits. For later considerations and suggestions, it is necessary to keep in mind that motivating employees, leaders have a tendency to assume that all are motivated by the same thing.[91]

---

[88] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011-1022.

[89] Leonard, N. H. et al. (1999): Work motivation: The incorporation of self-based processes. In: *Human Relations*, volume 52, pp. 969-998.

[90] Jöreskog, K.G., Sörbom, D. (1985): LISREL VI. Mooresville: Scientific Software, Inc.

[91] Barbuto, J.E., Brown, L.L. (1999): Motivating Your Employees. In: *Nebraska Cooperative Extension*, volume 11, p. 2.

3. PSI-method (Kuhl)

The theory of Personality Systems Interactions (PSI) by Julius Kuhl is a theory of voluntary action control, which to attempt to integrate motivational, volitional, cognitive, developmental and psychological theories of personality.[92] The theory assumes that motivational intelligence is only able to develop when a positive general mood provides the basis for regulating emotions and integrating painful experiences.

The PSI theory also offers an explanation for the phenomena that intrinsic motivation sometimes is destroyed by material incentives. If a behaviour is controlled almost entirely by external incentives like orders or rewards, it leads to decreases of internal involvement. This leads to the 'over-justification effect', which means that factors for self-motivation caused by enjoying the activity itself are overridden by extrinsic motivators.

Four functions can be activated:

- Advisor function (memory extension) - relaxed, calm atmosphere

- Planning function (intention memory) - factual, sober mood

- Execute (intuitive behaviour control) - positive and joyful mood

- Checking function (object identification system) - serious and negative mood

A construct of affect- or mood-regulation tries to describe how personality works. Self-control or self-management describes the ability of people to regulate their emotions. In addition, 7 levels of personality are listed. Levels of initial response, which is genetically pre-determined, include (1) custom action, (2) temperament and (3) affects (pleasant and unpleasant feelings). Second response, which is learned in the course of our lives, consists of (4) stress management, (5) motives, (6) cognitive processes and (7) self-control. PSI-theory describes personality in a highly individually form and also concerns the interaction of cognitive, emotional and motivational processes.

Motivation Sources Inventory - **Comparison with other Motivational Theories**

There are a number of theories that attempt to capture types or sources of motivation affecting organizational members, and some of them were discussed in the previous chapters. These content theories all propose a limited set of motivational sources. Some arranged in a

---

[92] Kuhl, J. (2001): Motivation und Persönlichkeit. Interaktionen psychischer Systeme. Hogrefe, Göttingen, pp. 303-777.

hierarchy, others are viewed as developmental stages and still others theorizing no basic process of transition from one source to another. The models differ with respect to the degree to which they theorize a dominant source of motivation. Some of these models are listed in table 1-2 below. The table is designed to match each of the sources models, which were described in previous chapters, with the MSI model. The listing was done in temporal order of draw up of the theories.

Table 1-2: Integrative Typology of Motivation Sources

Motivation Sources Inventory	*Intrinsic process*	*Instrumental*	*Self-Concept External*	*Self-Concept Internal*	*Goal Internalization*
Bernard (1938)	N/A	Material Inducements	Social Inducements	N/A	N/A
Maslow (1954)	Physiological	Safety	Love	Esteem	Self-Actualization
McClelland (1961)	N/A	Power	Affiliation	Achievement	N/A
Etzioni (1961)	N/A	Calculative / Alienation	Social Moral	N/A	Pure Moral
Murray (1964)	Intrinsic Pleasure	Power	Affiliation	Achievement	N/A
Herzberg (1968)	N/A	Satisfiers	Satisfiers	Motivators	N/A
Alderfer (1969)	Existence	N/A	Relatedness	Growth	N/A
Piaget (1972)	Preoperational	Concrete	Formal	Full-Formal	Post-Formal
Deci (1975)	Task Pleasure	Extrinsic	Interpersonal Challenges	Overcoming	Outcome Valence
Loevinger (1976)	Impulsive	Opportunistic	Conformist	Conscientious	Autonomous
Katz and Kahn (1978)	N/A	Legal Compliance	Membership Approval	Role Performance	Internalized Values
Kegan (1982)	Impulsive	Imperial	Interpersonal	Institutional	Inter-Individual
Bandura (1986)	Sensory Intrinsic Physiological	Extrinsic	N/A	Personal Standards Self-Regulation	N/A
Deci and Ryan (2002)	Intrinsic Motivation	External Regulation	Introjected Regulation	Integrated Regulation	Identified Regulation

Source: created by author from Barbuto and Scholl (1998)[93]

Focus of Doctoral Thesis on *Motivation Sources Inventory* (MSI)

For the purpose of this thesis, both cognitive theories are not appropriate, as they are describing the process through which needs are translated in behaviour. In contrast, the content theories try to explain why employees have different needs at different times. These aspects are viable in the context of measuring impact of motivation on ERP project success. Though, newer approaches with measurable scales for different motivation sources do exist.

---

[93] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issues 3, p. 1018.

Self-determination theory by Deci and Ryan focuses on three basic needs, and the results of inquiries - intrinsic motivation is dominant - look to be to be predetermined. There is also a lack of proven instruments to measure the sources of motivation. The PSI method seems to be very complex and not really suitable for an after go-live analysis of ERP projects.

The author selects the *Motivation Sources Inventory* model developed by Barbuto and Scholl (1998) to measure key users' motivation during ERP projects. The reasons for that decision can be summarized with the theories' acceptance, comprehensibility, applicability and comparability. Barbuto and Scholl (1998) identified the trichotomy found by McClelland ('Big Three Motives')[94] as one of the most accepted and applied taxonomy of motivation. After overlooking this model, they added two important dimensions of human motivation. *Intrinsic process* means performing for the fun of it, and goal internalization describes performing out of a sense of values and purpose. As analysed in the next chapter, this new typology has been used in several articles and has been proven to be reliable in predicting the different sources of motivation of different kind of employees. Comprehensibility is assured through good descriptions which are founded by the experienced questionnaire. It is easier to understand aspects of motivation with concrete examples, which are also statistically proven concerning goodness of fit. As mentioned, Barbuto and Scholl developed a new typology of motivation that integrates the strong points of the trichotomy of McClelland. Most importantly, they added a system which makes the different sources measurable, which give this model a high level of applicability. The questionnaire of MSI had been applied on several occasions, and therefore the results are comparable to previous studies. Another main advantage is the existence of an existing and proven catalogue of questions or statements assigned to the different sources. This fact makes this study very well verifiable to previous researches.

1.2. Project management, ERP projects and ERP project management

An ERP implementation project, whose success is the dependent variable in this thesis' model, can be seen as a special kind of IT project. ERP or IT project management is a specific approach of project management, focusing more on technical aspects and ERP inherent concepts. Before these characteristics of ERP projects and its' management are evaluated, this chapter gives an overall view on the topic project management. The ideas of project management provide the basis of how ERP project implementations are carried out today.

---

[94] Barbuto, J.E. et al. (2008): Using the MBTI® Instrument and the Motivation Sources Inventory to Test the Relationships Between Jung's Psychological Types and Sources of Work Motivation. In: *Journal of Psychological Type,* volume 68, issue 12, p. 140.

Project Management

For todays' organizations, innovations and changes are often implemented by working on projects, making project work is a vital part of a modern company.

The word project actually originally meant 'before an action', being derived by the Latin word *projectum*. The matching verb *proicere* combines *pro-*, which denotes precedence, something that comes before something else in time and *iacere*, 'to do'. In English, a project initially described a plan of doing something, and not actually performing it.

The application of the term project can be made in school or university, engineering or on project management. In this context, the term project applied on project management is essential. A project can be seen as a management environment that is created for the purpose of delivering business products according to a specified business case. A project can also be described as 'a temporary endeavour to create a unique product, service or result'.[95]

The contents of a project are described as unique to the company where the project is executed. In opposite, typical company processes are repetitive and ongoing. Concerning the temporal aspects, a project usually has a defined beginning and a planned end date.[96]

Thus a project can also be defined as a goal-oriented temporary activity, where limited resources like time and labour are used in a restrictive temporary setting. Gray and Larsson (2000) stated 'a project is a complex, non-routine, one-time effort limited by time, budget and resources, and performance specifications designed to meet customer needs'[97]

The evaluated projects in this thesis were implemented in Austria and Germany, and therefore it is important the definition of a project by the German Institute for industrial norms and regulations based on norm number DIN 69901, which describe project literally as 'endeavour, which is unique and limited by a clearly defined scope, timeline, financial and human resources and other limiting factors, it implies differentiation from other intends and requires a project specific organization'.[98]

---

[95] Turner, J.R., Müller, R. (2003): On the nature of the project as a temporary organization. In: *International Journal of Project Management*, volume. 21, issue 1, p. 1.

[96] Ibid, pp. 2.

[97] Gray, C., Larson, E. (2000): Project Management: The Managerial Process. Burr Ridge, IL, p. 4.

[98] Hofmann, M. (2014): Performance-orientiertes Projektmanagement: Konzeption zum Umgang mit einmaligen, komplexen Aufgaben. Springer, Gabler, p. 25. GPM Deutsche Gesellschaft für Projektmanagement (2009), DIN 69901-5:2009 Nr. 3.43. Translated by author from German: ‚Ein Projekt ist ein Vorhaben, das im Wesentlichen durch die Einmaligkeit der Bedingungen in ihrer Gesamtheit gekennzeichnet ist wie Zielvorgabe, zeitliche, finanzielle, personelle und andere Begrenzungen, Abgrenzung gegenüber anderen Vorhaben, projektspezifische Organisation'.

The application of project management techniques has become an integral part in all industries, mainly to achieve greater efficiency and transparency. They own core skills of management including motivation, leadership, organizing, communicating and decision making.

Project work is an integral part of each organization, as companies continuously have to adapt to new market needs and changing requirements. To achieve that, companies use projects to implement new strategies or changes inside the organization. Morris (1994) stated that 'Management by projects has become a powerful way to integrate organizational functions and motivate groups to achieve higher levels of performance and productivity.' [99]

During the last decades new methods and tools for conversion of project management were developed. The first project management technique was developed by Henry Gantt in the 1910s, when informal techniques and tools were mostly used. The so called Gantt charts helped to manage projects on an ad-hoc basis. Gantt charts are bar-chart-based graphs, which are still used as an instrument to visualize and control complex project plans.[100] During the 1930s and 1940s the defence and aerospace industries were the main driving forces of finding ways to handle complex projects, leading to further development of project management techniques and instruments. In consequence, the Critical Path Method (CPM) and the Program Evaluation and Review Technology (PERT) approach were developed in the United States for extensive military projects.[101] For the next two decades, these two approaches became parts of the standards for project management, which was confirmed by a large number of publications, as Morris pointed out 'by 1964 the bibliography on PERT comprised nearly 1000 books and articles'.[102]

During the last three decades of the last century, projects became more international, cultural diverse and also the need for approaches not only taking care of hard quantitative data became evident. As a result, newer methods tried to include softer ideas in project models.[103] This development led to modern approaches. These methods emphasize soft-skills of project managers and do less stress administrative activities for achieving a successful project delivery.

---

[99] Morris, P.W.G. (1994): The management of projects. London, New York, NY, p. 18.
[100] Richman, L. (2002): Project management step-by-step. New York, Amacom, p. 292.
[101] Cartlidge, D. (2015): Construction Project Manager's Pocket Book. Routledge, New York, p. 8.
[102] Morris, P.W.G. (1994): The management of projects. London, New York, NY, p. 31.
[103] Williams, T.M. (1999): The need for new paradigms for complex projects. In: *International Journal of Project Management*, volume 17, issue 5, p. 272.

Projects are usually described with life-cycles, with each project phase containing specific sub-processes and related elements which can be applied in different stages of the project. Labuschagne and Brent (2005) generalize that 'various project life cycle approaches exist in the literature, e.g. control-oriented model, quality-oriented model, risk-oriented model, a fractal approach to project life cycle, as well as some company-specific project life cycles'.[104]

The general concept of all definitions of project lifecycles is quite similar, although there are different types of classifications concerning the stages. Common characteristics of the project lifecycle method can be found, as each project phase expects clearly defined outputs described as part of project processes. It is essential all members of the affected organization know and accept the tasks, processes and regulations for accomplishing successful projects. The most accepted formal project management structure is 'project management body of knowledge' (PMBoK), which was developed by Project Management Institute (PMI). According to the PMBoK, a project is split into the phases initiating, planning, executing, monitoring, closing and controlling project activities. This PMI project management framework very clearly classifies these 5 phases into process groups. The four main stages are initiating-, planning-, executing- and closing process groups, according with the fifth phase monitoring and controlling, which is conducted throughout the overall project life cycle.[105]
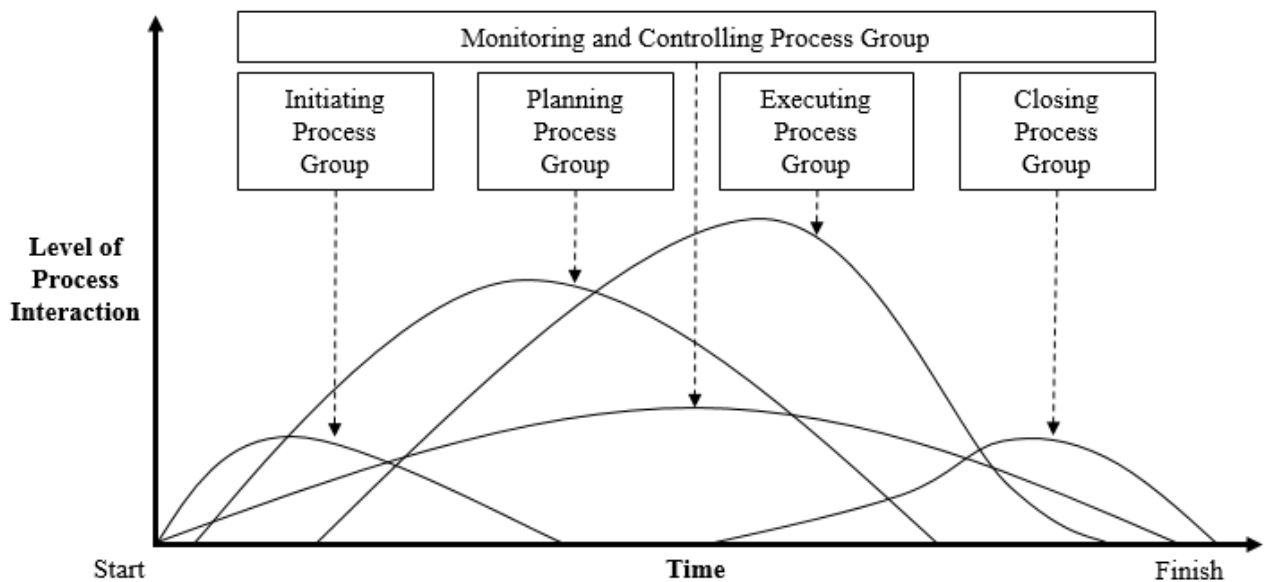
Figure 1-5: Five Phases of Project Management
Source: created by author from Kerzner (2013)[106]

[104] Labuschagne, C., Brent, A.C. (2005): Sustainable Project Life Cycle Management: the need to integrate life cycles in the manufacturing sector. In: *International Journal of Project Management*, volume 23, issue 2, p. 152.
[105] Kerzner, H. (2013): Project management: A systems approach to planning, scheduling and controlling. New York, John Wiley and Sons, pp. 10.
[106] Ibid.

The *initiation* process group includes activities which are required to start a new project. During this first phase, the high level requirements of the project are being summarized, a project charter is created and stakeholders are identified. This groups helps to define an initial project scope, which is to be authorized by project sponsors, and results in a project kick off. In addition, the project manager is starting to allocate resources to carry out the project.

After completing the processes of initiation, the *planning* stage of the project succeeds. The planning process group needs to be conducted in a specific logical order. In the beginning of that phase, more detailed requirements are collected, project scope is more clearly defined and a work breakdown structure is created. The work breakdown structure is outlining the project into plan and controllable elements, dividing it into subtasks and work packages. The next step includes activities of project time management with sub-processes like define activities, sequence activities, estimate activity resources, estimate activity durations and develop schedules. A project schedule can be seen as the result of these activities. The planning is continued with project cost management, plan quality, develop human resource plan, plan communications, project risk management and plan procurement. A bad conducted planning process causes serious consequences, especially unclear requirements and vague scoping result in a high degree of uncertainty. The planning phase is critical for the overall project success, as is its subsequent stage.

The *executing* process group usually consume most project resources as it is designed to deliver the product or service. To achieve the overall project scope, project managers need to interact frequently with project stakeholders. Project manager needs to assure the project is executed according to the scope and planning documents and within the required quality metrics. In case of a changed project scope or altered requirements, a structured change management processes needs to be applied. Further important processes to be completed during the execution phase are project quality management, project human resource management, project communication management and conduct procurements.

The last stage of the project is done by the *closing* process group, and consists of all activities to finish the actual project work. It also contains documentation of the project, as information about the project should lead to company wide acceptance for it. Before project team members leave the project organization, it is advised to conduct an examination of lessons learnt. It is important to strive for a structured end of a project, as delays on final payments or purchase bring needless disagreements in cooperation to consulting partners. Every project has to be formally closed, and further projects experience needs to be well documented for bringing benefit to the organization.

A fifth component can be described as the *monitoring and controlling* process group, which takes place during the complete project life cycle. It is necessary to record and show the progress, quality and performance of the project. There also needs to be controlled whether the project sticks to the project management plan and is running according to the predefined project scope. It is mandatory to record project status regularly and essential to communicate it within project team and organization. Eventual bottleneck concerning employees have to be discussed and solved in coordination with human resources department. The peak of these observing activities is during the planning and especially executing phase of the project, and relatively low during the initiating and closing stages.

Enterprise Resource Planning (ERP)

Enterprise resource planning (ERP) system has a strategic relevance for the company, because its integration into the core business processes or strategies can directly impact the firm's performance.[107] Therefore, many companies have begun to develop strategies focusing on information technologies, with ERP adoption being a critical thrust for fundamental organizational improvements like business process redesign.[108]

The term ERP was formally used first by the Gartner Group in the early 1990s.[109][110] Although definitions for ERP vary, it can being seen as a generic term by now. The term ERP was used as an extension of Materials Requirements Planning (MRP), reflecting the extension of the system beyond manufacturing. According to Klaus et al. (2000), ERP systems can been defined as 'comprehensive, packaged software solution that seeks to integrate the complete range of a business' processes and functions in order to present a holistic view of the business from a single information and IT architecture'.[111][112] O'Leary (2000) describes ERP systems as 'computer-based systems designed to process an organization's transactions and facilitate integrated and real-time planning, production, and customer response'.[113]

---

[107] Sambamurthy, V. et al. (2003): Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. In: *MIS Quarterly*, volume 27, issue 2, p. 238.

[108] Robey, D. et al. (2002): Learning to implement enterprise systems: An exploratory study of the dialectics of change. In: *Journal of Management Information Systems*, volume 19, issue 1, p. 18.

[109] Harreld, H. (2001): Extended ERP reborn in b-to-b. In: *InfoWorld*, volume 23, issue 35/36, p. 21.

[110] Gould, L.S. (2002): ERP: Complexities, ironies, and advances. In: *Automotive Design & Production*, volume 114, issue 11, p. 44.

[111] Klaus, H. et al. (2000): What is ERP? In: *Information Systems Frontiers*, volume 2, p. 141.

[112] Al-Mashari, M. et al. (2003): Enterprise resource planning: A taxonomy of critical factors. In: *European Journal of Operational Research*, volume 146, p. 353.

[113] Rashid, M.A., Hossain, L., Patrick, J.D. (2002): The Evolution of ERP Systems: A Historical Perspective. In: *Enterprise Resource Planning: Solutions and Management*, p. 37.

ERP software can also be defined as customizable, standard application software which includes integrated business solutions for the core processes (e. g. sales and distribution, purchasing, warehouse management, production planning and control) and the major administrative functions (e. g. human resource management, controlling and accounting) of an enterprise. It is designed to integrate and optimize the business processes and transactions in a company. ERP software usually also includes integrated solutions for the steering of transactions with business partners, especially Customer Relationship Management and Supply Chain Management. By integrating the business processes across the organization and the central database, ERP differs from earlier information systems in its capacity to disseminate information in real-time and increase organizational flexibility and agility.[114]

History of Enterprise Resource Planning

The first business software systems were conceptualized and implemented within the paradigm of the division of labour. These systems usually were tailored for particular departmental needs, but lacked the ability to integrate its functions across the division. This means, it was normal to collect and process the same information multiple times in different places, creating a serious challenge when decision makers tried to retrieve the right information at the right time. This solution generated serious asymmetries between different functional groups within the same organization.[115]

In the early business software days, accounting was the first company application to be computerized. As accountants were eager to know the value of their inventory, the functions of the first manufacturing software were limited to inventory control and purchasing. The development of Material Requirements Planning (MRP) software addressed the needs of manufacturing operations.[116] MRP was focusing on materials and planning control, using a set of decision rules to translate production schedules into exact time-phased requirements.[117]

Organizations realized that an integrative character would gain efficiencies for these systems. As a result, these systems were expanded in scope in the early eighties, sub consequently leading to Manufacturing Resource Planning (MRPII) software. MRPII incorporated additional capabilities to support other business functions such as production, sales, marketing and

---

[114] Sambamurthy, V. et al. (2003): Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms, *MIS Quarterly,* volume 27, issue 2, pp. 237.
[115] Kang, S. et al. (2008): ERP Alignment for positive business performance: Evidence from Korea's ERP Market. In: *Journal of Computer Information Systems*, pp. 25.
[116] Gumaer, R. (1996): Beyond ERP and MRP II. In: *IIE Solutions*, volume 28, issue 9, p. 32.
[117] Orlicky, J. (1975): Material Requirements Planning. New York, NY: McGraw Hill.

finance.[118] MRPII was able to bring together some units and processes, but could not be seen as a companywide system. As it did not cover all departments of an enterprise, there still were serious issues concerning incompatibilities and interoperability.

A logical evolution was a software developments focusing on integrating all business processes and functionalities within an organization. As mentioned above, the term for this new generation of business software, Enterprise Resource Planning (ERP), was found by the Gartner Group. The main goal was a frictionless flow of information through the whole enterprise, including additional modules such as inventory, purchasing, sales and distribution, supply chain, production and human resources.[119]

Table 1-3: Historical evolution of Enterprise Resource Planning (ERP)

Decade	ERP Evolution
1960s	Inventory Control Packages
1970s	Material Requirements Planning (MRP)
1980s	Manufacturing Resources Planning (MRP II)
1990s	Enterprise Resource Planning (ERP)
2000s	Extended ERP

Source: created by author, own literature research.

Main functions and characteristics of ERP Systems

ERP systems cover most of modern companies' functional areas, including financial accounting, human resources, manufacturing, order processing, supply chain management, project management and customer relationship management. For most market-leading ERP systems, a differentiation in business modules had been established. The different modules, which very often display the departments of a business organization. Recently, the borders between these modules are becoming blurred, as ERP project approaches tend to be more process oriented. But nevertheless, ERP project teams are still set up and organized based on this classification.

This classification also has an importance for the definition which ERP projects are qualified for the empirical survey on success of ERP implementation. To be approved for the sample, the ERP project at least had to include the core modules Finance (FI), Materials Management (MM) and Sales and Distribution (SD). Common ERP modules are summarized in table 1-4.

---

[118] Barker, R. (2001): Manufacturing best practice and human intellectual energy. In: *Integrated Manufacturing Systems,* volume 12, issue 1, pp. 7.

[119] Kang, S. et al. (2008): ERP Alignment for positive business performance: Evidence from Korea's ERP Market. In: *Journal of Computer Information Systems*, pp. 25.

Table 1-4: Overview of important ERP Modules

ERP module		Description
Financial Accounting	FI	Accounts receivable, accounts payable, asset accounting, financial management, budgets and statements.
Controlling	CO	Common costs, profit centre accounting, sales management and product costing.
Sales and Distribution	SD	Quotations, sales processes, contracts, deliveries, shipment processing, invoicing.
Materials Management	MM	Inventory management, goods movement, inventory management, supplier selection, procurement functions, invoice verification.
Production Planning	PP	Production planning, material requirements planning, production orders for series, Individual production, order confirmations.
Quality Management	QM	Monitoring and checking quality during goods receipt and production.
Plant Maintenance	PM	Monitoring and maintenance of technical installations.
Human Resources	HR	Personnel administration, payroll, time billing, vacation tracking, training.
Funds Management	FM	Accounting and budget management for public organizations.
Treasury	TR	Electronic banking, liquidity forecast, financial transactions.
Project System	PS	Process planning, scheduling, management by project numbers over several submodules.

Source: created by author.

One primary goal of ERP is to improve and increase information flow within an organization.[120] ERP software standardizes information within the organization and also streamlines the data flow between different departments of the company, as pictured in figure 1-6.
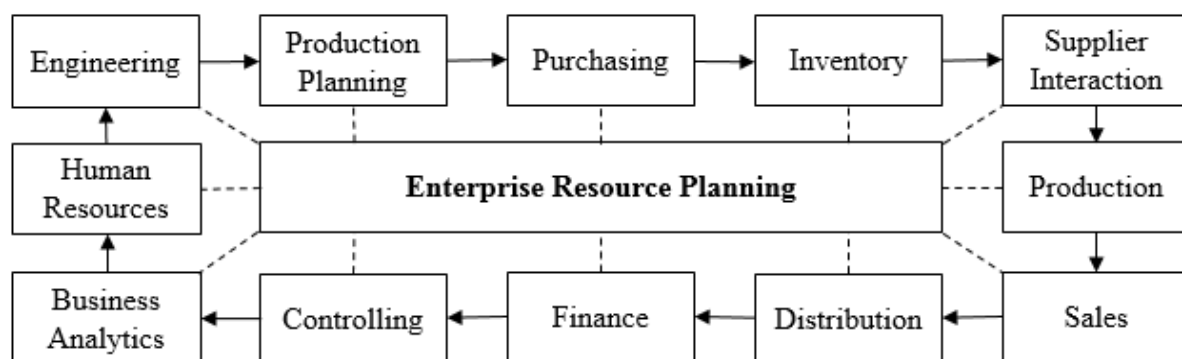
Figure 1-6: Integration Aspect of ERP
Source: created by author

---

[120] Norris, G. et al. (2000): E-Business and ERP: Transforming the enterprise. New York: John Wiley & Sons.

To summarize that view, Esteves (2001) described ERP systems as 'software packages composed of several modules, such as human resources, sales, finance and production, providing cross-organization integration of data through embedded business processes'.[121]

Four fundamental characteristics of ERP systems can be described with terms multinational, reference models, integrated information and flexibility.[122] ERP systems can be considered as multinational systems since they reflect national laws and regulations from specific country environments. Secondly, ERP systems comprise reference models that reflect preferred business models in terms of best practices, data employed and organizational structure. Furthermore, ERP systems' integrate all business processes within an organization (see figure 1-6), enabling real time access to the same information. And finally, ERP systems provide flexibility, allowing organizations to customize the system to fulfil specific scenarios and circumstances.

ERP Benefits

The ERP market is still growing and very profitable, so there are good reasons why enterprises decide for ERP systems.[123] Koch (2002) lists the main benefits and reasons for companies which adopt ERP:[124]

- Integrating financial information

- Integrating customer order information

- Standardizing and speed up manufacturing processes

- Reducing inventory

- Standardizing HR information

During the last decade, ERP not only provides the software architecture, but also offers process templates that include industries 'best practices', which are sets of reference processes for each branch. This approach usually makes ERP implementation easier, and enables

---

[121] Esteves, J., Pastor, J. (2001): Enterprise Resource Planning System Research: An annotated bibliography. In: Communications of AIS, volume 7, issue 8, p. 2.

[122] Kang, S. et al. (2008): ERP Alignment for positive business performance: Evidence from Korea's ERP Market. In: *Journal of Computer Information Systems*, pp. 25.

[123] Bajwa, D. et al. (2004): An integrative Framework for the assimilation of Enterprise Resource Planning Systems: Phases, Antecedents, and Outcomes. In: *Journal of Computer Information Systems*, volume 44, issue 3, pp. 81.

[124] Koch, C. (2006): ABC: An Introduction to ERP, Getting Started with Enterprise Resource Planning (ERP). In: *CIO*, March, p. 4.

companies to participate from proven processes and solutions. As mentioned before, an efficient and effective information flow throughout the whole enterprise imply big advantages. Seddon et al. proposed a division of practical benefits into five aspects. Table 1-5 reviews ERP benefit from different perspectives, and tries to explain why ERP systems are very appealing for enterprises of every size.[125]

Table 1-5: Benefits of ERP Systems

Benefits of ERP	
1. **Operational benefits**	By automating business processes and enabling process changes, they can offer benefits in terms of cost reduction, cycle term reduction, productivity improvement, quality improvement, and improved customer service.
2. **Managerial benefits**	With centralized database and built-in data analysis capabilities, they can help an organization achieve better resource management, improved decision making and planning, and performance improvement.
3. **Strategic benefits**	With large-scale business involvement and internal/external integration capabilities, they can assist in business growth, alliance, innovation, cost, differentiation, and external linkages.
4. **IT infrastructure benefits**	With integrated and standard application architecture, they support business flexibility, reduced IT cost and marginal cost of business units' IT, and increased capability for quick implementation of new applications.
5. **Organizational benefits**	They affect the growth of organizational capabilities by supporting organization structure change, facilitating employee learning, empowering workers, and building common visions.

Source: created by author from Shang and Seddon (2000)[126]

Various ERP project success stories were documented in extended studies worldwide, describing benefits include cost reductions, better cost management and efficient delivering. Examples for studies on ERP success are researches on Taikang Life[127] or Air France[128].

ERP Vendors

Currently, the most important ERP vendors worldwide are *SAP*, *Oracle*, *Sage*, *Infor* and *Microsoft*, with companies like *BAAN*, *J.D. Edwards* or *PeopleSoft* also holding minor market shares. According to the recent market share analysis by the Gartner Group, the top 10

---

[125] Seddon, P.B. et al. (2003): Second-wave enterprise resource planning systems. New York: Cambridge University.

[126] Shang, S., Seddon, P.B. (2000): A comprehensive framework for classifying the benefits of ERP systems. In: *AMCIS 2000 Proceedings*, p. 1011.

[127] Chen, J. (2007): SAP ERP Accelerating Taikang Life's Business Standardization and Internationalization. In: IDC Special Study, March, pp. 1-10.

[128] Pang, A. (2006): Air France Soars to New Heights with Upgrade mySAP ERP System: Meeting its commitment to Excellence. In: *IDC Case Study*, July, pp. 1-9.

vendors own almost 64% of the worldwide market.[129] The total market size in 2012 was $24,5B, with *SAP* holding with just over $6B in total ERP software revenue. Due mergers and acquisitions, the market is very dynamic.
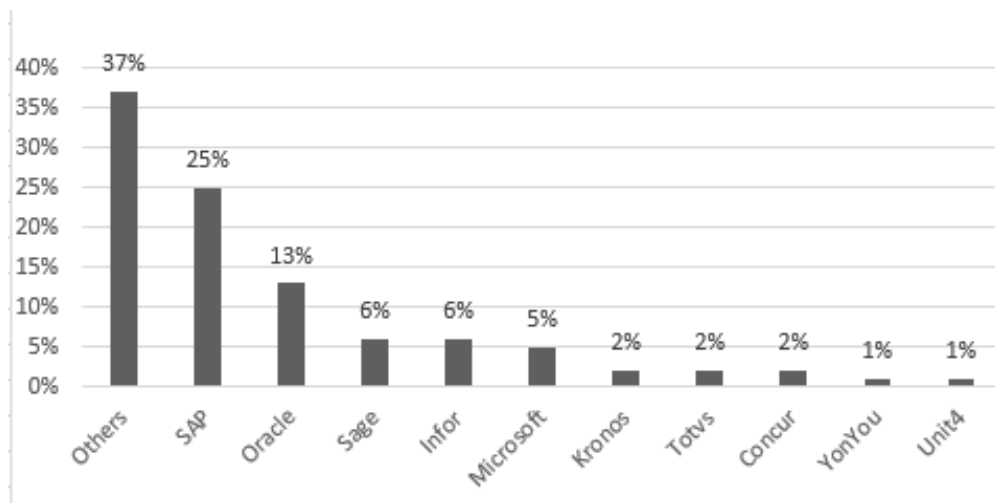
Figure 1-7: Worldwide ERP Market Share 2012
Source: created by author from Pang (2013)[130]

In Central Europe and especially in Germany, Austria and Switzerland, *SAP* has an even more dominant role. As pictured in figure 1-8, *SAP* own just over 57% of all ERP software revenues in Germany in 2011.
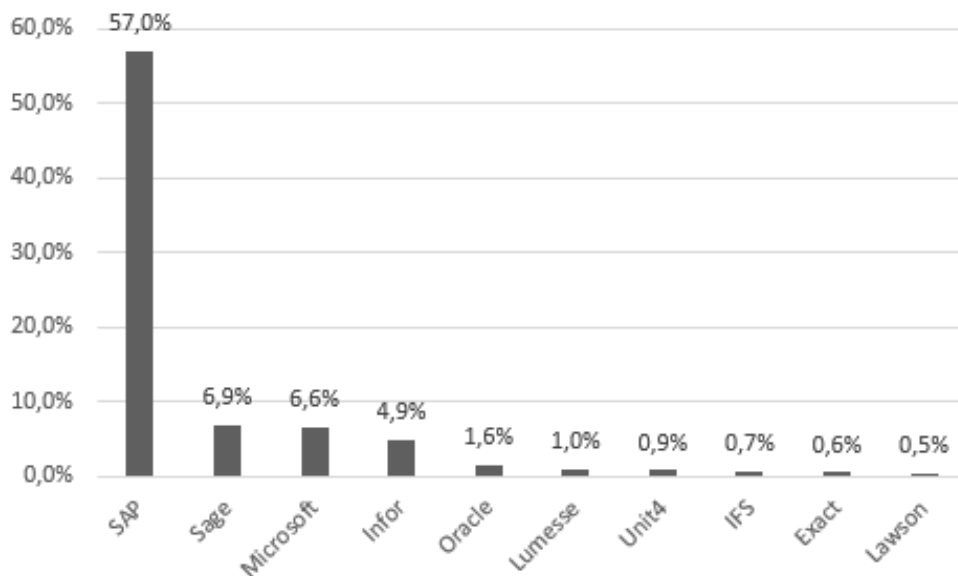
Figure 1-8: Market Share (% of revenues 2011) of leading ERP Vendors in Germany
Source: created by author from Statista (2016)[131]

---

[129] Pang, C. et al. (2013): Market Share Analysis: ERP Software. In: *Worldwide*, pp. 1-10.

[130] Ibid.

[131] Statista (2016): http://de.statista.com/statistik/daten/studie/262275/umfrage/marktanteile-der-anbieter-von-erp-software-in-deutschland/

ERP Project Phases

As mentioned before, a typical ERP project lasts at least for one year, which means motivation needs to be on a high level for most of the time, especially during the critical phases. Jacob and Wagner (1999) split an implementation project plan to five phases:[132]

1. Initiation: introduction of the software

2. Orientation: configuration for business processes

3. Development: customizing, developing interfaces

4. Pre-production: preparing for rollout

5. Post-production: focus on ancillary functionality and features of the system to be rolled out in the future.

A widely used methodology to implement an ERP system in an organization divides the implementation process into five different phases.[133] The method is called '*Accelerated SAP*', and shows a notable similarity with the general approach for project management.
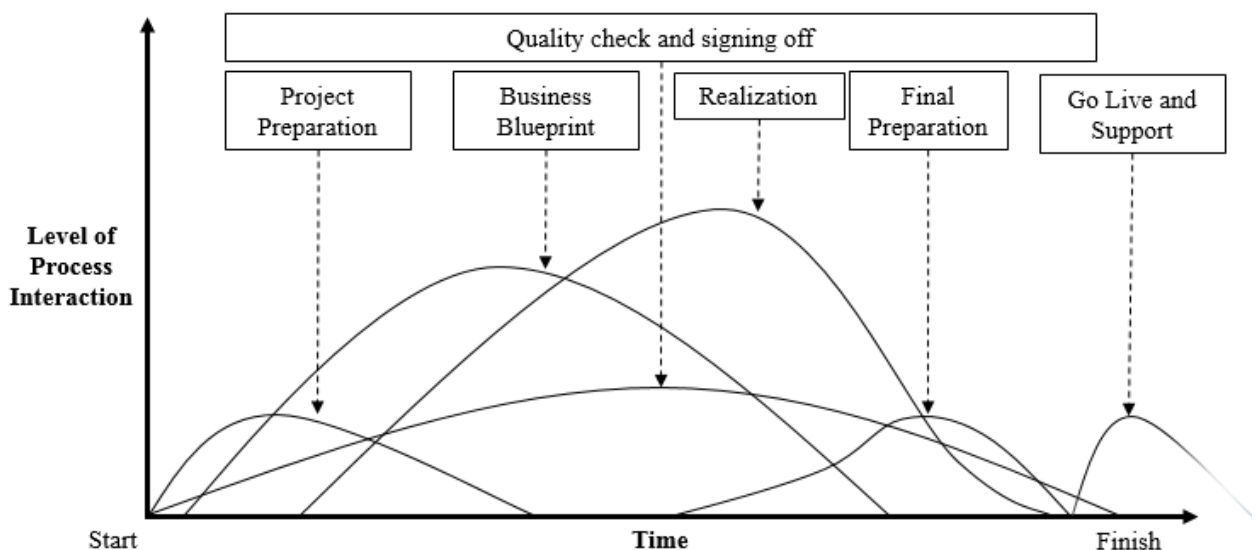
Figure 1-9: ERP Project Phases
Source: created by author from Lui and Chan (2008)[134]

The method is pictured in figure 1-9, and has similarity with project life cycle (see figure 1-5).

[132] Jacob, G., Wagner, T. (1999): Rapid ERP implementation. In: *The Tuolumne County, California experience. Government Finance Review*, volume 15, issue 4, pp. 28-33.
[133] Lui, K.M., Chan, K.C.C. (2008): Rescuing Troubled Software Projects by Team Transformation: A Case Study With an ERP Project. *In: IEEE Transactions on Engineering Management*, volume 55, issue 1, p. 175.
[134] Lui, K.M., Chan, K.C.C. (2008): Rescuing Troubled Software Projects by Team Transformation: A Case Study With an ERP Project. *In: IEEE Transactions on Engineering Management*, volume 55, issue 1, p. 176.

Phase 1 is named *project preparation*, as the ERP implementation team goes through initial planning and preparation for ERP project for the client.

The purpose of the second stage is to achieve a common understanding of how the company intends to run ERP to support their businesses. In addition, the original project goals and objectives are refined, and the overall project schedule is revised. The result is the *business blueprint*, a detailed documentation of the results gathered during requirements workshops, and the eponym of that phase.

The purpose of the *realization* phase is to implement all the business processes based on the Business Blueprint.

The purpose of phase 4 is to complete the *final preparation* (including testing, end user training, system management and cutover activities) to finalize project team's readiness to go live. The so called Final Preparation phase also serves to resolve all critical open issues.

And finally phase 5 is summarized as *go-live and support*. The purpose is to move from a project-oriented, pre-production environment to live production operation. The most important operations include setting up of production support, monitoring system transactions and optimizing overall system performance.

Each phase peaks with critical milestones team members have to reach within the project. These pinnacles also mark times of very high psychological pressure and workload. *Accelerated SAP* can only be seen as an example for a project method, as other ERP vendors have very similar approaches. *SAP* is the dominant ERP system in Central Europe, and most of the examined ERP projects applied a method with the same kind of phases.

Roles in ERP Projects

An organizational separation of the employees in companies which implement ERP project can be made. Usually, employees affiliated to ERP project are distinct into the following roles:

- CEO (Chief Executive Officer)

- CFO (Chief Financial Officer)

- Head of IT department / CIO (Chief Information Officer)

- ERP project manager

- Key user / sub project manager

- End user, participating in the project

- End user, not participating in the project

- External staff, extra casted for the ERP project

During some ERP project, especially in medium-sized companies, the role project manager and head of IT can be fulfilled by the same person. Additional stakeholders can be project influenced customers, resource managers, line managers, consultants, vendors and subcontractors.

A special role is occupied by the ERP sponsor, who is also named as project champion is some literature.[135] The sponsor is not only freeing financial circumstances, he also makes sure the management is aware of the progress, importance and goals of the ERP project. In cooperation with project management, also commitment of executives of all departments needs to be ensured. The sponsor preferable also plays an active role, being a member of the steering committee, the highest-level body of ERP projects. This institution usually is a regular, preferably monthly meeting of decision makers concerned by the ERP implementation. It is typically consisting of the project sponsor, IT responsible, project managers and executives of both implementing company and consulting company. The steering committee is informed by project management about status, progress and eventual problems. It controls the advancement of the project with regard to dates, newly found requirement, risks and expenses. And mostly important, it sets the main strategy and goals of any ERP project, and also communicates them within the whole company. This commitment to the project by management and goal awareness within the organization is critical to maintain a high level of employees' motivation and focus.

For project management, it is important to manage stakeholder's influence in relation to the requirements to ensure a successful project. Reporting to the steering committee can become difficult especially during ERP project, as some topics are very technically and hard to explain to upper management. There are narrower views of the term stakeholder, focusing on the influencers and decision makers of a business or technological change. In this context, stakeholders are managers who have the organizational authority to allocate resources like people, money or services. They can also set priorities for their own organizations in support

---

[135] Nah, F.F.H et al. (2001): Critical factors for successful implementation of enterprise systems. In: *Business Process Management Journal*, volume 7, issue 3, p. 292.

of a change. They are the people who have the power to make a change. This closer definition will be applied on the dimension 'stakeholders' satisfaction' for ERP project management success.[136]

During ERP projects, motivation usually has to take place in a hierarchical order. Projects manager motivate the sub project managers, sub project managers motivate key users and end users. And most important, the management, namely CEO has to provide a good basic mood and calm support in critical situations. They are able to evaluate the ERP projects success from an objective point of view, as status of the ERP implementation is regularly reported to them during steering committees.

As the name suggests, the key users play a decisive role in ERP projects. They attend workshops and presentations about the inspection of the ERP concept, determine demands on needed functions and provide information about the processes of their department and location. Key users usually consult the performance of user trainings, inspect data sources and define the construction of forms and reports. It can be summarized that key users, aside from project management, carry the major work load in ERP projects. They assume responsibility for definitions, processes and tests. These tests can be either functional, integrational or be concerned with load or acceptancy. In addition, key users are also directly involved in checking the quality of data, forms and reports.

For surveys on *motivation*, only key users were questioned. For *evaluating ERP projects' success*, only CEOs with already finished ERP projects were consulted. This also includes expert interviews and pre-tests, which helped to evaluate the exact wording of the assessing statements. The reasoning on that selection will be provided in later chapters.

It is also important to mention that the role of key user in any form is almost never assumed by CEOs, even in medium-sized companies. Although CEOs have insights to ERP projects by commonly attending steering committees, they generally do not have the time and functional position to be a key user in an ERP implementation project.

ERP Project Management

As this research is designed to understand the area of project management applied on ERP projects, it is required to discuss whether the management of ERP projects has to be handled differently than projects in e.g. the construction or medical industry.

---

[136] Reynolds, S.J. et al. (2006): Stakeholder Theory and Managerial Decision-Making: Constraints and Implications of Balancing Stakeholder Interests. In: *Journal of Business Ethics*, volume 64, p. 285.

ERP projects often have specific challenges, especially because they contain very complex requirements, technical descriptions and difficulties during the specifications analysis phase to define a clear scope. For big sized software implementations, companies almost only choose the form of a project. As a temporary, partial cross-departmental form of organization, project teams are not always completely determined from the start. In the beginning, the decision makers lack knowledge, which competence, know-how and persons have to be part of the project team. Also power struggles over the project participation of key players from departments are usual in the beginning of projects. Implementations go through different phases. Later in the project, more and more key users typically join the project team. ERP implementation projects are rarely publicized before its launch outside the organization, but until sometime afterwards, for example at reaching certain milestones.

ERP project methods like repeating prototyping is challenging for most involved project team members, as they have to learn and understand this method first. This leads to additional challenges, besides the successful management of the project it is also necessary to gain trust from all important employees.

Some critical factors such as lack of top management support, poor project management or unrealistic project objectives are similar to other project types. But an ERP implementation has specific challenges, starting with the software itself. Choosing an appropriate product is very critical, as the ERP software and hardware can simply be unsuitable for the company processes' needs.[137] For Holland and Light (1999) a changing of requirements or business processes during the implementation is a big challenge, which can lead to high organizational efforts, if it is not orderly solved. It can cause massively increasing costs if the chosen software is not capable to carry out the new processes in standard delivery. Another specific risk is the dependence on the technical support by the ERP vendor and the know-how and abilities of its' ERP consultants.[138] Permanent feedback with the internal project team members is necessary to avoid permanent damage caused by bad advising. Because users are the employees who have to effectively work with the new system, a lack of user involvement during the project phases is also not purposeful.[139]

---

[137] Zhang, Z. et al. (2005): A framework of ERP systems implementation success in China: An empirical study. In: *International Journal of Production Economics*, volume 98, issue 1, pp. 56-80.
[138] Holland, C.P., Light, B. (1999): A Critical Success Factors Model for ERP Implementation. In: *IEEE Software*, volume 16, issue 3, pp. 31.
[139] Zhang, Z. et al. (2005): A framework of ERP systems implementation success in China: An empirical study. In: *International Journal of Production Economics*, volume 98, issue 1, pp. 56-80.

An implementation of a highly integrated ERP system is not just a technical job, but can revolutionize the organization. Therefore, it needs careful planning and strategy.[140] Still, many project managers are not aware of the scope, size and complexity of ERP projects. Preconditions for starting a successful implementation are organizational commitment, clear communication of strategic goals, viewing of ERP as an enterprise-wide venture, selection of a compatible ERP system, insurance of data accuracy and effective resolving of multi-site issues.[141]

1.3. Nature of ERP projects in medium-sized Enterprises

As already stated in the introduction, this study is focusing on medium-sized companies implementing ERP in Austria and Germany. A project of that high investment and length has various specific implications on companies of that size.

Firstly, the characteristics of that kind of enterprises need to be clarified. European Commission defined the perimeter of SMEs (Small and Medium sized Enterprises) in 2012, establishing three broad parameters:[142]

- Micro-enterprises have up to 10 employees

- Small enterprises have up to 50 employees

- Medium-sized enterprises have up to 250 employees

The European definition of SME also states 'the category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro'.[143]

This study is collecting data from medium-sized companies, which have between 50 and 250 employees and annual turnover and/or an annual balance sheet exceeding 10 million euro within the previous described upper limits. To avoid companies from other sizes, a preselection had been made before the organizations were contacted for the survey.

---

[140] Bingi, P. et al. (1999): Critical issues affecting an ERP implementation. In: *Information Systems Management*, volume 16, issue 3, pp. 7-14.

[141] Umble, E., Umble, M. (2002): Avoiding ERP implementation failure. In: *Industrial Management*, 44(1), p. 28.

[142] European Commission (2003): Recommendation 2003/361/EC: SME Definition.

[143] Alver, J., Kadak, T. (2009): Conformity of Data Used in the Controlling Process: A Survey of Estonian SMEs. In: *Finance and Accounting: Theory and Practice*, *Development and Trends*, Rīga, LU Akadēmiskais apgāds, p. 35.

The medium-sized companies' context does affect the ERP implementation in various ways. Generally the organizations size makes differences concerning resources, management, structure and culture, processes and knowledge. Also environmental characteristics like more uncertainties, a smaller customer base and powerful vendors influence an ERP project, especially when it comes to setting priorities of goals. A weaker market position makes decisions during the implementation more dependent on external circumstances.

A big challenge is the costly selection process of ERP solutions, which are very often too complex and comprehensive for companies of that size. In addition, the IT department traditionally plays a less important role compared to large companies. IT departments in medium-sized companies are usually financially and personally understaffed, and not ready for actively shaping ERP guided business processes.

Medium-sized enterprises have comparably limited financial and human resources.[144] The budgets for ERP projects are tightly calculated, which make increasing costs very critical, as allocation of new money is not as easy as for larger enterprises.[145] In addition, spending money for an IT project is accompanied by sponsors' extensive assessment. Financial constraints are also important parameter for selection of ERP system, which needs to be affordable. There is also the desire for short running time of the project to save money and manpower. That needs to be balanced with the predefined goals. The limited pool of qualified personnel available leads to lack of technical IT expertise and awareness of ERP systems influence on processes.[146] Due shortened implementation phase and a lack of human capital, also the much needed training of users comes up short. Nevertheless, some studies have observed that IT competence of employees in medium-sized companies had raised over the last years.[147]

Technical IT expertise is no longer an area management can ignore, especially in medium-sized companies. The IS knowledge of CEOs is significantly influencing ERP projects in a positive way.[148] In fact, it is more common that executives of organizations of that size are

---

[144] Laukkanen, S. et al. (2007): Enterprise size matters: objectives and constraints of ERP adoption. In. *Journal of Enterprise Information Management*, volume 20, issue 3, pp. 310.

[145] Pleshko, L., Nickerson, I. (2007): Strategic comparisons of very large firms to smaller firms n a financial service industry. In: *Academy of Strategic Management Journal*, volume 6, pp. 105.

[146] Chang, S.I. et al. (2010): Critical Factors of ERP Adoption for Small- and Medium- Sized Enterprises: An Empirical Study. In: *Journal of Global Information Management*, volume 18, pp. 82.

[147] Olsen, K.A., Sætre, P. (2007): IT for niche companies: is an ERP system the solution? In: *Information Systems Journal*, volume 17, pp. 37.

[148] Chang, S.I. et al. (2010): Critical Factors of ERP Adoption for Small- and Medium- Sized Enterprises: An Empirical Study. In: *Journal of Global Information Management*, volume 18, pp. 82.

interested in the technical details, the project method and software solution. The position of CEOs of medium-sized enterprises are often owners who have a very high power of control and knowledge of all aspects of business and processes.[149] As management structure is very flat, decision making is also generally centralized and on short notice.

The simpler and flatter structure is generally an advantage during the ERP project. Change management is easier to carry out, as communication is less complex and environment is more flexible. Smaller companies are having more unified culture, as few groups with opposite interests exist. Employees share the same corporate mind-set, making them more open to necessary changes to ensure the organizations goals.[150]

The employees are not that specialized compared to large companies, so they have more knowledge on integrated processes. Generally, processes and operations are less complicated compared to large organizations, leading to more openness towards needed adaptions. Procedures are not highly formal and standardized, which makes change management much easier compared to large businesses.[151] It is simpler to adapt existing processes for medium-sized companies, but in some cases, literature advices keeping their straightforwardness.[152][153]

Concerning this study, the most distinctive peculiarity is the dominant role of CEOs in medium-sized companies. They get much more insights on the ERP project compared to big corporations. CEOs in medium-sized companies directly make financial decisions concerning the ERP implementation. In addition, they also are very much aware of the business processes and often have the final decision on change management. The controlling role and decisive strategical function in the steering committee make the CEO the most fitting person to evaluate ERP projects success.

---

[149] Shiau, W.L. et al. (2009): Development of measures to assess the ERP adoption of small and medium enterprises. In: *Journal of Enterprise Information Management*, volume 22, pp. 99.

[150] Wong, K.Y., Aspinwall, E. (2004): Characterizing knowledge management in the small business environment. In: *Journal of Knowledge Management*, volume 8, pp. 44.

[151] Ibid.

[152] Quiescenti, M. et al. (2006): Business process - oriented design of enterprise resource planning (ERP) systems for small and medium enterprises. In: *International Journal of Production Research*, volume 44, pp. 3797-3811.

[153] Snider, B. et al. (2009): ERP implementation at SMEs: analysis of five Canadian cases. In: *International Journal of Operations and Production Management*, volume 29, pp. 4-29.

2. ANALYSIS OF ERP PROJECT SUCCESS, ITS MEASUREMENT AND THE IMPACT OF EMPLOYEES' MOTIVATION

In this chapter, an analysis of context and previous experience is done. Tables, graphs and analyses of existing data support to describe the current situation and existing environment.

It is very important to narrow the field of this study, because the results of surveys need to come about under similar circumstance. That is also an important precondition for having comparable results. As already the title expresses, the focus of my study is limited on successful ERP projects which were finished in medium-sized companies.

Despite the significant investments in ERP projects made by organizations around the world, formal efforts to determine their success and the underlying causes have been very limited.[154]

For further access to this topic, is important to differentiate between success *criteria* or *dimension* and success *factors*. A criterion (plural criteria) is 'a rule or principle for evaluating or testing something'. [155] A dimension is 'measurement, scope or aspect'.[156] A factor is 'one of the elements contributing to a particular result or situation'.[157] Collins and Baccarini point out that 'criteria (or dimensions) are used to measure success whilst factors facilitate the achievement of success.'[158]

To not be confused, it is very important to point out these two different views on this topic. Although these words are very closely linked, the exact dimensions of these perspectives underlie different assumptions and requirements. While a fitting measurement is required for analysis of quantitative data, the aspect of success factors for ERP projects offers theoretical foundation for interpretation of results and addressing suggestions.

Success factors of ERP projects describe what is necessary to achieve successful ERP implementations. The perspective is often applied in advance of a new project. The participating parties are also very broadly seen, as not only the implementing enterprise is in focus of consideration. In these considerations, also culture, environment, ERP consultants and vendors have an important role. Some approaches describing success factors of ERP projects are discussed in the next chapter.

---

[154] Gable, G.G. et al. (2003): Enterprise systems success: a measurement model. In: *Proceedings of the 24th International Conference on Information Systems*, Seattle, WA, pp. 576-591.

[155] CED (2014a): Criteria. Collins English Dictionary. Link in references and checked on 15.02.2016.

[156] CED (2014b): Dimension. Collins English Dictionary. Link in references and checked on 15.02.2016.

[157] CED (2014c): Factor. Collins English Dictionary. Link in references and checked on 15.02.2016.

[158] Collins, A. Baccarini, D. (2004): Project Success - A Survey. In: *Journal of Construction Research*, volume 5, issue 2, p. 211.

Dimensions or Criteria for Measurement of ERP Project Success

One of the main tasks of this thesis is to determine the project success of already finished ERP implementations. The evaluated success rating of ERP projects is the dependent variable in the research model. An important aspect is the perspective of measured success. It needs to be justified, why the perspective of CEOs and IT Managers is best fitting. To find a fitting method to investigate ERP project success rates, different approaches are analysed and the best framework needs to be chosen. Another facet can be anticipated at this point, the subdivision of ERP project success into project management success and project product success. The combination of both perspectives gives a full assessment for measuring ERP project success.

2.1. Success Factors of ERP Projects

ERP projects are confronted with various threats endangering its success. Some of these obstacles can be high project complexity, inadequate planning or inefficient management. The challenge and change of technological know-how and a difficult business environment is also a project risk. Empowerment and restructuring in organizations, along the search for skilled and competent manpower can also be a big challenge.

Pinto and Slevin developed a ten-factor model to successful project implementation. The ten factors were 'project mission', 'top management support', 'project schedule plan', 'client consultant', 'personnel', 'technical tasks', 'client acceptance', 'monitoring and feedback', 'communication' and 'troubleshooting'.[159] Although this model was not exclusively developed for IT or ERP, some of the factors are still valid for ERP implementation projects.

The critical success factors analyses from Holland and Light (1999) came from expansion of Pinto and Slevin's framework. They have divided the critical success factors under the strategic and tactical headings. Strategic issues specify the need for a project mission, top management support, and a project schedule outlining individual action steps for project implementation. Tactical issues focus on communication with all affected parties, recruitment of necessary personnel for the project team, and obtaining the required technology and expertise for the technical action steps. User acceptance, monitoring, and feedback at each stage, and troubleshooting were also classified as tactical issues.[160]

---

[159] Pinto, J. K., Slevin, D. P. (1987): Balancing strategy and tactics in project implementation. In: *Sloan Management Review*, volume 29, issue 1, pp. 33-41.

[160] Holland, C.P. et al. (1999): Beyond ERP systems: innovative strategies for competitive advantage. In: *Proceedings of the 7th European Conference on Information Systems*, Copenhagen, pp. 288-301.

Nah et al. described 11 factors, which can be applied to the process oriented ERP life cycle model and are critical to ERP implementation success.[161]

The first factor is described as *(1) ERP teamwork and the teams' composition.* Teamwork has a very high importance, as ERP project teams should not only consist of the best people in the company, they also need to see the project as top priority and team members need to have the time to deal with the high workload. Full time assignment and the possibility of co-locating together are also seen as an advantage. To achieve successful team-work and effective ERP implementations, compensations and incentives are suggested.[162] In addition, project team members should have high business and technical know-how.[163]

An ERP project needs support and approval from the *(2) top management* throughout the whole implementation.[164] Tying management bonuses to project success helps achieving this. Management also needs to declare in public the ERP project as top priority for the company. [165] Management also has to show full commitment to the project and show useful involvement. In addition, the allocation of useful employees for the ERP project team needs to be allowed.[166] These project members also need to be set free with enough time to fulfil their tasks within the project. New goals, structures, roles and responsibilities established and communicated. If conflicts light up during the project, management needs to mediate.[167] A proven instrument for mediation is a regular steering committee.

To keep focus on business benefits, a *(3) business plan* that sketches out proposed strategic and tangible benefits, resources, costs, risks and timeline is crucial.[168]

Furthermore, *(4) effective communication* of expectations and education is essential for every level in the company throughout the project.[169] It also includes the formal promotion of

---

[161] Nah, F.F.H et al. (2001): Critical factors for successful implementation of enterprise systems. In*: Business Process Management Journal*, volume 7, issue 3, pp. 285-296.

[162] Ibid, p. 289.

[163] Sumner, M. (1999): Critical success factors in enterprise wide information management systems projects. In: *Proceedings of the Americas Conference on Information Systems*, pp. 297-303.

[164] Ibid.

[165] Nah, F.F.H et al. (2001): Critical factors for successful implementation of enterprise systems. In*: Business Process Management Journal*, volume 7, issue 3, p. 291.

[166] Holland, C.P. et al. (1999): A critical success factors model for enterprise resource planning implementation. In: *Proceedings of the 7th European Conference on Information Systems*, volume 1, pp. 273-297.

[167] Roberts, H.J. and Barrar, P.R.N. (1992): MRPII implementation: key factors for success.

[168] Nah, F.F.H et al. (2001): Critical factors for successful implementation of enterprise systems. In*: Business Process Management Journal*, volume 7, issue 3, p. 291.

[169] Ibid.

project teams and the advertisement of project's status and progress to the rest of the organization.[170]

Good *(5) project management* implies to have one or more selected persons who take care of driving for a successful project and clearly define a limited and controllable project scope. Planning of exact-defined tasks and accurate estimation of required effort is essential, like the escalation management of issues and conflicts.[171] Any changes of scope need to be evaluated concerning its additional time, costs and benefits.[172] To stay within schedule and budget, deadlines and milestone need to be monitored. A focus on results and constant tracking of schedules and budgets against targets are very important, because it also measure the success of the ERP project in every phase.[173]

Another word for *(6) project champion* would be project sponsor or high level executive sponsor. This person is in charge and leads the project throughout the organization. He brings in a business perspective, transformational leadership and conflict resolving.[174]

Business and IT systems concerning existing business processes, organization structure, culture, and information technology also influence success of new ERP systems.[175] As a result, *(7) appropriate business and legacy systems* can be seen as a requirement.

A culture with shared values and common aims is very helpful to achieve success. Organizations need to have a strong corporate identity that is open to change. A focus on quality, a strong computing ability and a strong willingness to accept new technology aids in implementation efforts.[176] Therefore, an accepted *(8) change management program and culture* is gaining more attention in faster changing circumstances.

A key factor is user involving *(9) business process reengineering and minimum customization* of the new ERP system. As part of the change management efforts, key users have to be involved in design and implementation of business processes and the ERP system. Education,

---

[170] Holland, C.P. et al. (1999): A critical success factors model for enterprise resource planning implementation. In: *Proceedings of the 7th European Conference on Information Systems*, volume 1, pp. 273-297.

[171] Rosario, J.G. (2000): On the leading edge: critical success factors in ERP implementation projects. In: *Business World*, pp. 21.

[172] Sumner, M. (1999): Critical success factors in enterprise wide information management systems projects. In: *Proceedings of the Americas Conference on Information Systems*, pp. 297-303.

[173] Nah, F.F.H et al. (2001): Critical factors for successful implementation of enterprise systems. In*: Business Process Management Journal*, volume 7, issue 3, p. 292.

[174] Sumner, M. (1999): Critical success factors in enterprise wide information management systems projects. In: *Proceedings of the Americas Conference on Information Systems*, pp. 297-303.

[175] Holland, C.P. et al. (1999): A critical success factors model for enterprise resource planning implementation. In: *Proceedings of the 7th European Conference on Information Systems*, volume 1, pp. 273-297.

[176] Roberts, H.J. and Barrar, P.R.N. (1992): MRPII implementation: key factors for success.

training and support for staff are essential from start to finish during ERP implementation projects.[177] Organizations need to be willing to change the business to fit the software with minimal customization.[178] As a result, new ERP software should not be modified and benefits of newer versions and releases bring advantages with pre-defined functions and processes.[179] Noticing the new ERP system configuration, iterative reengineering should take place to take advantage of improvements from the new system. New ideas and quality checks have to be carried out when the system is implemented successfully.[180]

From the technical and practical point of view, *(10) software development, testing and troubleshooting* is inevitable. There is a choice to be made on the level of functionality and approach to link the system to legacy systems. In addition, to best meet business needs, companies may integrate other specialized software products with the ERP suite. Interfaces for commercial software applications or legacy systems may need to be developed in-house if they are not available in the market.[181] Rosario (2000) states that the organization implementing ERP should work well with vendors and consultants to resolve software problems. Quick response, patience, perseverance and problem solving capabilities are important. Vigorous and sophisticated software testing eases implementation.[182]

And finally, *(11) monitoring and evaluation of performance* is a crucial indicator for the current status of implementation. Milestones and targets are important to keep track of ERP projects' progress. Achievements are compared against project goals, which need to be effectively measurable and meet business needs.[183] Monitoring and feedback include analysis of user feedback and the exchange of information between the project team members.[184]

The teamwork and composition of ERP *implementer-vendor-consultant partnership* is also seen as a key factor affecting ERP implementation success. This relationship needs to be well coordinated and trustful. The existence of a cross-functional ERP core team is emphasized,

---

[177] Holland, C.P. et al. (1999): A critical success factors model for enterprise resource planning implementation. In: *Proceedings of the 7th European Conference on Information Systems*, volume 1, pp. 273-297.

[178] Ibid.

[179] Rosario, J.G. (2000): On the leading edge: critical success factors in ERP implementation projects. In: *Business World*, pp. 21.

[180] Nah, F.F.H et al. (2001): Critical factors for successful implementation of enterprise systems. In*: Business Process Management Journal*, volume 7, issue 3, p. 294.

[181] Bingi, P. et al. (1999): Critical issues affecting an ERP implementation. In: *Information Systems Management*, volume 16, issue 3, pp. 7-14.

[182] Rosario, J.G. (2000): On the leading edge: critical success factors in ERP implementation projects. In: *Business World*, pp. 21.

[183] Falkowski, G. et al. (1998): A recipe for ERP success. In: *Beyond Computing*, p. 44.

[184] Holland, C.P. et al. (1999): A critical success factors model for enterprise resource planning implementation. In: *Proceedings of the 7th European Conference on Information Systems*, volume 1, p. 276.

since ERP covers a wide range of functional areas within a company. The significance of good team work is also mentioned in that context. Users need training, education and support, helping to retain a high motivation. An organizational culture also implies that the employees share common values and goals and are open to needed changes. Along with top management support and project management software development, factors can be summarized, which also play important roles in measuring ERP project success.[185] Based on that study, a further research in Sweden describes top management support, business process reengineering, effective communication, project team and change management as the critical success factors. For that purpose, various ERP consulting firms and ERP vendors were interviewed.[186]

Most recently, Zouine and Fenies (2014) conducted a meta-analysis comparing different critical success factors of ERP system projects, and pointed out significant importance based on 32 articles focusing on the ERP system. This perspective is often applied in advance of a new project. The participating parties are drawn very broadly, as not only the implementing enterprise is in focus of consideration. In these considerations, also culture, environment, ERP consultants and vendors have an important role.[187]

Experiencing ERP project implementations practical, the good cooperation and communication between implementing companies' key users and the ERP consultants of the system integrator points are usually referred to as important success factors. Besides the good knowledge of the consultants, also the interpersonal factors between employees and a high commitment and motivation of staff are seen as crucial. Employees involved in the project must take responsibility for their sub-areas on a regular basis. Most of these issues are directly or indirectly influenced by factor motivation during the project. The reasons or causes of project success and failure have been the subject of many studies[188], but 'there has been little attempt in the past to define the criteria for success'[189]. Consequently, the task of developing operational measures for software success has lagged.[190]

---

[185] Ibid.

[186] Fang, L., Patrecia, Sylvia. (2005): Critical success factors in ERP implementation. In: *Paper within IT and Business Renewal*, Jönköping, pp. 1-62.

[187] Zouine, A., Fenies, P. (2014): The Critical Success Factors of the ERP System Project: A Meta-Analysis Methodology. In: *The Journal of Applied Business Research*, volume 30, issue 5, pp. 1407.

[188] Shenhar, A.J. et al. (2002): Refining the search for project success factors: a multivariate typological approach. In: *R&D Management*, volume 32, issue 2, p. 111

[189] Wateridge, J. (1998): How can IS/IT projects be measured for success. In: *International Journal of Project Management*, volume 16, issue 1, p. 59

[190] Jiang, J.J. et al. (2002): Perception differences of software success: provider and user views of system metrics. In: *Journal of Systems and Software*, volume 63, issue 1, p. 19.

2.2. ERP Project Success and its Components

The preceding analysis of ERP success factors is the foundation of defining ERP project success and helps concluding on results of empirical evaluation. Furthermore, a differentiated definition of ERP project success is required. Generally, a project is considered successful, if it has its objectives like profit, punctuality and adherence to budget reached or exceeded. This thesis focuses on motivation during ERP projects. Hence, not only the success of the result of the implementation, namely the running ERP system, is relevant. Hence, an evaluation of the ERP project itself also needs to be considered. Baccarini (1999) described *project success* with two separate components, project management success and project product success.[191]
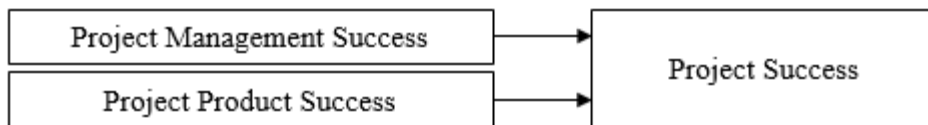
Figure 2-1: Components of ERP Project Success
Source: created by author from Baccarini (1999)[192]

Project Management Success focuses on the successful accomplishment of the project with regards to cost, time and quality (Pinkerton, 2003).[193] It also considers the manner the project management was conducted (Baccarini, 1999)[194], resulting in the quality of project management process. According to Collins and Baccarini (2004), the last success criterion is satisfying project stakeholders' needs where they relate to the project management process, primarily focusing on project owner and team members.[195]

For Pinkerton (2003) *project product success* focuses on the effects of the project's final product. Pinkerton described a connection between both components of ERP project success, but also characterized the causal relationship as weak.[196] For example, the resulting product, which would be a well running system, could also be achieved with a project which was not in time or budget.[197][198]

---

[191] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 25.

[192] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 25.

[193] Pinkerton, W.J. (2003): Project management: achieving project bottom-line success, McGraw-Hill, p. 337.

[194] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 25.

[195] Collins, A. Baccarini, D. (2004): Project Success - A Survey. In: *Journal of Construction Research*, pp. 211.

[196] Pinkerton, W.J. (2003): Project management: achieving project bottom-line success, McGraw-Hill, p. 344.

[197] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 29.

[198] Pinkerton, W.J. (2003): Project management: achieving project bottom-line success, McGraw-Hill, p. 338.

A research by Ram et al. (2013) emphasizes on these two components, as the impact of success factors are empirically tested on the success of the ERP implementation itself and further on the organizational performance, which describes the post-implementation benefits of the product. The four tested key factors, namely project management, training and education, business process re-engineering and system integration manifested mixed results on these two main aspects of ERP project success.[199]

The distinction between *Project Management Success* and *project product success* is also relevant for practical use of making surveys concerning the evaluation of ERP projects' success. Business experience shows that each of the two main aspects has specific dimensions. Consequently, these dimensions have particular characteristics, which will be investigated in the next subchapters.

Measurement of ERP Management Success

For many companies, ERP implementations are a large IT investment that radically redesigns the entire IT landscape and working processes. Despite these substantial investments made by organizations, systematic attempts to measure their success have been few, as impacts resulting from ERP projects are arguably difficult to measure.[200]

Currently and in practice, the success of an ERP implementation project is often reduced to three facts. Firstly, the ERP system is accurate configured and properly running, secondly, the whole project is (more or less) on time, and finally, the whole project is (more or less) within budget. The traditional view on the success of project management usually measures whether a project was within time, budget and specifications.
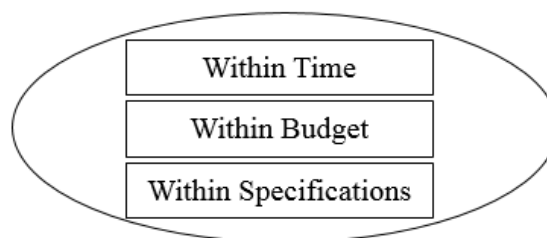
Figure 2-2: Project Management Success - traditional View
Source: created by author from van der Westhuizen and Fitzgerald (2005)[201]

[199] Ram, J. et al. (2013): Implementation Critical Success Factors (CSFs) for ERP: Do they contribute to implementation success and post-implementation performance? In: *International Journal of Production Economics*, volume 144, issue 1, pp. 157.

[200] Gable, G.G. et al. (2003): Enterprise systems success: a measurement model. In: *Proceedings of the 24th International Conference on Information Systems*, Seattle, WA, p. 576.

[201] Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In: *European Conference on IS Management, Leadership and Governance 2005*, p. 4.

This traditional view on the success of project management usually measures whether a project was within time, budget and specifications Blaney (1989)[202]. Redmill (1997)[203] and Globerson and Zwikael (2002)[204] also describe these dimensions as important criteria to measure ERP project management success. Experience in reality showed that these three dimensions mentioned above are not enough to effectively measure success of project management. Further studies on ERP project success which will be described later in this paper added new criteria like 'Quality of the Management Process' and 'Project Stakeholder Satisfaction'. As described in table 2-1, Baccari (1999) summarizes guidance regarding quality of the project management process.

Table 2-1: Summarizing Quality of Project Management Process

Author	Quality of project management process
Turnan (1986)[205]	Anticipating all project requirements, having sufficient resources to meet project needs in a timely manner, and using these resources efficiently to accoomplish the right task at the right time and in the right manner
Lientz, Rea (1995)[206]	Dealing with the issues early or as soon as they surface and keeping management informed
Baker, et al. (1988)[207]	Effective coordination and relation patterns between project stakeholders, e.g., team spirit, participative decision-making
Kerzner (1992)[208]	Minimum scope changes, no disturbarnce to the organization's main flow of work, no disturbance to corporate culture.
Freeman, Beale (1992)[209]	Completeness of the termination, absence of post-project problems, quality of post-autid analysis, identifying and solving of technical problems during the project

Source: created by author from Baccarini (1999)[210]

---

[202] Blaney, J (1989): Managing software development projects. In: *Paper presented to Project Management Seminar/Symposium*, Atlanta, Georgia, pp. 410-417.

[203] Redmill, F (1997): Software projects: evolutionary vs. big-bang delivery, Wiley series in software engineering practice, Wiley, Chichester, p. 30.

[204] Globerson, S., Zwikael, O. (2002): The Impact of the Project Manager on Project Management Planning Processes. In: *Project Management Journal*, volume 33, issue 3, p. 58.

[205] Turnan, J. (1986): Success modeling: A technique for building a winning project team. In: *PMI Annual Seminar & Symposium*, Montreal, pp. 94-108.

[206] Lientz, B.P., Rea, K.P. (1995): Project Management for the 21st century. San Diego: Academic Press.

[207] Baker, B.N., Murphy, D.C., Fisher, D. (1988): Factors affecting project success. In: D.I. Cleland & W.R. King (Eds.), Project Management Handbook, New York: Van Nostrand Reinhold, pp. 902-919.

[208] Kerzner, H. (1992): Project Management: A systems approach to planning, scheduling and controlling. New York, Van Nostrand Reinhold.

[209] Freeman, M., Beale, P. (1992): Measuring project success. In: *Project Management Journal*, volume 23, issue 1, pp. 8-17.

[210] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, pp. 25-32.

Baccarini (1999) points out that these efficiency factors are in fact variables contributing to project management success.[211] Project Management Success is also dependend on how eficiently the project has been managed. Criteria like cost and time are mesuring effectiveness, but also efficiency needs to be considered.[212] Later it will be described that these factors will be operationalized and measured in a survey adressed to companies CEOs, who valuate the project management proccess and communication.

An important part of the project management success is project stakeholder satisfaction. Project stakeholders are individuals and organizations that are actively involved in the project, or whose interests may be affected as a result of project execution or project completion. For project stakeholder satisfaction, the narrower definition of the term stakeholder is applied, focusing on the influencers and decision makers of a business or technological change, adopting the stakeholder approach to management.[213][214]

Project Management Institute's (2008) definition of project management is 'the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from project'. Project stakeholders are individuals and organizations that are actively involved in the project, or whose interests may be affected as a result of project execution or project completion.[215] To satisfy stakeholders, 'the project management team must identify the stakeholders, determine what their needs and expectations are, and then manage and inluence those expectations to ensure a successful project.[216] Baccarini (1999) sees Project stakeholder satisfaction influenced by both project success components - product success and project management success.[217]

---

[211] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 29.

[212] DeWit, A. (1988): Measurement of project success. In: *International Journal of Project Management*, volume 6, issue 3, pp. 164-170.

[213] Reynolds, S.J. et al. (2006): Stakeholder Theory and Managerial Decision-Making: Constraints and Implications of Balancing Stakeholder Interests. In: *Journal of Business Ethics*, volume 64, p. 285.

[214] Bourne, L., Walker, D.H.T. (2006): Using a visualising tool to study stakeholder influence: two Australian examples. In: *The Project Management Journal*, volume 37, issue 1, pp. 8.

[215] PMI (2008): A guide to the Project management body of knowledge (PMBoK Guide), fourth edition. Newtown Square, Pa., Project Management Institute, p. 6, p. 37.

[216] PMI (2008): A guide to the Project management body of knowledge (PMBoK Guide), fourth edition. Newtown Square, Pa., Project Management Institute, p. 246.

[217] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 29.
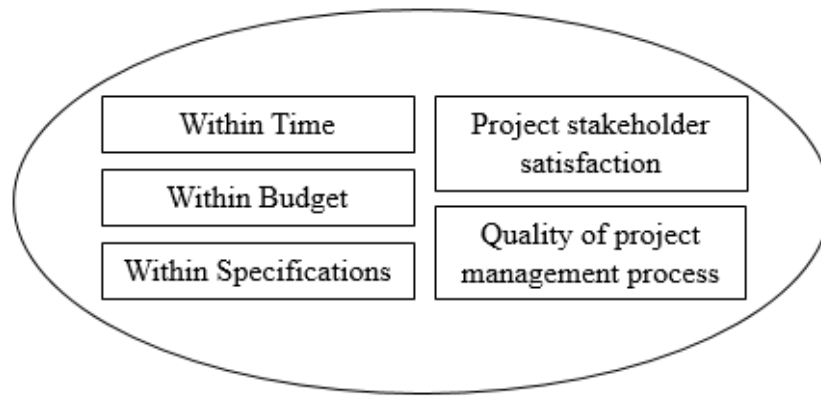
Figure 2-3: Project Management Success - extended traditional View
Source: created by author from van der Westhuizen and Fitzgerald (2005)[218]

For measuring the success of the project product, even other factors like 'satisfaction of users' or 'added value caused by product' can be added. Pinkerton (2003) notes that there is not always a straight context between management and product success.[219] For example, a failure in reaching the planned budget for the ERP implementation does not automatically indicate that the finished product (running ERP software), does not bring net benefits.

Measurement of ERP Product Success

After an ERP implementation, the most practical and obvious measurements focus is on delivering a functional ERP product within certain temporal and economic restrictions. Behrens et al. (2005) state that the probability of system success should increase when a new system is accepted to be used.[220]

In the past, researchers have published a number of models trying to explain what makes an Information System 'successful'. Davis's (1989) Technology Acceptance Model (TAM)[221] based on the Theory of Reasoned Action and Theory of Planned Behavior[222] from Fishbein and Ajzen (1975) tried to explain why some information systems are more accepted by users than others. Acceptance, however, is not equivalent to success, although acceptance of an information system is a necessary precondition to success.[223] It is important to point out that

[218] Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In*: European Conference on IS Management, Leadership and Governance 2005*, p. 5.

[219] Pinkerton, W.J. (2003): Project management: achieving project bottom-line success, McGraw-Hill, p. 344.

[220] Behrens, S. et al. (2005): Predicting System Success using the Technology Acceptance Model: A Case Study. In: *16th Australasian Conference on Information Systems*, Sydney, paper 70, p. 1.

[221] Davis, F.D. (1989): Perceived usefulness, perceived ease of use, and user acceptance of information technology. In: *MIS Quarterly*, volume 13, issue 3, pp. 319.

[222] Fishbein, M., Ajzen, I. (1975): Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Addison-Wesley, Reading.

[223] Petter, S., et al. (2008): Measuring information systems success: models, dimensions, measures, and interrelationships. In: *European Journal of Information Systems*, volume 17, p. 327.

most researches in this field were conducted on the level of Information Systems. As mentioned before, an enterprise resource planning (ERP) system is an information system that incorporates enterprise-wide internal and external information systems into a single unified solution. Information System is an often used umbrella term for ERP. In many of the applied literature for project success measurement, these two terms are used synonymous.

Ding and Straub (2007) give concerns that criteria and measures describing the characteristics of an information system, might not capture the intangible or indirect value generated by the according system.[224] The following models for ERP success measurement should give an overview of the existing approaches without an extensive explanation of each framework. To find a fitting method to investigate ERP project success rates, different approaches are analysed and the best framework needs to be chosen, exploited, statistically proven and if possible improved.

2.3. Approaches to ERP Project Success Measurement

All aspects defining ERP project success discussed above are relevant for the next important step, conceptualizing a construct for empirically measuring ERP project success. The measurement of enterprise resource planning (ERP) systems success or effectiveness is critical to our understanding of the value and efficacy of ERP implementation investment, which bind a lot of financial and human resources. Bradford and Sandy pointed out, because of a lack of empirically effective evaluation models, more than the half of the interviewed companies started no assessments on the performance of ERP systems.[225] As a result, a reliably model for ERP project success measurement is important. This thesis also proposes a new and empirical proven success model for ERP projects, which can be practically used in advance. The following section focuses on the dimensionality of ERP project success in terms of the construct's composition. The most prominent model describing ERP project success is the DeLone and McLean I/S Success Model[226][227], which will be described in detail later in this chapter. Besides the DeLone and McLean model and its successors, there are other approaches have to be mentioned in this context.

---

[224] Ding, Y., Straub, D. (2007): Using Marketing Exchange Theory to conceptualize IS Quality and Re-conceptualize the IS Success Model. In: *28th International Conference on Information Systems*, Montréal, pp. 2.

[225] Bradford, M., Sandy, R. (2002): Realizing value in ERP. In: *Journal of Cost Management*, volume 16, issue 2, 2002, pp. 13-19.

[226] DeLone, W.H., McLean, E.R. (1992): Information Systems Success: The Quest for the Dependent Variable. In: *Information Systems Research*, volume 3, issue 1, 1992, pp. 60-95.

[227] DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. In: *Journal of Management Information Systems*, volume 19, issue 4, pp. 9-30.

Balanced Scorecard Approaches (Rosemann and Wiese, 1999)

To measure the projects performance, an adaptation of the Standard Balanced Scorecard to ERP Software Implementation can be used.[228] As the implementation of ERP software is a quite unusual domain for the Balanced Scorecard approach because only one process, namely the implementation process, is evaluated. For that concern, it was necessary to adapt the perspectives within the Balanced Scorecard for this purpose. In addition to the four classical perspectives (financial/cost, customer, internal processes, and innovation and learning), a fifth perspective was added for also evaluating the performance of running ERP software. Rosemann and Wiese distinguish two purposes of the Balanced Scorecard, namely the evaluation of implentation of ERP software and the evaluation of operational performance of ERP software. This view (pictured in figure 2-4) is similar to previously described project success approach described by Baccarini (1999) with its components project management success and project product success.[229]
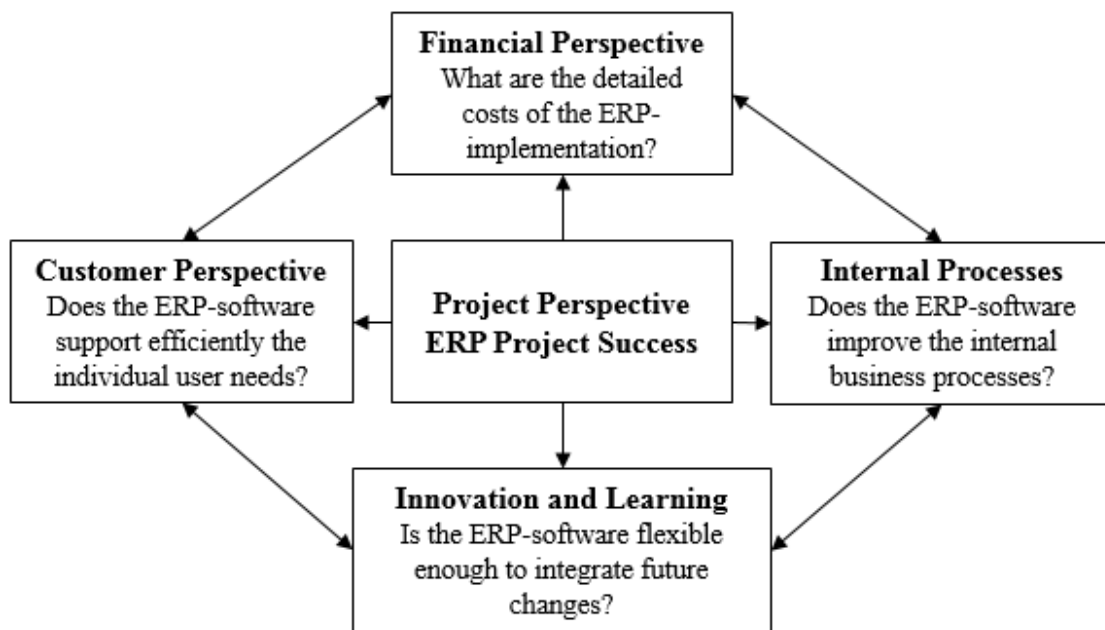
Figure 2-4: ERP Implementation Balanced Scorecard
Source: created by author from Rosemann and Wiese (1999)[230]

Financial Perspective analyses the detailed costs of the ERP implementation and checks whether the finished project was broadly in budget. *Customer Perspective* evaluates the efficient ERP software support the individual user needs. The aspect *Innovation and Learning*

---

[228] Rosemann, M., Wiese, J. (1999): Measuring the Performance of ERP Software - a Balanced Scorecard Approach. In: *Proc. 10th Australasian Conference on Information Systems*, pp. 775.
[229] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 25.
[230] Rosemann, M., Wiese, J. (1999): Measuring the Performance of ERP Software - a Balanced Scorecard Approach. In: *Proc. 10th Australasian Conference on Information Systems*, pp. 777.

checks whether the implemented ERP package is flexible enough to integrate future changes. *Internal Processes* look at the ERP software's improvement of the internal business processes. And finally, a fifth and additional perspective was implemented, namely *Project Perspective.* It consists of typical project controlling measures, reviewing whether milestones like 'go-live' date were reached in time.

Assessing the usefulness of this model, the approach of Balanced Scorecards adapted for ERP project covers most of the important facets of an ERP implementation. While it is easy to collect information about financial and project perspective directly after go live, it definitely takes more time for the other three perspectives. To evaluate that, the new ERP system needs to run for at least 6 month to get reliable data. On the negative side of this approach, there is a lack of empirical studies using Balanced Scorecard in ERP project. That also means that main key performance indicators for every perspective have yet to be identified. Additionally, these indicator need to be classified for making a meaningful analysis.

A Process Theory of Enterprise System Success (Markus and Tanis, 2000)

Markus and Tanis (2000) developed 'A Process Theory of Enterprise System Success' described by four different phases for chartering, project, shakedown and onward/upward processes. Each phase is characterized by key players, typical activities, characteristic problems, appropriate performance metrics and a range of possible outcomes. The approach focuses on the sequence of events leading up to implementation completion.[231]
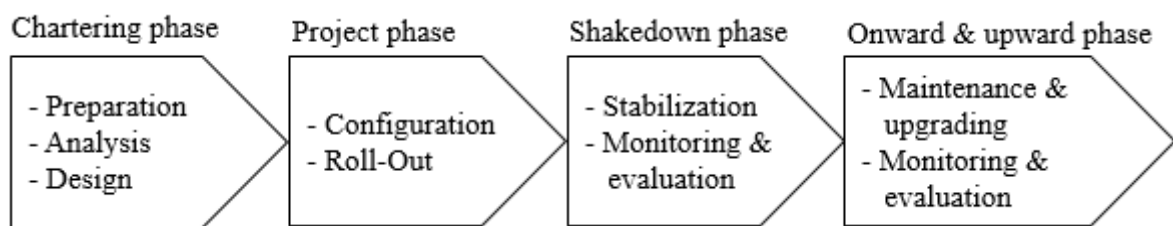
Figure 2-5: Adopted Enterprise System Experience Cycle
Source: created by author from Markus and Tanis (2000)[232]

A total of 11 critical success factors for ERP implementation have been identified, emphasizing the partnership between implementer and consulting company as the most critical success factor. Chartering is the period of decisions leading to funding of the ERP system project. In addition, decisions defining the business case and solution constraints are made. During the project phase, system configuration and rollout is executed, getting system

---

[231] Markus, M.L., Tanis, C. (2000): The enterprise system experience - from adoption to success. In: *Framing the domains of IT research: Projecting the future through the past*, volume 173, p. 189.
[232] Ibid.

and end users up and running. The shakedown phase is the period of time from go live until 'normal operation' or 'routine use'. It is used for stabilizing, eliminating 'bugs' and getting to normal operations. Finally, the 'onward and upward phase' is the period from normal operation until the system is replaced with an upgrade or a different system. The main tasks are maintaining systems, supporting users, upgrading and obtaining system extensions. In opposition to other models, Markus and Tanis' construct provides a theoretical framework for analysing the business value of ERP systems looking back and foresighted. On the downside, this approach is lacking measurements of the ERP product success, and in addition, the model was not proven by many empirical studies yet.

Task-Technology Fit Construct as an Indicator of ERP Success (Smyth, 2001)

The Task-technology Fit (TTF) theory by Smyth (2001)[233], added two additional success dimensions to the original model by Goodhue and Thompson (1995)[234]. Task-technology fit is accomplished if the capabilities of ERP system fully enable the tasks the user has to perform. As a result, tasks (actions to transform inputs to output, e.g. sales order to delivery), ERP (tool to carry out tasks) and user are influencing TTF. The other dimensions of ERP success are 'perceived usefulness' and 'user satisfaction'. The arrows in figure 2-6 show the correlation of the dimensions, resulting in a measurement of ERP project success.
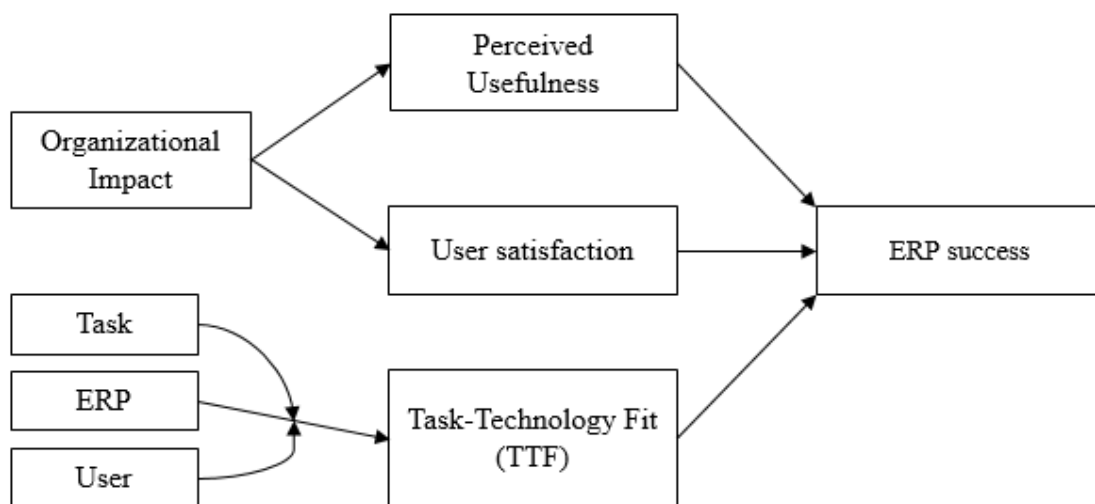
Figure 2-6: Task-Technology Fit ERP Success Model
Source: created by author from Smyth (2001)[235]

---

[233] Kronbichler, S.A. et al. (2010): A Comparison of ERP-Success Measurement Approaches. In: *Journal of Information Systems and Technology Management*, volume 7, issue 2, p. 297.
[234] Goodhue, D.L., Thompson, R.L. (1995): Task-Technology Fit and Individual Performance. In: *MIS Quarterly*, volume 19, issue 2, pp. 213.
[235] Smyth, R.W. (2001): Challenges to successful ERP use. In: *The 9th European Conference on Information Systems*, Bled, p. 1230.

This model is mainly focusing on the advantages ERP users have using the new system, but is leaves out many other aspect measuring the total success of ERP implementations like efficiency, management assessment and economic value.

Ex-ante Evaluation of ERP Software (Stefanou, 2001)

Stefanou (2001) developed a construct emphasizing an ex-ante evaluation of ERP systems, as the selection of an ERP software is very costly and includes a long time commitment. The model (see figure 2-7) is picturing the ERP implementation and is divided into four phases.[236]
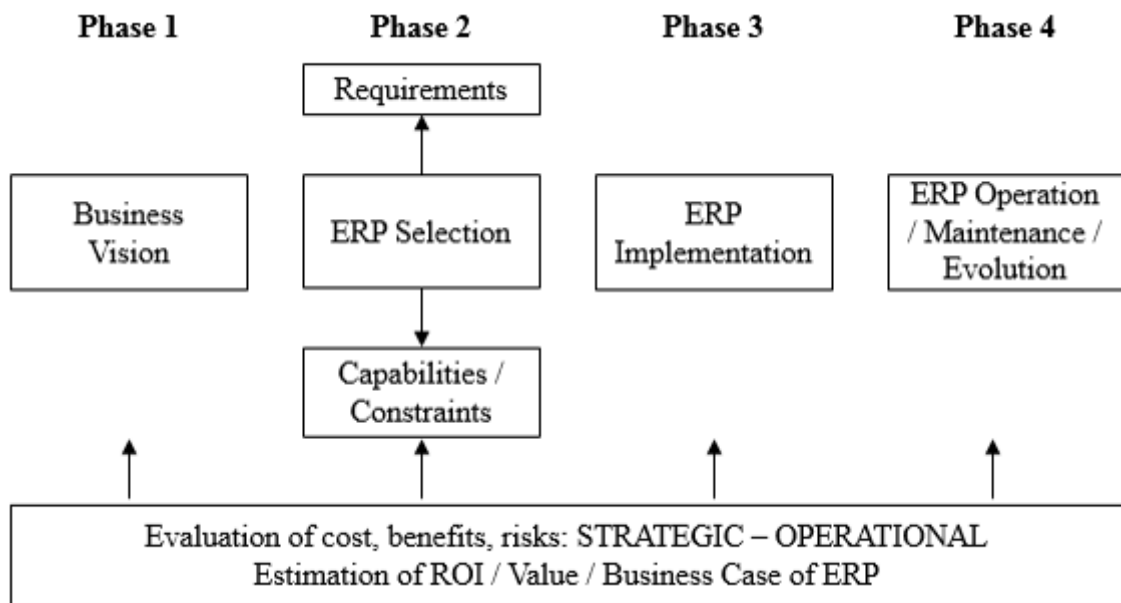
Figure 2-7: Major Phases of ERP lifecycle
Source: created by author from Stefanou (2001)[237]

Clarification of the 'business vision' (phase 1) can be seen as the first step of an ERP acquisition. A clear business vision is including defined goals for the implementation. An evaluation whether the new system is able to achieve these goals needs to be done.

During the first part of the second phase 'business needs and the company's capabilities' are compared, and as a result, a list of the required technological changes for a successful implementation must be made. In addition, all possible technical, organizational, human, financial and time constraints for the ERP project are evaluated. The second part of the second phase the 'selection of required ERP modules' and possibly additional software needs to be made. Subsequently, ERP product, vendor and support services need to be chosen.

---

[236] Stefanou, C.J. (2001): A framework for the ex-ante evaluation of ERP software. In: *European Journal of Information Systems*, volume 10, p. 209.
[237] Ibid.

During the third phase 'costs and benefits caused by the ERP implementation project' are estimated. And finally, during 'operation, maintenance and evolution' phase (4), a continuous evaluation whether the new ERP solution fulfils the needs of the business is necessary. This phase includes estimation of the future costs and benefits which arises from operating, maintaining and extending the ERP system with additional functionality.

For the purpose of this thesis, an ex-ante model for ERP success measurement is not applicable, simply explained by its own original intention to evaluate ERP impacts before the project is conducted.

The DeLone / McLean IS Success Model (DeLone and McLean, 1999, 2003)

The DeLone and McLean model was the first study to bring some order in ERP researchers' multiple choices of success measures.[238] The original model is based on theoretical and empirical research conducted by researchers in the 1970's and 1980's. To construct the model, over 100 papers containing empirical IS success measures were reviewed. The result was an integrated view of IS success represented by six dimensions.
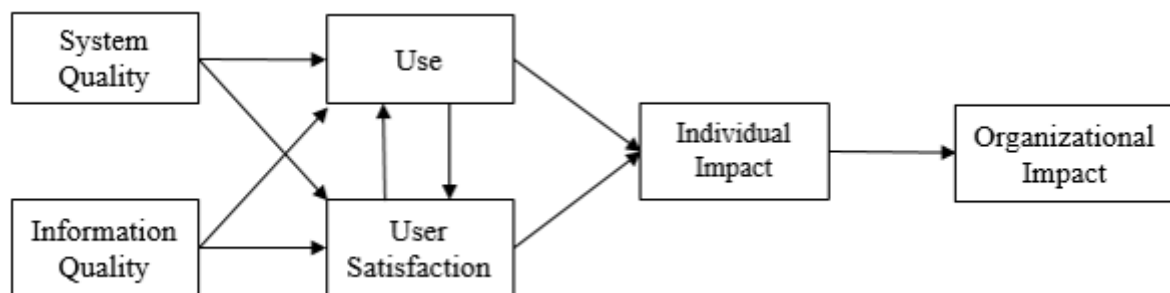
Figure 2-8: The original DeLone and McLean IS Success Model
Source: created by author from DeLone and McLean (1992)[239]

As shown in figure 2-8, System Quality measures the information processing system itself and Information Quality measures the information system output. Information Use measures the consumption of the output of an information system and User Satisfaction measures the users' response to the use of the output of an information system. Finally, Individual Impact measures the effect of information on the users and Organizational Impact measures the effect of information on organizational performance.[240]

---

[238] Seddon, P.B. (1997): A respecification and extension of the DeLone and McLean model of IS success. In: *Information Systems Research*, volume 8, issue 3, pp. 240.

[239] DeLone, W.H., McLean, E.R. (1992): Information Systems Success: The Quest for the Dependent Variable. In: *Information Systems Research*, volume 3, issue 1, p. 87

[240] Ibid.

Based on their comprehensive research in the early 1990's, DeLone and McLean published an updated model.[241] The temporal aspect of the new model implies that an ERP system is firstly created and experienced, and it has organizational impacts afterwards. As shown in figure 2-9, the created system contains various functions and exhibits various degrees of system and information quality. Next the experiences of users and managers using these functions are either satisfactory or not. The use of the system and its information impacts and influences collectively result in organizational impacts.[242]
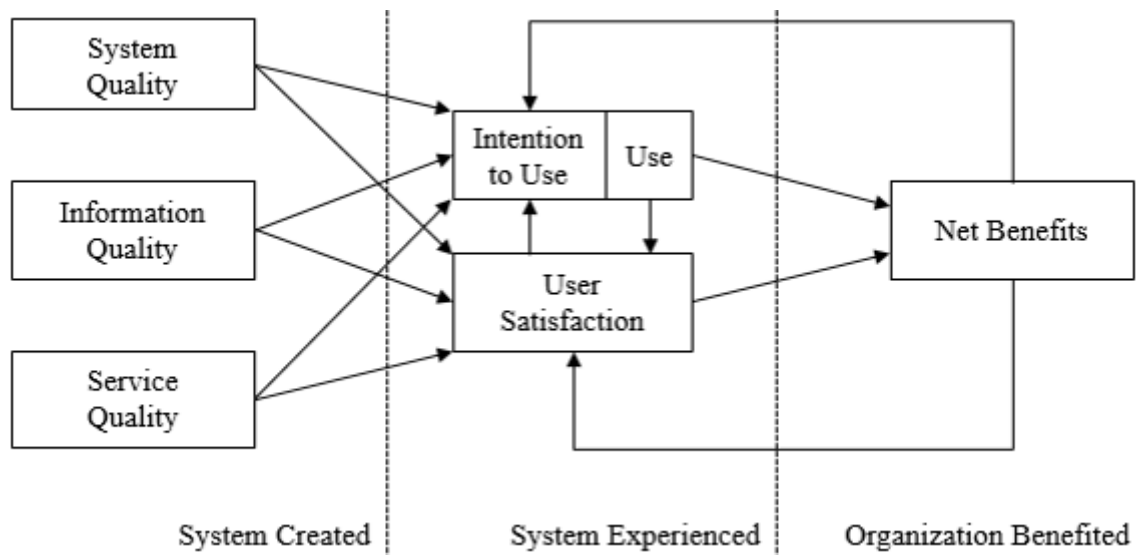
Figure 2-9: The updated DeLone and McLean Model with temporal Aspects
Source: created by author from DeLone and McLean (2003)[243]

Some changes in the updated model like the addition of 'service quality' as an extra dimension to 'information quality' and 'system quality' were conducted. Furthermore, 'intention to use' was placed alongside 'use', and 'individual impact' and 'organizational impact' were collapsed into a 'net benefits' dimension. In the updated model, also arrows were added to demonstrate proposed associations in a process sense. These arrows do not assume causal relationships between the dimensions, though. For every six dimension measuring IT projects' success, a variety of elements were mentioned in researches over the past 20 years. For better understanding, for every dimension describing nouns and its original sources are mentioned.

---

[241] DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. In: *Journal of Management Information Systems*, volume 19, issue 4, p. 11.
[242] Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In: *European Conference on IS Management, Leadership and Governance 2005*, p. 9.
[243] DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. In: *Journal of Management Information Systems*, volume 19, issue 4, p. 24

The success dimension *system quality* constitutes the required characteristics of an ERP and subsumes measures of the system itself. These measures typically focus on usability and performance aspects of the system under examination. Literature research identified terms like access, integration, reliability[244], convenience[245], ease of use[246], flexibility, response time[247], customization, system accuracy and system features[248].

The success dimension *information quality* forms the required characteristics of ERP's output, e.g. information an employee can generate using a company's ERP, such as the latest sales statistics or clearly arranged stock figures. It focuses on usefulness for the user and high quality of the information coming from the system. Information quality is often seen as a key antecedent of user satisfaction and encourages intention to use the system. Characteristics for information quality are accuracy, conciseness, timeliness, relevance[249], availability, completeness[250], format, usability[251], reliability and understandability[252]. ERP software standardizes information within the organization, streamlining the data flow between different parts of a business. According to Minahan (1998) 'ERP gives all users a single, real-time view of their company's available resources and commitments'.[253] This means data are entered by one department and colleagues in other units immediately have access to the information without having to re-enter the information into the system.

The success dimension *service quality* represents the quality of the support that the users receive from the IT department like training and consulting. It also measures the goodness of hotline or helpdesk provided by IT support personnel. Occurrences for service quality are

---

[244] Gable, G.G. et al. (2008): Re-conceptualizing information system success: The IS-impact measurement model. In: *Journal of the Association for Information Systems*, volume 9, issue 7, pp. 378.

[245] Bailey, J.E., Pearson, S.W. (1983): Development of a tool for measuring and analyzing computer user satisfaction. In: *Management Science*, volume 29, issue 5, pp. 530.

[246] McKinney, V. et al. (2002): The measurement of web-customer satisfaction: An expectation and disconfirmation approach. In: *Information Systems Research*, volume 13, issue 3, pp. 296.

[247] Iivari, J. (2005): An empirical test of the Delone-Mclean model of information system success. In: *The DATA BASE for Advances in Information Systems*, volume 26, issue 2, pp. 8.

[248] Sedera, D., Gable, G. (2004): A factor and structural equation analysis of the enterprise systems success measurement model. In: *Proceedings of the 25th international conference on information systems*, p. 455.

[249] Rainer, R. K., Jr., Watson, H. J. (1995): The keys to executive information system success. In*: Journal of Management Information Systems*, volume 12, issue 2, pp. 83.

[250] Iivari, J. (2005): An empirical test of the DeLone-McLean model of information system success. In: *The DATA BASE for Advances in Information Systems*, volume 26, issue 2, pp. 8.

[251] Sedera, D., Gable, G. (2004): A factor and structural equation analysis of the enterprise systems success measurement model. In: *Proceedings of the 25th international conference on information systems*, p. 455.

[252] McKinney, V. et al. (2002): The measurement of web-customer satisfaction: An expectation and disconfirmation approach. In: *Information Systems Research*, volume 13, issue 3, pp. 296.

[253] Minahan, T. (1998): Enterprise Resource Planning: Strategies not included. In: *Purchasing*, volume 125, issue 1, p. 113.

assurance, empathy and reliability[254] Further characteristics describing service quality can also be flexibility, interpersonal quality, ERP training and responsiveness[255].

The dimension *use / intention to use* represents the degree and manner in which an ERP system is utilized by its users. The measurement of recipient consumption could be done objectively by capturing the frequency of use or functions utilized. Literature describes this aspect with characteristics like daily use[256], frequency of use[257] and intention to (re)use[258]. DeLone and McLean describe this dimension with nature of use, navigation patterns, number of site visits and number of transactions executed.[259]

User satisfaction is widely considered as one of the most important measures of success, as it describes the user's level of satisfaction utilizing an ERP system. Measuring user satisfaction becomes especially needed when the system use is mandatory, making the frequency of use an inappropriate indicator. Seddon and Kiew (1994)[260] connect adequacy, efficiency and overall satisfaction with this dimension. Further instance for user satisfaction is enjoyment.[261]

And finally, *net benefits*, which roughly consist of individual impact, describing the measure of the effect of information on the recipient or user, and organizational impact, describing measure of the effect of information on organizational performance. In addition, also the value of technology investment measured with quantifiable financial numbers can be applied. Forms of net benefits described by Sedera and Gable (2004) are decision effectiveness or individual productivity, business process change, cost reduction, improved outcomes/outputs,

---

[254] Pitt, L. F. et al. (1995): Service quality: A measure of information systems effectiveness. In: *MIS Quarterly*, volume 19, issue 2, pp. 173.

[255] Chang, J.C.J., King, W.R. (2005): Measuring the performance of information systems: A functional scorecard. In: *Journal of Management Information Systems*, volume 22, issue 1, pp. 85.

[256] Almutairi, H., Subramanian, G. H. (2005): An empirical application of the DeLone and McLean model in the Kuwaiti private sector. In: *Journal of Computer Information Systems*, volume 45, issue 3, pp. 113.

[257] Iivari, J. (2005): An empirical test of the Delone-McLean model of information system success. In: *The DATA BASE for Advances in Information Systems*, volume 26, issue 2, pp. 8.

[258] Davis, F.D. (1989): Perceived usefulness, perceived ease of use, and user acceptance of information technology. In: *MIS Quarterly*, volume 13, issue 3, pp. 318.

[259] DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. In: *Journal of Management Information Systems*, volume 19, issue 4, p. 26.

[260] Seddon, P.B., Kiew, M.Y. (1994): A partial test and development of the DeLone and McLean model of IS success. In: *Proceedings of the 15th international conference on information systems*, Vancouver, p. 108.

[261] Gable, G.G. et al. (2008): Re-conceptualizing information system success: The IS-impact measurement model. In: *Journal of the Association for Information Systems*, volume 9, issue 7, pp. 378.

increased capacity and overall productivity[262]. Further descriptions are job effectiveness / job performance / job simplification[263] and competitive advantage[264].

The DeLone and McLean IS model was applied to ERP systems on various occasions. Notable mentions are studies by Gable et al. (2003)[265], Qian and Bock (2005)[266], Sedera (2006)[267], Sedera and Gable (2004)[268] and Lin et al. (2006)[269]. Various authors assigned the same keywords to each ERP project success dimension. Further important sources for characteristics of the dimensions are summarized in table 2-2.

---

[262] Sedera, D., Gable, G. (2004): A factor and structural equation analysis of the enterprise systems success measurement model. In: *Proceedings of the 25th international conference on information systems*, p. 455.

[263] Iivari, J. (2005): An empirical test of the DeLone-McLean model of information system success. In: *The DATA BASE for Advances in Information Systems*, volume 26, issue 2, pp. 8.

[264] Almutairi, H., Subramanian, G. H. (2005): An empirical application of the DeLone and McLean model in the Kuwaiti private sector. In: *Journal of Computer Information Systems*, volume 45, issue 3, pp. 113.

[265] Gable, G.G. et al. (2003): Enterprise systems success: a measurement model. In: *Proceedings of the 24th International Conference on Information Systems*, Seattle, WA, pp. 576-591.

[266] Qian, Z., Bock, G.-W. (2005): An empirical study on measuring the success of knowledge repository systems. In: *Proceedings of the 38th Hawaii international conference on system sciences*, Big Island, Hawaii, pp. 1-10.

[267] Sedera, D. (2006): An empirical investigation of the salient characteristics of IS-success models. In: *Proceedings of the 12th Americas conference on information systems*, Acapulco, pp. 517-527.

[268] Sedera, D., Gable, G. (2004): A factor and structural equation analysis of the enterprise systems success measurement model. In: *Proceedings of the 25th international conference on information systems*, Washington, pp. 449-463.

[269] Lin, H. Y. et al. (2006): ERP systems success: An integration of IS success model and balanced scorecard. In: *Journal of Research and Practice in Information Technology*, volume 38, issue 3, pp. 215-228.

Table 2-2: Aspects of ERP Project Success Dimensions, literary Source Analysis

		Pitt, et al. 1995[270]	Rainer, Watson 1995[271]	McKin. et al. 2002[272]	DeLone McLean 2003[273]	Sedera, Gable 2004[274]	Iivari 2005[275]	Chang King 2005[276]	Almut. Subram 2005[277]	Gable, et al. 2008[278]
System Quality	Access			x						x
	Customization					x				x
	Ease of use			x		x				x
	Flexibility, Integration					x	x			x
	Reliability									x
	Response time						x			
	System accuracy / features					x				x
Information Quality	Accuracy		x				x			x
	Availability						x			x
	Completeness, Conciseness		x			x				x
	Format					x	x			x
	Relevance		x			x				x
	Reliability			x						
	Timeliness		x	x						x
	Understandability			x		x				x
	Usability					x				x
Service Quality	Assurance, Reliability	x								
	Empathy, Flexibility	x								
	Interpersonal quality							x		
	IS/ERP training							x		
	Responsiveness	x						x		
Use / Intent. to Use	Daily / Frequency of use						x		x	
	Intention to (re)use									
	Nature of us, navigation				x					
	No. of site visits/transactions				x					
User Satisfact.	Adequacy, Efficiency								x	
	Enjoyment									x
	Overall satisfaction								x	x
Net Benefits	Decisions eff. / productivity					x				x
	Job effective / performance						x			
	Business proc. change					x				x
	Competitive advantage								x	
	Cost reduction					x			x	x
	Improved outcomes / outputs					x				x
	Increased capacity					x				x
	Overall productivity					x				

Source: created by author, based on literature review

[270] Pitt, L. F. et al. (1995): Service quality: A measure of information systems effectiveness. In: *MIS Quarterly*, volume 19, issue 2, pp. 173-187.

[271] Rainer, R. K., Jr., Watson, H. J. (1995): The keys to executive information system success. In*: Journal of Management Information Systems*, volume 12, issue 2, pp. 83-98.

[272] McKinney, V. et al. (2002): The measurement of web-customer satisfaction: An expectation and disconfirmation approach. In: *Information Systems Research*, volume 13, issue 3, pp. 296.

[273] DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. In: *Journal of Management Information Systems*, volume 19, issue 4, pp. 9-30.

[274] Sedera, D., Gable, G. (2004): A factor and structural equation analysis of the enterprise systems success measurement model. In: *Proceedings of the 25th international conference on information systems*, pp. 454.

[275] Iivari, J. (2005): An empirical test of the DeLone-McLean model of information system success. In: *The DATA BASE for Advances in Information Systems*, volume 26, issue 2, pp. 8-27.

[276] Chang, J.C.J., King, W.R. (2005): Measuring the performance of information systems: A functional scorecard. In: *Journal of Management Information Systems*, volume 22, issue 1, pp. 85-115.

[277] Almutairi, H., Subramanian, G. H. (2005): An empirical application of the DeLone and McLean model in the Kuwaiti private sector. In: *Journal of Computer Information Systems*, volume 45, issue 3, pp. 113-122.

[278] Gable, G.G. et al. (2008): Re-conceptualizing information system success: The IS-impact measurement model. In: *Journal of the Association for Information Systems*, volume 9, issue 7, pp. 378.

The Gable et al. Model (Gable et al., 2003)

On the basis of the DeLone and McLean construct, Gable et al. (2003) build up a new model for ERP system success using the measures Sedera et al. associated. It has four quadrants, namely individual impact, organizational impact, information quality and system quality.

The impact dimensions are an assessment of benefits which are caused by the ERP system. Individual impact describes the effects of the system on the individual working with the system, e.g., decision effectiveness or users' productivity. Organizational impact contains the impact of the system on the organization, delivering measures for organizational costs or staff requirements. The quality dimensions point out the future potential. System quality consists of measures like ease of use, flexibility or data accuracy, whilst information quality describes measures like relevance, importance or timeliness of information.
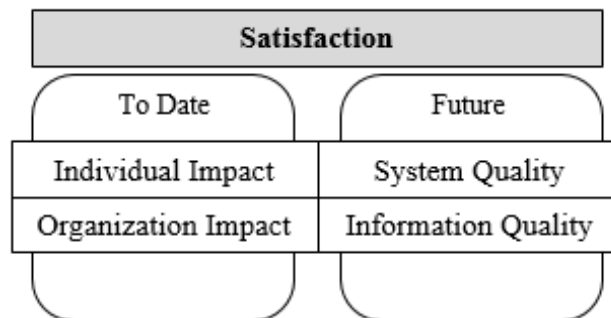
Figure 2-10: The Gable et al. Model
Source: created by author from Gable et al. (2003)[279]

As there is no explicit dimension for user satisfaction, satisfaction is seen as an overall measure of success. Compared to the DeLone and McLean model, it does not reflect a process model of success and omits the construct use. The Gable et al. model is very good fitting for measuring at a certain point of time.[280]

The extended ERP Systems Success Measurement Model (Ifinedo, 2006)

Based on the model of Gable et al. (2003), Ifinedo (2006) extended the dimensions of success for ERP measurement by adding two new dimensions.

Firstly, an external source was introduced with Vendor/Consultant Quality, as competent partners are needed to deal with the very complex challenge of ERP system implementation. It measures the component of external quality on the ERP systems success. An aspect can be

---

[279] Gable, G.G. et al. (2003): Enterprise systems success: a measurement model. In: *Proceedings of the 24th International Conference on Information Systems*, Seattle, WA, pp. 576-591.
[280] Ibid.

the management of know-how transfer and a good mixture between internal and external staff. The second added dimension, Workgroup Impact, describes sub-units or functional departments of an organization, partially formed for the purpose of the ERP project. Exemplary measures for this dimension are improvement of interdepartmental communication or organizational-wide communication.[281]
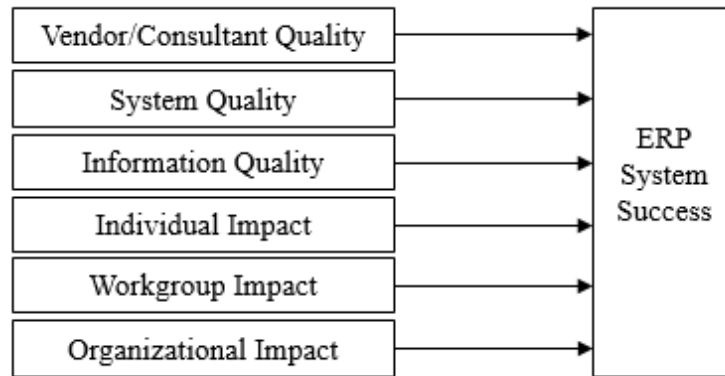
Figure 2-11: The Extended ERP Systems Success Measurement Model
Source: created by author from Ifinedo (2006)[282]

Ifinedo pointed out system quality and organizational impact as the two most important dimensions for ERP systems success. This model is more theoretical, and was not applied empirically in the past. Therefore seems to be inappropriate for further use in this thesis.

An Extension of the DeLone and Mclean Model (van der Westhuizen and Fitzgerald)

It was already mentioned that to measure the whole ERP project success, project management and project product success needs to be combined. Pinkerton (2003)[283] or Baccarini (1999)[284] emphasized the importance of incorporating a product success component into the definition of project success. Pinkerton describes this need by citing 'Using traditional criteria for evaluating project success is like using the time of a single runner to determine whether or not a relay has been successful'.[285]

---

[281] Ifinedo, P. (2006): Extending the Gable et al. Enterprise Systems Success measurement model: a preliminary study. In: *Journal of Information Technology Management*, volume 17, issue 1, pp. 14-33.

[282] Ibid.

[283] Pinkerton, W.J. (2003): Project management: achieving project bottom-line success, McGraw-Hill.

[284] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 25.

[285] Pinkerton, W.J. (2003): Project management: achieving project bottom-line success, McGraw-Hill, p. 338.

Presuming ERP project success needs to be seen as addition of project management success and project product success,[286] the extended traditional perspective from project management measuring can be added to the model developed by DeLone and McLean.
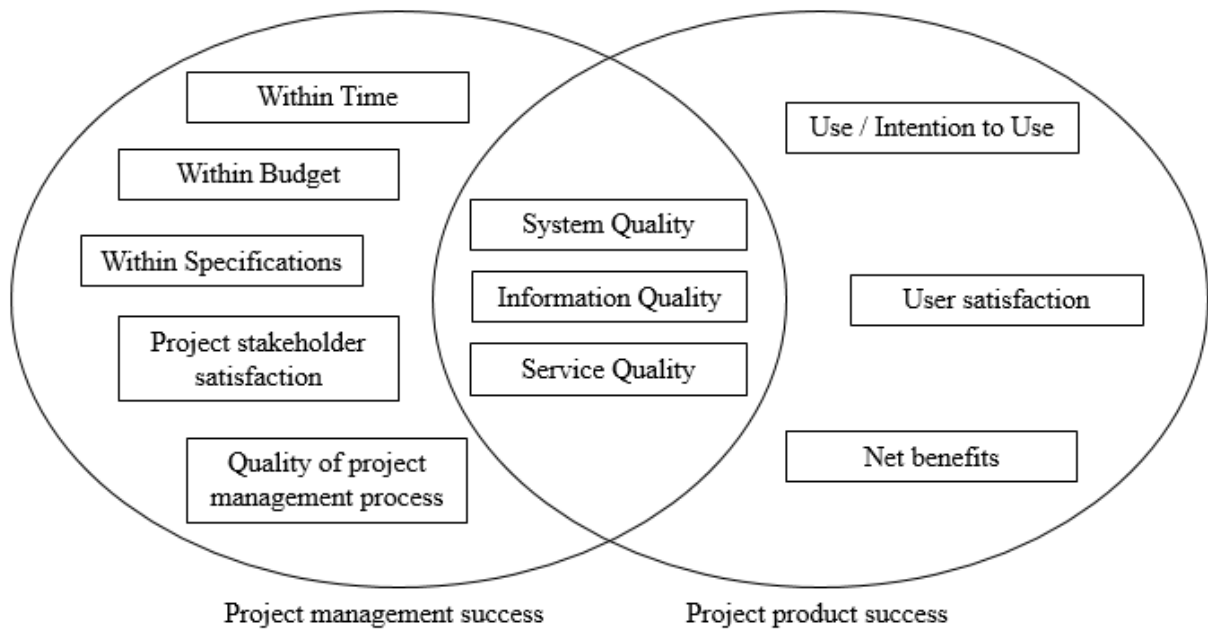
Figure 2-12: Measurement of ERP Project Success
Source: created by author from van der Westhuizen and Fitzgerald (2005)[287]

The DeLone and McLean model is more focusing on results after go-live of IT projects, leaving out the criteria of project phase and system introduction itself. That concentration on running ERP systems is not fitting on measuring the whole project success. But a complete picture for the required model is given in addition with the extended traditional approach. Consequently, this more comprehensive model incorporates both, project management and project product success of ERP implementations. The additional dimension are described below.

Within Time is checking whether main milestones and go live were reached in time with predefined specifications. Is also includes the time span of ERP project.

Within Budget is controlling whether project budget within predefined specifications is not exceeded, the budget was used effectively and evaluates expenses for extra requirements.

Within Specifications is testing whether the predefined specifications were achieved for go-live, goals of project were reached and the scope of project was kept.

---

[286] Ibid.

[287] Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In: *European Conference on IS Management, Leadership and Governance 2005*, p. 12.

Project Stakeholders are individuals and organizations that are actively involved in the project, or whose interests may be affected as a result of project execution or project completion. For this criterion, the more narrow definition is used, as the stakeholders are described as managers who have the organizational authority to allocate resources (people, money, services), can set priorities for their own organizations in support of a change, are responsible for profit and loss and finally are dependent on success of ERP implementation.

Quality of Project Management Process is not only evaluation the quality, but also the efficiency and transparency of ERP project management. It also includes the management for escalations and risk management preparing for critical phases.

2.4. Sources of Motivation and ERP Projects

As indicated in chapter 1.2, ERP systems are considered as the most important IT-based business innovation over the last decades. These systems promise better productivity, fluid processes and cost advantages. As a result many companies have decided to implement ERP worldwide.[288] Today, running an ERP system is considered a common business strategy.[289]

An Implementation of a new ERP system is widely considered as a problematic and difficult task, as it is coming with changes in all areas of the company.[290] Many companies cannot realize the expected advantages of ERP systems, because the implementation failed. [291] Statistically, more than 40 percent of ERP project fail, close to 90 percent finish too late or with massive exceeded budget.[292] A failed ERP implementation causes serious disadvantages for a company and implies further costs, as the organization suffers a damaged image, which has also negative effects on vendors, customers and shareholders.[293]

ERP project team members expect a sufficient support from the management. To avoid demotivated employees, management needs to provide enough resources. A visible support from management positively encourages and motivates the project members, which also

---

[288] Beatty, R.C., Williams, C.D. (2006): ERP II: Best Practices for Successfully Implementing an ERP Upgrade. In: *Communications of the ACM*, volume 49, issue 3, p. 105.

[289] Holland, C.P., Light, B. (1999): A Critical Success Factors Model for ERP Implementation. In: *IEEE Software*, volume 16, issue 3, pp. 30-36.

[290] Brown, D.H., He, S. (2007): Patterns of ERP Adoption and Implementation in China and some Implications. In: *Electronic Markets*, volume 17, issue 2, p. 132.

[291] Aladwani, A.M. (2001 Change Management Strategies for Successful ERP Implementation. In: *Business Process Management Journal*, volume 7, issue 3, p. 266.

[292] Chang, S. et al. (2008): An ERP System Life Cycle-Wide Management And Support Framework For Small- And Medium-Sized Companies. In: *Communications of AIS*, volume 22, p. 277.

[293] King, S.F., Burgess, T.F. (2006): Beyond Critical Success Factors: A Dynamic Model of Enterprise System Innovation. In: *International Journal of Information Management*, volume 26, issue 1, p. 60.

makes the changes of processes easier.[294] To ease the ERP implementation process, top-management should support a positive attitude of employees towards the new ERP system, to handle communication and conflicts more efficiently.[295]

During ERP implementation phase, employees are usually under increased pressure and have to manage above average workload. Therefore, executives have to facilitate a good relationship based on trust and engagement with their project team members, to increase their motivation and working results.[296] In literature, to less ERP trainings can even demotivate the project team members, because even an effective ERP system cannot improve the company when the users do not know how to use it properly.[297]

Kei and Wei (2008) described how the management can influence the culture of an organization and encourage key users' motivation to increase the success of ERP implementations. It is important to allocate enough resources, because the employees need time to adapt to the new system. Participation on the development of innovative ideas and open communication concerning companies' ERP strategy helps to increase motivation of the project team. The reasons for ERP implementation needs to be explained and understood by all key users, because project team members need to comprehend various decisions by the management during all phases of ERP implementation. A positive attitude towards the new IT system also wakes up enthusiasm towards changes. An ERP project also changes the balance of power in organizations, as key users take charge of new task and responsibilities. The resulting conflicts can be solved with good communication and active participation by the employees. If key users are allowed to make their own decisions and if they have the possibility to influence the ERP project, motivation and willingness to learn increases significantly. The last instrument to motivate project team members are rewards like job promotions or pay raises. Rewards should promote risk-taking, cooperative behaviour and continuous learning, as the goal is an atmosphere, which rewards correct behaviour. Furthermore, it is very important that these rewards are consistent with the main goals of the ERP implementation.[298]

---

[294] Bingi, P. et al. (1999): Critical issues affecting an ERP implementation. In: *Information Systems Management*, volume 16, issue 3, p. 9.

[295] Ibid.

[296] Sarker, S., Lee, A.S. (2003): Using a Case Study to test the Role of three Key Social Enablers in ERP Implementation. In: *Information & Management*, volume 40, issue 8, p. 826.

[297] Al-Mudimigh, A.S. (2007): The Role and Impact of Business Process Management in Enterprise Systems Implementation. In: *Business Process Management Journal*, volume 13, issue 6, p. 872.

[298] Ke, W., Wei, K.K. (2008): Organizational Culture and Leadership in ERP Implementation. In: *Decision Support Systems*, volume 45, issue 2, pp. 208-218.

Liu und Seddon (2009) summarized the change management tasks of project management with three aspects, namely motivation of employees, influence on system usage behaviour and creation of acceptance towards the new ERP system. Interestingly, there was no significant relation found between these aspects and efforts of management.[299]

The influence of managements' charisma is in focus of an approach from Neufeld et al. (2007). The concept of charisma is described by Idealized Influence (optimism, enthusiasm, ideas, confidence) and Inspirational Motivation (pride, purpose, respect, morale). The study confirms a charismatic project management has positive influence on problems with system acceptance, perceived user-friendliness and satisfaction of key users.[300]

Huq und Martin (2006) observe a lack of motivation during ERP projects, because employees feel more pressure caused by various changes. It is suggested that management and personnel department need to work together to support the project team members while considering the ethical aspects.[301]

Jones et al. (2006) describe dimensions of organizational culture and their impact on knowledge exchange during ERP implementations. If project members compete against each other, they tend to have a negative motivation to share knowledge with colleagues.[302]

Xu und Ma (2008) analyse the knowledge transfer between employees and external ERP consultants during ERP implementation. Key users' motivation is essential for reception of knowledge. Without motivation, employees tend to simulate the acceptance of new knowledge, are just passively involved in knowledge exchange, and even refuse to receive knowledge.[303]

Literature on the impact of ERP systems and the aspect of motivation is growing, but most studies in the literature are interviews, case studies or industry surveys.[304][305] The literature

---

[299] Liu, A.Z., Seddon, P.B. (2009): Understanding how Project Critical Success Factors affect Organizational Benefits from Enterprise Systems. In: *Business Process Management Journal*, volume 15, issue 5, pp. 716-743.

[300] Neufeld, D.J. et al. (2007): Charismatic Leadership and User Acceptance of Information Technology. In: *European Journal of Information Systems*, volume 16, issue 4, pp. 494-510.

[301] Huq, Z., Martin, T.N. (2006): The Recovery of BPR Implementation through an ERP Approach. In: *Business Process Management Journal*, volume 12, issue 5, pp. 576-587.

[302] Jones, M.C., et al. (2006): Exploring Knowledge Sharing in ERP implementation: An Organizational Culture Framework. In: *Decision Support Systems*, volume 41, issue 2, pp. 411-434.

[303] Xu, Q., Ma, Q. (2008): Determinants of ERP Implementation Knowledge Transfer. In: *Information & Management*, volume 45, issue 8, pp. 528-539.

[304] Davenport, T.H. (1998): Putting the Enterprise into the Enterprise System. In: *Harvard Business Review*, volume 76, pp. 121.

[305] Tsai, W.H. et al. (2005): Critical management issues in implementing ERP: empirical evidences from Taiwanese firms. In: *International Journal of Services and Standards*, volume 1, issue 3, pp. 299.

research concerning existing experience is approaching the topic sources of motivation in successful ERP projects. To analyse the status quo of this topic, development and application of *Motivation Sources Inventory* (MSI) is outlined. Furthermore, aspects of motivation, motivational theories and MSI in ERP projects are sketched.

The method for data collection and parsing existing experience was a secondary analysis using data from scientific databases, namely EBSCO Business Source Premium and Google Scholar Database.

Motivation Sources Inventory by Barbuto and Scholl - Further Developments

The fundamental work describing the 5 sources of motivation was published 1998 by John E. Barbuto and Richard W. Scholl under the title: '*Motivation Sources Inventory*: development and validation of new scales to measure an integrative taxonomy of motivation'.[306]

Since 1998, most of further development was continued by John E. Barbuto, and the 'taxonomy of motivation' was applied on various topic and society groups. As described in previous chapters, the first publication was based on testing 60 items, namely 12 questions assigned to each source of motivation. Testing was the questions were delegated to 156 upper level undergraduate students, who all graduated from high school. The average age was 27 years, and the sample was 56% men. The respondents were employed in a wide variety of organizations on an average of 31 hours a week. The survey was done at business courses at a north-eastern U.S. university, which means the geographical reach was quite restricted. With varimax-rotated component pattern at least six unique items per motivation source was identified. The best resulted goodness of fit, measure by coefficient 'α', was accomplished by *intrinsic process* motivation. The main findings on this investigation were a relatively high validity and reliability of the measure. In addition the authors stated that the *Motivation Sources Inventory* model and the developed scales could be used for further empirical inquiries. Anticipated fields of application were the effect of external situations or the question whether there can be a single source of motivation for individuals.

In 2001, J.E. Barbuto examined a teaching approach to show how motivation sources are evident in 'behaviour and decisions'. The taxonomy again included the five sources of motivation, adding an easy understandable description of the five categories.

---

[306] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issues 3, pp. 1011-1022.

Table 2-3: Derivation of 5 Sources of Motivation

Motivation Source	Definition
Intrinsic process	Derived from fun or enjoyment of the task
Instrumental	Derived from expectations of tangible rewards
External self-concept	Derived from a desire to improve reputation and image
Internal self-concept	Derived from a need to meet personal standards of ideal self
Goal internalization	Derived from a deep-rooted belief in the cause or principle

Source: created by author from Barbuto (2001)[307]

The paper offered instructions for conducting and processing of class exercise. The exercise was designed to stimulate and challenge students to apply motivation theory to understand organizational behaviour in a variety of situations. Through the execution and processing of the scenarios and role plays, students developed an appreciation of individuals' sources of motivation and their effects on behaviour.[308]

Barbuto (2001) also proposed an 'alternative scoring method' for the *Motivation Sources Inventory* was proposed, using ratio analysis for getting better results.[309] Alternative scoring scheme had become necessary to avoid centrality of the means for empirical surveys. That means in practice, respondents tend to fill out questionnaires by avoiding clear statements. One of the weaknesses in the measure was that respondents demonstrated a bias (prejudice) towards large or small agreement with items, resulting in centrality of the means. As a result, an alternative scoring scheme that alleviates these effects was introduced.

The new method, ratio analysis, provided an empirical assessment more consistent with the theoretical framework of the inventory. Rather than using the summated score for each of the five subscales (six items for each subscale), researchers may calculate a ratio for each source, dividing the subscale, score by the sum of scores on all 30 items. In addition, theoretical and empirical support for ratio analysis was provided.

---

[307] Barbuto, J.E. (2001): Understanding and applying an integrative taxonomy of motivation sources to professional and personal settings. In: *Journal of Management Education*, volume 25, issue 6, p. 714.

[308] Barbuto, J.E. (2001): Understanding and applying an integrative taxonomy of motivation sources to professional and personal settings. In: *Journal of Management Education*, volume 25, issue 6, p. 722.

[309] Barbuto, J.E. (2001): An alternative scoring method for the motivation sources inventory: A case for ratio analysis. In: *Psychological Reports*, volume 88, issue 2, pp. 385.

The next study demonstrated study tests the 'relationship between sources of motivation and organizational citizenship behaviours'.[310] Organizational citizenship behaviour (OCB) research started to be extensive in the 1980is, and since then it focused on the effects of OCBs on individual and organizational performance. One hundred seventy-five employees from 31 locations of two agriculturally based companies completed a survey about the *Motivation Sources Inventory* and were rated by their supervisors for demonstrated organizational citizenship behaviours. The questionnaire to determine Organizational Citizenship Behaviour was consisting of questions about participants work habits. For example, questions were about frequency of missing work, helping out colleagues, making breaks or performing only required tasks. Sample items for MSI were again clearly assigned to each category. Table 2-4 demonstrates examples of items for every source of motivation.

Table 2-4: Sample Items for the *Motivation Sources Inventory*

Source of Motivation	Sample Question
Intrinsic process	I would prefer to do things that are fun
Instrumental	Job requirements will determine how hard I will work
External self-concept	It is important to me that others approve of my behaviour
Internal self-concept	Decisions I make will reflect high standards that I set for myself
Goal internalization	I would not work for a company if I didn't agree with its mission

Source: created by author from Barbuto (2001)[311]

The result of this study showed some significant relationships between specific sources of motivation and organizational citizenship behaviour. Expression of MSI was quite divergent compared to the studies before, as very high levels of *self-concept internal* motivation were measured. The importance of this finding can be concluded, because *self-concept internal* motivation is based on personal challenge and self-authorship. That means organizational policies and procedures do not affect these individuals' motivation. The homogeneity of the sample limits the generalizability of results, as the target organizations of this survey shared the same geographic location and are of similar business. At this point, it is necessary to point out that his relationship was retested in 2011 by the same author, showing more insights. A

---

[310] Barbuto, J.E. (2001): Testing the underlying motives of organizational citizenship behaviors: a field study of agricultural co-op workers. In: *Published at 28th national agricultural education research conference*, pp. 539-550.

[311] Barbuto, J.E. (2001): Testing the underlying motives of organizational citizenship behaviors: a field study of agricultural co-op workers. In: *Published at 28th national agricultural education research conference*, p. 546.

significant positive relationship between individuals' *self-concept internal* motivations and organizational citizenship behaviours was confirmed. Additionally, analysis also yielded significant negative relationships between *instrumental* and *self-concept external* motivations and organizational citizenship behaviours.[312]

In 2003, Barbuto issued a paper dealing with 'sex differences' (gender differences) among five sources of motivation for a sample of 208 undergraduate students, who completed the *Motivation Sources Inventory*.[313] Results generated by t-tests produced few statistically significant gender differences for the five sources of motivation. Four motives showed no gender difference, but interestingly, *instrumental* motivation was significantly higher among men than women.

In 2004, the focus of study moved to relationships between leaders' sources of motivation and the influence tactics used when influencing subordinates. Moderating variables such as leaders' Machiavellian disposition were suggested as possible explanations also reported weaker relationships between motivation and influence tactics. A clear interpretation of the results was not possible.[314]

Further studies dealt with special characteristics of motivation in agricultural surroundings. Identifying sources of motivation of Adult Rural Workers demonstrated a high proportion of *self-concept internal* work motivation, as the other four sources were evenly distributed across the sample population. It is concluded that to engage the interest and involvement of rural workers most effectively, when influence attempts that appeal to workers' internally derived standards and sense of the ideal self are carried out.[315] An investigation on agriculture and non-agriculture students indicated statistically significant differences between for 2 sources of motivation. For student of agricultural subjects, self-concept internal and goal internalization motivation were both significant higher pronounced, while the other three items were quite the same.[316]

---

[312] Barbuto, J.E., Story, J.S. (2011): Work motivation and organizational citizenship behaviors. In: *Journal of Leadership Studie*s, volume 5, issue 1, pp. 24.

[313] Barbuto, J.E. et al. (2003): Sex differences among five sources of motivation in the motivation sources inventory: Preliminary findings. In: *Psychological reports*, volume 93, issue 1, p. 48.

[314] Moss, J.A., Barbuto. (2004): Machiavellianism's Association with Sources of Motivation and Downward Influence Strategies. In: *Psychological reports*, volume 94, issue 3, pp. 933-943.

[315] Barbuto, J.E. et al. (2004): Identifying Sources of Motivation of Adult Rural Workers. In: *Journal of Agricultural Education*, volume 45, issue 3, pp. 11-21.

[316] Barbuto, J.E., Fritz, S.M. (2004): Is There a Difference Between Agriculture/Natural Resources and Non-Agriculture/Natural Resources Majors' Motivation Sources? In: *Nacta Journal*, volume 48, issue 3, pp. 30-35.

Leadership styles and conflict management were examined on *Motivation Sources Inventory* through two comprehensive studies.

To test relationships between leaders' motivation and their use of leadership style (charismatic, transactional, and / or transformational), one hundred eighty-six leaders and 759 direct reports from a variety of organizations were sampled. Leaders were administered the MSI, while followers reported leaders' full range leadership behaviours using the Multifactor Leadership Questionnaire. Result showed that *Motivation Sources Inventory* subscales significantly correlated with leaders' self-reports of charisma, transactional and laissez-faire leadership.[317] A result relevant for interpretation of this research was the studies' consistency with Kegan's lens perspective for understanding limitations of leaders. It states that 'leaders see the world through their own paradigm or lens and assume others share a similar lens'. This concludes many leaders think others are motivated the same way they are.[318]

To test the relationship between sources of motivation and conflict management styles of leaders, 126 leaders and 624 employees were sampled. The five sources of work motivation were associated with Rahim's modes of interpersonal conflict management. The model explained variance for 4 modes, namely obliging, dominating, avoiding and compromising, but explained little variance for integrating. The second question, how these variables influence effectiveness of leadership, could not be answered clearly by the model.[319]

A study of the relationship between followers' mental boundaries and sources of work motivation was conducted with government employees. Tests only gave a significant positive but weak correlation between followers' mental boundaries and *self-concept internal* motivation, while other correlations were not significant.[320] A similar field study tested the relationship between locus of control, which refers to the extent to which individuals believe that they can control events that affect them, and sources of work motivation. Analysis showed a significant positive relationship between follower's locus of control *and self-concept external* motivation, *self-concept internal* work motivation, and *goal internalization*.[321] Retesting these two topics, a further study in 2010 examined leaders' and members' scores on

---

[317] Barbuto, J.E. (2005): Motivation and Transactional, Charismatic, and Transformational Leadership A Test of Antecedents. In: *Journal of Leadership and Organizational Studies*, volume 11, issue 4, pp. 26-40.

[318] Ibid, p. 38.

[319] Barbuto, J.E., Xu, Y. (2006): Interpersonal Conflict Management Styles, and Leadership Effectiveness: A Structural Model. In: *Psychological reports*, volume 98, issue 1, pp. 3-20.

[320] Barbuto, J.E., Story, J.S. (2007): Relations of organizational and interpersonal boundaries with sources of work motivation. In: *Perceptual and motor skills*, volume 105, issue 3, pp. 1155-1158.

[321] Barbuto, J.E., Story, J.S. (2008): Relations between locus of control and sources of work motivation amongst government workers. In: *Psychological Reports*, volume 102, pp. 335-338.

locus of control, sources of motivation, and mental boundaries to predict the quality of leader-member exchanges. Analysis pointed out that, followers' scores on locus of control and rated *goal internalization* motivation, along with leaders' scores on locus of control and leaders' scores of *self-concept internal* motivation were positively related to leader-member exchanges.[322]

The first cross-cultural comparison testing motivational differences in response to the *Motivation Sources Inventory* between U.S. (138) and South-African (114) work samples. Using ratio analysis for measurement, results and analysis indicated that American managers scored significantly higher on *intrinsic process* (fun), while South-African managers scored significantly higher on *self-concept external* (reputation within company) and *goal internalization* (purpose of company).[323]

An examination of the relationships between psychological type and sources of work motivation yielded no consistent results. This study sampled 208 undergraduate students to examine the relationships between the four dichotomies measured on the Myers-Briggs Type Indicator (MBTI) instrument and the five sources of work motivation measured on the *Motivation Sources Inventory*. The four pairs of preferences or dichotomies are defining personality types:

- Focusing: Extraversion (E) versus Introversion (I)

- Taking information: Sensing (S) versus Intuition (N)

- Making decisions: Thinking (T) versus Feeling (F)

- Living outer life: Judging (J) versus Perceiving (P).

The results revealed several relationships, most with small effect sizes, like extraversion-introversion is significantly related to both *intrinsic process* and *goal internalization*. Further Analysis suggests that the MBTI-instrument and the MSI are measuring distinctly different aspects of the human psyche. Motivation and psychological type appear to be two distinct

---

[322] Barbuto, J.E. et al. (2010): Locus of Control, Sources of Motivation, and Mental Boundaries as Antecedents of Leader-Member Exchange Quality. In: *Psychological reports*, volume 106, issue 1, pp. 175-188.
[323] Barbuto, J.E., Gifford, G.T. (2007): Sources of Work Motivation of Business Leaders in the USA and South Africa: A Cross-Cultural Comparison Using the Motivational Sources Inventory. In: *Psychological reports*, volume 101, issue 2, pp. 636-640.

dimensions of the human psyche. It also shows motivation seems to be a different construct than either psychological type specifically or personality in general.[324]

Motivation Sources Inventory **- Application by other Authors**

The MSI had been applied on several topics. Most recently, a paper by Yan (2013) investigated the relationship between employees' motivation sources and organizational commitment among Chinese employees. Each motivation source was tested against affective, continuance or normative commitment. A difference between Chinese and European employees concerns the type of commitment. While in China continuance commitment plays a dominant role, affective commitment is most important in Western settings.[325]

Other publications use this measurement for comparison with leadership styles. For example, Wagner (2010) described the relations of transactional and transformational leadership styles in context with the *Motivation Sources Inventory*. In this context, also gender, leadership experience or organizational types were tested.[326]

A study by Carter and Rudd (2005) analysed factors which influence leadership participation in agricultural organizations. MSI was used in this context as a factor that contributes to members willingness to serve (or not to serve) on their county Farm Bureau boards. Being involved in youth organizations may help to encourage future participation in organizations as adults, of previous experience was mainly positive.[327]

Lin (2013) applied the five sources of motivation on the use of Enterprise Wikis. The strongest apply was found for *self-concept external* motivation, while *instrumental* motivation and *internalization of goal* also have significant importance. It is concluded that the MSI is suitable to measure the motivation to use Enterprise Wikis.[328]

---

[324] Barbuto, J.E. et al. (2008): Using the MBTI® Instrument and the Motivation Sources Inventory to Test the Relationships Between Jung's Psychological Types and Sources of Work Motivation. In*: Journal of Psychological Type*, volume 68, issue 12, pp. 139-147.

[325] Yan, Z. (2013): The relationship between employees' motivation sources and organizational commitment among Chinese employees. In: *Osaka University Paper*, pp. 19.

[326] Wagner, D.N. (2010): Leadership Education Reconsidered: Examining Self-Perceived Leadership Styles and Motivation Sources among Undergraduate Leaders. Bowling Green State University, Thesis.

[327] Carter, H.S., Rudd, R.D. (2005): Factors which influence Leadership Participation in Agricultural Organization. In: *Association of Leadership Educations 2005 Annual Conference*, p. 9.

[328] Lin, D. (2013): Die fünf Quellen der Motivation bei der Nutzung von Enterprise Wikis. In: *11th International Conference on Wirtschaftsinformatik*, Leipzig, Germany, p. 656.

2.5. Motivational Theories and ERP Projects

Many books explaining business roadmaps to ERP implementations handle motivational methods applied during the projects at the edge. For the purpose of the thesis, literature research needs to discover whether the *Motivation Sources Inventory* has been used for examining motivation during ERP projects. To figure out what kind of motivational methods, styles or theories are states of the art in ERP projects, the area of research needs to be structured with the use of approximation.

Significance of Motivation in ERP Projects

The information system literature points out that ability of motivating people, vision, attitude and behaviour of leaders are critical for employees' perceptions of IT innovation and thus its adoption outcomes (Armstrong and Sambamurthy 2001[329]; Boynton et al. 1994[330]; Purvis et al. 2001[331]; Orlikowski 1992[332]; McKenney et al. 1997[333]). But in this literature, motivational theories are not empirically proven and tested. A scientific article by Ko, Kirch and King (2005) focuses on knowledge transfer in ERP projects in the USA. The text also refers to the influence of Motivational factors for knowledge transfer within the project.[334] Morris (2010) examined the impacts of ERP systems implementation on job satisfaction. Based on surveys in a telecommunications company, he found that ERP system implementation moderated the relationships between three job characteristics (skill variety, autonomy, and feedback) and job satisfaction. Nevertheless, motivation was only seen as a minor factor which leads to job satisfaction.[335] Several studies describe motivation as one of the main factors in ERP implementation projects, but none of them wrote about it as a major topic.

Hwang (2005) investigated enterprise systems management and implementation issues based on the informal control mechanisms. The article applied adoption and implementation to the informal controls, such as cultural control and self-control, which can be viewed as a tacit

---

[329] Armstrong, C.P., Sambamurthy, V. (1999): Information technology assimilation in firms: The influence of senior leadership and IT infrastructures. In: *Information Systems Research*, volume 10, issue 4, pp. 304-327.

[330] Boynton, A.C. et al. (1994): The influence of IT management practice on IT use in large organizations. In: *MIS Quarterly*, volume 18, issue 3, pp. 299-318.

[331] Purvis, R.L. et al. (2001): The assimilation of knowledge platforms in organizations: An empirical investigation. In: *Organization Science*, volume 12, issue 2, pp. 117-135.

[332] Orlikowski, W.J. (1992): The Duality of Technology - Rethinking the Concept of Technology in Organizations. In: *Organization Science*, volume 3, issue 3, pp. 398-427.

[333] McKenney, J.L. et al. (1997): Bank of America: The crest and trough of technological leadership. In*: MIS Quarterly*, volume 21, issue 3, pp. 321-353.

[334] Ko, D.-G, Kirsch, L.J., King, W.R. (2005): Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. In: *MIS Quarterly*, volume 29, issue 1, pp. 59-85.

[335] Morris, M.G., Venkatesh, V. (2010): Job Characteristics and Job Satisfaction: Understanding the Role of Enterprise Resource Planning System Implementation. In: *MIS Quarterly*, volume 34, issue 1, pp. 143-161.

perspective in knowledge management. Hwang described uncertainty avoidance and intrinsic motivation as the important antecedents of ERP systems adoption.[336]

Beside these findings, also papers about the motivations of ERP implementation itself exist. A doctoral thesis by Harrison (2004) is analysing the perceptions of ERP implementation project team members, to determine if there were differences in motivations and levels of satisfaction between the project team members from both public- and private- sector organizations. The purpose of this study was to determine the benefits sought from implementing ERP, the extent to which critical factors were present during the ERP project, the level of satisfaction with the performance of implemented modules, the perceptions of benefits and concerns of implementing ERP, the extent to which selected decision-making processes were used in the organization's decision to implement ERP, and the number of modules purchased with the intent to implement versus those actually implemented. This knowledge should allow organization leaders to make more informed decisions when implementing ERP.[337] Nevertheless, the goal of that study, to find out what motivates companies to implement ERP, differs fundamentally with the approached finding what motivates employees during ERP projects.

According to Frey and Osterloh, motivated employees play a crucial role in creating a company's sustainable competitive advantage. Successful management by motivation shows that in a knowledge-based society, this goal cannot be achieved by extrinsic motivation alone. Pay for performance often even hurts because it crowds out intrinsic motivation. To succeed, companies have to find ways of fostering and sustaining intrinsic motivation. With the help of in-depth case studies, representative surveys, and analysis based on a large number of firms and employees, this work identifies the various aspects of motivation in companies and shows how the right combination of intrinsic and extrinsic motivation can be achieved.[338]

Motivation Theories applied on ERP Projects

There can be found an increasing range of seminars dealing with Motivation in projects. For ERP project-management trainings, Personality Systems Interactions (PSI) is attracting more attention. It is promised that PSI helps to understand how an individual moves from deciding on a specific course of action to carry that action through. PSI also explains what happens

---

[336] Hwang, Y. (2005): Investigating enterprise systems adoption: uncertainty avoidance, intrinsic motivation, and the technology acceptance model. In: *European Journal of Information Systems*, volume 14, pp. 150-161.

[337] Harrison, J.L. (2004): Motivations for Enterprise Resource Planning (ERP) System Implementation in Public versus Private Sector Organizations. Dissertation at the University of Central Florida, Orlando, Florida.

[338] Frey, B.S., Osterloh, M. (2001): Successful Management by Motivation: Balancing Intrinsic and Extrinsic Incentives (Organization and Management Innovation), Springer Berlin Heidelberg, p. 87.

when the carry through to action does not take place. These PSI training courses try to explain the significant gap between people's best intentions and what people actually do. It should help coaches and project-leaders to realize how they can support their colleagues and team members to make substantial and sustainable changes in their approach to their work.

Self-determination theory of motivation is a popular topic for educational institutions like universities or schools. It is also utilized on topics like partnership, family, health, sports and environmental awareness.[339] An application of this theory on ERP projects was not carried out so far.

As mentioned, management books dealing with motivation as key factor are available, e.g. Frey and Osterloh (2001) describe successful management by motivation, suggesting balanced intrinsic and extrinsic incentives by management. Motivation has to be seen as a key factor to motivate employees to share their knowledge very fast and effective during ERP projects. The study states that successful management by motivation shows that in a knowledge-based society, the goal of competitive advantage cannot be achieved by extrinsic motivation alone. The book identifies the various aspects of motivation in companies and shows how the right combination of intrinsic and extrinsic motivation can be achieved.[340] It needs to be examined whether these findings can be applied to the particular project situation of an ERP implementation.

Studies applying the *Motivation Sources Inventory* in ERP Projects

After assessing the significance of motivation during ERP implementations and analysing motivation theories applied on ERP projects, literature review was further narrowed. Concerning *Motivation Sources Inventory* (Barbuto and Scholl) and its application in ERP projects, search queries did not yield any results, indicating no use in previous studies on ERP project success. The word inventory appeared on some occasions, but it was with logistical meaning, and had nothing to do with the described theory of motivation. In the past, the main application areas of the theory were students, agricultural surroundings and specific countries. According motivation in ERP projects, there always a hint can be found that project managers have to assure motivation within project members. But this usually comes from the practical point of view, and there is no scientific examination which motivational theory may fit best.

---

[339] Deci, E.L., Ryan, R.M. (2008): Self-Determination Theory: A Macrotheory of Human Motivation, Development, and Health. In: *Canadian Psychology*, volume 49, p. 184.
[340] Frey, B.S., Osterloh, M. (2001): Successful Management by Motivation: Balancing Intrinsic and Extrinsic Incentives (Organization and Management Innovation), Springer Berlin Heidelberg.

Literature research shows that still no profound study using MSI on ERP implementations had been made yet.

Summarizing the analysis of existing experience concerning sources of motivation and ERP, it can be stated that although there is still a lack of scientific books on this exact topic, it can be said that motivational theories in ERP projects are becoming more attention. Especially new motivational theories are used to train managers and coaches who have the leading role in ERP projects. In context with this dissertation, it can be stated that not a single test of the *Motivation Sources Inventory* (MSI) in ERP projects has been done. This thesis seems to be the first to apply that theory on the success of ERP projects with the help of empirical surveys.

3. RESEARCH ON THE IMPACT OF MOTIVATION ON ERP PROJECT SUCCESS

This chapter introduces the primary research conducted in order to evaluate the impact of sources of motivation on ERP project success of medium-sized companies in Austria and Germany. Primary research, with both qualitative and quantitative research methods, has been conducted between August 2014 and January 2015. The underlying framework of the primary research is illustrated in table 3-1.

Table 3-1: Framework of the Primary Research

1. Qualitative Research	
Purpose:	Exploration, validation and justification of the research model
Participants:	Purposeful sample of selected executives with ERP project experience
Instrument:	Evaluative interview
Data Collection:	Personal and telephone interviews
Data Analysis:	Data recording in spreadsheets, protocol with remarks

2. Pilot Study	Validation of survey on ERP project success

3. Quantitative Research	
Purpose:	Determine data of dependent variable of model and evaluate its dimensions
Participants:	CEOs of medium-sized companies implementing ERP projects
Instrument:	1 structured questionnaire with closed statements on ERP project success
Data Collection:	Online survey
Data Analysis:	Statistical analysis including descriptive statistics, factor analysis

4. Quantitative Research	
Purpose:	Confirmation or falsification of research hypotheses
Participants:	Key users of corresponding projects in step 3
Instrument:	1 unstructured questionnaire with closed statement on motivation sources
Data Collection:	Online survey
Data Analysis:	Statistical analysis including descriptive statistics, multiple regression analysis

5. Research Results	

Source: Authors' illustration

Mixed research methods are being seen controversially in regards to the appropriate paradigm allocation. In the past, a dualism existed, whether only qualitative or quantitative research should be applied. Purists of qualitative or quantitative methods point out the necessity of subjective and objective view, respectively. Researchers even state that research methods

should never be mixed.[341] Mixed methods research is formally defined 'as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study'.[342] Johnson and Onwuegbuzie (2004) point out strengths and weaknesses of qualitative, quantitative and mixed research methods. The analysis resulted in a proposed 'Mixed Methods Research Process Model', which allows to combine qualitative and quantitative methods in a structured way.[343]

This dissertation follows the pragmatic research paradigm for mixed research and applies both qualitative and quantitative research methods. The mixed research design compensates the weaknesses of one research method with the strengths of the other one and eventually elevates research credibility and the validity of findings.

Sequencing of qualitative and quantitative research methods has been necessary for creating an appropriate method for measuring the dependent variable. The purpose of the qualitative research within this dissertation has been to explore, validate and justify the theoretical measurement model of ERP project success by experienced executives. Expert interviews with CEOs and ERP experts assessing the questionnaires constituted the basis for the dependent variable of quantitative research. That means the qualitative research has been conducted prior to the first quantitative survey, and did essentially contribute to the development of the quantitative research instrument.

Expert interviews have been conducted either personally or via telephone with assistance of desktop sharing tools. In total, 10 evaluating interviews have been conducted with an equal distribution of experts representing executives from medium-sized companies in Austria and Germany. To be select as potential interview partners, certain requirements needed to be fulfilled. For respondents to be adequate, it has been essential to have vast experience in multiple finished ERP projects in function of CEO. Additionally, as they are not from big corporations but work as executives in medium-sized companies, they also had to have experience working personally with an ERP system. This affinity to the software makes it easier for them to evaluate aspects in context with users' requirements.

---

[341] Johnson, R.B., Onwuegbuzie, A.J. (2004): Mixed methods research: A research paradigm whose time has come. In: *Educational Researcher*, volume 33, issue 7, p. 14.

[342] Johnson, R.B., Onwuegbuzie, A.J. (2004): Mixed methods research: A research paradigm whose time has come. In: *Educational Researcher*, volume 33, issue 7, p. 17.

[343] Johnson, R.B., Onwuegbuzie, A.J. (2004): Mixed methods research: A research paradigm whose time has come. In: *Educational Researcher*, volume 33, issue 7, pp. 14-26.

The main goal was to evaluate the statements in the questionnaire in context of understandability and goodness of fitting to the ERP project success dimensions. For each interview remarks and ratings were made in an Excel sheet describing the survey. All interviews have also been protocolled in meeting minutes, and summarized after interview completion.

Following the expert interviews, the questionnaire was reworked, changing some of the wording of the statements describing the 11 dimensions of ERP success measurement to achieve a better understandability. In addition, some items were moved to different categories or totally eliminated from the survey, as the number of items was cut to 6 per dimension. The qualitative pre-step of expert interviews was not necessary for the second survey on employees' motivation, as an often effectively used questionnaire for that purpose already exists.[344]

3.1. Research Model of Sources of Motivation in ERP Projects and Hypotheses

This section presents the research model and explains the research hypotheses, operationalizing the underlying thesis of this dissertation, which has been formulated as:

There is a positive correlation between certain sources of motivation of project key users and the overall ERP project success of medium-sized companies in Austria and Germany.

Generally, the concept of *Motivation Sources Inventory* is investigated in ERP projects. Dependent variable is the success of ERP projects determined by various dimensions. Independent variables are the five sources of motivation, described as *intrinsic process, instrumental* motivation*, self-concept external* motivation*, self-concept internal* motivation and *goal internalization*. In every employee, these five sources of motivation exists, but in different amounts. Figure 3-1 presents the components of further investigation.

---

[344] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011-1022.
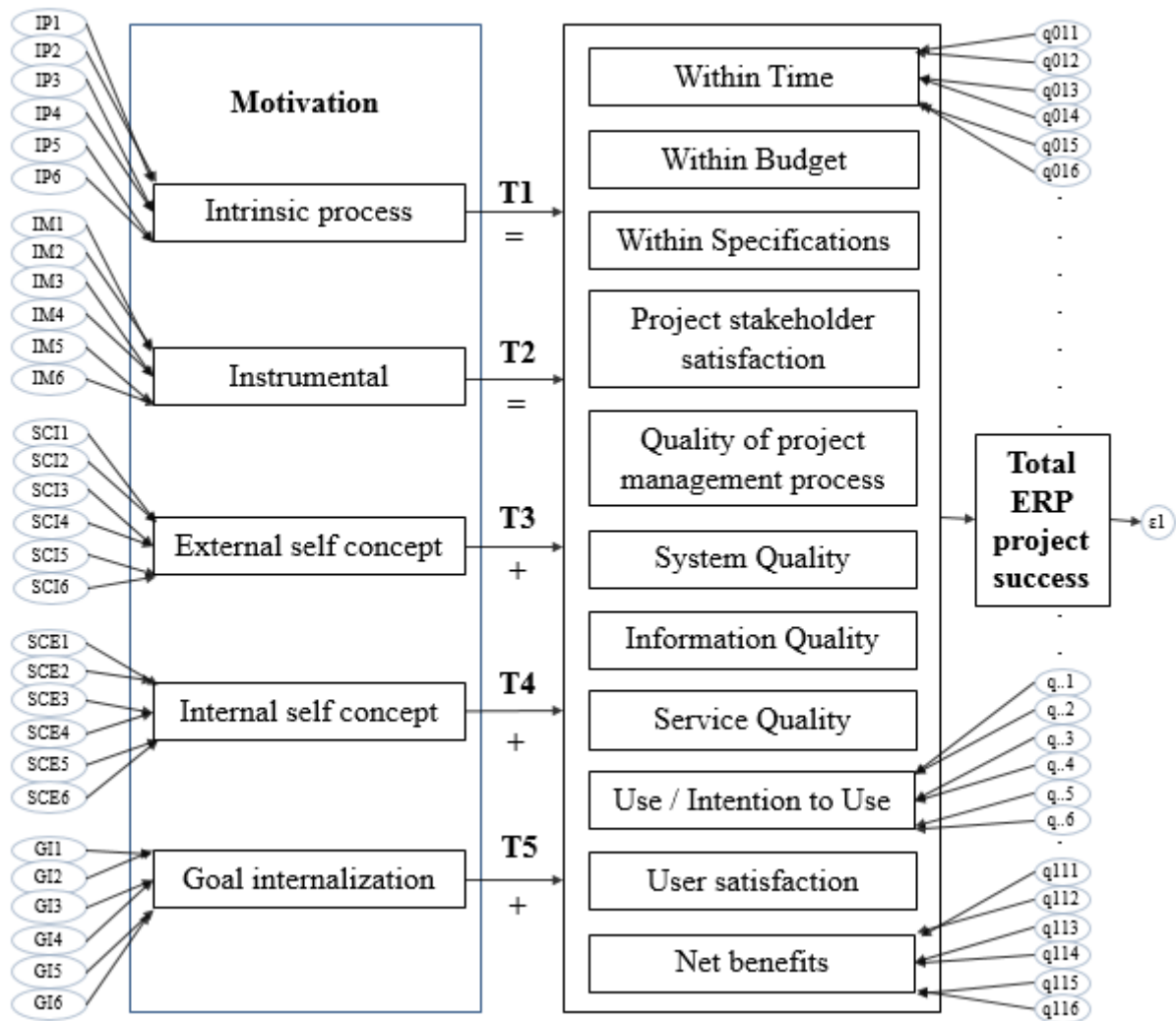
Figure 3-1: Research Model with Variables
Source: created by author.

The data from the surveys will be able to compare motivation with different levels of successful projects. This should enable to confirm whether there is a positive correlation between key users' different sources of motivation and ERP project success or not.

The model can obviously not fully explain the requirements for successful ERP projects, as employees' motivation is only one factor. The other factors for making ERP implementations successful were discussed in previous chapters. But the model clarifies how project team members need to be motivated and which personalities they should be to increase the chance to have a more successful project. Statistical analysis should also reveal how huge the impact of the factor motivation is on ERP project success in total.

Given the five different sources of motivation as independent variables, the author derives **5 theses** (T) for statistical analysis.

T1: Project team members in successful ERP projects have no significant higher *intrinsic process* motivation score than project team members in unsuccessful projects.

The focus of *intrinsic process* motivation lies on having fun fulfilling tasks. For example, a musician is playing the guitar enthusiastically, a controller is intensively analysing statistics or a salesman is having dedicated talks with customers, simply because it is giving them pleasure. People who are motivated that way do not even think about why they do it and what benefits or rewards they get. Leonard et al. describe these individuals as 'often diverted from tasks that are relevant to goal attainment in order to pursue tasks which are intrinsically more enjoyable. Thus, as long as team tasks are enjoyable, these individuals will be motivated to continue working effectively in the context of the team.[345]

Therefore it can be assumed that sheer fun has no significant positive impact on results, especially in project situations. During ERP projects, also unpleasant work needs to be finished in time and a task cannot be stopped because of displeasure. An ERP project is very much dependent on reaching milestones in time and with an acceptable quality. Finally, discipline is more important than fun for reaching goals during ERP implementations.

T2: Project team members in successful ERP projects have no significant higher *instrumental* motivation score than project team members in unsuccessful projects.

The behaviour of these people is essentially guided by the prospect of tangible benefits or rewards from outside. A reward can be more money or being promoted to a better position within the company. According to Leonard et al. 'in the situation of pure *instrumental* motivation, members resolve conflict among alternative courses of action by determining the actions, tasks, or procedures most likely to lead to goal attainment and thus, to their extrinsic benefit.'[346] The main motive can be described as pursuit of power.

It is assumed that *instrumental motivation* is not promoting ERP project success in long-term. Money and rewards do not help to achieve a better performance in stressful situations. During an ERP project, rewards are not really present, hence no greater output can be expected. In case of success, a bonus or promotion usually happens after completion of the project. The aspect of money can be more perceived hygienically, which means a lack of rewards compared to others within the company can even lead to demotivated employees.

---

[345] Leonard, N.H. et al. (1999): Work motivation: The incorporation of self-based processes. In: *Human Relations*, volume 52, p. 989.
[346] Ibid.

T3: Project team members in successful ERP projects have a significantly higher *self-concept external* motivation score than project team members in unsuccessful projects.

The source of self-image in case of *self-concept external* motivation is coming from fulfilling a role and meeting expectations from environment. Leonard et al. state that this type of motivation can base on personal social identity or on being associated publicly with a successful group. According to Leonard et al. 'it is not only important that the group is successful in meeting its goals, but that it is the members' technical, behavioural, or conceptual skills that are responsible for this success.[347] The aspect of being an important member of a team is dominant. Affiliation to the ERP project team is the number one priority. To trigger that kind of motivation, employees need to be praised for their performance, because that kind of people constantly search for recognition.

It can be assumed that good team players would make excellent ERP project team members. With team spirt, it might be easier to reach a big and distant goal. Project management always tries to strengthen that team spirt, as team building event are organized. Rewards are not given to individuals, but to the whole team if milestones are reached. The presumption is that more *self-concept external* motivated team members impact the ERP project success positively, although the intensity might not be significant. One restriction can be the strong commitment to existing plans, which makes team members inflexible. Another issue can be reputation being the driving force for this motivation, as such individuals may find it hard to give credit to others for achievements.

T4: Project team members in successful ERP projects have a significantly higher *self-concept internal* motivation score than project team members in unsuccessful projects.

The behaviour and values of this group are based on internal standards and benchmarks. An ideal is internalized as a guideline for actions for unconscious reasons. They main motive is to deliver a good performance, irrespective of the circumstances.

It can be assumed that a project team motivated with high *self-concept internal* attributes is positively influencing success of ERP implementations. People work on task until they are finished, even at cost of overtime. During ERP projects, reaching milestones on time is very critical, because delays will have negative impacts in several areas. Postponing fixed appointments usually cost a lot of money, especially because of the integrative facet of ERP

---

[347] Leonard, N.H. et al. (1999): Work motivation: The incorporation of self-based processes. In: *Human Relations*, volume 52, p. 990.

project. For example, if one department drags behind, efficient integrative system tests are not possible.

T5: Project team members in successful ERP projects have a significantly higher *goal internalization* motivation score than project team members in unsuccessful projects.

This motivation is about needing to believe in what project team members are doing. Persons of that group focus on goals and objectives of organizations or companies. Key users want to make valuable contribution to success of ERP project. The motive is a combination of membership and achievement. Generally, the purpose of activities is most important and it is also not necessary to get much credit for reached success. Leonard et al state that 'achieving internalized values and goals of the team or organization is the driving force behind this source of motivation.'[348]

The author assumes that many team members with high goal internalization have a positive impact on ERP project success, because targeted work is one of the most important criteria during long-term ERP implementations. Probably the most essential task of project management is to make clear the major goal of the project on various occasions. The primary task is to have a go-live without big problems and an effective system. It is very important to have the main goal in mind all the time. People who can differ essential from unimportant tasks will have a higher chance to reach a successful ERP implementation.

T6: The dimensionality of measuring ERP project success in medium-sized companies is determined by dimensions project management, user satisfaction, time and budget, ERP system quality and economic value.

The dimensions of measurement of ERP project success need to be checked after empirical survey. The questionnaires were created based on the results of literature research, and items were assigned with the help of expert interviews. But only statistical analysis will show whether some dimensions are over representative or too similar to be seen as a separate dimension. In addition, it needs to be examined whether the numbers of dimensions can be reduced without losing informative value.

Dependent Variable of Primary Research Model

Various reasons like simplicity and acceptability speak for choosing this model. The DeLone and McLean model is simple, as it was able to reduce numerous success dimensions to six.

---

[348] Leonard, N.H. et al. (1999): Work motivation: The incorporation of self-based processes. In: *Human Relations*, volume 52, p. 991.

The model is also widely accepted. From 1999 to 2002 alone, the original model has already been refereed in 285 papers.[349] According to contemporary articles, the DeLone and McLean IS Success Model seems to remain the most popular, comprehensive framework for IS success measurement.[350]

Another strong argument for the DeLone and McLean model is its original intention. The authors state their intention in the title as 'The Quest for the dependent Variable'.[351] Like in this thesis, project success is currently undergoing a similar quest for a dependent variable in various researches.[352][353]

The extended model by van der Westhuizen and Fitzgerald (2005) with its 11 dimension covers most of ERP project issues.[354] Consequently, this more comprehensive model incorporates both, project management and project product success of ERP implementations.

The question is, how the concrete measurement looks like and whether it is possible to rate an ERP project as overall successful. Before measures can be created, certain requirements have to be fulfilled:[355]

- Measurements can be controlled, which means indicators can be influenced by stakeholders. For example, a given weakness of ERP cannot be influenced by consultants or users, and should not be in scope of measures.

- Indicators are easy to quantify, which means in best case, the data and key figures for measuring are already available.

- Measure are understandable, which means every project member is able to understand the figures correctly and the same way.

- Measures must be reliable, relevant and as accurate as possible.

---

[349] DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. In: *Journal of Management Information Systems*, volume 19, issue 4, p. 11.

[350] Kronbichler, S.A. et al. (2010): A Comparison of ERP-Success Measurement Approaches. In: *Journal of Information Systems and Technology Management,* volume 7, issue 2, p. 306.

[351] DeLone, W.H., McLean, E.R. (1992): Information Systems Success: The Quest for the Dependent Variable. In: *Information Systems Research*, volume 3, issue 1, p. 60.

[352] Jiang, J.J. et al. (2002): Perception differences of software success: provider and user views of system metrics. In: *Journal of Systems and Software*, volume 63, issue 1, pp. 17-27.

[353] Linberg, K.L. (1999): Software developer perceptions about software project failure: a case study. In*: The Journal of Systems and Software*, volume 49, issue 2-3, pp. 177-192.

[354] Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In: *European Conference on IS Management, Leadership and Governance 2005*, pp. 1-17.

[355] Hoffecker, J., Goldenberg, C. (1994): Using the Balanced Scorecard to Develop Companywide Performance Measures, *Journal of Cost Management*, volume 8, issue 3, pp. 5-17.

Independent Variable of Primary Research Model

The measurement of motivation has been very little exploited in the past and very few approaches operationalization of it was found in literature.

In order to assess the underlying research hypotheses, a total number of five independent dimensions are used to describe motivation: *intrinsic process motivation, instrumental motivation, self-concept external motivation, self-concept internal motivation* and *goal internalization*. Each aspect is operationalized by six items. The questionnaire used for this measurement remains unchanged compared to the original study by Barbuto and Scholl.[356]

It is very important to mention that there is not a measurement of total amount of motivation for project team members conducted. There is no distinction made between generally more or less motivated people. The question is, how employees are motivated, and what is the impact of these different ways of being motivated.

Project managers or HR (human resources) managers are frequently assuming that other people share their same motivation patterns and are basically all motivated the same. But the models of MSI asserts that this perspective makes managers fail to tap into the right motives of others. As a result, employees remain unmotivated, and tasks and goals were not perfectly done.

Barbuto claims that the key to motivate others is to tap into the right source of motivation, which means to know which buttons to press. These buttons refer to the five different sources of motivation.[357] These sources can also be described as the actual motives for doing things or the needs employees have that must be satisfied. These motives are the reasons why goals are pursued and more effort is invested.

Intrinsic process motivation is all about having fun and enjoyment during activities. When people mainly motivated by that source could choose their tasks, they would take whichever ones give them the most pleasure. On the other hand, they often put off tasks which aren't fun. As a result, the project team members need to be engaged in work they enjoy doing.

If people would be just driven by *instrumental motivation*, their main focus would be on getting tangible rewards. Job or career choices are mainly based on money and rewards. The

---

[356] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011-1022.

[357] Ibid.

whole life is seen as a series of exchanges, in this specific case between employee and company. The management has to demonstrate what these persons are going to get and which reward is offered for good performance. In addition that kind of employee will always look for a better financial situation.

Improving reputation with others is the main goal of *self-concept external* motivated employees. A desire to meet others' expectation is dominant, as people try to take care of colleagues' wishes and find important what others think of them. People motivated this way seek membership and status within desired reference groups. They want to get recognition or even praise for the work that they do. Managers need to tell them, how good the performance was and how they appreciate it.

The source of *self-concept internal* motivation is all about giving yourself a challenge. People motivated this way are disinterested in mediocre or ordinary tasks. Managers need to give them activities that require skills, quality and talent. Would a person just be motivated by that source, public recognition for accomplishments and rewards would be irrelevant.

And finally *goal internalization* is presuming the need to believe in what individuals are doing. People motivated by this source must know the purpose and desired goals of a project before being engaged. Management needs to address what is the vision, what needs to be achieved and why project team members should believe in the common goals.

There is no ethical assessment on the five different sources of motivation. This means, it is in principle not good or bad to be motivated by one specific source like the pursuit of rewards. A single source of motivation is also not universal. This implicates that no person is motivated by just one source, because everybody is motivated by each source at some extent. The bottom line is, how much of each source is required to get somebody motivated.

3.2. Instruments of Qualitative and Quantitative Research conducted

Before primary research was conducted, comprehensive literature research of publications concerning these theories of motivation and ERP Project success was done to make sure to have a solid theoretical framework and fundament for this dissertation. Secondary sources included books concerning methodical work, ERP project management, human resourcing and social behaviour. Workshops and relevant conferences have been joined in order to get direct feedback to topic adequate questions. Main findings and reflections on secondary data, mainly derived from extensive literature review are mainly presented in chapters 3 and 4. The

research instruments of expert interviews and online surveys were used for the primary research of this dissertation.

Qualitative Expert Interviews

An expert interview is one of the most used method in empirical social research. Category groups in which expert interviews are mostly used are industrial-social research, organizational research, education research and political research.[358]

Expert interviews are sessions with one or more people who are considered expert in a particular subject. The format can be an informal one-on-one meeting or with a small group (2-3 person). Also a telephone call is possible. The results are summarized in written form, as audio- or videotaping may not be practicable.

To test the model and hypotheses, survey instruments need to be developed. For the questionnaire concerning motivation, this study can rely on a proved inventory of items designed by Barbuto and Scholl.[359]

Due literature research, no fitting questionnaire has been found covering all dimensions of ERP Project Success. As a result, the most important purpose of these expert interviews is to find the inventory of questions which are assigned determine ERP Project Success. At that point, the exact wording of the questions is critical. As the survey is done with a five-point Likert scale, the questions are formulated in form of statements whose approval can be rated.

To develop the statements for the survey, the first step was to make expert interviews with ERP project managers to get a collection of statements suited to evaluate the belonging dimensions. For this task, eight ERP project managers with experience of at least 5 years were interviewed.

Afterwards the personal opinion of decision makers (CEO) and heads of IT department in Austria and Germany has been investigated. The relevant persons should explain their point of view on the success of the project and also help defining the surveys' questions, and as a result a pre-test with 10 CEOs and CIOs was conducted. That means structured interviews

---

[358] Meuser, M., Nagel, U. (1991): ExpertInneninterviews - vielfach erprobt, wenig bedacht: ein Beitrag zur qualitativen Methodendiskussion. In: *Qualitativ-empirische Sozialforschung: Konzepte, Methoden, Analysen. Opladen*, Westdt. Verlag, pp. 441-471.

[359] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011-1022.

along predetermined relevant dimensions and also the quantification of these dimensions using rating scales were conducted.[360]

The two main objectives of the pre-test were:

- Checking understandability of all statements describing ERP project success

- Evaluating the fitting of statements to respective dimensions describing ERP project success

Before the pre-test was sent to the CEOs and CIOs, a detailed instruction about the purpose of the pre-test was carried out. The intelligibility was commented with a free text field, and the fitting of statements to the dimensions was rated with a 5-point Likert scale. After the pre-test was returned, a telephone interview was conducted to eliminate the last ambiguities. The interviews were carried out in German language, as the mother tongue of all experts and the author is German. The importance of expert interviews given in their first language needs to be mentioned, because only that guarantees original and authentic statements.[361] The final result of the expert interviews was a questionnaire with 66 items measuring ERP project success in German language. Although later the quantitative online survey was also spread in German, the finished questionnaire was translated by the author into English language. An anonymized list of experts can be found in appendix 2.

Quantitative Surveys

A questionnaire on *Motivation Sources Inventory* (MSI), with items for measurement of the independent variables in the model, is already existing. As it was shown in the literature review of MSI's scientific and empirical application, the questionnaire by Barbuto and Scholl had been used on various topics and circumstances. As a result, the survey is easier to analyse and compare. The statements in the questionnaire are listened randomly without its assignment to motivation source. That should help to avoid giving influenced and biased answers. In the used survey, the content of the statements are the same to the questionnaire of Barbuto and Scholl.[362]

---

[360] Ganzach et al. (2000): Making decisions from an interview: Expert measurement and mechanical combination. In: *Personnel Psychology*, volume 53, issue 1, p. 4.

[361] Kruse, J. et al. (2012): In und mit fremden Sprachen forschen. Eine empirische Bestandsaufnahme zu Erfahrungs- und Handlungswissen von Forschenden, p. 46.

[362] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, p. 1021.

The original questionnaire evaluating sources of motivation was formulated in English language. The detailed target groups are described later, but it needs to be anticipated that almost all participants have German as their mother tongue. As a result, the survey was translated by the author into German language with high carefulness of the context. Both versions can be found in the appendix.

Both quantitative surveys in this thesis are structured with 5 point Likert scales rating each item. Likert scales are valid research measurement scales which allow the respondents to express the degree of agreement or disagreement with a particular statement on an ordinal scale regarding a specific variable.[363] The degree of approval can be from 5 'strongly agree' to 1 'strongly disagree'.

For the survey on ERP Project Success, no suitable and scientific proven questionnaire was existing. At least, literature research did not reveal a set of items to make a standardized measurement. Many ERP consulting companies already use a quality review in the form of spreadsheets. These quality reviews are normally formulated and questioned by the quality managers or marketing experts of ERP consulting companies, who want to evaluate the project from their external standpoint. The questions are very much targeting the efficiency of project management, knowhow and services quality of the ERP vendor. Questionnaires of that kind are targeting to find out potential fields of improvement for consulting and service performance. As a result, ERP project measurement methods created by ERP industry are not applicable to get a comprehensive evaluation of this topic. For a neutral analysis of ERP project success, a comprehensive survey covering all perspectives needed to be defined, and items for every dimension needed to be classified and pre-tested as well.

The author built up an inventory of items describing 11 dimensions of ERP project success described by van der Westhuizen and Fitzgerald (2005) as an extension of the DeLone and McLean model.[364] The author also used the describing nouns for comprising each dimension found in literature review (chapter 2.3, table 2-2). The statements for each dimension were phrased to condense most of the aspects found in the chosen approach of ERP project success measurement. As describes in the previous chapter, expert interview were conducted to test every item on its understandability, goodness of fit to its dimension and final choosing of

---

[363] Likert, R. (1932): A technique for the Measurement of Attitudes. In: *Archives of Psychology*, volume 140, pp. 1-55.

[364] Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In: *European Conference on IS Management, Leadership and Governance 2005*, p. 12.

maximum six items per dimension. CEOs from different companies also were asked whether all the statements were save against misinterpretation.

Because the survey was carried out in Austria and Germany, and although it can be implied that CEOs speak English, the survey was formulated in German language. Besides the fact that context is easier to understand in first language, it also needs to be mentioned that English as business language is not so common in medium-sized companies than in larger ones. To avoid any misunderstandings or misinterpretations, an English translation was also provided for every item. According to Atteslander (1993), rules for creating new surveys has to be applied, as a question should:

- be formulated clearly and unambiguously

- contain simple words and avoid foreign words, abbreviations and technical terms

- be brief and refer only to facts

- appeal to facts directly and concretely. Abstract terms have to be concretized

- provoke no specific response (no leading questions)

- be formulated as neutral and not include 'polluted' or evaluative terms

- not be hypothetical

Double questions, addressing two or more issues in a question, ought to be avoided. In addition, statement should not have complicated grammatical constructions.[365]

Considering these requirements, the final comprehensive query was created, with 6 statements assigned to each of the 11 dimensions of ERP project success. For example, one of six statement describing Net Benefits is: 'The new system expands the possibilities of increased sales'. The possible answers were fixed with a 5-level Likert-scale, which ranges from value 1 'strongly disagree to 5 'strongly agree'. To make later statistical analysis easier, all statements were formulated in a positive meaning, which implies 'strongly agree' has a positive valuation of the project success dimension.

---

[365] Atteslander, P. (2010): Methoden der empirischen Sozialforschung. Erich Schmidt Verlag, p. 155.

3.3. Data Collection and Analysis within the Primary Research

Data collection actually started with qualitative experts interviews as described in previous chapter. The data from these interviews were recorded in protocols and structurally collected in spreadsheets. This was done in order for weighting and evaluating the summarized information. Experts also assessed each items' comprehensibility and fitting to assigned dimensions for measurement of ERP project success. In order to evaluate the assessment of the experts, also spread sheets were used to discover the final version of the questionnaire.

After the expert interview phase, the quantitative research instrument has been constructed. Questionnaires are handed out to the target groups, with the goal of collecting measureable facts. The responses are favourably administered via the World Wide Web, as the online tool 'SurveyMonkey' was used to collect the data. The links for the surveys were distributed per E-Mail to CEOs, and to avoid long delays, reminders per telephone were made.

To get very fast results, online survey is seen as the best method. Popularity of internet use increased over the last two decades, as cost of computer hardware and software decreased, making nearly all organizations moving online.[366]

A main advantage of online survey is the fact that unique populations can be reached, which is especially necessary with this topic.[367] Getting access to CEOs of companies, even if they are from medium-sized organizations, would have been much more difficult some decades ago. The use of emails implicates at possibility to establish a direct contact to executives, although there is still a chance messages are preselected by assisting personal. To get attention on the survey, the author tried to design an appealing wording in the first contact email, offering summarized findings from the study in return for participants.

An online questionnaire also saves time for the researcher, as a large sample with common characteristics can be reached in the short term, despite being separated by a large distance.[368] In addition, it is possible to distribute an invitation to the online survey to a large amount of potential participants. The author of this thesis realized that with a mailing list containing about 12.000 CEOs showing interest on ERP systems. Online surveys also allow researchers

---

[366] Nie, N. et al. (2002): Internet use, interpersonal relations and sociability: Findings from a detailed time diary study. In: *B.Wellman (Ed.), The Internet in Everyday Life*, pp. 215-243.

[367] Garton, L. et al. (1999): Studying on-line social networks. In: *S. Jones (Ed.), Doing Internet Research: Critical Issues and Methods for Examining the Net*, pp. 75-105.

[368] Ibid.

to collect data without spending directly time on that task.[369] Once the invitations are sent, other aspects of the study can be addresses.[370] In the case of this questionnaires though, a frequent interaction with potential participants was necessary. Giving away information about success of an internal project of that high organizational impact raises questions about the origin of the researcher, the background of the study, the anonymization of data and the guarantee of privacy policy. Using the online survey tool 'SurveyMonkey' implied an automatic and immediate transmission of the responses to a database file. Even before the required number of responses was reached, the author was in position to conduct preliminary statistical analyses.

Another advantage beside the quick response rate is the reduced costs by moving to an electronic medium from a paper format.[371] Although online survey hosts like 'SurveyMonkey' do charge a fee for their service, it is much lower compared to expenses on paper questionnaires sent by postal mail.

A major disadvantage of online surveys can be found in context with sampling issues. For example, detailed characteristics of the people participating may be questionable. Without further checks, the survey may address the wrong target groups. To compensate the disadvantages of online questionnaires, various measures were implemented. To avoid a low response rate, the general willingness of participating enterprises was clarified in advance. This measure also help to eliminate the problem with being considered as online spam and the bad quality of mailing list, as the participants' mail addresses are also checked in advance. It was also essential to address every executive personally with his or her name. The bias of misunderstandings were avoided, as the possibility of personally contacting the author per phone or mail in case of questions was offered. And finally, the requirements for participating on the surveys were very clearly communicated before and during the questionnaire. These prerequisites mentioned above are described in the next chapter.

In addition to the queries, an explanation for each dimension was added including the descriptions for each dimension from the literature analysis. This was applicable for the dimensions System Quality, Information Quality, Service Quality, Use / Intention to Use, User Satisfaction and Net Benefits. The five dimensions solely attached to project

[369] Llieva, J. et al. (2002): Online surveys in marketing research: Pros and cons. In: *International Journal of Market Research*, volume 44, issue 3, pp. 361-367.

[370] Andrews, D. et al. (2003): Electronic survey methodology: A case study in reaching hard-to-involve Internet users. In: *International Journal of Human-Computer Interaction*, volume 16, issue 2, pp. 185-210.

[371] Llieva, J. et al. (2002): Online surveys in marketing research: Pros and cons. In: *International Journal of Market Research*, volume 44, issue 3, pp. 361-367.

management success were also explained. A detailed description of all dimension was given at the end of chapter 3, identifying the characteristics of the extended ERP success measurement model presented by van der Westhuizen and Fitzgerald.

Table 3-2 provides an overview of the various research aspects and their operationalization. It also describes how the variables are assessed and which statistical tools are used for analysis.

Table 3-2: Research Aspects, Research Proposals and Analysis

Research Aspect	These	Independent Variables	Dependent Variable	Assessment	Analysis
Impact of *intrinsic process* motivation on ERP project success	T1	*Intrinsic process* motivation	ERP project success	2 Questionnaires, 5-point Likert scale	Multiple linear regression analysis
Impact of *instrumental* motivation on ERP project success	T2	*Instrumental* motivation	ERP project success	2 Questionnaires, 5-point Likert scale	Multiple linear regression analysis
Impact of *self-concept external* motivation on ERP project success	T3	*Self-concept external* motivation	ERP project success	2 Questionnaires, 5-point Likert scale	Multiple linear regression analysis
Impact of *self-concept internal* motivation on ERP project success	T4	*Self-concept internal* motivation	ERP project success	2 Questionnaires, 5-point Likert scale	Multiple linear regression analysis
Impact of *goal internalization* motivation on ERP project success	T5	*Goal internalization* motivation	ERP project success	2 Questionnaires, 5-point Likert scale	Multiple linear regression analysis
Dimensionality of ERP project success measurement can be identified	T6	-	ERP project success	1 Questionnaire, 5-point Likert scale	Factor analysis

Source: created by author.

In advance, descriptive analysis was used to characterize the sample of the primary research. Then factor analysis was employed in order to test validity and dimensionality of the dependent variable ERP project success.

3.4. Participants, Sample and Timing of Primary Research

For qualitative research assessing and pre-testing the questionnaire on ERP project success, executives from medium-sized companies in different branches were invited to participate. The requirements for being selected for expert interviews were mostly referring on having experience with multiple ERP implementations in Austria or Germany. Therefore, a certain seniority of the CEOs was required. It is important to mention that experts were asked to put themselves into the role of CEOs without vast ERP knowledge when they had to rate items in

the questionnaire concerning understandability. It cannot be expected from average managing directors, who were later invited to participate in the quantitative survey, to have deeper knowledge in ERP project management and its system performance. Finally, the expertise of 10 CEOs was used to evaluate and improve the quality of the questionnaire on ERP project success.

After the quality check through expert interviews, the web links for the quantitative surveys were sent per mail to CEOs from medium-sized companies from Austria and Germany. The requirement for participation was that the companies had to have a full ERP implementation, which means the core modules like finance and logistics were included, mainly finished in the years 2011, 2012 or 2013.

Bases for all survey are the target groups, the organizational separation of the employees in the explored company. Possible participants on the 2 surveys are Chief Executive Officer, (CEO), Chief Information Officer (CIO), project manager, key user (sub project manager), end user (participating in the project without responsibility) or external staff (additionally casted for ERP project).

Because these groups have different relation to the ERP implementation, it needs to be decided which group has to be included in the survey. In this thesis, the focus is on evaluation the sources of motivation of key users and its impact on ERP project success. For evaluating and confirming the success of the finished ERP implementation, it makes sense to ask CEOs. First of all, they have reliable access to many relevant figures and indicators. And secondly, it is experienced that CEOs and high level managers usually have a more objective view on achievement of previous set goals. It is comprehensible that the ERP project managers are excluded from these surveys, as they would assess dimensions they actively worked on during ERP implementation. As their own performance is also rated on these issues, an assessment by ERP project managers would be biased and presumably too positive.

CEOs are best fitting for objectively evaluating ERP project success, as they are not directly and daily involved in ERP project implementation, but still have contact with key users in medium-sized companies. They are in active exchange with ERP project management, usually taking part in ERP project steering committee and know the most important numbers and milestones being project sponsor. In addition, CEOs are able to access the financial numbers to assess net benefits.

The second survey on sources of motivation was completed by key users. The reason for selection of key users is justified by their central role during ERP implementations, which was

described in detail in chapter 2. It can be summarized that key users do most of the project work, co-design processes and test them. They have the responsibility for processes and business functions of each department being mapped effectively to the new ERP system. To be qualified for participating in the quantitative survey on employees' motivation, the key users needed to be full time employed during the whole ERP project phases. Another requirement is that they still work in the company the implementation was conducted. This also has a practical reason, as the key users were invited by CEOs to participate on the online survey. Filling out the questions in the anonymous surrounding of the World Wide Web assured key users their data were not made known to anybody in the participating organizations.

The starting point of methodological considerations is the research goal, to find out how and which sources of motivation mostly impact ERP projects. A unique role to the concept of research design is taken by the choice of the survey dates. As a temporarily project organization exists during ERP implementations, considerations for a survey several potential points of time were offered, such as at start, during final phase or after go-live of ERP project (backward look). However, some of these theoretical options fall away for various reasons and are not operable based on problems with field access.

At the start of projects, team members start an extended period of close collaboration with ERP consultants. An extensive knowledge has to be built up as members of the project team learn the ERP system and ERP standard processes. Vice versa, consultants get familiar with the organization of the implementing company. The intensity of involvement with the system implementation and organization design draws project members away from their daily business. Their knowledge and experience status are overlapped by new knowledge and possibly some experience in the new ERP project. This poses the risk of distorted representation in surveys on key users' motivation that are conducted directly after the project started. Since the success of ERP projects cannot be seriously evaluated at that stage, a design that provides ex-ante surveys is not realizable.

Conducting the two surveys at the final phase of ERP project would imply an inquiry during the most critical stage of an implementation. The responsibility for the operations is passed by the project team to a large number of users, with the majority of them being beginners concerning working with the new system. During this time, the most questions from normal users to the project team are expected. At this point, the project team also is under pressure, proving the working hypothesis formulated before, is working properly and with good performance. Therefore, this point of time is also not well fitting for making surveys, as

positive distortions of opinions can be expected due to micro-political situations, social desires or even effects of euphoria. Concerning the success of ERP project rated by CEOs, a qualitative evaluation might be possible, but key figures like reaching the expected costs or increased net benefits are not yet available.

Surveys several months after go-live allow incorporating the effects of the project results on the productive operation into the study (backward look). In contrast to the starting time of productive system operation, it can be assumed that the troubles mentioned above came into perspective and the ERP consultant assignments are largely completed. It may be expected that the organization and daily work with the new ERP system have begun to pass into a self-directed everyday state regarding the object of our investigation.

Taking the described analysis into account and for the purposes of the research objective, surveys in form of backward look months after go-live is best suitable for the purpose of this doctoral thesis. At that point of time, also the experiences of former project members were assessed with a helpful distance. It is expected to get more objective feedback after the new ERP system is running for a certain period of time. From the practical point of views, the backward look is the only really possible method, because it is practically not feasible to accompany over 200 ERP projects at once.

Summoning up the requirements for ERP projects, its' questioned participants and circumstances, firstly the implementing company has to be a medium-sized business. Moreover CEO and survey participating key users from the project must still work in the company. This is checked in advance during the contact per mail with CEO. And finally, the main ERP implementation had to be finished for about six months. This time having passed since go live make sure evaluation of ERP project success is not negatively tampered by often occurring system problem during the first weeks working with the new software. In most cases, it takes not more than two months having a proper running ERP system again.

A total number of ERP implementation projects for medium-sized companies in Austria and Germany per year is not statistically observed in any journal or scientific literature so far. To find out the general population, a group of eleven ERP salesman, researchers and ERP journal editors were asked by the author to estimate the total number of ERP projects per year. This group of people qualified to answer that single question by being experts of the ERP market for a long time. Besides professional experience in that branch for over 20 years, the respondents of this panel each have knowledge of different kind of ERP solutions. A mean number of 650 full ERP implementations per year was the result, which means the number for

the researched time span is close to 2000. An overview of this second qualitative expert interview can be found in appendix 8.

The response on the mailing to CEOs was relatively good, though many questions concerning privacy and data security had to be clarified per mail and phone calls. The quantitative survey was mainly conducted between November 2014 and January 2015 at online tool 'SurveyMonkey'.

A simple random sample has been drawn from a medium-sized companies ERP database consisting of 10.804 potential respondents from Germany and Austria. This database is consisting of organizations interested in a new ERP implementation. A total of 3.389 emails, were not deliverable or have created failure notices which prevented the potential respondents from participation in the survey. This resulted in 7.415 potential respondents, but it must be restricted that approximately only 5 to 7 % of all interested companies have actually implemented a new ERP system in presupposed time span. After a 3 month data collection phase, 402 responses on the survey on ERP project success and 345 responses on motivation were registered. After deleting all the incomplete and obvious invalid responses on the first query, a total of 326 companies validly filled out the survey on ERP project success.

The second step was to get the associated survey data for the second survey on employees motivation, as consideration upon data security is more pronounced with project team members. Revealing the way employees are motivated is a sensitive topic for most people, especially if the request to take part comes from their own CEO. As a result, many project team members refused to participate with the voluntary survey. This obstacle leads to many quantitative survey samples described as ERP projects being without completion on the second survey, making these spot checks unusable for later correlation analysis. In total 328 responses on the second questionnaire on motivation were usable and valid. In some organizations, more than one key user of one company answered. In this case, mean value for all responses of one organization were determined and used for further analysis.

As one sample case needs validly filled out questionnaires from both surveys, the last step was to match the data from the responses. This was done in over 90% of the cases by matching identical IP address of the participants. If IP addresses were not suiting each other, links were made due to identical text in the field 'company name'. Cases where a clear matching was not possible were completely left out for further statistical analysis. The development of the final sample size is pictured in figure 3-2.
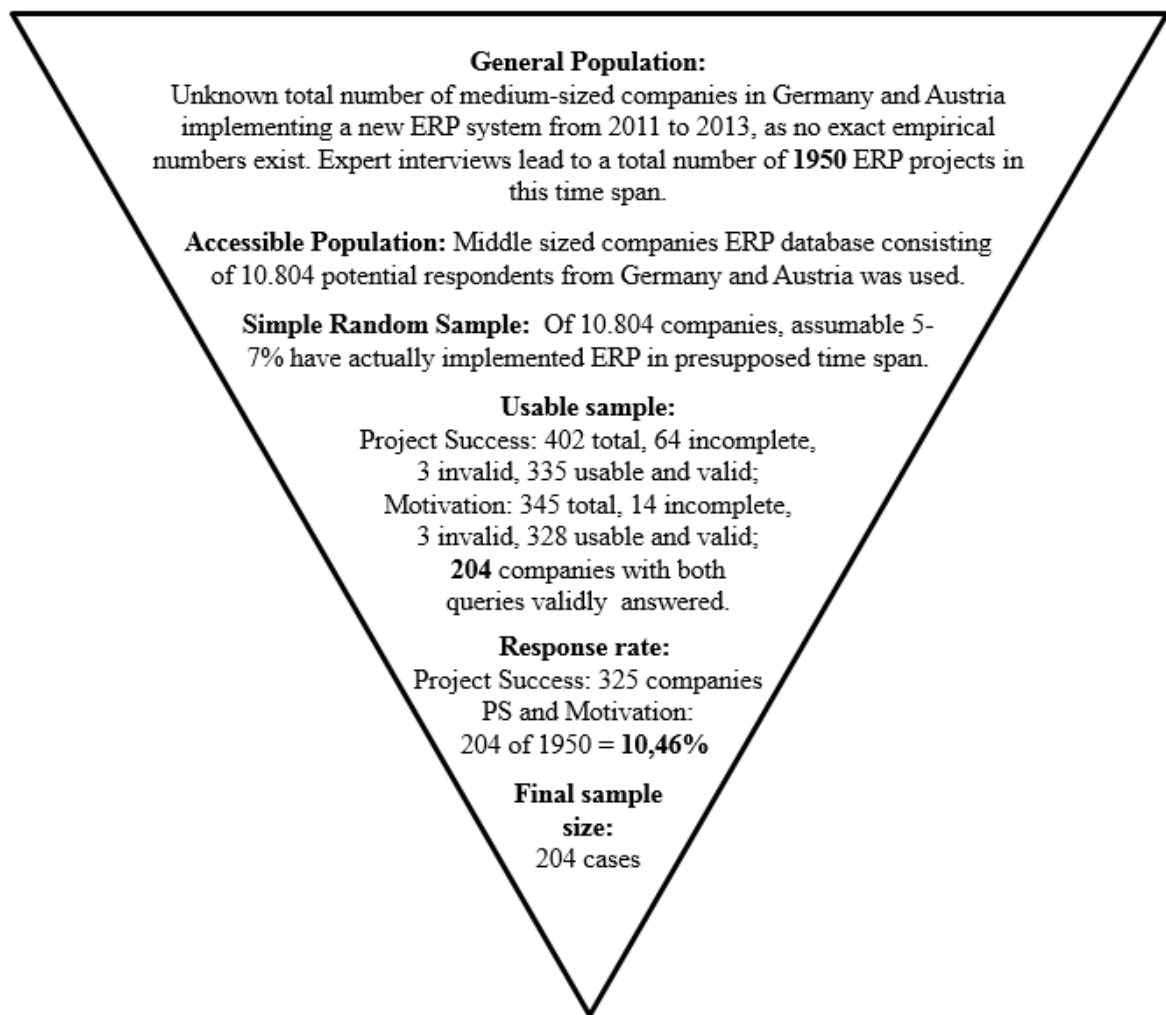
General Population:
Unknown total number of medium-sized companies in Germany and Austria implementing a new ERP system from 2011 to 2013, as no exact empirical numbers exist. Expert interviews lead to a total number of **1950** ERP projects in this time span.

Accessible Population: Middle sized companies ERP database consisting of 10.804 potential respondents from Germany and Austria was used.

Simple Random Sample: Of 10.804 companies, assumable 5-7% have actually implemented ERP in presupposed time span.

Usable sample:
Project Success: 402 total, 64 incomplete, 3 invalid, 335 usable and valid;
Motivation: 345 total, 14 incomplete, 3 invalid, 328 usable and valid;
204 companies with both queries validly answered.

Response rate:
Project Success: 325 companies
PS and Motivation:
204 of 1950 = **10,46%**

Final sample size:
204 cases

Figure 3-2: Development of the Quantitative Research Sample
Source: created by author.

The number for approximately 1950 full ERP projects in medium-sized companies in Austria and Germany is not empirically proven and a result of expert estimations, which are described in the next chapter. Underlying that number, the sample covers at least over 10 % of the total population.

The following chapters reveal the results from qualitative and quantitative research related to impact of employees' motivation on ERP project success within medium-sized companies in Austria and Germany.

3.5. Qualitative Research Results: Measurement of ERP Project Success

This chapter describes the results and findings from content analysis from all qualitative expert interviews conducted in context with ERP project success. It was necessary to research fitting and understandable items for the survey, and evaluate the statistical population.

Finding Items for Survey on ERP Project Success

To find possible statements which describe each of the 11 dimensions describing ERP project success[372], eight experienced ERP project management experts were interviewed. The interview was guide lined by a questionnaire created by the author. Many additional statements were formulated by the experts in different ways, but actually mean the same. The author added these statements and summarized them to own found items. The interviews showed that some statements were not formulated clearly and some aspects were even missing. The main finding of the interviews was the realization that all statements have to be formulated in a positive way. The first questionnaire draft by the author also included items which required low rating to achieve high success, because they were negatively expressed. This resulted in possible confusion at test subjects, and might include the danger of misreading or misinterpreting the content of some statements. During the quantitative survey, the author explicitly pointed out that every statement is formulated in a positive way. Finally, the interrogations resulted in 8 to 10 items per dimension.

Evaluation of Survey on ERP Project Success

These expert interviews were conducted as a pre-test on the survey with CEOs and CIOs of medium-sized companies. Checking comprehensibility of all statements describing each dimension of ERP project success lead to various rephrasing of statements used for items. The fitting of statements to respective dimensions describing ERP project success was also evaluated by each expert conducting a pre-test. The rating for this goodness of fit was decisive for choosing the final 6 items per ERP project success dimension.

Total Number of ERP Implementations

The circumstances and target group of the survey was predefined, but as mentioned before, an empirically proven number of ERP implementations in medium-sized companies per year in Austria and Germany does not exist. To get an approximately number for the statistical population, ten experts were asked for their estimation on that number. The suggested numbers for a total number of ERP implementations during the three year time span ranges between 930 and 4100. These 2 values were statistical outliers, as eight experts calculated a total number between 1650 and 2490. An average number of 1950 finished ERP projects during the examined time span is the result of these swift expert interviews.

---

[372] Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In: *European Conference on IS Management, Leadership and Governance 2005*, pp. 1-17.

3.6. Quantitative Research Results

The sample concerning the main hypothesis consisted of 204 cases, which describe companies implementing an ERP system. To be considered as a reasonable case for further statistical analysis, at least one CEO had to validly fill out a questionnaire on ERP projects' success, and at least one key user from the same company had to complete the questionnaire on *Motivation Sources Inventory* accurately. In many of these cases, more than one person completed the survey on motivation per company. In some cases, even more than one CEO evaluated ERP project success. To avoid further complexity, the mean values of multiple respondents' answers of one company were calculated and assigned to each of the 204 cases. As a result, all demographic data revealed is summed up to the 204 cases of the main study, with some cases consisting of average valued statements of multiple responses.

The majority of 92% of the participating companies conducted the ERP implementation in Germany (188 cases). Close to 8% of the projects were carried out in Austria, totalling 16 cases. This ratio between Austria and Germany is similar to its total population (Austria in 2014: 8.543.932[373] to Germany in 2014: 81.198.000[374]). A detailed listing of the demographic results from the two quantitative surveys can be found in Appendix 9.

Figure 3-3: Distribution of Sample per Country in Relation to Countries' Population
Source: created by author, own quantitative research

3.6.1. Dimensionality of ERP Project Success Measurement

First observation on the results revealed that there could be obvious similarities and correlations between the 11 dimensions of the used model. As a result, factor analysis has been used to reveal a more accurate underlying dimensionality of ERP project success measurement, in the context of the construct's constitution and major influencing factors.

---

[373] Statistik Austria (2016): Population of Austria in 2014, Link in references, checked on 15.02.2016
[374] Statistisches Bundesamt (2016): Population of Germany in 2014, Link in references, checked on 15.02.2016

Additional expert interviews with long-time ERP experienced CEOs suggested a logical reduction to 5 dimensions. It was confirmed that no aspect of ERP project success was missing with these newly reduced dimensionality. For further approval on this number, a parallel analysis with O'Connor macro was conducted. The intrinsic value of the fifth component of the random data (1,795) was closest to the fifth component of the used data for measuring ERP project success (1,821).

A principal component factor analysis with Varimax was performed with 66 measurement items, theoretically relating to the 11 original dimensions gathered from the 326 sample elements. The Kaiser-Meyer-Olkin measure of sampling adequacy has been determined with a value of 0,956, which suggests that the sample is factorable. Bartlett's Test of Sphericity has given significant results with 0,000 ($p < 0,05$), indicating that there are correlations within the data and that factor analysis was appropriate.[375]

Table 3-3: Three highest Factor Loadings from rotated Component Matrix for Items per new Dimension

	1 = project management; 2 = user satisfaction; 3 = time and budget; 4 = ERP system quality ; 5 = Economic value	Dimension				
No.	**Item**	**1**	**2**	**3**	**4**	**5**
PS08_5	The communication and escalation paths were known and transparent from the outset.	,712	,114	,138	,182	,123
PS04_5	The management board was satisfactorily informed about project progress at every stage of the project.	,706	,090	,100	,217	,219
PS04_4	Escalations were addressed fully and promptly to the stakeholders.	,701	,030	,093	,146	,169
PS09_2	Users see the new system processing steps mainly positive compared to old system.	,104	,769	,184	,161	,229
PS10_3	Users feel their work is less time consuming compared to old system.	,089	,759	,243	,060	,164
PS10_2	Users recognize the new system has more advantages than disadvantages for their daily work.	,127	,739	,168	,185	,372
PS01_6	The project was completed by the scheduled time.	,188	,131	,772	,000	,177
PS02_1	Total budget within the predefined specifications was met.	,165	,093	,756	,129	-,015
PS01_4	The go-live date was met.	,152	,117	,734	,013	,189
PS07_3	The information generated from the new system is easy to understand.	,194	,347	,062	,649	,159
PS07_5	The new system has a good data quality.	,289	,183	,041	,631	,164
PS07_2	The system covers our desired processes.	,252	,266	,100	,623	,321
PS11_5	The new system expands the possibilities of increased sales.	,158	,240	,009	,131	,679
PS11_2	Our business processes are operating more efficiently and transparently than before.	,216	,455	,179	,230	,623
PS11_3	The project results help our company to reduce costs in the medium term.	,077	,409	,127	,227	,601

Source: created by author, own quantitative research[376]

---

[375] Backhaus, K. et al. (2008): Multivariate Analysemethoden, 12th edition, Springer: Berlin, p. 323.
[376] The full table can be found in the appendix.

Item loadings above 0,4 have been accepted have been included to the 5 new dimensions. The full table of all items which generated an acceptable loading to stay in the model can be found in the appendix.

Cronbach's Alpha has been used as reliability coefficient in assessing the internal consistency of the model. The analysis revealed values ranging between 0,916 and 0,945 (> 0,8) which indicates a very high level of internal consistency of the measurement scale for the particular sample. Table 3-4 also describes the mean values and standard deviation of each ERP project success dimension.

Table 3-4: ERP Project Success' new 5 Dimensions, Cronbach's Alpha

Dimension	Description	Mean	Standard Deviation	Coefficient α
1	Project management	3,835	0,241	0,945
2	User satisfaction	3,848	0,195	0,942
3	Time and budget	3,609	0,305	0,918
4	ERP system quality	4,159	0,202	0,907
5	Economic value	3,967	0,391	0,916

Source: created by author, own quantitative research.

Five new main components have been extracted, with given Eigenvalues of the factors above 1, with factor 5 having the lowest value at 1,806. The cumulative value of the five dimensions explains 56,4% of the total variance. Project management explains the majority of 37,5%, followed by user satisfaction (8,1%), time and budget (4,9%), ERP system quality (3,1%) and economic value (2,7%). A list of factors' Eigenvalues can be found in Appendix 11. The reduction of dimensions for ERP project success is pictured in figure 3-4.
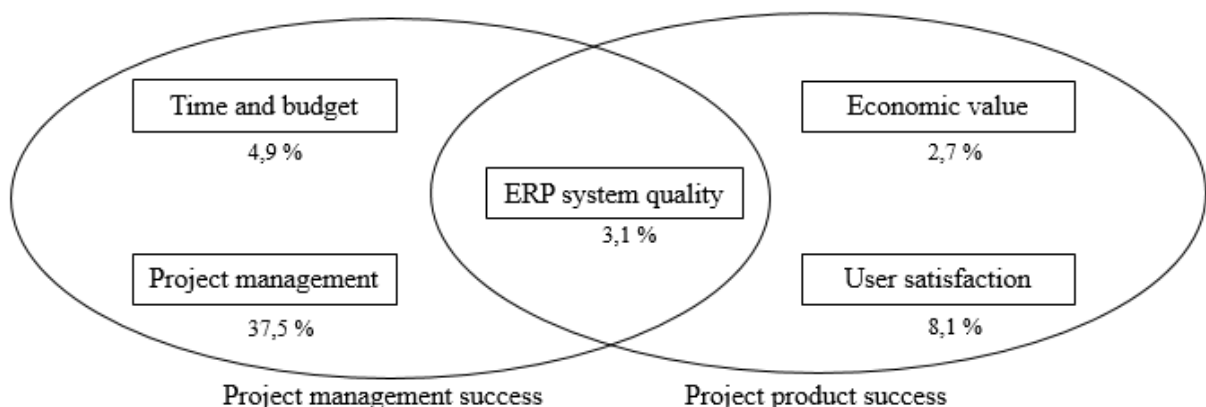

Figure 3-4: ERP Project Success Measurement with 5 new Dimensions
Source: created by author, own quantitative research.

3.6.2. Impact of Sources of Motivation on ERP Project Success

The main question is the impact of the five independent variables representing the *Motivation Sources Inventory* on the dependent variable ERP project success. The five independent variables *intrinsic process motivation, instrumental motivation, self-concept external, self-concept internal* and *goal internalization* have been included in the model.

As described in chapter 3.2, each dimension of MSI consists of six items with the score of 5 for full agreement and 1 for absolute no agreement for the statement. Mean values pictured in table 3-5 are calculated as average values of six items per dimension. In conclusion, five would be highest score which could be achieved for each dimension.

Table 3-5: MSI - *Motivation Sources Inventory* - 5 Dimensions

Dimension	Description	No.	Mean	Standard Deviation
1	*Intrinsic process* motivation	204	3,2375	0,54441
2	*Instrumental* motivation	204	3,0782	0,48559
3	*Self-concept external* motivation	204	2,9196	0,52142
4	*Self-concept internal* motivation	204	4,0663	0,46341
5	*Goal internalization* motivation	204	3,5364	0,53745

Source: created by author, own quantitative research.

The results show that the mean of *self-concept internal* motivation clearly is higher compared to the other dimensions, with *goal internalization* scoring the second highest mean. The others three dimensions score with a balanced characteristics around the middle (3) of the highest possible score of five.

The Null-hypothesis of the model, which states that there is no significant relationship between the independent variables and the dependent variable, has been checked with procedure of F-test. The five-dimensional model revealed an f-value of 6,296 at a significance level of p=0,000 (<0,05) for the reviewed model. Hence, there are significant relationships within the model and Null-hypotheses cannot be confirmed. Multiple regression analysis is justified, as Durbin-Watson value of 2,076 is indicating low auto-correlation. Checking further requirements, P-plot and histogram analysis show normal distributions of data within the model.

Table 3-6 summarizes results from multiple regression analysis regarding the five-dimensional model, involving *intrinsic process motivation, instrumental motivation, self-concept external, self-concept internal* and *goal internalization* as independent variables.

Table 3-6: Results from Multiple Regression Analysis: Impact of 5 Dimensions of MSI on ERP Project Success

Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	**Std. Error**	**Beta**	**t-value**	**p-level**	**Rol.**	**VIF**
(Constant)	159,051	23,968		6,636	,000		
Intrinsic process	-5,993	5,503	-,092	-1,089	,277	,610	1,638
Instrumental motivation	-2,032	5,385	-,028	-,377	,706	,801	1,248
Self-Concept External	-3,429	5,785	-,050	-,593	,554	,602	1,661
Self-Concept Internal	21,636	6,353	,283	3,406	,001*	,632	1,582
Goal Internalization	12,861	5,868	,195	2,192	,030*	,551	1,815
$R^2 = 0,137$ (p $<$ 0,05*)							

Source: created by author, own quantitative research.

Results show that the model explains 13,7% of the total variance in ERP project success. The independent variables *self-concept internal* and *goal internalization* have a significant positive influence on ERP project success. By contrast, no significant relationship was found between *intrinsic process, instrumental* and *self-concept external* motivation on the dependent variable of the success rate of an ERP implementation. The Beta level of 0,283 indicates that *self-concept internal* motivation can be seen as biggest predictor of ERP project success. *Goal internalization* follows second with a Beta value of 0,195.
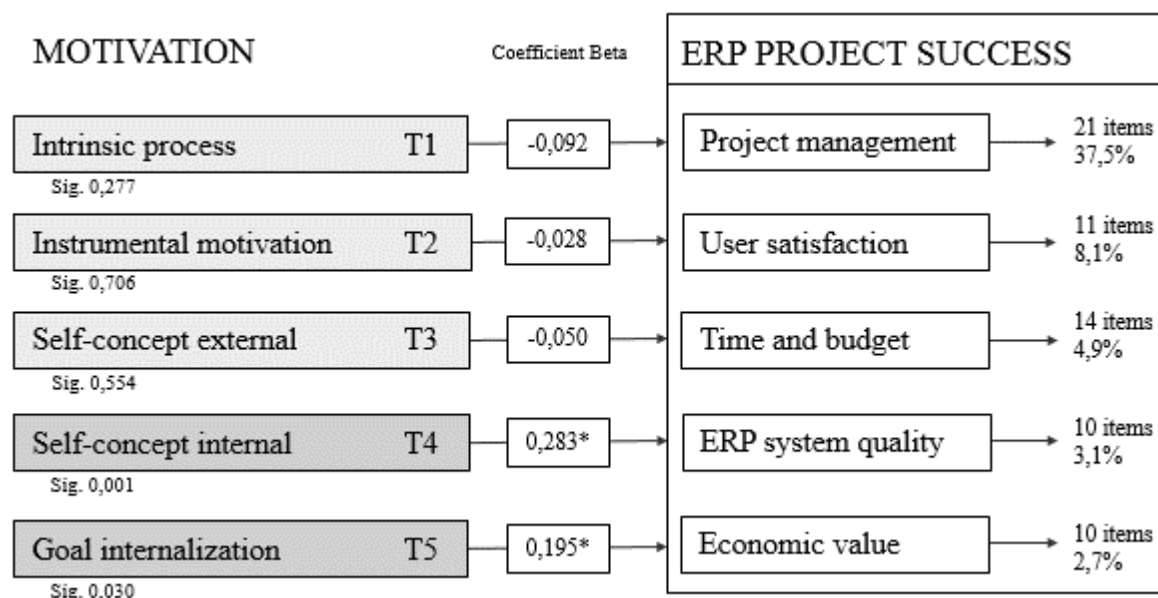

Figure 3-5: Summary of Results from Multiple Linear Regression Analysis
Source: created by author, own quantitative research.

Figure 3-5 illustrates key research findings about the 5 different sources of motivation's impact on ERP project success. It includes Beta coefficients for the independent variables, which are marked with a '*' if p-level $<$ 0,05.

Summarizing the results from quantitative research, *self-concept internal* motivation and *goal internalization* have a significant positive influence on ERP project success. No relationship between motivational factors related to *intrinsic process, instrumental-* and *self-concept external* motivation and the dependent variable has been found.

3.7. Interpretation of Results from Primary Research

ERP systems have changed the way in which business data is collected and stored.[377] Even more important, the way data is shared and used across a company has high impact on processes, information and organization of modern companies. An implementation of ERP can deliver improving ways of doing business and establish new potentials and perspectives for expanding companies. Especially for cross-national operating companies an effective and fitting ERP system is an essential requirement, as in most cases old IT-systems are replaced because of technical restrictions and limitations concerning processes. But the road to a well running ERP software can be full of obstacle, as previous chapters also broached the issue of ERP project failure. Issues which are related to the functionality and configuration of the ERP system itself are not the main challenge anymore, as being able to achieve functional coordination within the company seems to be a significantly more important task for the ERP project managers. Critical success factors for ERP implementations are ERP teamwork and its' composition, support of top management, a good business plan, efficient communication, effective project management, appropriate systems, functional change management, reasonable business process reengineering, good testing and finally, regular monitoring and evaluation of performance.[378] Focusing on qualities key user should bring in, cooperation, knowledge, communication, responsibility, high commitment and motivation are mainly mentioned. Reason for decreasing team morale are implementation delays, wasted efforts, repetitive rework, trial and error solutions and very often just failure of communication. Good communication is a core factor, since it enables visibility as to how each group's contribution complemented those of the others. Project management must embrace all uncertainties and variables relating to the implementation. In addition, it must arrange fair allocation of workload to retain motivation and productivity within key users. The effect of employees' motivation by managers is strongly connected to choosing appropriate timing for the motivational efforts. Even more important is to address the right source of motivation for

---

[377] Teittinen, H. et al. (2013): ERP in action: challenges and benefits for management control in SME context. In: *International Journal of Accounting Information Systems*, volume 14, issue 4, pp. 278.

[378] Nah, F.F.H. et al. (2001): Critical factors for successful implementation of enterprise systems. In*: Business Process Management Journal*, volume 7, issue 3, pp. 285.

every individual project team member. It is the responsibility of management to make it easier for the stakeholders in the organization to bid farewell to the former status quo which manifests in processes and functions of the old ERP system. Strong approval for the project from prominent people within the organization is essential to motivate affected employees. These opinion leaders are able to encourage project team members like key users to approach the new ERP project with greater enthusiasm.

It is very important for further considerations on the interpretation of previous quantitative analysis that employees' motivation is only one of many factors leading to a successful ERP implementation. Furthermore, result from this research show that even only specific sources of motivation have significant impact on ERP project success.

3.7.1. Dimensionality of ERP Project Success Measurement

As pointed out in chapter 2.3, different constructs of measuring ERP project success underwent an evolutionary process. For better understanding all aspects of these models, elements and characteristics were clearly defined. By adding the dimensions for project management success to the DeLone and McLean model, the approach by van der Westhuizen and Fitzgerald (2005) provides a comprehensive basis for an instrument to measure the dependent variable, total ERP project success. To prevent too much complexity, the differences in the perceptions of all stakeholders (Linberg 1999; Seddon et al. 1999) and different system types (Seddon et al. 1999) were not integrated. For instance, relating the 11 dimensions to five different stakeholders and six system type dimensions mentioned by Seddon et al. (1999) results in more than 300 combinations. This exponential increase of factors would lead to an unmanageable measuring model.

Empirical data and factor analysis (see table 3-3) showed that the 11 dimensions can be reduced to five main aspects as illustrated in figure 3-6. The main construct stayed the same, as ERP project success is mainly a combination of project management success and project product success. Dimensions project management, time and budget and parts of ERP system quality can mainly be assigned to component project management success.[379] Project product success is containing dimensions user satisfaction, parts of ERP system quality and economic value of the preceding ERP implementation.

---

[379] Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, p. 25.
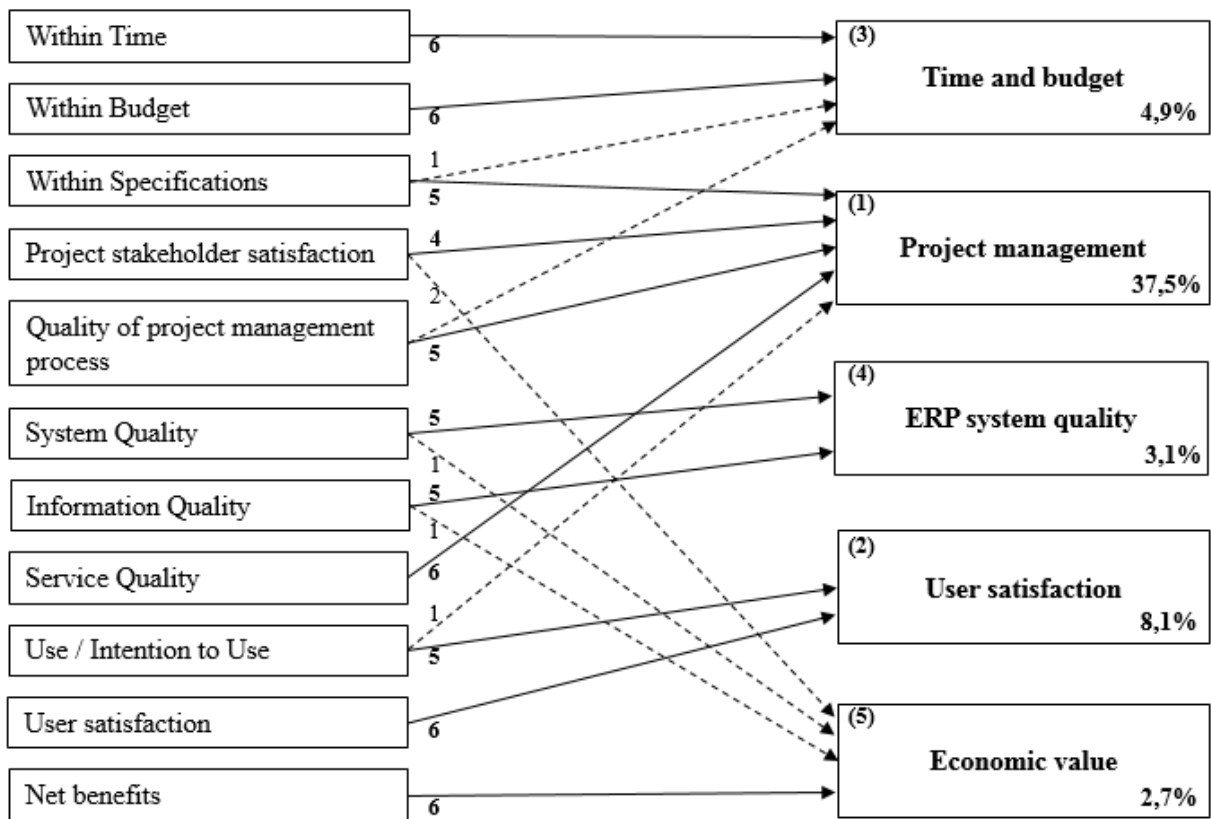
Figure 3-6: Shift of Items to new Dimensions of ERP Project Success
Source: created by author, own quantitative research.

In most cases, all items from the old dimensions fitted directly with one of the 5 new dimensions. In 4 cases, one item was assigned to different dimensions. In one case, namely 'project stakeholder satisfaction', two items moved to new dimension 'economic value'. When retrospectively looking at these 2 items, the shift was content comprehensible.

The numbers implicate that a big weighting of ERP project success is on the quality of *project management* during the implementation project, an aspect which was emphasized in chapter 2.2. Most of the total success is determined by this dimension. It also suggests that time and budget or even directly derived economic value is not most important evaluating ERP projects. It also seems to confirm the development of increasing importance of good project managers. A study on 36 companies with ERP systems by Ike and Mogens (2005) states that project management principles explained close to 30% of the changes that impact ERP project success.[380] A raising number of members is recently observed for professional associations for project managing, more employees strive for project management certification and number of project management offices in companies is also increasing.

---

[380] Ike, C.E., Mogens, M. (2005): Identifying Critical Issues in Enterprise Resource Planning (ERP) Implementation. In: *Computers in Industry*, volume 56, pp. 545-557.

Poor project management paired with bad team compositions and unrealistic project management expectations is often described as the main factor of ERP project failure.[381] In their six factor model, Gargeya and Brady (2005) described a lack of adequate project management besides absence of appropriate culture and organizational readiness as the main influencing factor determining the success or failure of ERP implementation.[382]

According to the research items, the focus of ERP project management quality is emphasized on good scoping, open information policy, effective and rapid escalation paths,[383] transparency, clean risk management and team member support. ERP projects ought to be finished within specifications, which means for reaching these goals project management and companies' top executives need to clarify very early a concrete project scope. The goals and scope of a project needs to be communicated to the project team members and even within the whole company for several times. The aspect of good scoping was already mentioned by Kerzner (1992).[384] Important information has to be communicated openly, especially the status or progress of the ERP implementation. If problems or mayor delays occur, these issues need to be escalated quickly and in full extent. For critical situations, also a transparent risk management is very important. The project management itself has to be highly visible and predictable, for example a status of all departments needs to be made on regular basis and in writing. It is also important to basically derive subproject plans and work packages from the main project objectives. And finally, the non-bureaucratic support of the project team members by project management is imperative. It needs to be stated that successful project management as a central function during ERP projects has also influence on other dimensions. Reaching the goals of budget and time are also dependent on good ERP project management on a basic level.[385]

Dimension *time and budget*, with an average factor score of 4,9% of the total variance, is also very much steered by project management activities during an ERP project. The main stakeholders for the aspect budget are mainly persons from the upper management like CEOs and chief financial officers. Wagner and Monk (2008) state that ERP project managers need

---

[381] Garg, P., Garg, A. (2013): An empirical study on critical failure factors for enterprise resource planning implementation in the Indian retail sector. In: *Business Process Management Journal*, volume 19, pp. 496-514.

[382] Gargeya, V.B., Brady, C. (2005): Success and failure factors of adopting SAP in ERP system implementation. In: *Business Process Management Journal*, volume 11, pp. 501-516.

[383] Lientz, B.P., Rea, K.P. (1995): Project Management for the 21st century. San Diego: Academic Press.

[384] Kerzner, H. (1992): Project Management: A systems approach to planning, scheduling and controlling. New York, Van Nostrand Reinhold.

[385] Longinidis, P., Gotzamani, K. (2009): ERP user satisfaction issues: insights from a Greek industrial giant. In: *Industrial Management & Data Systems*, volume 109, issue 5, pp. 628-645.

to ensure that they have a suitable plan in place for available resources, as the success of an ERP project in terms of its budget and its timelines is dependent on the effectiveness of such project management.[386]

The aspect of time can be seen from two perspectives, depending on the given point of time. During the project, it is essential that deadlines and milestones are met. Delays during the implementation phase have direct consequence for costs and expenses of the project. Delays also have a high implication on motivation of key users, as frequently postponed dates increase frustration for all involved employees, especially when the reasons for shifting are caused by bad planning or decisions. That also means, timelines for ERP projects need to be established in a realistic way, taking care of the available resources. As a result, time lags during ERP implementations are seen as very costly and critical. During a running project, dimension time will be seen as a very prominent factor by the stakeholders. The reason for that might be the moment when the survey was filled out by CEOs, namely several months after go-live of the new ERP system. Observations by the author identify that the factor time is experienced with less importance after the ERP system is finally running very well. Retrospective evaluation very often is putting time and budget into perspective. The reason for that might be a gladly accepted trade off with dimension ERP system quality. The dimension time and budget takes a backseat, when CEOs observe that delays or even moderate budget overruns result in a very good ERP system with all desired information and reports.

The next dimension, *ERP system quality* (3,1%) is strictly evaluating a certain point of time months after go-live. System and information quality combine in this dimension, which is very much determined by the diligence and accuracy the ERP system was implemented. System quality is very much depending on the knowhow of IT department and competence of hosting partner. The hosting of the implemented ERP system can be done by internal IT or external partners. To measure the quality of the system, indicators like response time, security, availability and reliability are used. In literature, reliability was fittingly attached to both original dimensions of system and information quality.[387][388] Furthermore, the behaviour of the system should largely correspond to the expectations of the users and it has to be easy to use. In addition, the new ERP system must be sufficiently adaptable for future

---

[386] Wagner, B., Monk, E. (2008): Enterprise Resource Planning. 3rd ed. Boston: MIT Course Technology Press.

[387] McKinney, V. et al. (2002): The measurement of web-customer satisfaction: An expectation and disconfirmation approach. In: *Information Systems Research*, volume 13, issue 3, pp. 296.

[388] Gable, G.G. et al. (2008): Re-conceptualizing information system success: The IS-impact measurement model. In: *Journal of the Association for Information Systems*, volume 9, issue 7, pp. 378.

requirements. Information quality is usually very much depending on the conceptualizing of effective reporting, a facet of ERP systems which is especially appreciated by higher management. Although reporting does not have a dominant role during ERP implementations, its successful realization is seen as very important evaluating a project retrospective. Getting a better reporting is a very common main goal of most ERP projects, as modern technologies promise more possibilities analysing large data. To measure that, information has to be available in the system and needs to be easy to understand when being processed for reporting. In many cases, the quality of migrated master data plays a central role, influencing the quality of the processes, reporting and also official mandatory declarations. For example, if data for external trade is maintained at material master data and customer data with high quality, the monthly 'Intrastat' declaration, which records the export and import goods within the European Union, is a matter of few minutes. A system with bad data quality requires a lot of reworking and error searching, leading to massive dissatisfaction.

Contemplating employees' contentment with the new system, *user satisfaction* scored the second highest value with 8,1%. This dimension also has an important role in the prominent DeLone and McLean model, as it measures the users' response to the use of the output of the ERP system. It is also described as a summary of attitudes and opinions to the manner in which information is delivered.[389] User satisfaction also measures how user's workplace needs are met in terms of improved performance, making this dimension dependent on reaching expectations. To prevent users' dissatisfaction caused by a system which is not meeting users' and organizations' requirements, ERP project responsibilities have to claim regular feedback during the implementation. This includes aspects like degree of user friendliness, ERP system reliability and appropriate functionality.[390] The reason why user satisfaction is the second highest determinant could be based on nature of ERP systems. It is the main instrument modern companies have to steer, plan and execute necessary processes and business functions. And it is essential that employees use this tool with the conviction that it helps them to effectively handle their daily work. Besides acceptance, users should appreciate the integrated nature of the new system. To fulfil expectations built up during the project, users should make satisfying use of the opportunities in the new system accordingly to the project goals. That also means the new system should be better compared to the old software in terms of processing steps, time consumption and complexity. After a short

---

[389] DeLone, W.H., McLean, E.R. (1992): Information Systems Success: The Quest for the Dependent Variable. In: *Information Systems Research*, volume 3, issue 1, p. 87.
[390] Dezdar, S., Ainin, S. (2011): The influence of organizational factors on successful ERP implementation. In: *Management Decision*, volume 49, issue 6, pp. 911-926.

training period, users need to find it easy to work with the new system. In most cases, a new ERP system is not just a replacement of the previous version. As a result, a major project goal is an added value, which also needs to be recognized by the affected employees. One of the most important advantages of new ERP systems is its' integrated nature, covering comprehensive processes across the departments. Initial scepticism has to be transformed to real appreciation of that factor.

To emphasize the importance of user satisfaction, it has to be pointed out what happens if key users are not content with the new system. This can lead to user resistance towards ERP implementation. This behaviour can be triggered by personal fears, like loss of status, influence or relationships. But dissatisfaction with the new system is very often caused by a lack of understanding how to work with the new system, its' nature and benefits. This can lead to a destructive approach towards ERP, resulting in communicating this negative attitude to others. In some cases, this situation even provokes employees to leave the company during or after the ERP implementation.

The lowest determinant is the *economic value* with 2,7%, a dimension which describes the extent to which the ERP system is contributing to the monetary success of individuals and organizations.[391] In the original model by DeLone and McLean (1992), the dimension net benefit consisted of individual and organizational impact. The individual impact of ERP implementations can be improved decision-making or improved productivity. The organization benefits from increased sales, cost reductions or improved profits.

The low value can be explained by the nature of this dimension. Historically, the economic view on ERP projects is dominated by negative apprehensions, as many executives are more concerned with financial losses caused by a failed ERP implementation, than with gains caused by a successful project. The expectation before a project starts is usually not including higher revenues or much improved productivity. The main requirement for go-live is that the new system is running as properly as the old one, with major improvements concerning added value set aside for a later phase. Clear and measureable financial improvements are simply not the most prominent goals in ERP projects. In addition, the difficulty of quantifying new ERP systems in monetary terms has to be mentioned. Murphy and Simon (2002) try to incorporate these intangibles into traditional cost-benefit analysis in an ERP project.[392] An increasing

---

[391] Petter, S. et al. (2008): Measuring information systems success: models, dimensions, measures, and interrelationships. In: *European Journal of Information Systems*, volume 17, p. 239.

[392] Murphy, K.E., Simon, S. J. (2002): Intangible benefits valuation in ERP projects. In: *Info Systems Journal*, volume 12, pp. 301-320.

difficulty of measurement of intangible benefits like internal improvement, customer service, foresight and adaptability is observed. Nevertheless, it was also demonstrated that traditional cost-benefit analysis can be applied to large-scale information system projects like ERP implementations.

Furthermore, a significant relationship between perceived usefulness (net value) and user satisfaction was described, hinting that economic values can partially be seen as a result of user's content with the new ERP system.[393] Economic value can be seen as a dimension which pictures values that are difficult to assign to the project, such as increased sales, more work efficiency, economic success and reduced costs. It also represents expanded possibilities, such as gaining access to current business information and opportunity to operate in new markets or countries. Summarized, economic value is a perceivable but not a paramount dimension measuring ERP project success.

3.7.2. Impact of Sources of Motivation on ERP Project Success

The importance of general motivation of employees engaged in ERP project is described by many studies. Olson and Kesharwani (2009) describe the missing of explicit goals, lack of commitment by senior managers and the failure of ERP project management to bring together the project objectives with motivations of the employees working within the organization as the main causes for less successful projects.[394] There is a risk of demotivation and demoralization of employees, if project management or the organization hinders the substitution of the former status quo to the new ERP system. Nevertheless, the impact of different sources of motivation on ERP project success has not been a concrete subject of research before.

Five research theses have been formulated which were describing the relations between each source of key users' motivation and ERP project success in Austria and Germany.

Impact of *Intrinsic Process* Motivation on ERP Project Success

The first these (T1) stated that key users in successful ERP projects have on average no significantly higher intrinsic process motivation score than project team members in unsuccessful projects. It was expected that employees mostly motivated by fun do not

---

[393] Leclercq, A. (2007): The perceptual evaluation of information systems using the construct of user satisfaction: case study of a large French group. In: *The DATABASE for Advances in Information Systems*, volume 38, issue 2, pp. 27-60.

[394] Olson, D.L., Kesharwani, S. (2009): Enterprise Information Systems: Contemporary Trends and Issues.

stimulate an ERP implementation to be more successful. The first these was confirmed, as no positive influence was found through quantitative analysis.

People who are motivated by having fun to fulfil their tasks might be a positive facet for an ERP project team at the first glance. Sirota et al. (2005) are describing most project members entering a new project fully motivated due to the novelty and excitement that comes along with a new endeavour.[395] But they are also very easily demotivated by setbacks, changes of scope or unpleasant work. Key users, who even put off tasks that do not bring enjoyment, can be seen as an evident project risk and danger for reaching milestones. Especially in ERP projects, milestones like integrated system tests are very much dependent on the synchronous completion of tasks and functionalities across departments. If the quality of work is dependent on enjoyment doing it, it is very difficult to build dependence towards key users. A special aspect needs to be mentioned in the context of medium-sized companies. In that type of companies, key users very often have to do their daily business besides the ERP project engagement. That double burden frequently results in overtime hours. As a result that unusual situation usually decreases pleasure during the process of work.

Fun for team building is often used by project management, as even games are played during team events to strengthen the groups' morale. But these activities are more for getting the team members to know each other than establishing long-term enjoyment. Studying project work in reality, the aspects of fun and pleasure takes an unimportant part during ERP implementations. More important is fulfilment of tasks, meeting of scope and business-like execution of milestones. *Intrinsic process* motivation of key users having no significant relationship with ERP project success could be explained with the long term and goal achieving character of that type of ventures.

Impact of *Instrumental* Motivation on ERP Project Success

The second these (T2) expected that key users in successful ERP projects have on average no significant higher *instrumental* motivation score than project team members in unsuccessful projects. For *instrumental* motivation, no relationship to ERP project success was observed, which confirms the hypothesis. This underlines the original implication of money and rewards as a hygiene factor, which absence is leading to demotivation.[396] The short time pleasure of extra money or a better position is not improving performance for a long term ERP project.

---

[395] Sirota, D. et al. (2005): The enthusiastic employee: How companies profit by giving workers what they want. Upper Saddle River, NJ: Wharton School Publishing.

[396] Herzberg, F.W. et al. (1959): The Motivation to Work. John Wiley. New York.

The result shows that different significance of *instrumental* motivation is not changing the outcome of ERP implementations. Project teams do not gain advantages if its' members are asking what's in for me. The financial aspect of individuals is not a factor when it comes to the performance of a team driven endeavour. The short term positive aspect of tangible rewards may help giving some extra effort in critical phases. It can also be argued that the prospect of a higher position can lead to better performance during projects. But it seems to be neutralized by the character of that kind of motivated persons, who put their own advantages in foreground. Project team members who take care more for financial benefits than for high quality work within a defined timeframe may not be the best fitting employees for ERP implementations. Being reward oriented also does not say anything about the way people are working. It neither implicates a high goal, team or quality oriented job approach. It more describes people, who are frequently looking for better situations, rather bad characters for a stringent and long-term ERP project. It can be said that simply fostering motivation through rewards does not bring a better result for the ERP implementation.

Impact of *Self-concept External* Motivation on ERP Project Success

Based on the observed data, these 3 (T3) has to be rejected, as no significant positive effect of high *self-concept external* motivated employees on the success of ERP projects has been found. Technically, people who are motivated by this source can be described as good team members. They seek membership and status within the project team. They express that by a desire for recognition and praise, as they want to meet others' expectations. Employees who are mainly motivated by this aspect are frequently questioning their own quality of work and asking for acknowledgement from their superiors. Additionally, they are also helpful in critical situations, partial in pursuit of being liked by others. Meeting the expectations of project management cannot be seen as a negative facet. But it can also have negative implications, especially in the context of ERP implementations. The role of ERP key user includes the responsibility for important business decisions. Key users have to summarize the needs of the whole department and sometimes influence decisions to get pragmatic and useable solutions. ERP systems have to represent business processes in an effective and economical way. Considering the needs of every stakeholder distantly involved may be popular, but often senselessly complicates the solution pictured in the ERP system. In many cases, a simple process is the better choice, especially for the first months working with a new ERP software. Trying to meet the expectations of many colleagues involved may also lead to an inability to make decisions. This can have decisive impact on time management within the ERP implementation. In many cases, it is better to make a quick but not perfect decision on

the shaping of business functions or processes. It is better to fix the scope for a solution early, than risking milestone by considering additional special requests. Changing the scope because key users want to suit everybody is one of the biggest risks during ERP projects. It can be assumed that the aspect of being a good team member is neutralized by characteristics like easy suggestibility and difficulties making decisions.

Impact of *Self-concept Internal* Motivation on ERP Project Success

An ERP implementation can be described as an extraordinary challenge, which demands high qualities from the key users. *Self-concept internal* motivated employees are able to accomplish a higher performance when they are challenged. They seek activities that require their skills and values, and an ERP project can be seen as a good provocation to improve their performance. Employees that are mostly motivated by this aspect tend to be motivated from within. As they are disinterested in ordinary tasks, a job in the form of a project can implicate benefits. Although menial tasks also need to be fulfilled during ERP implementations, key users often have the possibility of delegating duties. The high emphasis on quality of work and fulfilling own perceptions definitely has positive influence on the possibility of reaching milestones like successful integration tests in time. People who are driven by that source of motivation are pushed by their special mission, leading to better performance, even at the cost of massive overtime. As described in previous chapters, an extra workload is a permanent feature of ERP implementations.

According to these 4 (T4), it was expected that key users who are mostly motivated by the *self-concept internal* source will positively influence ERP project success. This source of motivation recorded the lowest p-value (0,001) and highest Standardized Coefficient Beta (0,283), which approves T4.

Impact of *Goal Internalization* on ERP Project Success

The last main these is assuming that high *goal internalization* has a positive significant relationship to ERP project success. The mentioned these 5 was also confirmed by underlying data, based on findings revealed from multiple regression analysis

Setting goals within a certain scope is one of the main characteristics of ERP projects. The dominant significance of common project goals were emphasized in previous chapters. Key users motivated by *goal internalization* are actively following up what is tried to be achieved during the ERP implementation. They must know the purpose and goal of the project, and these principles are guiding their choices. The need to believe in what needs to be done is

what describes this form of motivation. The main target of ERP implementations during projects is a successful go live with the new system. Employees who honestly believe in the importance and improvement of a new ERP system do also pursuit the projects' goals more consequently. Pursuit of common goals also helps to reach milestones in time, as own desires are postponed in favour of collective interests. That kind of key users are actively taking the chance of immortalizing themselves within the company with newly designed processes and structures.

3.8. Comparison of Results with other Researches applying *Motivation Sources Inventory*

As previously mentioned in chapter 2.5, this thesis is the first application of *Motivation Sources Inventory* on ERP project success so far. Therefore, a direct comparison with previous results is not possible. Motivation was measured with the instrument of MSI in other circumstances, which can be compared with the result of this empirical research. The fields of application can be divided into aspects like peoples' conduct, origin, gender or the industry they are working in. The main result of this study is that ERP project success increases with key users who are primarily motivated by *self-concept internal* motivation and *goal internalization*. The other three sources of motivation seem to have no significant impact to the outcome of an ERP implementation.

Most of the medium-sized enterprises participating in this study are manufacturing companies, trading companies or service providers. All of them are from the private sector and profit-oriented. Barbuto et al. (2004) identified the sources of motivation of adult rural workers. The study revealed high proportion of *self-concept internal* work motivation among rural workers, which implies engagement can be increased by appealing to workers' internally derived standards and sense of the ideal self.[397] In contrast with motivation during successful ERP projects, agricultural workers motivation is not significant for *goal internalization*. This aspect is very important in project situations, when tasks need to be fulfilled to reach milestones. For rural workers, the individual's internal standards are more appealing than a worthy cause to give their best effort. Like in this study, pleasant work environment, higher pay or public recognition does not give significantly increased performance of agricultural workers.[398]

---

[397] Barbuto et al. (2004): Identifying Sources of Motivation of Adult Rural Workers. In: *Journal of Agricultural Education*, volume 45, issue 3, p. 11.
[398] Barbuto et al. (2004): Identifying Sources of Motivation of Adult Rural Workers. In: *Journal of Agricultural Education*, volume 45, issue 3, p. 18.

This research was conducted with over 200 companies in Austria and Germany. *Motivation Sources Inventory* was also used for cross cultural comparison on how employees are motivated. While in Central Europe challenges and purpose of work have a high importance, other sources have a significant higher proportion in other countries. Motivational difference between South Africa and the USA were revealed for business leaders. While American managers scored significantly higher on *intrinsic process*, South-African executives had significantly higher results on *self-concept external* and *goal internalization*.[399] This means that fun during work is an effort increasing aspect. In South Africa goals and purpose play an important role, which is also the case in Europe. A high emphasis on reputation is a very special characteristic which was not explicitly found in other countries. The author assumes that the search for better worldwide reputation for the whole country during the last decades might influence this albeit individual characteristic.

A research considered with motivation sources of employees in China confirmed a high emphasis on the search for challenges and congruence of their values with the organization in Western societies. In opposite to that, Chinese workers have strong concerns about job security, costs and risks. The study revealed a significant higher score on *instrumental motivation*.[400] This is a remarkable result, as rewards and money very rarely have a positive impact on work motivation in other studies. Some researches even found out a negative influence.

An aspect which was not explicitly investigated in this thesis was gender of key users. One reason in this circumstances is the imbalance, as more than three-quarter of participants were male. A previous study showed few statistically significant gender differences for the five sources of motivation. However, *instrumental motivation* was significantly higher among men than women, which might still be explained by traditional roles in Western societies.[401] An extension of this thesis with this aspect could yield interesting results, but would not crucially contribute to the main research question.

The MSI was also applied on studies on people's behaviours, control or leadership. The relationship between sources of motivation and organizational citizenship behaviours was

---

[399] Barbuto, J.E., Gifford, G.T. (2007): Sources of Work Motivation of Business Leaders in the USA and South Africa: A Cross-Cultural Comparison Using the Motivational Sources Inventory. In: *Psychological reports*, volume 101, issue 2, p. 636.

[400] Yan, Z. (2013): The relationship between employees' motivation sources and organizational commitment among Chinese employees. In: *Osaka University Paper*, pp. 19.

[401] Barbuto, J.E. et al. (2003): Sex differences among five sources of motivation in the motivation sources inventory: Preliminary findings. In: *Psychological reports*, volume 93, issue 1, p. 48.

evaluated by Barbuto and Story (2011).[402] Organizational citizenship behaviours (OCB) describes a form of voluntary behaviour in the form of additional commitment within the organization an employee works. It is a behaviour which is outside contractually agreed obligations and therefore it is not claimable. It is specific for OCB to be beyond claimable engagement, and it is also not an opportunistic behaviour with an expected personal benefit. Like in the analysis of this thesis, a significant positive relationships between individuals' *self-concept internal* motivations and organizational citizenship behaviours were found. In addition, results showed significant negative relationships between *self-concept external* and *instrumental* motivations and organizational citizenship behaviours. People who primarily look for rewards and reputation are clearly not open for voluntary work.

The same authors also examined the impact of MSI on locus of control, which describes the extent to which individuals believe that they can control events that affect them.[403] In addition of a positive correlation with individuals' *self-concept internal* and *goal internalization* motivation, also *self-concept external* motivation had a positive impact. People who want to control their future circumstances give a strong impetus on gaining acceptance and status. During ERP projects, personal wishes need to be put back and also the planning cannot show too much consideration for individual interests. Key users who mainly look for more reputation do not positively influence the success of the ERP project.

A study by Carter and Rudd (2005) analysed the motivational factors which influence leadership participation in agricultural organizations.[404] The goal of the study was to determine the reasons why employees chose to participate or not participate in leadership roles. Results show that only *self-concept internal* motivation positively influences this leadership behaviour. Unlike in this thesis, goal internalization did not positively correlate to the willingness to lead. The main motive to do that is seeking for challenges. Common ideals and beliefs joint with the organization are not enough to positively influence the request to become a leader. In opposite to that, as strong sense of duty to work toward the goal of the company does have a positive impact for the success of ERP implementations. A research on

---

[402] Barbuto, J.E., Story, J.S. (2011): Work motivation and organizational citizenship behaviors. In: *Journal of Leadership Studies*, volume 5, issue 1, pp. 24.

[403] Barbuto, J.E., Story, J.S. (2008): Relations between locus of control and sources of work motivation amongst government workers. In: *Psychological Reports*, volume 102, pp. 335-338.

[404] Carter, H.S., Rudd, R.D. (2005): Factors which influence Leadership Participation in Agricultural Organization. In: *Association of Leadership Educations 2005 Annual Conference*, pp. 1.

relations of organizational and interpersonal boundaries on MSI brought very similar results like the impact on leadership participation mentioned above.[405]

And finally, a research on the five sources of motivation during the use of enterprise wikis brought very deviating results compared to the impact on ERP project success.[406] Like during ERP projects, *self-concept internal* motivation has also a significant positive correlation. The learning of new abilities surely motivates people to use enterprise wikis. But also *self-concept external* motivation has a positive impact, because people want to inform others about theirs work and seek affirmation for that. In addition, also *instrumental* motivation has a positive correlation to the willingness to use enterprise wikis. That might be reasoned in the direct benefit of more information and possibilities to easy daily work. Both aspects do not appear in that form during ERP projects. But they might play a role during daily work after go-live of the new ERP system.

To summarize the comparison, it is noticeable that the significant score for *goal internalization* seems to be a peculiarity of ERP project implementations. Challenges, described by *self-concept internal* motivation, seem to be a motivator for many situations or circumstances. But the belief in purpose and goal-oriented working style are particular qualities needed for long term projects like ERP implementations. ERP projects are clearly driven be the reaching of goals in the form of milestones. *Goal internalization* is clearly marked by the absence of self-interest. This aspect is not very often the main motivator to do things or to increase performance. But during a long lasting ERP project, the selfless pursuit of a common goal is a very import component. Without belief in the cause of the ERP implementation, key users will rapidly loose the motivation to perform.

3.9. Summary of Key Findings

The investigation of key users' motivation in the context of ERP project is a relatively new object of research. Previously, many studies about ERP lacked empirical evidence. The concept of *Motivation Sources Inventory* with its scales made the aspect motivation

---

[405] Barbuto, J.E., Story, J.S. (2007): Relations of organizational and interpersonal boundaries with sources of work motivation. In: *Perceptual and motor skills*, volume 105, issue 3, pp. 1155-1158.
[406] Lin, D. (2013): Die fünf Quellen der Motivation bei der Nutzung von Enterprise Wikis. In*: 11th International Conference on Wirtschaftsinformatik*, Leipzig, Germany, pp. 643-657

measureable.[407] Although motivation is often mentioned as a factor for success, its' impact on ERP project success was not quantified before.

Results from multiple regression analysis showed that the model depending on *Motivation Sources Inventory* can explain ERP project success to a certain extend. The influence of key users' motivation on the total success of ERP implementations is also limited with just over 10 percent, depending on the project. It can be seen as one of many success factors for ERP implementations. Concerning this facet, the main focus is on two aspects. Firstly, the different types of motivated key users, an ERP project team needs to be successful, are important. This results in consideration related to the selection of employees for this type of projects. Secondly, the different types of motivated key users lead to more or less successful projects. Each source of motivation is associated with ways of doing the job and fulfilling tasks. As a result, organizations can foster related behaviours which promise better results. Concerning the main hypothesis, it can be stated that there is a positive correlation between single sources of motivation of key users and the overall ERP project success of medium-sized companies in Austria and Germany. The outcome related to each individual research these is summarized in table 3-7.

---

[407] Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011-1022.

Table 3-7: Test of Theses

These	Assumption on these	These corroborated
T1	Project team members *intrinsic process* motivation will **not** be positively related to ERP project success	Confirmed
T2	Project team members *instrumental* motivation will **not** be positively related to ERP project success	Confirmed
T3	Project team members *self-concept external* motivation will be **positively** related to ERP project success	Not Confirmed
T4	Project team members *self-concept internal* motivation will be **positively** related to ERP project success	Confirmed
T5	Project team members *goal internalization* motivation will be **positively** related to ERP project success	Confirmed
T6	The dimensionality of measuring ERP project success in medium-sized companies is determined by dimensions *project management, user satisfaction, time and budget, ERP system quality* and *economic value*.	Confirmed
T6A	ERP project success is partly determined by *project management*	Confirmed (37,5%)
T6B	ERP project success is partly determined by *user satisfaction*	Confirmed (8,1%)
T6C	ERP project success is partly determined by *time and budget*	Confirmed (4,9%)
T6D	ERP project success is partly determined by *ERP system quality*	Confirmed (3,1%)
T6E	ERP project success is partly determined by *economic value*	Confirmed (2,7%)

Source: created by author, results from own research.

These 6 and its five sub theses T6A-T6E are the prerequisite to get a reliable dependent variable of ERP project success.

It was confirmed that both (T1) *intrinsic process* and (T2) *instrumental* motivation do not have a positive relation to ERP project success. It was also verified that (T4) *self-concept internal* and (T5) *goal internalization* motivation are positively related to the success of ERP implementations. In opposite to the authors' expectation, key user with high (T3) *self-concept external* motivation do not positively contribute to a better outcome of the ERP implementation.

CONCLUSIONS AND SUGGESTIONS

This chapter accentuates main conclusions form conducted research and deviates suggestions in general, for ERP project management and for companies' management of medium-sized companies in Austria and Germany.

- Based on the primary research findings, it can be concluded that certain expression of key users' motivation promotes ERP project success. Two of five sources of motivation have a higher score in more successful ERP projects than in less successful projects.

CONCLUSIONS

1. *Sources of motivation* have a different impact on performance of employees during ERP projects compared to other working conditions. It can be concluded that the temporal aspect of ERP projects and the heavy workload during that period favour staff with particular motivational characteristics.

2. A worldwide generalization of the results cannot be made, as other studies clearly showed a different emphasis on different *sources of motivation* in other countries like China or the USA.

3. Compared to other research areas where *Motivation Sources Inventory* was applied, *goal internalization* motivated people achieve higher performance during ERP projects. This may be reasoned by the high importance of milestones and need of synchronous progress during ERP projects. Internalization of the projects' cause, willingness to work towards the goals of the company and removal of self-interest make that kind of individuals particularly valuable during project situations.

4. An evaluation of employees concerning their motivational sources can improve the quality of team composition for long term projects. People who are open for challenges, new knowledge (*intrinsic process* motivation) and the organizations' goals (*goal internalization*) should be preferably selected.

5. Results from factor analysis showed that ERP project success can be measured with five different dimensions, which represent aspects of project management success and project product success. As proven with O'Connor's parallel analysis and further expert interviews, measurement of ERP project success can be

efficiently performed with dimensions of *project management, time and budget, ERP system quality, user satisfaction* and *economic value.*

6. The dimension of *project management* which includes the quality of project management process, compliance of specifications, satisfaction of project stakeholders and quality of service covers the most considerable dimension for the measurement of ERP project success.

7. Key users' motivation can explain ERP project success in medium-sized companies to a certain extend. In the complex undertaking of an ERP implementation, sources of key users' motivation can explain over 10% of the outcome, based on numbers resulting from multiple regression analysis.

8. As revealed by multiple regression analysis, the next five conclusions concern the five different sources of motivation. It can be concluded that aspect of *intrinsic process* motivation has no positive influence on a long term project of an ERP implementation. A lack of fun completing unpleasant tasks and frustrating setbacks can lead to problems reaching milestones and general unreliability, factors which have a major negative influence on ERP project success. The positive effects of enjoyment working on new tasks seem to be neutralized by demotivation caused by an ERP project immanent higher work load.

9. It can be concluded that rewards like more money or a better position do not increase the likelihood of a successful ERP project. The perspective of getting a better job after a well done ERP implementation may motivate key users for a longer time. But the *instrumental* motivation is neutralized by disturbance and envy felt by other project team members. Key users who are mainly motivated by rewards will also tend to deliver their best performance when it is publically recognized. They will also save energy, which seems to be in contrast to success relevant work in the background. A lot of ERP project related work is done alone or in small groups, which means that employees who tend to give their best with the prospect of remuneration might not get the stage they need to be motivated.

10. Key users who are mostly motivated by an improved reputation with others (*self-concept external* motivation) do not significantly increase success of ERP projects. Although being good team players, their lack of being decisive and tendency to expand the scope of the implementation can endanger the goals and purpose of an ERP project.

11. If key users are mainly motivated with source *self-concept internal* motivation the chances for a more successful ERP project is increasing. It can be concluded that a project team has to be staffed with employees' who frequently seek challenges and have a will to use their skills and qualities. That type of key users are also curious for constantly improving their know-how, an aspect, the application of which is fundamental for the success of ERP.

12. Key users who are primarily motivated by *goal internalization* help to increase the success of an ERP implementation with their awareness for the projects' goals and importance. Their belief towards companies' goals and the purpose of the project help to reduce insecurities of other stakeholders involved. Compared with other studies, the positive impact of *goal internalization* on increased performance seems to be a special characteristic of ERP projects.

13. Besides top management support, effective project management and ERP technical issues, results from this study show that key users' motivation can be described as a significant aspect of ERP project success. It plays an important role for team composition and developing project champions.

GENERAL SUGGESTIONS

1. Based on the fact that two sources motivation positively influence ERP project success, it is suggested to apply the underlying construct on executive and project management conduct as a feasible instrument to foster performance of the key users.

2. Executives dealing with issues relating to ERP projects should find out what source of motivation needs to be satisfied in order to get productive and efficient team members. Key users will only exert effort if the correct sources of motivation are addressed by management.

Suggestions to Project Managers of ERP Implementations

1. Many project managers assume that people around them are motivated the same way and share their same motivation patterns. As a result, this approach does not work for everybody and they may fail to tap into the right motives of others. ERP project managers have to promote the fitting sources of motivation, otherwise project team members and key users remain unmotivated, tasks do not get done and goals are not reached.

2. Project managers should put together a team with employees, who are mainly motivated by *goal internalization* and *self-concept internal* motivation.

3. The effect of motivation is also connected to choosing appropriate timing for the motivational efforts. It is suggested to counteract potential moments of demotivation like frequent overtime periods, undesired iteration of test cycles and the final project phase the last month before go live. To do that, project management has to free up key users from daily work and fairly compensate for overtime work.

4. To lower the risk of demotivation of key users who are mainly motivated by fun during work process, it makes sense to allocate enjoyable tasks. If the key user is agreeing with the processes, it is recommended to let him bring enthusiasm to other users by actively presenting prototypes and integration tests in the new ERP system. Another opportunity to engage *intrinsic process* motivated employees is the training of end users. It also can be proposed to appeal on other accessible sources of motivation. It is suggested to frequently point out the purpose of the project and emphasize the key users' responsibility.

5. Project managers do not have major direct influence on rewards for project team members. *Instrumental motivation* does not promote ERP project success. But it works hygienically towards employees' performance. If there is no fair payment for extra work caused by the project, ERP project management has to support key users' claims towards the organizations CEO. If key users strive for a better job position, project management should always emphasize the conjunction of this prospect with concrete project targets.

6. Choosing key users who are motivated by improving their reputation (*self-concept external*) can have a positive impact on project team spirit, because that type of team members want to please everybody. But this aspect is neutralized by ineffective personal characteristics like wrong goal focusing and shortcomings in decision-making. To avoid the growing of project scope because of consideration of to many opinions, this type of key user needs streamlined management and supervision. Also the employees from the departments who try to influence the key users need to be briefed about ERP project goal by project management. If the key user has a derived weakness in decision-making, project management need to take away the fear of wrong or bad decisions. It is suggested to point out clearly

defined escalation paths and precedence cases. To strengthen the position of key users seeking for recognition, project management should emphasize their autonomy and self-responsibility. And finally, the project manager needs to be the person key users get their desired praise from for their efforts during ERP implementation.

7. Key users who are motivated by challenges (*self-concept internal*) need to be personally fostered by project management. Project members who have participated in the project and have understood the organization's operations will be highly motivated and committed as such experiences provide a valuable opportunity for professional growth. It is advised to assign them responsibility within the project. But that also implies a risk, because individuals of this type of character also tend to draw too many areas of liability to themselves. Project management has to control these competences to avoid overload. Generally and proved by the underlying study, it is advised that these type of employees are favourably selected for ERP project teams.

8. Finally, project management work highly profits from *goal internalized* working style. It is recommended to frequently settle the projects' purpose with that type of key users. If other team members are reluctant to join, project managers should encourage them to support the key users' goals. It is also very important to repeatedly formulate and concretize the main purposes of the ERP implementation. A prerequisite for that is a straightforward definition of easy understandable project goals. If key users have problems with goals of the ERP project, it is advised to discuss that with individual conversation.

Suggestions to Management - CEOs and Superiors of Key Users in ERP Projects

The possibilities for CEOs and direct superiors to influence motivation of key user are fewer compared to ERP project managers. This is explained by less cooperation during the phases of the ERP implementation. Nevertheless, CEOs and direct superiors have possibilities to foster motivation of key users, as they have authorization to release resources, grant trainings, raise wages, illustrate career opportunities or just actively look for a dialogue with the employee.

1. To avoid bad key user performance caused by work overload, executives can provide enough resources during critical project phases.

2. Working with *instrumental* motivation seems to be very dangerous, because especially when money is involved, animosities between employees are often evident. Managers have to avoid the mistake of rewarding non-involved persons, an action which is usually acknowledged with massive demotivation of key users. A long term motivation can be a chance for a better job position, but as the underlying results show, it also has just the effect of a hygiene factor.

3. It is suggested that top management legitimizes key users seeking for reputation making important decisions. This legitimization makes the key user act in the name of the CEO within the scope and priority of top management.

4. Key users who are mainly motivated from within and like to do activities which require their skill always want to improve their knowledge. Management is well advised to grant them training in context with the ERP projects purpose. It is also recommended to free up *self-concept internal* motivated key users for concentrating on the ERP implementation if necessary. Especially in critical implementation phases like business blueprint, test cycles or preparation of go live, top management has to instruct key users to prefer project work over daily business.

5. Management can support belief in the purpose of ERP projects by frequently announcing its' importance for the future of the entire organization. This can be justified with needed process integration, internationality, competiveness and secured jobs. It is very important that top management personally attends key meetings like prototypes or integration tests. Presence also gives key users the security concerning a common purpose of the project.

Implications for further Research

The underlying empirical research with its items revealed in this thesis should provide a basis for further standardized application of ERP project success measurement. The practical implication from the findings concerning the measurement of ERP project success can be pulled over the reduction of dimensions from 11 to 5. As a consequence, it is useful to develop a new questionnaire which is consisting of less items. A survey with 6 items per dimension would sum up to 30 items in total, a number which is better to sell to potential participants who have traditionally few time for external issues. The new questionnaires' understandability and goodness of fit for every item also needs to be approved by expert interviews.

The measured success of ERP implementation can be seen as the dependent variable in further models, as the output can be influenced by various other factors during the project.

The results and conclusions can help to better understand motivators of employees during ERP implementations, and could also derive further recommendations for project management, leadership styles and organizational activities. This thesis left out demographic or gender differences in the analysis of the model. Furthermore, cultural distinctions were not included, as Austria and Germany are very similar concerning work ethics. Previous research found out motivational differences between Chinese and Western countries, which could suggests that this specific characteristics would also occur in the context of ERP projects. As this thesis is based on investigations in midsized companies, another interesting application of this model would be an iteration of this research in large corporations. It cannot be ruled out that other sources of motivation have a positive impact on success of ERP implementation in bigger organizations. Another suggested application is the comparison between different industries, as some branches of business are more project driven than others. In addition, it is recommended to examine influencing factors on employees' motivation during ERP projects. The effect of different leadership styles on the motivation of key users in ERP projects promises to be a valuable research application.

Due the fact that this thesis is the first research evaluating the impact of different sources of motivation on ERP project success, further studies dealing with that topic would make the underlying results and interpretation comparable.

References / Bibliography

1.   Adams; J.S., Berkowitz, L.; Hatfield, E. (1976): Equity theory: toward a general theory of social interaction. New York: Academic Press, 1976.

2.   Aladwani, A.M. (2001): Change Management Strategies for Successful ERP Implementation. In: *Business Process Management Journal*, volume 7, issue 3, pp. 266-275.

3.   Alderfer, C. (1969): An Empirical Test of a New Theory of Human Needs. In: *Organizational Behavior and Human Performance*, volume 4, issue 2, pp. 142-175.

4.   Allport, F.H. (1933): Institutional Behavior, Chapel Hill, University of North Carolina Press Institutional Behavior.

5.   Al-Mashari, M., Al-Mudimigh, A., Zairi, M. (2003): Enterprise resource planning: A taxonomy of critical factors. In: *European Journal of Operational Research*, volume 146, pp. 352-364.

6.   Al-Mudimigh, A.S. (2007): The Role and Impact of Business Process Management in Enterprise Systems Implementation. In: *Business Process Management Journal*, volume 13, issue 6, pp. 866-874.

7.   Almutairi, H., Subramanian, G. H. (2005): An empirical application of the DeLone and McLean model in the Kuwaiti private sector. In: *Journal of Computer Information Systems*, volume 45, issue 3, pp. 113-122.

8.   Alver, J., Kadak, T. (2009): Conformity of Data Used in the Controlling Process: A Survey of Estonian SMEs. In: *Finance and Accounting: Theory and Practice*, *Development and Trends*, Rīga, LU Akadēmiskais apgāds, pp. 34−40.

9.   Andrews, D., Nonnecke, B., Preece, J. (2003): Electronic survey methodology: A case study in reaching hard-to-involve Internet users. In: *International Journal of Human-Computer Interaction*, volume 16, issue 2, pp. 185-210.

10. Appleton, E. (1997): How to survive ERP. In: *Datamation*, volume 43, issue 3, March, pp. 50-53.

11. Armstrong, C.P., Sambamurthy, V. (1999): Information technology assimilation in firms: The influence of senior leadership and IT infrastructures. In: *Information Systems Research*, volume 10, issue 4, pp. 304-327.

12. Atteslander, P. (2010): Methoden der empirischen Sozialforschung. Erich Schmidt Verlag, 13. Auflage.

13. Baccarini, D. (1999): The Logical Framework Method for Defining Project Success. In: *Project Management Journal*, volume 30, issue 4, pp. 25-32.

14. Bailey, J.E., Pearson, S.W. (1983): Development of a tool for measuring and analyzing computer user satisfaction. In: *Management Science*, volume 29, issue 5, pp. 530-545.

15. Backhaus, K., Erichson, B., Plinke, W., Weiber, R. (2008): Multivariate Analysemethoden, 12th edition, Springer: Berlin.

16. Bajwa, D., Garcia, J., Mooney, T. (2004): An integrative Framework for the assimilation of Enterprise Resource Planning Systems: Phases, Antecedents, and Outcomes. In: *Journal of Computer Information Systems*, volume 44, issue 3, pp. 81-90.

17. Baker, B.N., Murphy, D.C., Fisher, D. (1988): Factors affecting project success. In: D.I. Cleland & W.R. King (Eds.), Project Management Handbook, New York: Van Nostrand Reinhold, pp. 902-919.

18. Barbuto, J.E., Brown, L.L. (1999): Motivating Your Employees. In: *Nebraska Cooperative Extension*, volume 11, pp. 1-4.

19. Barbuto, J.E. (2001): Understanding and applying an integrative taxonomy of motivation sources to professional and personal settings. In: *Journal of Management Education*, volume 25, issue 6, pp. 713-725.

20. Barbuto, J.E. (2001): An alternative scoring method for the motivation sources inventory: A case for ratio analysis. In: *Psychological Reports*, volume 88, issue 2, pp. 385-386.

21. Barbuto, J.E. (2001): Testing the underlying motives of organizational citizenship behaviors: a field study of agricultural co-op workers. In: *Published at 28th national agricultural education research conference*, pp. 539-550.

22. Barbuto, J.E. (2005): Motivation and Transactional, Charismatic, and Transformational Leadership - A Test of Antecedents. In: *Journal of Leadership and Organizational Studies*, 2005, volume 11, issue 4, pp. 26-40.

23. Barbuto, J.E., Fritz, S.M., Plummer, B.A. (2003): Sex differences among five sources of motivation in the motivation sources inventory: Preliminary findings. In: *Psychological reports*, volume 93, issue 1, pp. 47-48.

24. Barbuto, J.E., Fritz, S.M. (2004): Is There a Difference Between Agriculture/Natural Resources and Non-Agriculture/Natural Resources Majors' Motivation Sources? In: *Nacta Journal*, volume 45, issue 3, pp. 30-35.

25. Barbuto, J.E., Gifford, G.T. (2007): Sources of Work Motivation of Business Leaders in the USA and South Africa: A Cross-Cultural Comparison Using the Motivational Sources Inventory. In: *Psychological reports*, volume 101, issue 2, pp. 636-640.

26. Barbuto, J.E., Lim, J.C.S., Fritz, S.M., Xu, Y. (2008): Using the MBTI® Instrument and the Motivation Sources Inventory to Test the Relationships Between Jung's Psychological Types and Sources of Work Motivation. In: *Journal of Psychological Type*, volume 68, issue 12, pp. 139-147.

27. Barbuto, J.E., Scholl, R.W. (1998): Motivation Sources Inventory: development and validation of new scales to measure an integrative taxonomy of motivation. In: *Psychological Reports*, volume 82, issue 3, pp. 1011-1022.

28. Barbuto, J.E., Story, J.S. (2007): Relations of organizational and interpersonal boundaries with sources of work motivation. In: *Perceptual and motor skills*, volume 105, issue 3, pp. 1155-1158.

29. Barbuto, J.E., Story, J.S. (2008): Relations between locus of control and sources of work motivation amongst government workers. In: *Psychological Reports*, volume 102, pp. 335-338.

30. Barbuto, J.E., Story, J.S. (2011): Work motivation and organizational citizenship behaviors. In: *Journal of Leadership Studies*, volume 5, issue 1, pp. 23-34.

31. Barbuto, J.E., Trout S.K., Brown, L.L. (2004): Identifying Sources of Motivation of Adult Rural Workers. In: *Journal of Agricultural Education*, volume 45, issue 3, pp. 11-21.

32. Barbuto, J.E., Weltmer, D.F., Pennisi, L.A. (2010): Locus of Control, Sources of Motivation, and Mental Boundaries as Antecedents of Leader-Member Exchange Quality. In: *Psychological reports*, volume 106, issue 1, pp. 175-188.

33. Barbuto, J.E., Xu, Y. (2006): Interpersonal Conflict Management Styles, and Leadership Effectiveness: A Structural Model. In: *Psychological reports,* volume 98, issue 1, pp. 3-20.

34. Barker, R. (2001): Manufacturing best practice and human intellectual energy. In: *Integrated Manufacturing Systems*, volume 12, issue 1, pp. 7-14.

35. Beatty, R.C., Williams, C.D. (2006): ERP II: Best Practices for Successfully Implementing an ERP Upgrade. In: *Communications of the ACM*, volume 49, issue 3, pp. 105-109.

36. Beheshti, H.M. (2006): What managers should know about ERP/ERP II. In: *Management Research News*, volume 29, issue 4, pp. 184-193.

37. Beheshti, H.M., Beheshti, C. M. (2010): Improving productivity and firm performance with enterprise resource planning. In: *Enterprise Information Systems*, volume 4, pp. 445-472.

38. Behrens S., Jamieson, K., Jones, D., Cranston, M. (2005): Predicting System Success using the Technology Acceptance Model: A Case Study. In: *16th Australasian Conference on Information Systems*, Sydney, paper 70, pp. 1-11.

39. Bingi, P., Sharma, M.K., Godla, J. (1999): Critical issues affecting an ERP implementation. In: *Information Systems Management*, volume 16, issue 3, pp. 7-14.

40. Blaney, J (1989): Managing software development projects. In: *Paper presented to Project Management Seminar/Symposium*, Atlanta, Georgia, pp. 410-417.

41. Blau, P.M. (1957): Formal Organisation: Dimensions of Analysis. In: *American Journal of Sociology*, volume 63, pp. 58-69.

42. Bourne, L., Walker, D.H.T. (2006): Using a visualising tool to study stakeholder influence: two Australian examples. In: *The Project Management Journal*, volume 37, issue 1, pp. 5-21.

43. Boynton, A.C., Zmud, R.W., Jacobs, G.C. (1994): The influence of IT management practice on IT use in large organizations. In: *MIS Quarterly*, volume 18, issue 3, pp. 299-318.

44. Bradford, M., Sandy, R. (2002): Realizing value in ERP. In: *Journal of Cost Management*, volume 16, issue 2, 2002, pp. 13-19.

45. Brown, D.H., He, S. (2007): Patterns of ERP Adoption and Implementation in China and some Implications. In: *Electronic Markets*, volume 17, issue 2, pp. 132-141.

46. Calhoun, C.J. (2002): Classical sociological theory. Wiley-Blackwell.

47. Carter, H.S., Rudd, R.D. (2005): Factors which influence Leadership Participation in Agricultural Organization. In: *Association of Leadership Educations 2005 Annual Conference,* July 11-14, Wilmington, NC, pp. 1-12.

48. Cartlidge, D. (2015): Construction Project Manager's Pocket Book. Routledge, New York.

49. CED (2014a): Criteria. Collins English Dictionary, Complete & Unabridged 10th Edition. http://dictionary.reference.com/browse/criteria, checked on 15.02.2016.

50. CED (2014b): Dimension. Collins English Dictionary, Complete & Unabridged 10th Edition. http://dictionary.reference.com/browse/dimension, checked on 15.02.2016.

51. CED (2014c): Factor. Collins English Dictionary, Complete & Unabridged 10th Edition. http://dictionary.reference.com/browse/factor, checked on 15.02.2016.

52. Chang, J.C.J., King, W.R. (2005): Measuring the performance of information systems: A functional scorecard. In: *Journal of Management Information Systems*, volume 22, issue 1, pp. 85-115.

53. Chang, S.I., Hung, S.Y., Yen, D.C., Lee, P.J (2010): Critical Factors of ERP Adoption for Small- and Medium- Sized Enterprises: An Empirical Study. In: *Journal of Global Information Management*, volume 18, pp. 82-106.

54. Chang, S., Yen, D.C., Huang, S., Hung, P. (2008): An ERP System Life Cycle-Wide Management And Support Framework For Small- And Medium-Sized Companies. In: *Communications of AIS*, volume 22, pp. 275-294.

55. Chen, J. (2007): SAP ERP Accelerating Taikang Life's Business Standardization and Internationalization. In: *IDC Special Study*, March, p. 1-10.

56. Ciompi, L. (1997): Die emotionalen Grundlagen des Denkens. Entwurf einer fraktalen Affektlogik. Göttingen: Vandenhoeck & Ruprecht.

57. Collins, A., Baccarini, D. (2004): Project Success - A Survey. In: *Journal of Construction Research*, volume 5, issue 2, pp. 211-231.

58. Cooke, D., Gelman, L., Peterson, W.J. (2001): ERP Trends. In: *The Conference Board*, pp. 1-28.

59. Davenport, T.H. (1998): Putting the Enterprise into the Enterprise System. In: *Harvard Business Review*, volume 76, pp. 121-131.

60. Davis, F.D. (1989): Perceived usefulness, perceived ease of use, and user acceptance of information technology. In: *MIS Quarterly*, volume 13, issue 3, pp. 318-346.

61. Deci, E.L., Ryan, R.M. (2008): Self-Determination Theory: A Macrotheory of Human Motivation, Development, and Health. In: *Canadian Psychology*, volume 49, pp. 182-185.

62. DeLone, W.H., McLean, E.R. (1992): Information Systems Success: The Quest for the Dependent Variable. In: *Information Systems Research*, volume 3, issue 1, pp. 60-95.

63. DeLone, W.H., McLean, E.R. (2003): The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. In: *Journal of Management Information Systems*, volume 19, issue 4, pp. 9-30.

64. DeWit, A. (1988): Measurement of project success. In: *International Journal of Project Management*, volume 6, issue 3, pp. 164-170.

65. Dezdar, S., Ainin, S. (2011): The influence of organizational factors on successful ERP implementation. In: *Management Decision*, volume 49, issue 6, pp. 911-926.

66. Ding, Y., Straub, D. (2007): Using Marketing Exchange Theory to conceptualize IS Quality and Re-conceptualize the IS Success Model. In: *Twenty Eighth International Conference on Information Systems*, Montréal, pp. 1-9.

67. Eisner, E.W. (1981): The Educational Imagination. New York, NY: Macmillan.

68. Esteves, J., Pastor, J. (2001): Enterprise Resource Planning System Research: An annotated bibliography. In: *Communications of AIS*, volume 7, issue 8, pp. 1-52.

69. European Commission (2003): Recommendation 2003/361/EC: SME Definition. Available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L: 2003:124:0036:0041:en:PDF. Checked on 13.02.2016.

70. Falkowski, G., Pedigo, P., Smith, B., Swanson, D. (1998): A recipe for ERP success. In: *Beyond Computing*, pp. 44-45.

71. Fang, L., Patrecia, Sylvia. (2005): Critical success factors in ERP implementation. In: *Paper within IT and Business Renewal*, Jönköping, pp. 1-62.

72. Fayol, H. (1949): General and Industrial Management. London: Pitman (first published in 1919).

73. Fishbein, M., Ajzen, I. (1975): Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Addison-Wesley, Reading.

74. Freeman, M., Beale, P. (1992): Measuring project success. In: *Project Management Journal*, volume 23, issue 1, pp. 8-17.

75. Frey, B.S., Osterloh, M. (2001): Successful Management by Motivation: Balancing Intrinsic and Extrinsic Incentives (Organization and Management Innovation), Springer Berlin Heidelberg.

76. Gable, G.G., Sedera, D., Chan, T. (2003): Enterprise systems success: a measurement model. In: *Proceedings of the 24th International Conference on Information Systems*, Seattle, WA, pp. 576-591.

77. Gable, G.G., Sedera, D., Chan, T. (2008): Re-conceptualizing information system success: The IS-impact measurement model. In: J*ournal of the Association for Information Systems*, volume 9, issue 7, pp. 377-408.

78. Ganzach, Y. Klugar, A.N.; Klayman, N. (2000): Making decisions from an interview: Expert measurement and mechanical combination. In: *Personnel Psychology*, volume 53, issue 1, pp. 1-20.

79. Garg, P., Garg, A. (2013): An empirical study on critical failure factors for enterprise resource planning implementation in the Indian retail sector. In: *Business Process Management Journal*, volume 19, pp. 496-514.

80. Gargeya, V.B., Brady, C. (2005): Success and failure factors of adopting SAP in ERP system implementation. In: *Business Process Management Journal*, volume 11, pp. 501-516.

81. Garton, L., Haythornthwaite, C., Wellman, B. (1999): Studying on-line social networks. In: *S. Jones (Ed.), Doing Internet Research: Critical Issues and Methods for Examining the Net*, pp. 75-105.

82. Globerson, S., Zwikael, O. (2002): The Impact of the Project Manager on Project Management Planning Processes. In: *Project Management Journal*, volume 33, issue 3, pp. 58-64.

83. Goodhue, D.L., Thompson, R.L. (1995): Task-Technology Fit and Individual Performance. In: *MIS Quarterly*, volume 19, issue 2, pp. 213-235.

84. Gould, L.S. (2002): ERP: Complexities, ironies, and advances. In: *Automotive Design & Production*, volume 114, issue 7, pp. 44-46.

85. Gray, C., Larson, E. (2002): Project Management: The Managerial Process. Burr Ridge, IL.

86. Gumaer, R. (1996): Beyond ERP and MRP II. In: *IIE Solutions,* volume 28, issue 9, pp. 32-35.

87. Gunson, J., De Blasis, J. (2003): ERP implementation project management: An art as well as a science. (332/658). Retrieved from http://archive-ouverte.unige.ch/unige:5806

88. Ha, Y.J., Ahn, H.J. (2014): Factors affecting the performance of enterprise resource planning systems in the post-implementation stage. In: *Behaviour and Information Technology*, volume 33, issue 10, pp. 1065-1081.

89. Hackman J. R., Oldham, G. R. (1976): Motivation through design of work. In: *Organizational Behavior and Human Performance*, volume 16, p. 250-279.

90. Häkkinen, L., Hilmola, O.P. (2008): Life after ERP implementation: Long-term development of user perceptions of system success in an after-sales environment. In: *Journal of Enterprise Information Management*, volume 21, issue 3, pp. 285-310.

91. Harreld, H. (2001): Extended ERP reborn in b-to-b. In: *InfoWorld*, volume 23, issue 35/36, pp. 21-24.

92. Harrison, J.L. (2004): Motivations for Enterprise Resource Planning (ERP) System Implementation in Public versus Private Sector Organizations. Dissertation at the University of Central Florida, Orlando, Florida.

93. Hersey, P., Blanchard, K.H., Johnson, D.E. (1996): Management of Organizational Behavior: Utilizing Human Resources, 7th Edition, Prentice Hall, p. 84/85.

94. Herzberg, F.W., Mausner, B., Snyderman, B.B. (1959): The Motivation to Work. John Wiley. New York.

95.   Herzberg, F.W. (1968): One more time, how do you motivate employees? In: *Harvard Business Review*, volume 46, issue 1, pp. 53-62.

96.   Hoffecker, J., Goldenberg, C. (1994): Using the Balanced Scorecard to Develop Companywide Performance Measures. In: *Journal of Cost Management*, volume 8, issue 3, pp. 5-17.

97.   Hofmann, M. (2014): Performance-orientiertes Projektmanagement: Konzeption zum Umgang mit einmaligen, komplexen Aufgaben. Springer, Gabler.

98.   Holland, C.P., Light, B. (1999): A Critical Success Factors Model for ERP Implementation. In: *IEEE Software*, volume 16, issue 3, pp. 30-36.

99.   Holland, C.P., Light, B., Gibson, N. (1999): A critical success factors model for enterprise resource planning implementation. In: *Proceedings of the 7th European Conference on Information Systems*, Copenhagen, pp. 273-297.

100. Holland, C.P., Light, B., Kawalek, P. (1999): Beyond ERP systems: innovative strategies for competitive advantage. In: *Proceedings of the 7th European Conference on Information Systems*, Copenhagen, pp. 288-301.

101. Huq, Z., Martin, T.N. (2006): The Recovery of BPR Implementation through an ERP Approach: A Hospital Case Study. In: *Business Process Management Journal*, volume 12, issue 5, pp. 576-587.

102. Huseman, R.C., Hatfield, J.D., Miles, E.W. (1987): A New Perspective on Equity Theory: The Equity Sensitivity Construct. In: *The Academy of Management Review,* volume 12, issue 2, pp. 222-234.

103. Hwang, Y. (2005): Investigating enterprise systems adoption: uncertainty avoidance, intrinsic motivation, and the technology acceptance model. In: *European Journal of Information Systems*, volume 14, pp. 150-161.

104. Ifinedo, P. (2006): Extending the Gable et al. Enterprise Systems Success measurement model: a preliminary study. In: *Journal of Information Technology Management*, volume 17, issue 1, pp. 14-33.

105. Iivari, J. (2005): An empirical test of the DeLone-McLean model of information system success. In: *The DATA BASE for Advances in Information Systems*, volume 26, issue 2, pp. 8-27.

106. Ike, C.E., Mogens, M. (2005): Identifying Critical Issues in Enterprise Resource Planning (ERP) Implementation. In: *Computers in Industry*, volume 56, pp. 545-557.

107. Jacob, G., Wagner, T. (1999): Rapid ERP implementation. In: *The Tuolumne County, California experience. Government Finance Review*, volume 15, issue 4, pp. 28-33.

108. Jiang, J.J., Klein, G., Discenza, R. (2002): Perception differences of software success: provider and user views of system metrics. In: *Journal of Systems and Software*, volume 63, issue 1, pp. 17-27.

109. Johnson, R.B., Onwuegbuzie, A.J. (2004): Mixed methods research: A research paradigm whose time has come. In: *Educational Researcher*, volume 33, issue 7, pp. 14-26.

110. Jones, M.C., Cline, M., Ryan S (2006): Exploring Knowledge Sharing in ERP implementation: An Organizational Culture Framework. In: *Decision Support Systems*, volume 41, issue 2, pp. 411-434.

111. Jost, P.-J. (2000): Organisation und Motivation. Eine ökonomisch-psychologische Einführung. Wiesbaden: Gabler.

112. Jöreskog, K.G., Sörbom, D. (1985): LISREL VI. Mooresville: Scientific Software, Inc.

113. Kang, S., Park, J., Yang, H. (2008): ERP Alignment for positive business performance: Evidence from Korea's ERP Market. In: *Journal of Computer Information Systems,* pp. 25-38.

114. Ke, W., Wei, K.K. (2008): Organizational Culture and Leadership in ERP Implementation. In: *Decision Support Systems*, volume 45, issue 2, pp. 208-218.

115. Kerlinger, F.N. (1986): Foundations of behavioral research. New York, 3rd edition, Holt, Rinehart and Winston.

116. Kerzner, H. (1992): Project Management: A systems approach to planning, scheduling and controlling. New York, Van Nostrand Reinhold.

117. Kerzner, H. (2013): Project management: A systems approach to planning, scheduling and controlling. New York, John Wiley and Sons.

118. King, S.F., Burgess, T.F. (2006): Beyond Critical Success Factors: A Dynamic Model of Enterprise System Innovation. In: *International Journal of Information Management*, volume 26, issue 1, pp. 59-69.

119. Klaus, H., Rosemann, M., Gable, G.G. (2000): What is ERP? In: *Information Systems Frontiers*, volume 2, pp. 141-162.

120. Ko, D.-G, Kirsch, L.J., King, W.R. (2005): Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. In: *MIS Quarterly*, volume 29, issue 1, pp. 59-85.

121. Koch, C. (2006): ABC: An Introduction to ERP, Getting Started with Enterprise Resource Planning (ERP). In: *CIO*, March, pp. 1-13.

122. Koh, S. C. L., Simpson, M. (2007): Could enterprise resource planning create a competitive advantage for small businesses? In: *Benchmarking: An International Journal*, volume 14, pp. 59-76.

123. Kronbichler, S.A., Ostermann, H., Staudinger, R. (2010): A Comparison of ERP-Success Measurement Approaches. In: *Journal of Information Systems and Technology Management,* volume 7, issue 2, 2010, pp. 281-310.

124. Kruse, J., Bethmann, S., Eckert, J., Niermann, D., Schmieder, C. (2012): In und mit fremden Sprachen forschen. Eine empirische Bestandsaufnahme zu Erfahrungs- und Handlungswissen von Forschenden. In: Jan Kruse (Ed.): Qualitative Interviewforschung in und mit fremden Sprachen. Eine Einführung in Theorie und Praxis. Weinheim, Beltz Juventa, pp. 27-68.

125. Kuhl, J. (2001): Motivation und Persönlichkeit. Interaktionen psychischer Systeme. Hogrefe, Göttingen.

126. Kwahk, K., Lee, J. (2008): The role of readiness for change in ERP implementation: Theoretical bases and empirical validation. In: *Information & Management,* volume 45, pp. 474-481.

127. Labuschagne, C., Brent, A.C. (2005): Sustainable Project Life Cycle Management: the need to integrate life cycles in the manufacturing sector. In: *International Journal of Project Management,* volume 23, issue 2, pp. 159-168.

128. Laukkanen, S., Sarpola, S., Hallikainen, P. (2007): Enterprise size matters: objectives and constraints of ERP adoption. In: *Journal of Enterprise Information Management*, volume 20, issue 3, pp. 310-334.

129. Leclercq, A. (2007): The perceptual evaluation of information systems using the construct of user satisfaction: case study of a large French group. In: *The DATABASE for Advances in Information Systems,* volume 38, issue 2, pp. 27-60.

130. Ledoux, J. (2009): Das Netz der Persönlichkeit. Düsseldorf, 2006.

131. Leonard, N.H., Beauvais, L.L., Scholl, R.W. (1999): Work motivation: The incorporation of self-based processes. In: *Human Relations*, volume 52, pp. 969-998.

132. Lepper, M.K., Greene, D., Nisbett, R. (1973): Undermining children's intrinsic interest with extrinsic reward: A test of the 'overjustification' hypothesis. In: *Journal of Personality and Social Psychology*, volume 28, pp. 129-137.

133. Lientz, B.P., Rea, K.P. (1995): Project Management for the 21st century. San Diego: Academic Press.

134. Likert, R. (1932): A technique for the Measurement of Attitudes. In: *Archives of Psychology*, volume 140, pp. 1-55.

135. Lin, D. (2013): Die fünf Quellen der Motivation bei der Nutzung von Enterprise Wikis. In: *11th International Conference on Wirtschaftsinformatik*, Leipzig, Germany, pp. 643-657.

136. Lin, H.Y., Hsu, P.Y., Ting, P.H. (2006): ERP systems success: An integration of IS success model and balanced scorecard. In: *Journal of Research and Practice in Information Technology*, volume 38, issue 3, pp. 215-228.

137. Linberg, K.L. (1999): Software developer perceptions about software project failure: a case study. In: *The Journal of Systems and Software*, volume 49, issue 2-3, pp. 177-192.

138. Liu, A.Z., Seddon, P.B. (2009): Understanding how Project Critical Success Factors affect Organizational Benefits from Enterprise Systems. In: *Business Process Management Journal,* volume 15, issue 5, pp. 716-743.

139. Llieva, J., Baron, S., Healey, N. M. (2002): Online surveys in marketing research: Pros and cons. In: *International Journal of Market Research*, volume 44, issue 3, pp. 361-367.

140. Longinidis, P., Gotzamani, K. (2009): ERP user satisfaction issues: insights from a Greek industrial giant. In: *Industrial Management & Data Systems*, volume 109, issue 5, pp. 628-645.

141. Lui, K.M., Chan, K.C.C. (2008): Rescuing Troubled Software Projects by Team Transformation: A Case Study With an ERP Project. In: *IEEE Transactions on Engineering Management*, volume 55, issue 1, pp. 171-184.

142. Markus, M.L., Tanis, C. (2000): The enterprise system experience - from adoption to success. In: *Framing the domains of IT research: Projecting the future through the past*, volume 173, pp. 173-207.

143. Maslow, A.H. (1943): A Theory of Human Motivation. In: *Psychological Review*, volume 50, pp. 370-396.

144. Maslow, A.H. (1954): Motivation and personality. New York: Harper and Row.

145. Mayo, E. (1945): The Social Problems of an Industrial Civilization. Boston: Graduate School of Business Administration, Harvard University.

146. McClelland, D.C. (1961): The Achieving Society. New York: Van Nostrand Reinhold.

147. McClelland, D.C. (1965): Toward a theory of motive acquisition. In: *American Psychologist*, volume 20, pp. 321-333.

148. McClelland, D.C. (1987): Human motivation. Cambridge.

149. McGregor, D. (1960): The human side of enterprise. New York, McGraw-Hill.

150. McKenney, J.L., Mason, R.O., Copeland, D.G. (1997): Bank of America: The crest and trough of technological leadership. In: *MIS Quarterly*, volume 21, issue 3, pp. 321-353.

151. McKinney, V., Kanghyun, Y., Zahedi, F.M. (2002): The measurement of web-customer satisfaction: An expectation and disconfirmation approach. In: *Information Systems Research*, volume 13, issue 3, pp. 296-315.

152. Meuser, M., Nagel, U. (1991): ExpertInneninterviews - vielfach erprobt, wenig bedacht: ein Beitrag zur qualitativen Methodendiskussion. In: *Qualitativ-empirische Sozialforschung: Konzepte, Methoden, Analysen.* Opladen, Westdt. Verlag, pp. 441-471.

153. Miles, R.E., Snow, C.C. (1994): Fit, Failure, and the Hall of Fame. How Companies Succeed or Fail. New York, Free Press.

154. Minahan, T. (1998): Enterprise Resource Planning: Strategies not included. In: *Purchasing*, volume 125, issue 1, pp. 112-127.

155. Morris, M.G., Venkatesh, V. (2010): Job Characteristics and Job Satisfaction: Understanding the Role of Enterprise Resource Planning System Implementation. In: MIS Quarterly, volume 34, issue 1, pp. 143-161.

156. Morris, P.W.G. (1994): The management of projects. London, New York, NY.

157. Moss, J.A., Barbuto, J.E. (2004): Machiavellianism's Association with Sources of Motivation and Downward Influence Strategies. In: *Psychological reports*, volume 94, issue 3, pp. 933-943.

158. Murphy, K.E., Simon, S. J. (2002): Intangible benefits valuation in ERP projects. In: *Info Systems Journal*, volume 12, pp. 301-320.

159. Nadler, D., Tushman, M.L. (1997): Competing by Design: The Power of Organizational Architecture. New York: Oxford University Press.

160. Nah, F.F.H, Lau, J.L. S., Kuang, J. (2001): Critical factors for successful implementation of enterprise systems. In: *Business Process Management Journal*, volume 7, issue 3, pp. 285-296.

161. Nerdinger, F.W. (2001): Motivation. In: H. Schuler, Lehrbuch der Personalpsychologie. Göttingen, Hogrefe.

162. Neufeld, D.J., Dong, L., Higgins, C. (2007): Charismatic Leadership and User Acceptance of Information Technology. In: *European Journal of Information Systems,* volume 16, issue 4, pp. 494-510.

163. Nicolau, A.I. (2004): Firm Performance Effects in Relation to the Implementation and Use of Enterprise Resource Planning Systems. In: *Journal of Information Systems*, volume 18, issue 2, pp. 79-105.

164. Nie, N., Hillygus, S., Erbring, L. (2002): Internet use, interpersonal relations and sociability: Findings from a detailed time diary study. In: *B.Wellman (Ed.), The Internet in Everyday Life*, pp. 215-243.

165. Norris, G., Hurley, J.R., Hartley, K.M., Dunleavy, J.R., Balls, J.D. (2000): E-Business and ERP: Transforming the enterprise. New York: John Wiley & Sons, Inc.

166. Northcraft, G.B., Neal, M.A. (1994): Organization Behavior: A Management Challenge, 2nd ed., Fort Worth: Dryden Press.

167. Olson, D.L., Kesharwani, S. (2009): Enterprise Information Systems: Contemporary Trends and Issues. New York: World Scientific Publishers.

168. Olson, D.L., Staley, J. (2012): Case study of open-source enterprise resource planning implementation in a small business. In: *Enterprise Information Systems*, volume 6, pp. 79-94.

169. Olsen, K.A., Sætre, P. (2007): IT for niche companies: is an ERP system the solution? In: *Information Systems Journal*, volume 17, pp. 37-58.

170. Orlicky, J. (1975): Material Requirements Planning. New York, NY: McGraw Hill.

171. Orlikowski, W.J. (1992): The Duality of Technology - Rethinking the Concept of Technology in Organizations. In: *Organization Science*, volume 3, issue 3, pp. 398-427.

172. Pang, A. (2006): Air France Soars to New Heights with Upgrade mySAP ERP System: Meeting its commitment to Excellence. In: *IDC Case Study*, July, 1-9.

173. Pang, C., Dharmasthira, Y., Eschinger, C., Motoyoshi, K., Brant, K.F. (2013): Market Share Analysis: ERP Software. In: *Worldwide*, pp. 1-10.

174. Parr, A., Shanks, G. (2000): A model of ERP project implementation. In: *Journal of information technology*, volume 15, issue 4, pp. 289-303.

175. Parsons, T. (1960): Structure and Process in Modern Societies. Glencoe, OL, Free Press.

176. Petter, S., DeLone, W., McLean E. (2008): Measuring information systems success: models, dimensions, measures, and interrelationships. In: *European Journal of Information Systems*, volume 17, issue 3, pp. 236-263.

177. Pinkerton, W.J. (2003): Project management: achieving project bottom-line success, McGraw-Hill, New York.

178. Pinto, J.K., Slevin, D.P. (1987): Balancing strategy and tactics in project implementation. In: *Sloan Management Review*, volume 29, issue 1, pp. 33-41.

179. Pitt, L.F., Watson, R.T., Kavan, C.B. (1995): Service quality: A measure of information systems effectiveness. In: *MIS Quarterly*, volume 19, issue 2, pp. 173-187.

180. Pleshko, L., Nickerson, I. (2007): Strategic comparisons of very large firms to smaller firms n a financial service industry. In: *Academy of Strategic Management Journal*, volume 6, pp. 105-116.

181. PMI (2008): A guide to the Project management body of knowledge (PMBoK Guide), fourth edition. Newtown Square, Pa., Project Management Institute.

182. Poba-Nzaou, P., Raymond, L. (2011): Managing ERP system risk in SMEs: A multiple case study. In: *Journal of Information Technology*, volume 26, pp. 170-192.

183. Porter, M.E. (1980): Competitive Strategy. New York, Free Press.

184. Pschyrembel, W. (2002): Klinisches Wörterbuch. Edition 259, de Gruyter, Berlin.

185. Purvis, R.L., Sambamurthy, V., Zmud, R.W. (2001): The assimilation of knowledge platforms in organizations: An empirical investigation. In: *Organization Science*, volume 12, issue 2, pp. 117-135.

186. Qian, Z., Bock, G.W. (2005): An empirical study on measuring the success of knowledge repository systems. In: *Proceedings of the 38th Hawaii international conference on system sciences*, Big Island, Hawaii, pp. 1-10.

187. Quiescenti, M., Bruccoleri, M., La Commare, U., La Diega, S.N., Perrone, G. (2006): Business process - oriented design of enterprise resource planning (ERP) systems for small and medium enterprises. In: *International Journal of Production Research*, volume 44, pp. 3797-3811.

188. Rainer, R.K., Jr., Watson, H.J. (1995): The keys to executive information system success. In: *Journal of Management Information Systems*, volume 12, issue 2, pp. 83-98.

189. Ram, J., Corkindale, D., Wu, M.L. (2013): Implementation Critical Success Factors (CSFs) for ERP: Do they contribute to implementation success and post-implementation performance? In: *International Journal of Production Economics*, volume 144, issue 1, pp. 157-174.

190. Rashid, M.A., Hossain, L., Patrick, J.D. (2002): The Evolution of ERP Systems: A Historical Perspective. In: *Enterprise Resource Planning: Solutions and Management*, pp. 35-50.

191. Redmill, F. (1997): Software projects: evolutionary vs. big-bang delivery. Wiley series in software engineering practice, Wiley, Chichester.

192. Reynolds, S.J., Schultz, F.C., Hekman, D.R. (2006): Stakeholder Theory and Managerial Decision-Making: Constraints and Implications of Balancing Stakeholder Interests. In: *Journal of Business Ethics*, volume 64, p. 285-301.

193. Richman, L. (2002): Project management step-by-step. New York, Amacom.

194. Roberts, H.J. and Barrar, P.R.N. (1992): MRPII implementation: key factors for success. In: *Computer Integrated Manufacturing Systems*, volume 5, issue 1, pp. 31-38.

195. Robey, D., Ross, J.W., Boudreau, M.C. (2002): Learning to implement enterprise systems: An exploratory study of the dialectics of change. In: *Journal of Management Information Systems,* volume 19, issue 1, pp. 17-46.

196. Rosario, J.G. (2000): On the leading edge: critical success factors in ERP implementation projects. In: *Business World*, pp. 21-27.

197. Rosemann, M., Wiese, J. (1999): Measuring the Performance of ERP Software - a Balanced Scorecard Approach. In: *Proc. 10th Australasian Conference on Information Systems*, pp. 773-784.

198. Ross, J., Vitale, M. (2000): The ERP Revolution: Surviving versus Thriving. In: *Information Systems Frontiers,* volume 2, issue 2, pp. 233-241.

199. Ryan, R.M., Deci, E.L. (2000): Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. In: American Psychologist, volume 55, pp. 68-78.

200. Sambamurthy, V., Bharadwaj, A., Grover, V. (2003): Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. In: *MIS Quarterly,* volume 27, issue 2, pp. 237-263.

201. Sarker, S., Lee, A.S. (2003): Using a Case Study to test the Role of three Key Social Enablers in ERP Implementation. In: *Information & Management,* volume 40, issue 8, pp. 813-829.

202. Scott, W.R., Davis, G.F. (2007): Organizations and Organizing: Rational, Natural and Open Systems Perspectives. International Edition, Pearson Education.

203. Seddon, P.B., Kiew, M.Y. (1994): A partial test and development of the DeLone and McLean model of IS success. In: *Proceedings of the 15th international conference on information systems*, Vancouver, pp. 90-109.

204. Seddon, P.B. (1997): A respecification and extension of the DeLone and McLean model of IS success. In: *Information Systems Research*, volume 8, issue 3, pp. 240-253.

205. Seddon, P.B., Shanks, G., Willcocks, L. (2003): Second-wave enterprise resource planning systems. New York: Cambridge University.

206. Sedera, D. (2006): An empirical investigation of the salient characteristics of IS-success models. In: *Proceedings of the 12th Americas conference on information systems*, Acapulco, pp. 517-527.

207. Sedera, D., Gable, G.G. (2004): A factor and structural equation analysis of the enterprise systems success measurement model. In: *Proceedings of the 25th international conference on information systems*, Washington, pp. 449-463.

208. Shang, S., Seddon, P.B. (2000): A comprehensive framework for classifying the benefits of ERP systems. In: *AMCIS 2000 Proceedings*, pp. 1005-1014.

209. Shehab, E., Sharp, M., Supramaniam, L., Spedding, T. (2004): Enterprise Resource Planning: An integrative review. In: *Business Process Management Journal*, volume 10, issue 4, pp. 359-386.

210. Shenhar, A.J., Tishler, A., Dvir, D., Lipovetsky, S., Lechler, T. (2002): Refining the search for project success factors: a multivariate typological approach. In: *R&D Management*, volume 32, issue 2, pp. 111-126.

211. Shiau, W.L., Hsu, P.Y., Wang, J.Z. (2009): Development of measures to assess the ERP adoption of small and medium enterprises. In: *Journal of Enterprise Information Management*, volume 22, issue 1-2, pp. 99-118.

212. Simon, H.A. (1964): On the concept of Organizational goal. In: *In Administrative Science Quarterly*, volume 9, issue 1, pp. 1-23.

213. Simon, H.A. (1997): Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations (4[th]ed.). New York: Free Press (first edition published in 1945).

214. Sirota, D., Mischkind, L.A., Meltzer, M.I. (2005): The enthusiastic employee: How companies profit by giving workers what they want. Upper Saddle River, NJ: Wharton School Publishing.

215. Skemp-Arlt, K.M, Toupence, R. (2007): The administrator's role in employee motivation. In: *Coach & Athletic Director*, volume 76, issue 7, pp. 28-34.

216. Smyth, R.W. (2001): Challenges to successful ERP use. In: *The 9th European Conference on Information Systems*, Bled, pp. 1227-1231.

217. Snider, B., Silveira, G.J.C.D., Balakrishnan, J. (2009): ERP implementation at SMEs: analysis of five Canadian cases. In: *International Journal of Operations and Production Management*, volume 29, pp. 4-29.

218. Statista (2016): http://de.statista.com/statistik/daten/studie/262275/umfrage/ marktanteile-der-anbieter-von-erp-software-in-deutschland/, checked 15.02.2016.

219. Statistik Austria (2016): Population of Austria in 2014, Online: http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/bevoelkerung/ind ex.html, checked on 15.02.2016.

220. Statistisches Bundesamt (2016): Population of Germany in 2014, Online: https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/Bevoelkerung/Bevoelkerun g.html, checked on 15.02.2016.

221. Stefanou, C.J. (2001): A framework for the ex-ante evaluation of ERP software. In: *European Journal of Information Systems*, volume 10, issue 4, pp. 204-215.

222. Sumner, M. (1999): Critical success factors in enterprise wide information management systems projects. In: *Proceedings of the Americas Conference on Information Systems*, pp. 297-303.

223. Taylor, F.W. (1911): The Principles of Scientific Management. New York, Harper.

224. Teittinen, H., Pellinen, J., Jarvenpaa, C. (2013): ERP in action: challenges and benefits for management control in SME context. In: *International Journal of Accounting Information Systems*, volume 14, issue 4, pp. 278-296.

225. Thong, J.Y.L., Yap, C.S. (1995): CEO characteristics, organizational characteristics and information technology adoption in small businesses. In: *Omega*, volume 23, pp. 429-442.

226. Tsai, W.H., Chien, S.W., Fan, Y.W, Cheng, J.M. (2005): Critical management issues in implementing ERP: empirical evidences from Taiwanese firms. In: *International Journal of Services and Standards*, volume 1, issue 3, pp. 299-318.

227. Turnan, J. (1986): Success modeling: A technique for building a winning project team. In: *PMI Annual Seminar & Symposium*, Montreal, pp. 94-108.

228. Turner, J.R., Müller, R. (2003): On the nature of the project as a temporary organization. In: *International Journal of Project Management*, volume. 21, issue 1, pp. 1-8.

229. Umble, E., Umble, M. (2002): Avoiding ERP implementation failure. In: *Industrial Management*, volume 44, issue 1, p. 25-33.

230. Van der Westhuizen, D., Fitzgerald, E.P. (2005): Defining and measuring project success. In: *European Conference on IS Management, Leadership and Governance 2005*, 7-8 Jul 2005, Reading, United Kingdom, pp. 1-17.

231. Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K.M., Deci, E.L. (2004): Motivation persistence, deep level learning and achievement: The synergistic role of intrinsic goal content and autonomy-supportive context. In: *Journal of Personality and Social Psychology*, volume 87, pp. 246-260.

232. Vroom, V.H. (1964): Work and motivation. John Wiley & Sons, New York.

233. Wagner, B., Monk, E. (2008): Enterprise Resource Planning. 3rd ed. Boston: MIT Course Technology Press.

234. Wagner, D.N. (2010): Leadership Education Reconsidered: Examining Self-Perceived Leadership Styles and Motivation Sources among Undergraduate Leaders. Bowling Green State University, Thesis.

235. Wateridge, J. (1998): How can IS/IT projects be measured for success. In: *International Journal of Project Management*, volume 16, issue 1, pp. 59-63.

236. Weber, M. (1947): The Theory of Social and Economic Organizations. New York, free press.

237. Wieder, B., Booth, P., Matolcsy, Z., Ossimitz, M. (2006): The impact of ERP systems on firm and business process performance. In: *Journal of Enterprise Information Management*, volume 19, issue 1, pp. 13-29.

238. Willcocks, L.P., Sykes R. (2000): The Role of the CIO and IT Function in ERP. In: *Communications of the ACM*, volume 43, issue 4, pp. 32-38.

239. Williams, T.M. (1999): The need for new paradigms for complex projects. In: *International Journal of Project Management*, volume 17, issue 5, pp. 269-273.

240. Wong, K.Y., Aspinwall, E. (2004): Characterizing knowledge management in the small business environment. In: *Journal of Knowledge Management*, volume 8, pp. 44-61.

241. Wua, J.H., Wang, Y.M (2005): Measuring ERP success: The key-users' viewpoint of the ERP to produce a viable IS in the organization. In: *Computers in Human Behavior*, volume 23, issue 3, pp. 1582-1596.

242. Xu, Q., Ma, Q. (2008): Determinants of ERP Implementation Knowledge Transfer. In: *Information & Management*, volume 45, issue 8, pp. 528-539.

243. Yan, Z. (2013): The relationship between employees' motivation sources and organizational commitment among Chinese employees. In: *Osaka University Paper*, pp. 1-30.

244. Zhang, Z., Lee, M.K.O., Huang, P., Zhang, L, Huang, X. (2005): A framework of ERP systems implementation success in China: An empirical study. In: *International Journal of Production Economics*, volume 98, issue 1, pp. 56-80.

245. Zouine, A., Fenies, P. (2014): The Critical Success Factors of the ERP System Project: A Meta-Analysis Methodology. In: *The Journal of Applied Business Research*, volume 30, issue 5, pp. 1407-1448.

APPENDIX

Appendix 1: Letter to Experts - Evaluation of Questionnaire on ERP Project Success

This is a template for evaluation of questionnaire on ERP project success. Each expert was briefed on telephone previously and addressed personally. The email was sent in German.

Sehr geehrte Frau… Sehr geehrter Herr…

Wie gerade telefonisch besprochen!

Ich bin gerade mitten in meiner Dissertation, bei der ich den Zusammenhang von verschiedenen **Arten von Motivation** und **Projekterfolg** bei ERP Einführungen untersuchen will.

Für die Arten der Motivation gibt es bereits einen oft erprobten Fragenkatalog.

Nun muss ich auch den **Projekterfolg** festlegen und eruieren.

Deshalb habe ich einen eigenen, relativ übersichtlichen Fragenkatalog erstellt.

Dieser ist unterteilt in 11 Dimensionen, denen auch 5 bis 6 Aussagen zugeordnet sind.

Wichtig:

Die Fragebögen werden an Geschäftsführer von Unternehmen mit abgeschlossenen ERP Projekten gesendet, also somit später an Sie!

Deshalb frage ich Sie als Experten…

Bitte um Ihr Feedback, wie Sie **die Fragen** die ich zum Thema **Projekterfolg** stelle **beurteilen**?

Passen die Fragen die ich stelle auch **zur Dimension**?

Bitte in der Spalten F bis J ankreuzen, **wie gut aus Ihrer Sicht die Aussagen zur Dimension passen.**

Falls Ihnen ein Kommentar oder eine bessere Formulierung der Aussage einfällt, dann bitte einfach in Spalte E ergänzen.

Bei Fragen bin ich jederzeit telefonisch für Sie erreichbar!

DANKE!!!!

Viele Grüße

Jürgen Alexander Gollner

gollner@gmx.at

+43676……27

Email to experts - English version; only German version was sent to CEOs

Dear Mrs…., dear Mr.…

As just discussed by telephone!

I am working on my dissertation, in which I research the correlation of different sources of motivation and project success during ERP implementations.

For the different sources of motivation already a proven questionnaire is existing.

Now I have to specify and determine project success.

Therefore, I created an own and clearly arranged questionnaire.

The questionnaire is divided in 11 dimension, which are 5 to 6 statements are assigned to.

Important:

These questionnaires will later be sent to CEOs of companies which completed ERP projects.

Therefore I ask you as an expert…

How do you rate the questions which are formulated for the topic project-success?

Do the questions or statement fit to each dimension?

Please rate in columns F to J, how well the statements fit to each dimension.

If you have any comments or a better formulation for a statement, feel free to supplement it in column E.

If you have any questions, do not hesitate to contact me on my mobile phone.

THANK YOU!

With best regards

Jürgen Alexander Gollner

gollner@gmx.at

+43676……27

Appendix 2: List of Experts - Evaluation of Survey on ERP Project Success

The experts evaluated the quality of survey on measurement of ERP project success.

	Date	Organization	Position	Region	Language
1	31.07.2014	Metal	CEO	Austria	German
2	28.07.2014	Automotive supplier	CEO	Austria	German
3	11.08.2014	Automotive supplier	CIO	Austria	German
4	25.07.2014	Semiconductors	CEO	Austria	German
5	18.08.2014	Semiconductors	CEO	Austria	German
6	23.07.2014	Trade	CEO	Germany	German
7	29.07.2014	Trade	CIO	Germany	German
8	25.07.2014	Consulting	CEO	Austria	German
9	05.08.2014	Electronics	CIO	Germany	German
10	22.07.2014	Trade	CIO	Germany	German

Appendix 3: Example of Invitation for Participation in the Quantitative Survey

This email was sent to CEOs of participating companies. Requirements like size of organization or date of ERP project was checked previously. It was only mailed in German languange, an English version was not used.

Von: Mag. Juergen Alexander Gollner [mailto:gollner@gmx.at]
Gesendet: Montag,   13:27
An:
Betreff: Bitte um Unterstützung: Online Umfrage für Dissertation - Motivation und ERP Projekterfolg

Sehr geehrter Herr

Mein Name ist Jürgen Alexander Gollner und ich schreibe derzeit im Rahmen meines Doktorat-Studiums in Management Science eine Dissertation.

Die wissenschaftliche Arbeit untersucht, ob ein direkter **Zusammenhang** von **Mitarbeiter-Motivation** und **Projekterfolg bei ERP Einführungen** besteht?

Auf Grund Ihrer Expertise ersuche ich Sie, mich durch Ihre Teilnahme an einer anonymen Online Umfrage bei der empirischen Datenerhebung zu unterstützen.

Diese Anfrage richtet sich an Sie, wenn in Ihrem Unternehmen ein neues ERP System implementiert wurde, und dieses in den Jahren 2012 bis 2014 live gegangen ist.

Das Ausfüllen eines Online-Fragebogens dauert ca. 5 bis 10 Minuten, die Ergebnisse werden unter Wahrung der datenschutzrechtlichen Bestimmungen anonymisiert und wissenschaftlich ausgewertet.

Ich habe **2 Online-Fragebögen** vorbereitet, um deren Ausfüllen ich Sie und Ihre Projekt-Mitarbeiter ersuche:

1. Thema **Projekterfolg** für Geschäftsführer (Zeitaufwand ca. 10 Minuten)

https://de.surveymonkey.com/s/6MJQMBN

2. Thema **Motivation** für die ERP-Projektmitarbeiter (Zeitaufwand ca. 5 Minuten)

Ich ersuche Sie **diesen Link** an **Projekt-Mitarbeiter** bzw. **Key-User weiterzuleiten.**

https://de.surveymonkey.com/s/6FVLJQD

Nach Abschluss der Dissertation übermittle ich Ihnen bei Interesse gerne die Forschungsergebnisse.

Bei Fragen bin ich jederzeit telefonisch oder per Mail für Sie erreichbar!

Vielen Dank!

Mit freundlichen Grüßen

Jürgen Alexander Gollner

gollner@gmx.at

+43 676   27

Appendix 4: Quantitative Survey on *Motivation Sources Inventory* - English

No online version of this survey in English is existing, but a copy of English and German version in Excel was sent per mail to CEOs. The questionnaire in English language is listed here.
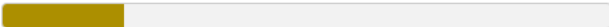
No.	Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11	I only like to do things that are fun.					
12	Decisions I make will reflect high standards that I have set for myself.					
13	Job requirements dictate how much effort I exert during work.					
14	It is important to me that others approve of my behaviour.					
15	I would not work for a company if I didn't agree with its mission.					
17	If I didn't enjoy my job at work I would leave.					
18	It is important that I work for a company that allows me to use my skills and talents.					
19	A day' work for a day's pay.					
20	I often make decisions based on what others will think.					
21	I have to believe in a cause before I will work hard at achieving its ends.					
23	I often put off work so that I can do something else that is more fun.					
24	I try to make sure that my decisions are consistent with my personal standards of behaviour.					
25	I would work harder if I knew that my effort would lead to higher pay.					
26	I work harder on a project if public recognition is attached to it.					
27	Unless I believe in the cause, I will not work hard.					
29	When choosing jobs I usually choose the one that sounds like the most fun.					
30	I consider myself a self-motivated person.					

31	When choosing jobs I usually choose the one that pays the most.					
32	If choosing jobs I want one that allows me to be recognized for success.					
33	When choosing companies to work for, I look for one that supports my beliefs and values.					
35	The people I choose to spend time with are the most fun to be with.					
36	I like to do things which give me a sense of personal achievement.					
37	At work, my favorite day of the week is 'payday'.					
38	Those people who make the most friends have lived the fullest lives.					
39	An organization's mission needs to be in agreement with my values for me to work hard.					
41	If choosing between two jobs, the most important criteria is 'which is more fun'.					
42	I need to know that my skills and values are impacting organization's success.					
43	People should always keep their eyes and ears open for better job opportunities.					
44	I give my best effort when I know what will be seen by the most influential people in an organization.					
45	If an organization is accomplishing missions that I agree with, it doesn't matter whether I was responsible for its success.					
47	If choosing between two tasks, the most important criteria is 'which is more fun'.					
	Additional Comments:					

Appendix 5: Quantitative Survey on *Motivation Sources Inventory* - German

1 / 5 20%

Herzlich Willkommen in dieser wissenschaftlichen Umfrage zum Thema Motivation und ERP Projekterfolg.

Diese anonyme Umfrage richtet sich an Mitarbeiter und Key-User von ERP-Projekten.

Der vorliegende Fragebogen umfasst 30 Fragen. Tests haben ergeben, dass die Beantwortung voraussichtlich 5 bis 7 Minuten in Anspruch nehmen wird.

Alle Angaben werden unter Wahrung der datenschutzrechtlichen Bestimmungen wissenschaftlich ausgewertet.
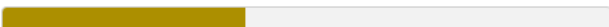
Es wird ausdrücklich darauf hingewiesen, dass die Daten weder an die teilnehmenden Unternehmen, noch an Dritte übermittelt werden.

Ich möchte Sie bei jeder Frage um eine ehrliche und realistische Bewertung bitten.

Vielen Dank, dass Sie mich bei meiner Dissertation unterstützen!

2 / 5 40%

* 1. Motivation

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Für mich ist wichtig, dass andere mein Verhalten billigen.	○	○	○	○	○
Meine Entscheidungen spiegeln die hohen Standards wider, die ich für mich gesetzt habe.	○	○	○	○	○
Ich würde nicht für ein Unternehmen arbeiten, mit dessen Mission ich nicht einverstanden bin.	○	○	○	○	○
Ich erledige nur Aufgaben gerne, wenn sie mir Spaß machen.	○	○	○	○	○
Die Arbeitsanforderungen geben den Aufwand vor, den ich während der Arbeit ausübe.	○	○	○	○	○
Ich treffe oft Entscheidungen auf der Grundlage, was andere denken.	○	○	○	○	○
Ich muss an eine Sache glauben, bevor ich für dessen Umsetzung hart arbeite.	○	○	○	○	○
Wenn meine Arbeit keinen Spaß machen würde, würde ich kündigen.	○	○	○	○	○
Ein ehrlicher Lohn für ehrliche Arbeit.	○	○	○	○	○
Ich unterbreche oft meine Arbeit, um etwas zu erledigen, was mehr Spaß macht.	○	○	○	○	○

Motivation und ERP Projekt Erfolg

* 2. Motivation

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Ich würde härter arbeiten, wenn ich wüsste, dass meine Bemühungen zu einem höherem Gehalt führen würden.	○	○	○	○	○
Ich arbeite härter in Projekten, mit denen öffentliche Aufmerksamkeit verbunden ist.	○	○	○	○	○
Wenn ich mir Arbeit aussuchen kann, wähle ich normalerweise die, die mir am meisten Spaß macht.	○	○	○	○	○
Wenn ich mir einen Arbeitsplatz aussuche, nehme ich den, der am besten bezahlt ist.	○	○	○	○	○
Ich wähle Arbeit, die mir erlaubt, für dessen Erfolg auch wahrgenommen zu werden.	○	○	○	○	○
Wenn ich mir meinen Arbeitsgeber aussuche, schaue ich nach einer Firma, die meine Überzeugungen und Werte unterstützt.	○	○	○	○	○
Ich sehe mich als selbst-motivierte Person.	○	○	○	○	○
Die Personen, mit denen ich gerne Zeit verbringe, sind in der Regel Menschen, mit denen ich Spaß haben kann.	○	○	○	○	○
Der beste Tag im Monat ist der Tag, an dem das Gehalt kommt.	○	○	○	○	○
Ich versuche sicherzustellen, dass meine Entscheidungen mit meinen persönlichen Verhaltensstandards übereinstimmen.	○	○	○	○	○

4 / 5   80%

* 3. Motivation

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Solange ich an eine Sache nicht glaube, bringe ich nicht vollen Einsatz.	○	○	○	○	○
Ich erledige gerne Dinge, welche mir ein Gefühl von persönlicher Verwirklichung geben.	○	○	○	○	○
Für mich ist wichtig, für ein Unternehmen zu arbeiten, welches mir erlaubt, meine Fähigkeiten und Begabung einsetzen.	○	○	○	○	○
Die Mission meiner Firma muss mit meinen Werten übereinstimmen, damit ich mich anstrenge.	○	○	○	○	○
Wenn ich zwischen 2 Jobs wählen kann, ist mein wichtigstes Kriterium 'wo kann ich mehr Spaß haben'.	○	○	○	○	○
Man sollte immer Augen und Ohren offen halten für eine Chance auf einen besseren Arbeitsplatz.	○	○	○	○	○
Ich gebe mein Bestes, wenn ich weiß, dass ich von einflussreichen Leuten in meinem Unternehmen beobachtet werde.	○	○	○	○	○
Ich muss wissen, dass meine Fähigkeiten und Werte den Erfolg meines Unternehmens beeinflussen.	○	○	○	○	○
Wenn eine Organisation Ziele erreicht, mit denen ich übereinstimme, ist es egal, ob ich für dessen Erfolg verantwortlich war.	○	○	○	○	○
Menschen mit den meisten Freunden hatten auch das erfüllteste Leben.	○	○	○	○	○

Motivation und ERP Projekt Erfolg

Angaben zu Unternehmen und Person

5 / 5 ████████████████████████ 100%

Vielen Dank für Ihre Unterstützung und Teilnahme an der Online-Umfrage!

* 4. Name Ihres Unternehmens
Falls Sie diese Angabe nicht machen wollen, bitte ich Sie für die Umfragen in Ihrem Unternehmen eine Nummer bzw.
Zahl einzutragen. Damit kann ich die zusammengehörigen Ergebnisse eindeutig zuordnen

[   ]

5. Angabe freiwillig: Wann wurden Sie geboren?

Geburtsjahr [   ]

6. Angabe freiwillig: Ihr Geschlecht?

○ männlich

○ weiblich

7. Angabe freiwillig: Welcher ist Ihr höchster Bildungsabschluss?

○ ohne Abschluss

○ Allgemeine Hochschulreife

○ Berufsausbildung

○ Diplom (Fachhochschule)

○ Bachelor

○ Master/Diplom/Magister (Universität)

○ Doktorgrad

○ keiner der oben genannten Abschlüsse

8. Angabe freiwillig: Über wieviele Jahre Berufserfahrung verfügen Sie?

Berufserfahrung in Jahren [   ]

[Zurück] [Fertig]

Appendix 6: Quantitative Survey on ERP Project Success - English

English Version on online survey on ERP project success in excel format.

5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree

Measurement of ERP project success

Within Time	5	4	3	2	1
• main milestones were achieved in time • go live is reached in time with predefined specifications • time span of project					
The predefined miles-stones were reached on time.					
In the course of the project, very few avoidable delays occurred.					
There was no ill reasoned shifting of go live.					
The go-live date was met.					
The time span of the project from start to go-live was in an acceptable range.					
The project was completed by the scheduled time.					
Within Budget	5	4	3	2	1
• Project budget (within pre-defined specifications) is not exceeded • Budget was used effectively • Expenses for extra requirements					
Total budget within the predefined specifications was met.					
The budget for new hardware and infrastructure was met.					
The internal project budget for employees was met.					
The project budget for external consultants was met.					
The result of the project would not have been achievable with less effort.					
The ratio between the planned project budget and expenses for Change Requests was at a reasonable level.					
Within Specifications	5	4	3	2	1
• Pre-defined specifications achieved for go-live • Goals of project • Scope of project					
The project objectives were clearly known and understood by the whole project team.					
The project scope had been defined in sufficient detail before the project started.					
The project scope was known by every member of the core project team.					
The project scope was repeatedly checked against the agreed specifications in order not to jeopardize the project goal.					
The proposed specifications have been implemented successfully.					
The process and the need for change requests was clear to all project members.					

Project stakeholder satisfaction	5	4	3	2	1

• Project stakeholders are individuals and organizations that are actively involved in the project, or whose interests may be affected as a result of project execution or project completion. For this criterion, the more narrow definition is used.
• Stakeholders are managers who
   o have the organizational authority to allocate resources (people, money, services)
   o set priorities for their own organizations in support of a change
   o are responsible for profit and loss
   o are dependent on success of ERP implementation
• This dimension is seen from the stakeholders point of view					

The stakeholders recognize that the new system adds value to the company.					
The decision for the new system was subsequently considered as correct and the expectations were met.					
The stakeholders were sufficiently involved in the project challenges and its impact on the entire company.					
Escalations were addressed fully and promptly to the stakeholders.					
The management board was satisfactorily informed about project progress at every stage of the project.					
From stakeholders' point of view, all changes in organization and process were carried out in time (change management).					

Quality of project management process	5	4	3	2	1
• Quality of project management process • Efficiency of project management process • Transparency of project management process • Escalation and risk management					
Overall, project management and project organization were carried out very efficiently.					
In each phase of the project status and goal achievement was clearly visible for all project team members.					
Important project steps and work packages were always coordinated with overall project goals.					
All major decisions were documented in writing.					
Reasonable requests for extensions and critical issues were provided in time to the decision makers (management, steering committee).					
During the whole project a clean and effective risk management was carried out.					

System Quality	5	4	3	2	1
• Access • Convenience, Ease of use • Customization, Flexibility • Integration • Reliability, Response time • System accuracy, System features					
The system meets the quality criteria for availability and reliability.					
The system is sufficiently adaptable for future requirements.					
The response times of the production system are satisfactory.					
The system is easy to use.					
The behaviour of the system largely corresponds to the expectations of the users.					
In total, the implementation has led to an improved efficiency within the company.					

	5	4	3	2	1
Information Quality	5	4	3	2	1
• Accuracy, Completeness, Precision • Availability, Timeliness • Format • Relevance, Reliability • Understandability, Conciseness					
The system provides the information our company requires.					
The system covers our organization's desired processes.					
The information generated from the new system is easy to understand.					
The new system meets our organization's security standards.					
The new system has a good data quality.					
The new system represents an added value compared to the old solution					
Service Quality	5	4	3	2	1
• Assurance • Empathy • Flexibility • Interpersonal quality • IS/ERP training • Reliability • Responsiveness					
During the project, the internal project members were adequately supported.					
The project managers were available to everyone and have actively cared for the project's success.					
The internal project members were able to rely on their colleagues and the defined procedures.					
In case of difficulties the ERP team quickly and constructively worked together to find a solution.					
The communication and escalation paths were known and transparent from the outset.					
During the project our company had functioning support structures and internal substitution rules.					
Use / Intention to Use	5	4	3	2	1
• Daily use • Frequency of use • Intention to (re)use • Nature of use • Navigation patterns • Number of transactions executed					
The new system is well accepted and used by the users.					
Users see the new system processing steps mainly positive compared to the old system.					
Users make satisfying use of the opportunities in the new system accordingly to the project goals.					
Users have been adequately trained on the new system.					
Users recognize an added value for their daily work using the new system.					
After a short training period, users find it easy to work with the new system.					
User satisfaction	5	4	3	2	1

	5	4	3	2	1
• Adequacy • Effectiveness / Efficiency • Enjoyment • Overall satisfaction					
Most users are very satisfied with the system created in the course of the project.					
Users recognize the new system has more advantages than disadvantages for their daily work.					
Users feel their work is less time consuming compared to the old system.					
Users can do daily operations at least equal or even better than before.					
The new system supports the user in fulfilling their respective objectives.					
Users appreciate the integrated nature of the new system.					

Net benefits	5	4	3	2	1
• Decision effectiveness / Individual productivity • Job effectiveness / Job performance / Job simplification • Business process change Competitive advantage • Cost reduction • Improved outcomes/outputs • Increased capacity • Overall productivity					
The implementation project can be considered on the whole as an economic success for our company.					
Our business processes are operating more efficiently and transparently than before.					
The project results help our company to reduce costs in the medium term.					
The new system allows us to quickly and inexpensively gain access to business-related information.					
The new system expands the possibilities of increased sales.					
The new system enables us to operate in new markets or countries.					

Appendix 7: Quantitative Survey on ERP Project Success - German

Note: an English version of the online survey does not exist, it was only done in German.

Motivation und ERP Projekt Erfolg

Erhebung zur Messung von ERP Projekterfolg

1 / 14   7%

Herzlich Willkommen in dieser wissenschaftlichen Umfrage zum Thema Motivation und ERP Projekterfolg.

Diese anonyme Umfrage richtet sich an Management, Projektleiter und/oder IT-Leiter von Firmen mit ERP-Projekten.

Der vorliegende Fragebogen umfasst 78 Fragen. Tests haben ergeben, dass die Beantwortung voraussichtlich 10-12 Minuten in Anspruch nehmen wird.

Alle Angaben werden unter Wahrung der datenschutzrechtlichen Bestimmungen anonymisiert und wissenschaftlich ausgewertet.

Es wird ausdrücklich darauf hingewiesen, dass die Daten weder an die teilnehmenden Unternehmen, noch an Dritte übermittelt werden.

Ich möchte Sie bei jeder Frage um eine ehrliche und realistische Bewertung bitten.

Vielen Dank, dass Sie mich bei meiner Dissertation unterstützen!

Weiter

Motivation und ERP Projekt Erfolg

ERP Projekterfolg

2 / 14   14%

* 1. Zeit

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Die definierten Meilensteine wurden zeitgerecht erreicht.	○	○	○	○	○
Im Projektverlauf traten sehr wenige vermeidbare Verzögerungen auf.	○	○	○	○	○
Es gab keine unplausibel begründete Produktivstartverschiebung.	○	○	○	○	○
Der Termin des Produktivstarts wurde eingehalten.	○	○	○	○	○
Die Zeitspanne des Projekts von Beginn bis zum Produktivstart war in einem akzeptablen Rahmen.	○	○	○	○	○
Das Projekt wurde zum geplanten Zeitpunkt fertiggestellt.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

ERP Projekterfolg

21%

* 2. Budget

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Das Gesamt-Budget innerhalb der vordefinierten Spezifikationen wurde eingehalten.	○	○	○	○	○
Das Budget für neue Hardware und Infrastruktur wurde eingehalten.	○	○	○	○	○
Das interne Projektbudget für Mitarbeiter wurde eingehalten.	○	○	○	○	○
Das Projektbudget für externe Berater wurde eingehalten.	○	○	○	○	○
Das Projektergebnis wäre nicht mit weniger Aufwand erreichbar gewesen.	○	○	○	○	○
Das Verhältnis zwischen geplantem Projektbudget und Aufwendungen für Change Requests war in einem vernünftigen Rahmen.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

ERP Projekterfolg

29%

* 3. Innerhalb definierter Spezifikationen
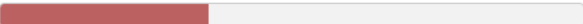
	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Die Projektziele waren im Projektteam bekannt und wurden auch von allen verstanden.	○	○	○	○	○
Der Projektumfang wurde im Vorfeld des Projekts ausreichend detailliert festgelegt.	○	○	○	○	○
Der Projektumfang war jedem Mitglied des Projektkernteams bekannt.	○	○	○	○	○
Der Projektumfang wurde regelmäßig auf die vereinbarten Spezifikationen abgeprüft, um das Projektziel nicht zu gefährden	○	○	○	○	○
Die geplanten Spezifikationen wurden erfolgreich umgesetzt.	○	○	○	○	○
Der Prozess und die Notwendigkeit von Change Requests war allen Projektmitgliedern klar.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

ERP Projekterfolg

36%

* 4. Zufriedenheit der Projekt-Stakeholder

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Die Stakeholder (Projekt-Entscheidungsträger) erkennen durch das neue System einen Mehrwert für das Unternehmen.	○	○	○	○	○
Die Entscheidung für das neue System war nachträglich betrachtet richtig und die Erwartungen wurden erfüllt.	○	○	○	○	○
Die Stakeholder waren ausreichend in die Projektbelange und deren Auswirkung auf das Gesamtunternehmen einbezogen.	○	○	○	○	○
Eskalationen wurden richtigerweise und zeitnah an die Stakeholder adressiert.	○	○	○	○	○
Die Stakeholder waren in jeder Phase über den Fortschritt des Projektes zufriedenstellend informiert.	○	○	○	○	○
Aus Sicht der Stakeholder wurden alle notwendigen organisatorischen und prozesstechnischen Veränderungen zeitnah durchgeführt (Change Management).	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

ERP Projekterfolg

43%

* 5. Qualität des Projekt-Management Prozesses

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Insgesamt betrachtet wurden Projektmanagement und Projektorganisation sehr effizient durchgeführt.	○	○	○	○	○
In jeder Phase des Projektes war Status und Zielerreichung für alle Projektteilnehmer klar erkennbar.	○	○	○	○	○
Alle Teilprojektpläne und Arbeitspakete wurden grundsätzlich von den übergeordneten Projektzielen abgeleitet.	○	○	○	○	○
Alle wichtigen Entscheidungen wurden schriftlich festgehalten.	○	○	○	○	○
Sinnvolle Anforderungen für Erweiterungen und kritische Themen wurden rechtzeitig an die Entscheidungsträger (Geschäftsführung, Lenkungsauschuß) getragen.	○	○	○	○	○
Es wurde während des gesamten Projektes ein sauberes und effektives Risikomanagement durchgeführt.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

ERP Projekterfolg

50%

* 6. Systemqualität

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Das System erfüllt die Qualitätsmerkmale Verfügbarkeit und Zuverlässigkeit.	○	○	○	○	○
Das System ist für spätere Anforderungen ausreichend anpassungsfähig.	○	○	○	○	○
Die Antwortzeiten des Produktivsystems sind zufriedenstellend.	○	○	○	○	○
Das System bietet ausreichende Benutzerfreundlichkeit.	○	○	○	○	○
Das Verhalten des Systems entspricht weitgehend den Erwartungen der Benutzer.	○	○	○	○	○
Insgesamt betrachtet hat die Implementierung zu einer Effizienzverbesserung im Unternehmen geführt.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

ERP Projekterfolg

57%

* 7. Informations-Qualität

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Das System liefert die von uns gewünschten Informationen.	○	○	○	○	○
Das System deckt die von uns gewünschten Prozesse ab.	○	○	○	○	○
Die aus dem neuen System generierten Informationen sind gut verständlich.	○	○	○	○	○
Das neue System erfüllt unsere Sicherheitsstandards.	○	○	○	○	○
Das neue System hat eine gute Datenqualität.	○	○	○	○	○
Das neue System stellt einen Mehrwert im Vergleich zur alten Lösung dar.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

9 / 14 64%

* 8. Service Qualität

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Während des Projektes wurden die internen Projektmitglieder ausreichend unterstützt.	○	○	○	○	○
Die Projektleiter waren für jeden erreichbar und haben sich aktiv um den Projekterfolg gekümmert.	○	○	○	○	○
Die internen Projektmitglieder konnten sich auf die Kollegen und die definierten Vorgehensweisen verlassen.	○	○	○	○	○
Bei Schwierigkeiten wurde schnell, konstruktiv und gemeinsam nach Lösungen gesucht.	○	○	○	○	○
Die Kommunikations- und Eskalationswege waren von Beginn an bekannt und transparent.	○	○	○	○	○
Während des Projektes gab es im Unternehmen funktionierende Supportstrukturen und interne Stellvertreterregelungen.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

10 / 14 71%

* 9. Nutzung / Beabsichtigte Nutzung

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Das neue System wird von den Benutzern gut akzeptiert und auch eingesetzt.	○	○	○	○	○
Die Benutzer sehen die neuen Arbeitsschritte im Vergleich zum Altsystem überwiegend positiv.	○	○	○	○	○
Die Benutzer schöpfen die Möglichkeiten im neuen System gemäß der Projektziele zufriedenstellend aus.	○	○	○	○	○
Die Benutzer sind ausreichend auf dem neuen System geschult worden.	○	○	○	○	○
Die Benutzer erkennen einen Mehrwert für Ihre tägliche Arbeit in der Nutzung des neuen Systems.	○	○	○	○	○
Den Benutzern fällt es nach einer kurzen Einarbeitungszeit leicht, mit dem neuen System zu arbeiten.	○	○	○	○	○

Zurück   Weiter

* 10. Benutzerzufriedenheit

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Die meisten Benutzer sind mit dem im Zuge des Projektes erstellten System sehr zufrieden.	○	○	○	○	○
Die Benutzer sehen beim neuen System mehr Vorteile als Nachteile für ihre tägliche Arbeit.	○	○	○	○	○
Die Benutzer empfinden das Arbeiten als weniger zeitaufwendig im Vergleich zum Altsystem.	○	○	○	○	○
Die Benutzer können ihr Tagesgeschäft gleichermaßen oder besser als vorher erledigen.	○	○	○	○	○
Das neue System unterstützt die Benutzer bei der Erfüllung ihrer jeweiligen Ziele.	○	○	○	○	○
Die Benutzer schätzen den integrativen Charakter des neuen Systems.	○	○	○	○	○

Zurück   Weiter

* 11. Nettonutzen

	trifft nicht zu	trifft eher nicht zu	unentschieden	trifft eher zu	trifft zu
Das Implementierungsprojekt war für unsere Unternehmen - insgesamt betrachtet - ein wirtschaftlicher Erfolg.	○	○	○	○	○
Unsere Geschäftsprozesse funktionieren effizienter und transparenter als zuvor.	○	○	○	○	○
Das Projektergebnis hilft unserem Unternehmen mittelfristig Kosten zu sparen.	○	○	○	○	○
Das neue System ermöglicht uns, schnell und kostengünstig an geschäftsrelevante Informationen zu gelangen.	○	○	○	○	○
Das neue System erweitert die Möglichkeiten erhöhter Umsätze.	○	○	○	○	○
Das neue System ermöglicht uns, in neuen Märkten oder Länder tätig zu werden.	○	○	○	○	○

Zurück   Weiter

Motivation und ERP Projekt Erfolg

Angaben zu Unternehmen und Person

13 / 14   93%

Vielen Dank für Ihre Unterstützung und Teilnahme an der Online-Umfrage!

* 12. Name Ihres Unternehmens
Falls Sie diese Angabe nicht machen wollen, bitte ich Sie für die Umfragen in Ihrem Unternehmen eine Nummer bzw. Zahl einzutragen. Damit kann ich die zusammengehörigen Ergebnisse eindeutig zuordnen

[   ]

13. Angabe freiwillig: In welchem Jahr wurden Sie geboren?

Geburtsjahr   [   ]

14. Angabe freiwillig: Ihr Geschlecht?

○ männlich

○ weiblich

15. Angabe freiwillig: Welcher ist Ihr höchster Bildungsabschluss?

○ ohne Abschluss

○ Allgemeine Hochschulreife

○ Berufsausbildung

○ Diplom (Fachhochschule)

○ Bachelor

○ Master/Diplom/Magister (Universität)

○ Doktorgrad

○ keiner der oben genannten Abschlüsse

16. Angabe freiwillig: Über wieviele Jahre Berufserfahrung verfügen Sie?

Berufserfahrung in Jahren   [   ]

Zurück   Weiter

177

14 / 14 �▊▊▊▊▊▊▊▊▊▊▊▊▊▊ 100%

17. Angabe freiwillig: In welchem Land wurde das Projekt ausgeführt?

☐ Deutschland

☐ Österreich

18. Angabe freiwillig: Die Branche Ihres Unternehmens?

○ Banken/Versicherungen/sonstige

○ Finanzdienstleistungen

○ Chemie-/Pharmaindustrie

○ Medien/Druck

○ Telekommunikation/Software

○ Versorgung (Strom, Gas, etc)

○ Verteidigung

○ Fertigungsindustrie

○ Forschung und Entwicklung

○ Handel

○ Logistik/Verkehr

○ Luft- und Raumfahrt

○ Verwaltung/öffentlicher Dienst

○ Sonstiges

19. Angabe freiwillig: Wie lange hat das ERP-Projekt insgesamt gedauert?

Projektdauer (in Monaten)

20. Angabe freiwillig: Wann war der Produktivstart des Projektes?

TT MM JJJJ

Produktivstart ERP System

21. Angabe freiwillig: Wie viele Mitarbeiter Ihres Unternehmens haben durchschnittlich im ERP-Projekt mitgearbeitet?

Durchschnittliche Anzahl der Mitarbeiter im ERP-Projekts

Zurück   Fertig

Appendix 8: Evaluating the Number of ERP Projects

Topic: Estimation of total number of ERP projects in medium-sized companies between 2011 and 2013 in Austria and Germany, list of ERP market experts.

	Date	Position	Region	Language
1	19.05.2015	CEO, executive ERP sales manager	Austria	German
2	20.05.2015	ERP sales manager	Austria	German
3	21.05.2015	Senior ERP sales manager	Germany	German
4	05.06.2015	Senior ERP sales manager	Germany	German
5	18.05.2015	Senior ERP sales manager	Germany	German
6	05.06.2015	ERP market expert, scientific researcher	Austria	German
7	26.05.2015	Executive ERP sales manager	Germany	German
8	09.06.2015	Market expert, ERP journal editor	Germany	German
9	22.05.2015	CEO, executive ERP sales manager	Germany	German
11	02.06.2015	ERP market expert, scientific researcher	Germany	German

Appendix 9: Demographic Variables resulting from Quantitative Surveys

Demographic Variables		CEOs	Key user
Gender	Male	95,10%	74,51%
	Female	4,90%	25,49%
Age	16-25 years	0,49%	1,96%
	26-35 years	4,90%	19,12%
	36-45 years	27,45%	27,94%
	46-55 years	47,06%	37,25%
	56-65 years	19,61%	13,24%
	over 65 years	0,49%	0,49%
Highest educational degree	Vocational school	20,10%	32,35%
	High school	8,82%	11,27%
	University of applied sciences	31,86%	27,94%
	Bachelors' degree	3,92%	3,92%
	Masters' degree	26,47%	19,61%
	Doctoral degree	6,86%	0,98%
	Miscellaneous	1,96%	3,92%
Professional experience	1-5 years	0,98%	4,41%
	6-10 years	6,86%	11,27%
	11-15 years	14,22%	16,18%
	16-20 years	16,18%	17,65%
	over 20 years	61,76%	50,49%

Appendix 10: Factor Loadings from Rotated Component Matrix for Items per new Dimension for ERP Success Measurement

No.	Item	1 = project management; 2 = user satisfaction; 3 = time and budget; 4 = ERP system quality ; 5 = Economic value	Dimension				
			1	**2**	**3**	**4**	**5**
PS08_5	The communication and escalation paths were known and transparent from the outset.		,712	,114	,138	,182	,123
PS04_5	The management board was satisfactorily informed about project progress at every stage of the project.		,706	,090	,100	,217	,219
PS04_4	Escalations were addressed fully and promptly to the stakeholders.		,701	,030	,093	,146	,169
PS03_4	The project scope was repeatedly checked against the agreed specifications in order not to jeopardize the project goal.		,685	,025	,293	,191	,113
PS05_5	Reasonable requests for extensions and critical issues were provided in time to the decision makers (management, steering committee).		,672	,044	,145	,246	,186
PS04_3	The stakeholders were sufficiently involved in the project challenges and its impact on the entire company.		,668	,158	-,013	,035	,249
PS05_3	Important project steps and work packages were always coordinated with overall project goals.		,649	,130	,231	,172	,137
PS03_2	The project scope had been defined in sufficient detail before the project started.		,640	,169	,254	,125	-,066
PS03_6	The process and the need for change requests was clear to all project members.		,639	,028	,273	,072	,117
PS05_6	During the whole project a clean and effective risk management was carried out.		,635	,084	,205	,275	,091
PS08_1	During the project, the internal project members were adequately supported.		,634	,246	,203	-,060	,058
PS08_3	The internal project members were able to rely on their colleagues and the defined procedures.		,633	,260	,251	,050	,074
PS03_3	The project scope was known by every member of the core project team.		,629	,186	,244	,072	-,081
PS05_2	In each phase of the project status and goal achievement was clearly visible for all project team members.		,595	,120	,379	,208	,097
PS03_1	The project objectives were clearly known and understood by the whole project team.		,572	,213	,199	,037	,014
PS04_6	From stakeholders' point of view, all changes in organization and process were carried out in time (change management).		,570	,243	,292	,166	,220
PS08_6	During the project our company had functioning support structures and internal substitution rules.		,565	,225	,173	,081	,155
PS08_2	The project managers were available to everyone and have actively cared for the project's success.		,515	,181	,207	,137	,150
PS05_4	All major decisions were documented in writing.		,513	,031	,182	,287	-,008
PS09_4	Users have been adequately trained on the new system.		,490	,421	-,002	,274	,028
PS08_4	In case of difficulties the ERP team quickly and constructively worked together to find a solution.		,485	,201	,354	,179	,216
PS09_2	Users see the new system processing steps mainly positive compared to the old system.		,104	,769	,184	,161	,229
PS10_3	Users feel their work is less time consuming compared to the old system.		,089	,759	,243	,060	,164
PS10_2	Users recognize the new system has more advantages than disadvantages for their daily work.		,127	,739	,168	,185	,372
PS09_5	Users recognize an added value for their daily work using the new system.		,251	,739	,122	,142	,276
PS10_1	Most users are very satisfied with the system created in the course of the project.		,164	,717	,131	,323	,242
PS10_4	Users can do daily operations at least equal or even better than before.		,099	,690	,206	,153	,326
PS09_1	The new system is well accepted and used by the users.		,240	,645	,145	,337	,145
PS09_6	After a short training period, users find it easy to work with the new system.		,217	,641	,112	,342	,033
PS09_3	Users make satisfying use of the opportunities in the new system accordingly to the project goals.		,336	,586	,078	,346	,063
PS10_6	Users appreciate the integrated nature of the new system.		,305	,584	,128	,157	,283
PS10_5	The new system supports the user in fulfilling their respective objectives.		,238	,578	,149	,269	,354

No.	Item	1 = project management; 2 = user satisfaction; 3 = time and budget; 4 = ERP system quality ; 5 = Economic value — Dimension				
		1	2	3	4	5
PS01_6	The project was completed by the scheduled time.	,188	,131	,772	,000	,177
PS02_1	Total budget within the predefined specifications was met.	,165	,093	,756	,129	-,015
PS01_4	The go-live date was met.	,152	,117	,734	,013	,189
PS01_1	The predefined miles-stones were reached on time.	,281	,094	,716	,095	,217
PS02_4	The project budget for external consultants was met.	,148	,124	,701	,166	,002
PS01_5	The time span of the project from start to go-live was in an acceptable range.	,261	,201	,692	,090	,152
PS01_2	In the course of the project, very few avoidable delays occurred.	,256	,114	,648	,046	,084
PS02_3	The internal project budget for employees was met.	,212	,182	,641	,120	-,069
PS02_6	The ratio between the planned project budget and expenses for Change Requests was at a reasonable level.	,354	,128	,626	,160	,072
PS05_1	Overall, project management and project organization were carried out very efficiently.	,510	,167	,523	,220	,253
PS01_3	There was no ill reasoned shifting of go live.	,199	,004	,447	,070	,289
PS02_2	The budget for new hardware and infrastructure was met.	,146	,131	,435	,264	,039
PS02_5	The result of the project would not have been achievable with less effort.	,186	,114	,428	,099	,061
PS03_5	The proposed specifications have been implemented successfully.	,401	,208	,418	,278	,277
PS07_3	The information generated from the new system is easy to understand.	,194	,347	,062	,649	,159
PS07_5	The new system has a good data quality.	,289	,183	,041	,631	,164
PS07_2	The system covers our desired processes.	,252	,266	,100	,623	,321
PS07_1	The system provides the information our company requires.	,250	,343	,111	,614	,262
PS06_2	The system is sufficiently adaptable for future requirements.	,122	,178	,286	,609	,279
PS07_4	The new system meets our security standards.	,403	,084	,121	,601	,231
PS06_3	The response times of the production system are satisfactory.	,164	,209	,231	,583	,095
PS06_4	The system is easy to use.	,088	,382	,134	,560	-,013
PS06_1	The system meets the quality criteria for availability and reliability.	,228	,230	,250	,552	,305
PS06_5	The behaviour of the system largely corresponds to the expectations of the users.	,202	,503	,243	,518	,083
PS11_5	The new system expands the possibilities of increased sales.	,158	,240	-,009	,131	,679
PS11_2	Our business processes are operating more efficiently and transparently than before.	,216	,455	,179	,230	,623
PS11_3	The project results help our company to reduce costs in the medium term.	,077	,409	,127	,227	,601
PS11_6	The new system enables us to operate in new markets or countries.	,143	,122	,162	,138	,587
PS11_1	The implementation project can be considered on the whole as an economic success for our company.	,139	,478	,286	,149	,583
PS07_6	The new system represents an added value compared to the old solution	,154	,354	,161	,299	,570
PS11_4	The new system allows us to quickly and inexpensively gain access to business-related information.	,122	,316	,102	,432	,556
PS06_6	In total, the implementation has led to an improved efficiency within the company.	,210	,508	,227	,207	,536
PS04_2	The decision for the new system was subsequently considered as correct and the expectations were met.	,185	,433	,218	,328	,497
PS04_1	The stakeholders recognize that the new system adds value to the company.	,357	,362	,124	,029	,494

The results are based on factor analysis from authors' research.

Results from *factor analysis,* were used to reveal a more accurate dimensionality of ERP project success measurement. Confirmation with additional expert interviews suggested a logical reduction to 5 dimensions, namely: 1 = project management; 2 = user satisfaction; 3 = time and budget; 4 = ERP system quality; 5 = Economic value

Appendix 11: ERP Project Success' five new Factors' Eigenvalues

Eigenvalues of the factors above 1.

	Factor	Eigenvalue	% of variance	% cumulated
1	**Project management**	24,746	37,494	37,494
2	**User satisfaction**	5,346	8,100	45,594
3	**Time and budget**	3,252	4,927	50,521
4	**ERP system quality**	2,074	3,143	53,664
5	**Economic value**	1,806	2,737	56,401