TEMPLATE-DRIVEN DOCUMENTATION OF BEST PRACTICES

Meshari Alwazae

Report Series / Department of
Computer and Systems Sciences
No. 15-017

Stockholms universitet

Template-driven Documentation of Best Practices

Meshari Alwazae

ISSN 1101-8526
ISBN 978-91-7649-286-4

Printed in Sweden by Holmbergs, Malmö 2015
Distributor: Department of Computer and Systems Sciences, Stockholm University

Dedicated to my parents, wife, daughter and son as well as to the memory of my late brother, Mansor, who passed away during the second year of my PhD

Abstract

Knowledge Management has become a key instrument for identifying, creating and sharing organizational knowledge assets. An attractive means for sharing knowledge is Best Practices (BPs), which are proven as well as efficient and effective solutions to recurring problems. BPs can offer significant benefits, including improved performance, reduced re-work and cost savings. However, it is challenging to share and use BP Documents (BPDs) in organizations, which is the overall problem addressed in this thesis. More precisely, the thesis focuses on two sub-problems: 1) The difficulty of finding and selecting appropriate BPs in large collections of BPs impedes the use of BPs, and 2) The low quality of BPDs impedes the use of BPs. Related to these problems, the thesis addresses two sub-goals. The first one is to design a BP Annotation Template for supporting the identification and selection of BPs in BP repositories. The template can be used for organizing and indexing the contents of BPDs independent of domain. The second sub-goal is to design a BP Document Template for supporting the creation, use and evaluation of BP documentation. The BP Document Template offers a structure for describing BPs in a detailed and systematic way.

The research methodology applied is design science, which is the scientific study and creation of artifacts as they are developed and used by people with the goal of solving practical problems. The first artifact, the BP Annotation Template, has been designed and developed based on a literature study and evaluated using expert interviews. The second artifact, the BP Document Template, has been designed and developed based on a literature study using grounded theory as well as on interviews with KM experts. The BP Document Template has been evaluated using expert interviews and demonstrated by being applied in three real-life cases. By basing the two artifacts on literature studies, the two artifacts consolidate, integrate and extend previous work on BP documentation.

The evaluations indicate that the BP Annotation Template provides a strong foundation for identifying and selecting BPs, independent of domain, and that the BP Document Template can support the structuring of BP documents so that they become complete, uniform and easy-to-use. An identified drawback of the two artifacts is the need for extensive resources for implementing and applying them since they may be complex and time-consuming to use. The artifacts are expected to support BP designers as well as BP managers and BP users.

Acknowledgement

Prima facie, I praise and give thanks to God, the Almighty, for providing me this opportunity, for good health, and for protecting me and granting me the capability to proceed successfully to complete this thesis.

Though only my name appears on the cover of this thesis, it is has been accomplished in more than five years at the Department of Computer and System Sciences (DSV) and a great many people have contributed to its production and appearance in its current form. I offer my sincere thanks to all of them.

First and foremost, I would like to express my sincere gratitude to my supervisor, Paul Johannesson, for his continuous support of my PhD study and research, for his patience, enthusiasm, motivation, and his immense knowledge. Paul is one of the best teachers that I have had in my life. He sets high standards for his students and he encourages and guides them to meet those standards. Also, I am grateful to my co-supervisor, Erik Perjons, for his encouragement and practical advice. I am thankful to him for facilitating understanding and communication between Paul and me, commenting on my views, helping me to enrich my ideas. Their excellent and caring guidance helped me through the entire period of the research and the writing of this thesis. We met often, not just during working days, but also during public holidays, summer holidays and after working hours. I cannot imagine having a better supervisor and mentor for my PhD study; one could not wish for a better or friendlier supervisor.

My deepest gratitude goes to my PhD dissertation opponent, Janis Grabis, and the dissertation committee members Mathias Ekstedt, Shengnan Han, William Song and Petros Gougoulakis. Special thanks also go to Shengnan Han, who was my pre-doc opponent and agreed to participate in my pre doc defense committee at the last moment.

I am also indebted to Anneli Edman, Fredrik Bengtsson and Asma Rafiq with whom I interacted during a course of KM in Uppsala University. They introduced me to diverse projects and methods, and participated in my study.

I have been amazingly fortunate to have great people around me from DSV. Particularly, I would like to acknowledge Amin Jalali, Aron Henriksson, Khuram Shahzad, Maria Bergholtz, Maria Skeppstedt, Constantinos Gian-

noulis, Shahzad Saleem, Iyad Zikra, Hasibur Rahman, Bin Xiao, Eric-Oluf Svee, Parisa Aasi, George Hodosi, Angela Westin, Hercules Dalianis, Rueben Laryea, Panagiotis Papapetrou, Jing Zhao, Golrokh Moattar, Nam Aghaee, Robin Eklund, Irvin Homem, Ernest Napoleon, Amer Jwehan, Soren Gustafsson, Thashmee Karunaratne, Amos Zamora, Claudia Ehrentraut, Nasrin Sulemani, Fatima Ferreira, Birgitta Olsson, Love Ekenberg, Lazar Rusu, Jelena Zdravkovic, Sven Olofsson, Lars Asker, Irma Munoz, Josef Swiatycki, Ram Gurung, Martin Henkel, Stewart Kowalski, for the many valuable discussions and gatherings during my journey. Also, I appreciate the efforts of the many graduate students at the KM course, who implemented my template in real-life cases.

I would like to acknowledge Elias Mturi, Orlando Zacarias, Florence Kivunike, Avelino Mondlane, Ranil Colombage, Jean Byungura, Xavier Muianga, Constantino Sotomane and Xavier Muianga for numerous discussions during the lunch break. I have also been blessed with friendly and cheerful families and friends who have opened their hearts for me: Alyaa Alfalahi, Ulrika Drougge, Chiara Rossitto, and Khalid Bencherifa. Mohamed El Mekawy has been supportive since the days I began working at DSV. Javier Razuri has helped me get on the road and he has been an experienced mentor at the gym, even though he tortured me.

Many friends have helped me stay sane through these difficult years. Their support and care helped me overcome setbacks and stay focused on my research. I greatly value their friendship and I deeply appreciate their belief in me. Special thanks go to Omar Babtaeen, Mohammed Jamalallail, Alexis Marathovouniotis, Megbel Alnugaibani, Abdularhim Bukari, Zaid Alshrari, Mohammed Algamdi, Ameer Said and Rami Alzahrani.

I also recognize the support, help and wise advice from the PhD Student Ombudsman, Fredrik Ljungqvist, during my case with Harald Kejllin. I am also thankful to Carol de Groot for her excellent editing and proofreading expertise. My sincere thanks also goes to all of the participants in the research who have given me insightful comments.

I am so grateful to the Ministry of Health scholarship scheme, which funded my study and the DSV for making it possible for me to study here. My special and hearty thanks also go to H.E. Hammad Almanea, H.E. Saleh Alshehaib and Abdullah Alderis, who encouraged and supported me.

Last but not least, I would like to thank my sisters, and brothers. They have always supported and encouraged me with their best wishes. Most importantly, none of this would have been possible without the love and patience of my mother, Nawal, and my father, Mohsen, my wife, Haifa, my daughter, Aleen and my son, Mansor. They have been a constant source of

love, concern, support and strength all these years. I would like to express my heart-felt gratitude to my family. They were always there, cheering me up, and they have stood by me through the good times and bad.

I owe my gratitude to all those people who I have mentioned here and others I could not recall. Because of all of these, my study experience has been one that I will cherish forever.

May the Almighty God richly bless all of YOU.

ياالله ياللي ماليس دونه من الخافي حجاب
ياعظيم الملك يا ربنا يا مقتدر
أشهد أنك فرد وأنك رجاء وأنك مهاب
لست في حاجة بشر إن شكر ولا كفر
أشهد أنك عز والبشر كومة تراب
كل ماصك البشر باب فتحت ألف باب
أنت يامن جمدت الماء وفجرت الصخر
ياالله إنك لاتشمت بنا يوم الحساب
يوم تدني الشمس منا وينشق القمر
الفخر بالدين والله ويانعم الفخر

لك الحمد يارحمن بأنك صمد، ياربي حمدا ليس غيرك يحمد، يامن له كل الخلائق تصمد .. أبواب كل ملك قد أوصدت .. ورأيت بابك واسعا لا يوصد.

- **مقتبس من محاضرة بعنوان "عظمة الله جل جلاله" لفضيلة الشيخ الدكتور عائض القرني - حفظه الله**

بسم الله الرحمن الرحيم
****

الحمد لله، الشكر لله، الثناء لله، العظمة لله، الملك لله، الكبرياء لله، العزة لله، المجد لله، السؤدد لله، البقاء لله ..

اللهم لك الحمد أنت نور السموات والأرض ومن فيهن، ولك الحمد أنت قيوم السماوات والأرض ومن فيهن ..
ولك الحمد أنت ملك السموات والأرض ومن فيهن ..

اللهم لك الحمد حتى ترضى ولك الحمد إذا رضيت ولك الحمد بعد الرضا ..

والصلاة والسلام على حامل العز في بني لؤي، وصاحب الطود المنيف في بني عبد مناف .. صاحب الغرة والتبجيل المؤيد بجبريل، المذكور في التوراة والإنجيل .. صلى الله وسلم عليه وعلى آله وصحبه وسلم تسليما كثيرا..

أشكر الله الذي وفقني لكتابة هذه الإطروحة، لذلك أريد أن أمدح الله، وأعظم الله، وأقدس الله، وأسبح الله، وأريد أن أناجي بحمده لأنه يستحق المدح كما قال عليه الصلاة والسلام للصحابي أسود بن سريع " أما إن ربك تبارك وتعالى يحب المدح ".

ويقول عليه الصلاة والسلام لا أحد أحب إليه المدح من الله ولذلك مدح نفسه ..

لك الحمد يارحمن ماهل صيب
وماتاب يامن يقبل التوب مذنب
لك الحمد ماهاج الغرام
وماهمى الغمام
وما غنى الحمام المطرب

الحمد لله حمدا كثيرا، الحمد لله حمدا لا نهاية له، لا يحد ولا يعد ولا يرد، الحمد لله بالإيمان، الحمد لله بالقرآن، الحمد لله بسيد ولد عدنان، الحمد لله باليقين، الحمد لله بنعمة الأمن والعافية، الحمد لله على كل نعمه ..

إليك وإلا لاتشد الركاب ومنك وإلا فالمؤمن خائب
وفيك وإلا فالغرام مضيع وعنك وإلا فالمحدث كاذب

أحمد الله على نعمه حمدا كثيرا لانهاية له سبحانه وتعالى ..
الله يحمد بكل بلسان والله قديم الإحسان، يحمد بكل لهجة، يحمد بكل لغة ..

Contents

Abbreviations

AISeL	Association for Information Systems Electronic Library
BP	Best Practice
BPD	Best Practice Document
BPMS	Business Process Management System
BSC	Balanced Scorecard
ERP	Enterprise Resource Planning
IS	Information System
IT	Information Technology
KM	Knowledge Management
KS	Knowledge Sharing
MP	Management Process

List of Figures

List of Tables

1. Introduction

This chapter describes the background to the thesis, the problems addressed, the research question, and the goals of the research.

1.1. Background

As institutions and societies become ever more complex, organizations need to develop strategies for identifying, creating, sharing and applying their knowledge assets by means of Knowledge Management (KM) (Dalkir, 2011). Snowden (2002) have identified three generations of KM. The first generation focused on containers of knowledge demonstrated by the phrase "*if only we knew what we know*", and by introducing IT approaches in KM. Organizations then started to utilize their knowledge assets more effectively by implementing internal KM systems and intranets. This second generation emphasized the importance of people and cultural issues in KM. The focus here was on people, and organizations realized the importance of the bottom-up adoption of KM by using IT solutions. The third generation is about the awareness of shared context, which creates shared meaning. It is about describing and organizing content so that end users can easily use and apply it. This phase is characterized by content management and the advent of metadata to describe the content. We are now in this third generation according to Snowden (2002). Knowledge sharing is the focus of this thesis.

Knowledge sharing means the provision of know-how and other types of knowledge to help employees to cooperate with others to develop new ideas, solve problems or apply procedures or policies to make the organization more effective and efficient (Wang and Noe, 2010). Knowledge sharing is critical to an organization's success as it leads to the acceleration of the deployment of knowledge to parts of the organization that can significantly benefit from it (Syed-Ikhsan and Rowland, 2004). Therefore, facilitating access to better knowledge throughout the organization helps employees to adopt and innovate their practices and deliver better quality work and products (Wiig, 2004). Knowledge sharing may happen via face-to-face interactions, through apprenticeship, via written correspondence or documents, by carrying out organizational routines and processes or by applying technologies in which knowledge is embedded (Wang and Noe, 2010; Nonaka and Takeuchi 1995; Argote 2013).

One of the most widely used means to share knowledge is via Best Practice (BP). A BP can be defined as "*the most efficient (least amount of effort) and effective (best results) way of accomplishing a task, based on repeatable procedures that have proven themselves over time for large numbers of people*" (cited from Wikipedia in Graupner et al. (2009)). For the past two decades, the use of BP to share knowledge has been a popular means to move organizations towards higher performance in order to be more successful (Whittle et al. 1992; Szulanski, 1996; O'Dell and Grayson, 1998; Davies and Kochhar, 2002; Netland and Alfnes, 2011; Watson, 2007). As an example, Cormican and O'Sullivan (2004) proposed a BP approach to identify the most valuable and successful practices in order to develop an effective product development process, which would result in competitive advantages for the organizations introducing the BPs.

Sharing BPs can affect a company's performance in a number of ways, such as an increased return on investment, increased value added per employee, and improved customer satisfac-

tion (Goodman and Goldman, 2007; Pfeffer and Sutton, 2006; Gold et al. 2001). Reddy and McCarthy (2006) stated some benefits that organizations may gain from the effective sharing of their BP documents: "1) identifying and replacing of poor practices; 2) raising the performance of poor performers to closer to that of the best; 3) avoiding 'reinventing the wheel'; 4) minimizing duplication of work caused by the use of poor methods; 5) saving costs through better productivity and efficiency".

However, there is a risk that organizations' BP initiatives can fail (Barrett and Stanley, 1999; Whittle et al.1992, Davies and Kochhar, 2000). Two main challenges in BP application can be summarized as follows:

- the difficulty of finding and selecting appropriate BPs in large collections of BPs (Simard and Rice, 2007; Dani et al. 2006; Mansar and Reijers, 2007; Hanafizadeh et al. 2009);
- the low quality of Best Practice Documents (BPDs), for example, a lack of information of how the BPs actually work in organizations as well as their usefulness (Dana and Smyrnios, 2010).

1.2. Problem Definition

This research focuses on organizing BPDs, in line with the above-mentioned characteristics of the third generation of KM. Therefore, the overall problem that this research aims to address is that *it is challenging to share and use BPDs in organizations*.

This thesis focuses on two practical problems that are root causes of this overall problem.

Practical problem 1

> *The difficulty of finding and selecting appropriate BPs in large collections of BPs impedes the use of BPs.*

It is a well-known problem that it is difficult to find and select BPs in large collections or repositories of BPs (Simard and Rice, 2007; Dani et al. 2006; Mansar and Reijers, 2007; Hanafizadeh et al. 2009). Practitioners do not know how to find appropriate BPs and which BPs to select among several similar ones, as argued by Abd Rahman et al. (2011). Instead of searching in the repository for BPs, practitioners tend to revert to informal communication channels and centralized authority to find ways of working or solutions to certain problems. These practices may not be the most efficient and effective ones.

Two main factors make it difficult to find and select appropriate BPs. There is a lack of a common terminology used by both practitioners and in BP documents, and there is a lack of domain-independent search indices.

The first factor is caused by the fact that practitioners use another terminology in their daily work than the one found in existing BPs, including their metadata, That is, the terminology used in BPs as well as their metadata, does not correspond to the one that is used by practitioners in their work environment (Dourish et al. 2000; Tough and Moss 2003). Hence, it is difficult for them to use the metadata, or navigate and understand the content of the BPs in order to find the appropriate ones (Kao et al. 2003; Mas and Marleau, 2009).

The second factor is the lack of domain-independent search indices (Vesely, 2011; Smith et al. 2010; Zhu et al. 2007; Graupner et al. 2009), i.e., search indices that consist of terms that are not associated with a specific domain. The lack of such indices makes it difficult for practitioners to find BPs in other domains then the one with which they are familiar. This is a drawback because practitioners may need to find BPs from other domains than those with

which they are familiar. For example, in small and medium size organizations, practitioners may need to manage several domains, and they may not be familiar with all of them. Another example is a high level manager that may want to obtain an overview of what BPs exist regarding a certain aspect of his organization that is independent of a particular domain. A third example is when there is a need to integrate BPs from different domains in order to carry out a certain task (Simard and Rice, 2007).

This practical problem is also related to a knowledge gap in the research literature, which has further motivated the research carried out and presented in this thesis.

Knowledge gap 1

> *There is a lack of knowledge about IS artifacts for finding and selecting appropriate BPs in BP repositories.*

Vesely (2011) has emphasized the lack of instruments for selecting and finding BPs. Vesely states that practitioners tend to select BPs randomly, subjectively and without proper justification. Smith et al. (2010) point out that the selecting and finding BPs is affected by so-called confirmation bias; that is, the practitioners search and select BPs that confirm their own beliefs.

Practical problem 2

> *The low quality of BPDs impedes the use of BPs.*

The practical problem stated above uses the expression "low quality of BPDs". In this thesis, this means that the BPD is not fit for its purpose. Some underlying causes for the low quality of documentation, in general, are that it has missing, incomplete, non-clear, redundant, incorrect, inconsistent, or irrelevant content.

Low quality BPDs means, for example, that the purpose and value of a BP is not clearly stated; that the description of the BP is not detailed enough to be easily applied; and/or that the earlier experiences of applying the BP are not presented.

Low quality BPDs lead to situations in which practitioners are not able to correctly and efficiently use BPs, or may not trust them. Hence, low quality BPDs can prevent the successful use BPs as a means of knowledge sharing. Researchers have emphasized that the lack of understanding of the purpose of a BP and the failure to measure the value of the knowledge within a BP are major barriers to the successful management of knowledge (Tabrizi et al. 2011; Aggestam and Persson, 2010; Dyer and McDonough, 2001).

The research presented in this thesis focuses on one aspect of low quality, that is, incompleteness. More precisely, the focus is on the lack of context in documentation. Existing BPDs are often static and do not provide appropriate context to enable the successful application of BP (Kothari et al. 2011). More precisely, a BP is bound to a specific set of circumstances and conditions to achieve its expected result. So far, the context of BP applications has only attracted limited theoretical attention. Dinur et al. (2009) argued that "*When context is discussed, it is mostly concerned with the context of the person possessing the knowledge or the human context surrounding the knowledge itself. In addition, the contextual embeddedness of knowledge is usually discussed on an organizational level of analysis*" (Dinur et al. 2009). It is this "*contextual embeddedness of knowledge on an organizational level"* supporting BP applications, that is a focus of our research.

Another important focus in our research is a lack of clarity, that is, a lack of precise, concise and easily understandable documentation. According to Hall (2002) and Rainey (2003), clear documentation helps to describe as well as maintain organizational practices.

The practical problem is also related to a knowledge gap in the research literature, which has further motivated the research carried out and presented in this thesis.

Knowledge gap 2

> *There is a lack of knowledge about IS artifacts for supporting the creation and evaluation of BPDs.*

Kao et al. (2003) and Dani et al. (2006) have emphasized the need for having instruments to enhance the quality of BPD, thereby enabling better search quality and more use of BPDs. Without properly documented BPs, it is difficult to share them within an organization.

1.3. Research Question and Goals

The overall research question in this thesis is:

> *How should IS artifacts be designed in order to improve the use of BPs in organizations?*

Within the IS area, there are various artifacts that range from software architectures, formal system, enterprise architecture, information models, and design guidelines to demonstrators, and production systems. An artifact is an object that has been made by humans with the purpose of addressing a practical problem. Stakeholders want to use the artifact in order to solve the practical problem or at least alleviate it. Thus, IS artifacts are always embedded in the context of a larger problem and do not exist in isolation, (Johannesson and Perjons, 2014).

The overall goal of the research presented in this thesis is:

> *to design IS artifacts for improving the use of BPs in organizations.*

This goal is achieved by addressing two of its sub-goals, which correspond to the two practical problems defined in section 1.2.

The first sub-goal is:

> *to design a BP Annotation Template for supporting the identification and selection of BPs in BP repositories.*

The BP Annotation Template is a structure for describing BPs in a concise and high level way. The template can be used for organizing and indexing the contents of BPDs in a domain-independent way. To use the BP Annotation Template is one solution to handle this problem. However, there are also other solutions for addressing the problem, including ontology, semantic search and intelligent system (Fensel, 2003; Baziz, 2004). These approaches have not been directly addressed in this thesis, but we believe that the annotation template solution can be fruitfully combined with them. In particular, the BP Annotation Template can subsequently be used to improve semantic search results by highlighting essential attributes of BP documents that can help to navigate and retrieve BP documents. In particular, the thesis focused solely on annotating attributes of BP documents, which can be reliably extracted from BP documents, and in exploring alternative ways in which this semantic information may be exploited by the BP Annotation Template to improve retrieval performance.

The second sub-goal is:

> *to design a BP Document Template for supporting the creation, use and evaluation of BPDs.*

The BP Document Template is a structure for describing BPs in a detailed and systematic way. The template can help knowledge engineers to develop high quality BPDs before disseminating them. The template can also be used to assess existing BPDs in order to enhance them.

1.4. Structure of the Thesis and Publications

The thesis follows the Gregor and Hevner (2013) schema for design science research. Hence, the thesis starts with an introduction in the first chapter, followed by a review of related work. The third chapter presents the research methodology, while the fourth chapter includes descriptions of the artifacts. Evaluations are described in Chapter 5 and the conclusions and discussion are given in Chapter 6. The main contributions of this thesis have been published in five included papers, as shown in Figure 1, and described below.

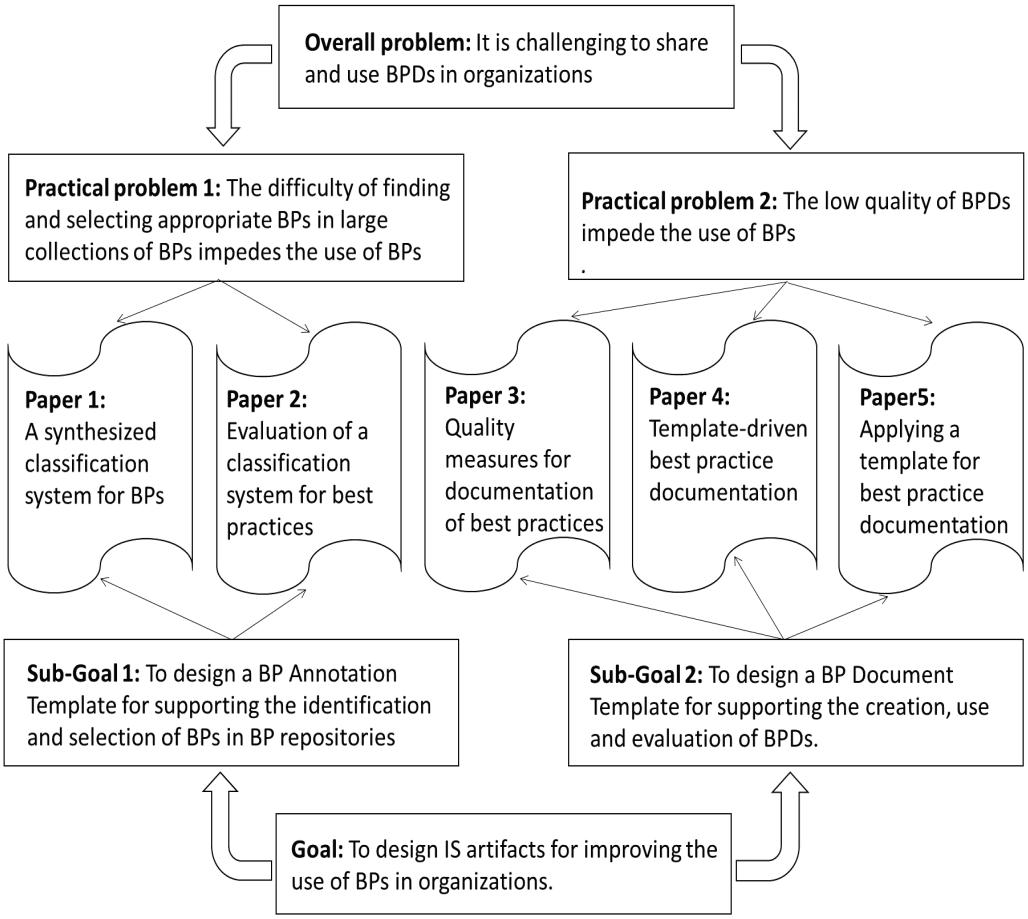

Figure 1.The relations between the research papers and problems and goals of the thesis

- Paper 1. Alwazae, M. Kjellin, H. and Perjons, E. (2014). A synthesized classification system for BPs. VINE: The Journal of Information and Knowledge Management Systems, 44 (2), 249-266.

Meshari Alwazae's contribution to the paper corresponds to more than 60 percent. He was the first author of the paper and he contributed to all parts, including the identification of the articles to be included in the reference articles in order to identify BP attributes and the design of

a synthesized classification system for BPs. Harald Kjellin and Erik Perjons provided continuous feedback on all the contributions, which significantly improved the paper. Also, they reviewed the paper and improved the writing.

- Paper 2. Alwazae, M.M.S. Johannesson, P. and Perjons, E. (2015). Evaluation of a classification system for best practices. 48th Hawaii International Conference on System Sciences (HICSS), 3702-3711.

Meshari Alwazae's contribution to the paper corresponds to more than 70 percent. He was the first author of the paper and he contributed to all parts including the development of the classification system for BPs. Paul Johannesson contributed to the classification system with two BP attributes with their allowed values. Paul Johannesson and Erik Perjons reviewed the paper and improved the writing.

- Paper 3. Alwazae, M.M.S. Perjons, E. and Kjellin, H. (2014). Quality measures for documentation of best practices. 47th Hawaii International Conference on System Sciences (HICSS), 3410-3419.

Meshari Alwazae's contribution to the paper corresponds to more than 70 percent. He was the first author of the paper and he contributed to all parts including the development of quality measures for documentation of BPs. Erik Perjons was involved in several discussions and continuous feedback on the quality measures for documentation of BPs and their use for improving BP documents. Also he reviewed the paper several times and significantly improved the writing. Harald Kjellin conducted one interview with a respondent.

- Paper 4. Alwazae, M. Perjons, E. and Johannesson, P. (2015). Template-driven best practice documentation. Submitted.

Meshari Alwazae's contribution to the paper corresponds to more than 70 percent. He was the first author of the paper and he contributed to all parts, including identification of the articles to be included in the reference articles in order to identify BP attributes and designing the BP Document Template. He also carried out the evaluation and data analysis. Paul Johannesson and Erik Perjons were involved in several discussions and continuous feedback on the design process for the template and its use for improving BP documents. Also, they reviewed the paper and significantly improved the writing.

- Paper 5. Alwazae, M. Perjons, E. and Johannesson, P. (2015). Applying a template for best practice documentation. The 3rd Information Systems International Conference, November, 2-4, Surabaya, Indonesia.

Meshari Alwazae's contribution to the paper corresponds to more than 70 percent. He was the first author of the paper and he contributed to all parts, including identification of the case study, and the respondents, and he also conducted the interviews. Erik Perjons and Paul Johannesson provided continuous feedback on the paper. Also, they reviewed the paper and significantly improved the writing.

Below is a list of publications the author has contributed to, but which are not included in the thesis.

- Alwazae, M. Perjons, E. and Kjellin, H. (2013). Verifying the Usefulness of a Classification System of Best Practices. The 5th International Conference on Knowledge Management and Information Sharing, Vilamoura, Algarve, Portugal, SciTePress, 405-412.

- Alwazae, M. and Kjellin, H. (2013). Creating Best Practices in Saudi Arabia. In Advances in Business Related Scientific Research Journal (ABSRJ), Edukator, 4 (2), 113-125.

- Alwazae, M. and Kjellin, H. (2012). An empirical Investigation of how Best Practices can be Shared, Knowledge Management Middle East, March 12-13, Academic Conferences Limited.

- Alwazae, M. and Kjellin, H. (2012). An empirical investigation of how best practices can be created a case study from Saudi Arabia. In Advances in Business Related Scientific Research Conference (ABSRC), September 5-7, Olbia, Italy.

- Kjellin, H. and Alwazae, M. (2011). Automated feedback to facilitate the understanding of filmed best practices. In Proceedings of 4th Conference of e-Learning Excellence in the Middle East, January 31-February 3, Dubai, United Arab Emirates, International council for open and distance education. 339-348.

2. Related Work in KM and BPs

This chapter describes the research setting for the artifacts developed, that is, the BP Annotation Template and the BP Document Template. First, the KM background is described, including the notion of knowledge sharing. Second, BP is defined along with examples of various BP systems and solutions as well as identified challenges for BPs. Third, key concepts and existing solutions for annotating BPs are discussed. Finally, key concepts and existing solutions for documenting BPs are discussed.

2.1. KM Background

This section introduces the KM background that underlies this thesis. The notions of data, information and knowledge are introduced in the first part. Second, KM is defined, and third, KM processes are presented. Finally, knowledge sharing is discussed.

2.1.1. Classification of Knowledge

To clarify what knowledge for organizations might mean, it is helpful to differentiate between data, information and knowledge. The relations between data, information and knowledge (sometimes also including understanding and wisdom) can be defined in different ways, as shown in Table 1. As the table shows, knowledge is usually defined as some sort of combination between information and personal experience, and therefore hard to transfer between people.

Researchers	Definitions
Ackoff (1989)	• Data: Symbols • Information: Data that are processed to be useful; provides answers to who, what, where, and when questions • Knowledge: Application of data and information; answers how questions • Understanding: Appreciation of why • Wisdom: Evaluated understanding
Choo et al. (2000)	• Data: Facts and messages • Information: Data vested with meaning • Knowledge: Justified, true beliefs
Liew (2007)	• "Data are recorded (captured and stored) symbols and signal readings." • "Information is a message that contains relevant meaning, implication, or input for decision and/or action. Information comes from both current (communication) and historical (processed data or 'reconstructed picture') sources. In essence, the purpose of information is to aid in making decisions and/or solving problems or realizing an opportunity." • "Knowledge is the (1) cognition or recognition (know-what), (2) capacity to act (know-how), and (3) understanding (know-why) that resides or is contained within the mind or in the brain. The purpose of knowledge is to better

	our lives. In the context of business, the purpose of knowledge is to create or increase value for the enterprise and all its stakeholders. In short, the ultimate purpose of knowledge is for value creation."

Table 1. The relationships between data, information and knowledge

The description of data, information, and knowledge as a hierarchy of higher and higher value, as shown in the examples in Table 1, has been criticized by, for example, Alavi and Leidner (2001). The basis for the transformation from data to information to knowledge is often a mixture of different dimensions at the same time, such as context, usability and interpretability. This makes it hard to determine when, for example, information is converted to knowledge in a certain situation. Instead, Alavi and Leidner (2001) suggest the following distinction: "Information is converted to knowledge once it is processed in the mind of individuals and knowledge becomes information once it is articulated and presented in form of text, graphics, word and other symbolic forms" (Alavi and Leidner, 2001). This thesis adopts the distinction made by Alavi and Leidner (2001). It is also based on the assumption that knowledge can be shared, at least partly, via information but also via observation, imitation and guidance.

The distinction between information and knowledge is also, according to Alavi and Leidner (2001), closely related to the distinction between explicit knowledge and tacit knowledge. Explicit knowledge is expressed in the form of text, numbers, codes, and formulae, while tacit knowledge is situated in the minds of people and, therefore, it is often difficult to formulate in an explicit way. While it is relatively easy to transfer explicit knowledge through formal language, it is much more difficult to transfer tacit knowledge (Nonaka and Takeuchi 1995).

While the field of information management is about managing explicit knowledge or information in organizations, KM is about managing and transferring both tacit and explicit knowledge (Frappaolo, 2006), and managing the conversion activities between the two types of knowledge (Nonaka and Takeuchi 1995).

2.1.2. Definition of KM

KM is an interdisciplinary field and has its roots in different disciplines, as shown in Figure 2. The most common disciplines for publishing KM literature are within IS and Human Resource Management (Jashapara, 2011). However, this interdisciplinary status gives KM valuable possibilities for synergy when carrying out a dialogue with other disciplines. For example, Guo and Sheffield (2008) have proposed the following fields for a paradigmatic and methodological examination of KM research: IS, Management and Systems Thinking.

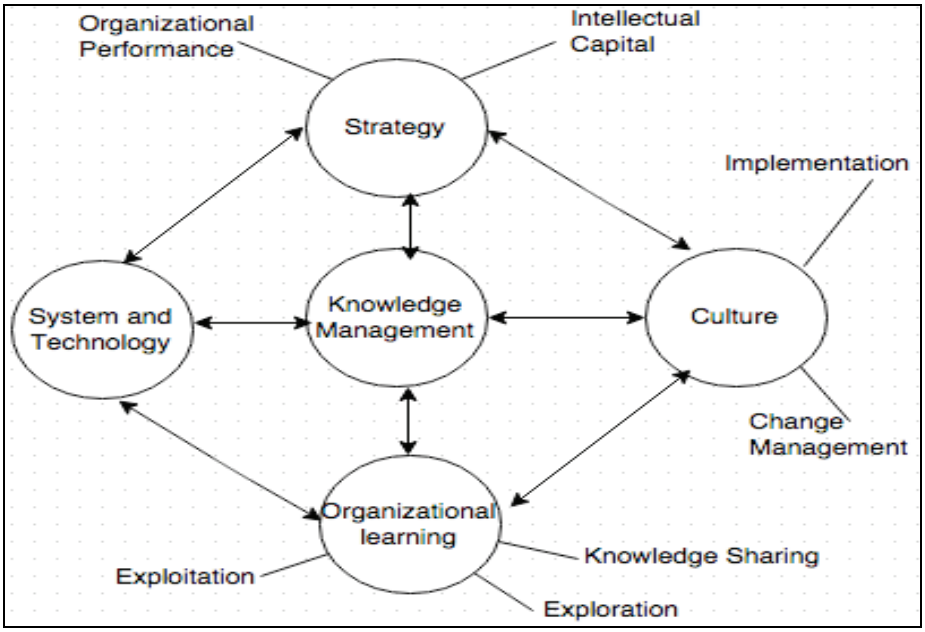

Figure 2. Dimensions of KM adapted from (Jashapara, 2011)

Given the multidisciplinary fields of KM, KM is defined differently by different authors in the literature. Table 2 presents a number of alternative definitions of KM. The definitions offered by Swan et al. (1999), and Mertins et al. (2003) focus on the activities of creating, sharing and applying knowledge; Mertins et al. (2003) from a IS perspective; Swan et al. (1999) from a human resource perspective. Beijerse (2000) and Newell et al. (2009) relate KM to strategies and policies used in organizations, while North and Kumta (2014) emphasize both strategic and operational objectives.

Researchers	Definitions
Swan et al. (1999)	"*.. any process or practice of creating, acquiring, capturing, sharing, and using knowledge, wherever it resides, to enhance learning and performance in organisations*"
Mertins et al. (2003)	"*... all methods, instruments and tools that in a holistic approach contribute to the promotion of core knowledge processes"*
Newell et al. (2009)	"*... improving the ways in which firms facing highly turbulent environments can mobilise their knowledge base (or leverage their knowledge 'assets') in order to ensure continuous innovation*"
Beijerse (2000)	"*The achievement of the organisation's goals by making the factor knowledge productive*"
North and Kumta (2014)	"*Knowledge management enables individuals, teams and entire organisations as well as networks, regions and nations to collectively and systematically create, share and apply knowledge to achieve their strategic and operational objectives. Knowledge management contributes to increase the efficiency and effectiveness of operations on the one hand and to change the quality of competition (innovation) on the other by developing a learning organisation*"

Table 2.Different definitions of KM by different researchers

Nowadays, KM is oriented to organizational objectives that include integration, innovation and the creation of competitive advantage, improved performance, and the sharing of BP (Bennis and O'Toole, 2005; Ghoshal, 2005; Serenko et al. 2008). Therefore, this thesis adopts Jashapara's definition of KM: "*the effective learning process associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate tech-*

nology and cultural environments to enhance an organization's intellectual capital and performance" (Jashapara, 2011). Jashapara's definition is based on interdisciplinary perspectives, and it gathers and brings different dimensions of KM together.

2.1.3. Knowledge Management Processes

Within the last two centuries, organizations have realized the important assets of both tacit and explicit knowledge for their success (Davenport and Prusak, 1998; Alavi and Leidner, 2001; Lee et al. 2014). One of the most influential efforts in KM is the work that described knowledge creation, conversion and transformation as a knowledge spiral model. See, for example, (Nonaka and Takeuchi 1995) and (Nonaka and Konno, 1998). The model emphasizes that organizational knowledge develops through dynamic and continuous interaction between explicit and tacit knowledge. The model describes four steps in the processes of knowledge transformation or conversion, as shown in Figure 3.

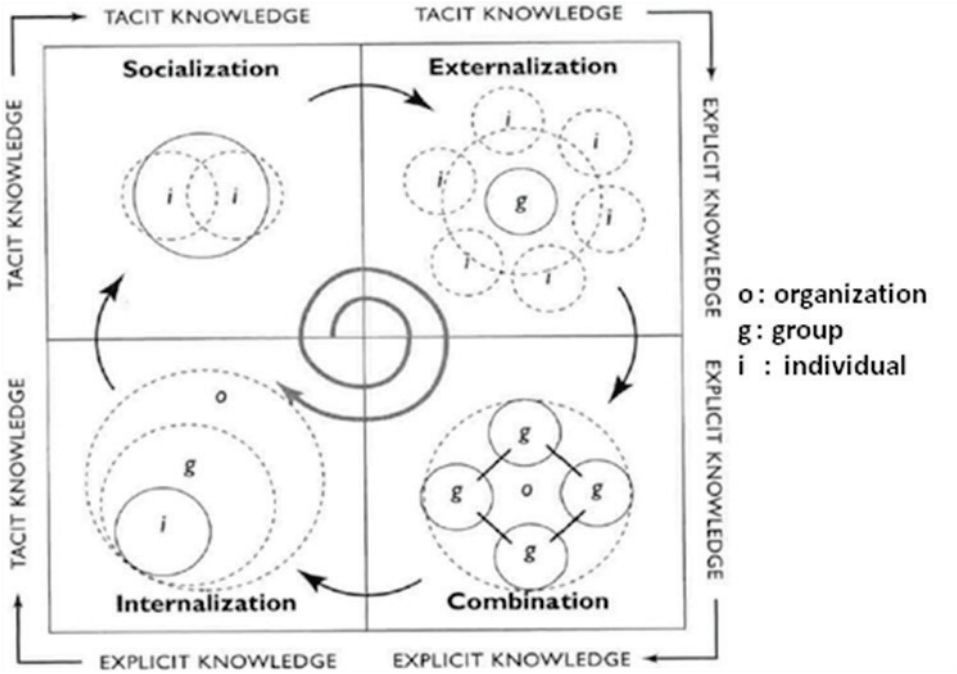

Figure 3. Spiral Model of the Knowledge Conversion and Self-transcending Process (Nonaka and Konno, 1998)

1. Socialization

Socialization is the process of capturing tacit knowledge from another person through direct interaction via dialogue, observation, imitation or guidance.

2. Externalization

Externalization is the process that translates or converts tacit knowledge into explicit knowledge. Externalization is supported by the articulation of tacit knowledge and the translation of it into an understandable form.

3. Combination

Combination is the process of putting together different bodies of explicit knowledge into more complex sets of explicit knowledge, e.g., when people exchange knowledge and combine explicit knowledge. This phase relies on three processes; first, collecting and integrating new explicit knowledge; second, disseminating explicit knowledge by means of meetings or presentations; third, processing and editing explicit knowledge to make it more usable.

4. Internalization

Internalization is the process of transforming explicit knowledge into tacit knowledge. In practice, two factors support this phase. First, explicit knowledge has to be demonstrated in practice and action. Second, the process of demonstrating the explicit knowledge has to engage 'learning by doing'.

As mentioned above, the spiral model emphasizes that organizational knowledge develops through dynamic and continuous interaction between explicit and tacit knowledge. Other researchers emphasize other activities or processes for KM. Table 3 summarizes.

Author	Processes/ Activities
Meyer and Zack (1996)	Acquire, refine, store, distribute and present knowledge
Alavi and Leidner (2001)	Create, store and /or retrieve, transfer and apply knowledge
Tiwana (2000)	Analyze, align, design, audit, design, create, develop, deploy, manage and evaluate knowledge
Awad and Ghaziri (2004)	Capture, organize, refine and transfer knowledge
Sagsan (2009)	Create, share, structure, use and audit knowledge
Turban et al. (2011)	Create, capture, refine, store, manage and disseminate knowledge
O'Dell et al. (2003)	Organize, share, adapt, use, create, define and collecting knowledge
Bukowitz and Williams (2000)	Get, use, learn, contribute, assess, build and/or sustain and divest knowledge
Wiig (1994)	Build, hold, pool and apply knowledge
Tiwana (2000)	Analyze, align, design, audit, design, create, develop, deploy, manage and evaluate knowledge

Table 3. Different processes for KM in the literature

The above processes are neither exhaustive nor mutually exclusive. Dalkir (2011) proposed a set of common processes for KM. These processes are knowledge capture and/or creation, knowledge sharing and dissemination, and knowledge acquisition and application, as shown in Figure 4. The definitions of the processes are as follows:

- Knowledge capture and creation - Knowledge capture is to identify existing internal knowledge in an organization, and knowledge creation is to develop new knowledge;
- Knowledge sharing and dissemination - Knowledge sharing is the movement of knowledge throughout the organization to get greater innovation and reuse for greater efficiency, and knowledge dissemination is the deliberate leveraging of knowledge as well as enabling knowledge to be spread via organizational learning and memory;
- Knowledge acquisition and application - Knowledge acquisition is "*the process of extracting, transforming and transferring expertise from a knowledge source*" (Dalkir, 2011), while knowledge application is the actual use of knowledge.

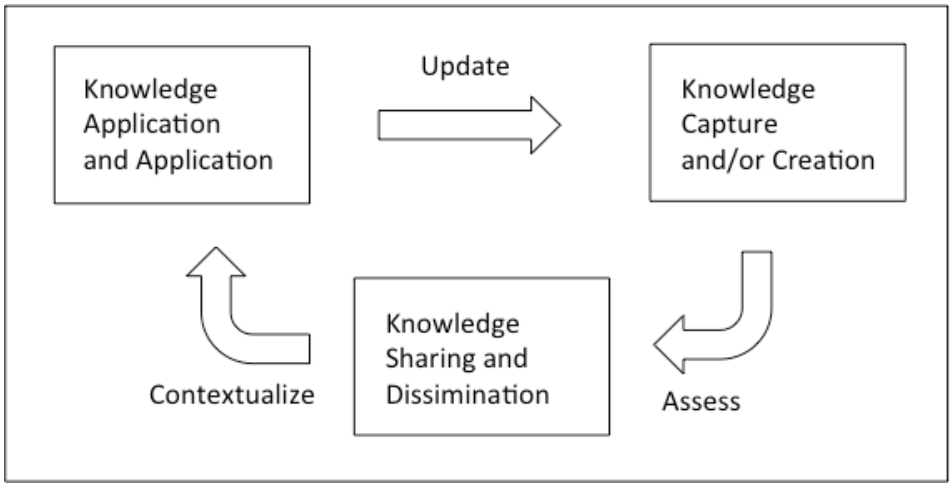

Figure 4. Processes for a KM, adapted from Dalkir (2011)

This thesis focuses on the knowledge-sharing process/activity, although other processes proposed by Dalkir (2011) are also of importance. Sharing knowledge is one of the most fundamental challenges in KM and important for its success (Jashapara, 2011).

2.1.4. Knowledge Sharing

Knowledge Sharing (KS) between employees and within and across teams is fundamental for successful KM and innovation (Jackson et al., 2006). According to Wang and Noe (2010), research has "shown that knowledge sharing and combination is positively related to reductions in production costs, faster completion of new product development projects, team performance, firm innovation capabilities, and firm performance including sales growth and revenue from new products and services".

Many different definitions of KS exist, as shown in Table 4. Some of them emphasize the need for the recipient to re-construct the knowledge shared. Related to the term KS are also the terms, knowledge transfer and knowledge exchange. These three terms are sometimes used as synonyms, but sometimes not. For example, the term "knowledge transfer" is sometimes used to emphasize the movement of knowledge between different sections, departments or organizations rather than between individuals (Ipe, 2003; Szulanski et al. 2004). Moreover, the term "knowledge exchange" sometimes includes actors providing knowledge to each other (as in KS) as well as employees seeking knowledge from each other (i.e., knowledge seeking) (Wang and Noe, 2010; Cabrera et al. 2006).

Author	Processes/Activities
Wang and Noe (2010)	"Knowledge sharing refers to the provision of task information and know-how to help others and to collaborate with others to solve problems, develop new ideas, or implement policies or procedures".
Maier et al. (2009)	KS is the process of one person (source) (1) deciding to share knowledge, (2) remembering a portion of knowledge, (3) explicating it to contextualized information on a medium, (4) actively or passively transferring it to another person (recipient) who (5) perceives the information and (6) interprets it in the given context so that the knowledge is re-constructed and integrated in the person's knowledge base. (7) Finally, newly acquired knowledge is evaluated by the recipient.
Wikipedia (2015)	"Knowledge sharing is an activity through which knowledge (namely, information, skills, or expertise) is exchanged among

	people, friends, families, or communities (for example, Wikipedia), or organizations."
Ipe (2003)	"Knowledge sharing is basically the act of making knowledge available to others within the organization. Knowledge sharing between individuals is the process by which knowledge held by an individual is converted into a form that can be understood, absorbed, and used by other individuals."

Table 4. Different definitions of the term, Knowledge Sharing

Renzl and his colleagues (2006) proposed two different approaches to the sharing of knowledge: (1) approaches mainly for sharing tacit knowledge such as communities of practice and storytelling; and (2) approaches mainly for sharing explicit knowledge, such as Patterns and BP databases.

Community of Practice

A community of practice refers to a work-related group of people who share common problems or interests, and who meet informally to learn from each other through ongoing interactions (Wenger and Snyder, 2000; Prusak and Matson, 2006).

A community of practice includes the advantage that it can solve problems, promote the sharing of BPs, develop the professional skills of employees, create a new line of business, and help the organization retain and recruit talent (Prusak and Matson, 2006).

A main drawback with a community of practice is that it is not easy to build and sustain within an organization because of its informal nature. The participants can be unwilling to accept interference and supervision, and are therefore hard to manage (Prusak and Matson, 2006).

Storytelling

Storytelling is one of the approaches to share knowledge that was introduced to organizations a long time ago. It has been used by organizations to share norms and values, develop trust and commitment in the organization, share tacit knowledge, facilitate unlearning and generate emotional connection. Thus, storytelling is an effective tool for sharing knowledge within communities of practice (Sole and Wilson, 2002; Dalkir, 2011).

Storytelling plays significant roles in capturing, storing and utilizing tacit knowledge in organizations, but can also play a role in storing and using explicit knowledge if the story is written down. Recently, the use of storytelling has grown rapidly among organizations as a deliberate tool to share knowledge, and it is the preferred method among some management consultants. The reason for this is that is uses authentic language to inspire, engage, attract and involve people in a narrative, in a fun and interesting form (Denning, 2001).

Based on the Knowledge Management Toolkit (2009), the benefits of storytelling are that it can:

- communicate and illustrate how to apply practices to solve challenges but also specifics of a context, that is, it can describe context specific knowledge;
- create changes in behavior and attitudes;
- create shared understanding among people about future direction and ambition.

The drawbacks of storytelling are that stories represent one perspective, i.e., a single point-of-view, which may be less relevant to other individuals. Moreover, the impact of storytelling depends on whether it is shared in a written or an oral form, and who is the author or teller. A limitation is also the fact that it does not replace analytical thinking, which some might think (Sole and Wilson, 2002).

Pattern

A pattern describes a solution to a specific problem, which recurs in a variety of cases in the context of an organization. Hence, each pattern combines a problem with a solution, reflecting the context and explaining how the pattern can be applied. A pattern has four general elements: pattern name, problem, solution, and the consequences of applying the pattern (Gamma et al. 1994). Riehle and Zullighoven (1995) define pattern as "*an abstraction from a concrete form, which keeps recurring in specific non-arbitrary contexts*". In order to be applied in a variety of cases, a pattern has an abstract form and it can then be adapted to fit the situation at hand.

The term 'pattern' has been widely used in software development, building architectural design (often inspired by the pattern language of Alexander et al. (1977)) and workflow management (Stephenson and Bandara, 2007). It has also been discussed in the area of organizational culture regarding teaching new employees the correct way to think, perceive and feel in relation to problems within the organizational context (Maier, 2007).

A pattern can be developed based on theoretical or practical evidence. Thus, a pattern is not invented. It is rather discovered by theoretical evidence or observation.

The differences between a pattern and a BP can be summarized as follows:

- a pattern can be built solely based on theoretical evidence, while a BP cannot;
- a pattern is often documented in a formal template, while a BP is often documented informally, for example, by using free text formats with little structure (Graupner et al. 2009);
- a pattern has a much smaller focus and can be independent, and can be seen as a building block that needs to be combined with other patterns in order to form a meaningful entity, while each BP is an independent entity (Stephenson and Bandara, 2007).

BP Database

A BP database is a database of BPs and needs to provide enough information for a potential user of the BP to find it and to be able to decide if it is worth applying for the situation at hand (Renzl et al. 2006).

2.2. Best Practice

This section starts with definition and discussion of the notion of BP followed by presenting cases of BP implementations. Challenges for applying BPs is presented at the end of this section.

2.2.1. Definition and Discussion of the Notion of BP

Even though the merits of BP are generally agreed upon, the scope, context and definition of BP are still varied. In the literature, BP is related to different scopes and contexts, and is therefore subject to a variety of circumstantial definitions. For example, Graupner et al. (2009) present a definition from Wikipedia that defines BP as "*the most efficient (least amount of effort) and effective (best results) way of accomplishing a task, based on repeatable procedures that have proven themselves over time for large numbers of people*". On the other hand, Szulanski (1996) focuses on presenting the BP as an ideal example of how best to execute a particular task. He explained the importance of viewing a BP, not as a law dictating how things should be done, but rather as an ideal example showing how to do it (Szulanski, 1996). Camp (1989) defines BPs as practices that will lead to the superior performance of a

company. These definitions focus on more than just the content of the BP, as they also implicitly guarantee that implementing the BP will lead to improvement in performance. Therefore, from the organizational perspective, BP is a good practice since it enhances organizational performance. However, this does not necessarily mean that BP is a good practice for other stakeholders, for example, the customer.

Despite the importance of BPs for KM within organizations, the conceptual understanding of BP is not without confusion. Fragidis and Tarabanis (2006) argued that the term "best" in BP is not used in a strictly literal manner. Rather than being considered superlative, BPs are sometimes only understood as promising approaches and activities that organizations may consider as useful tools and experimental practices (Fragidis and Tarabanis, 2006). Jarrar and Zairi (2000) fashioned their definition and adopted the Chevron approach by dividing BP into three levels: a good idea, a good practice and a proven BP. The American Productivity and Quality Centre also noted that there can be no all-encompassing BP, because the concept "best" is not universally agreed upon, and each practice has to be adapted to suit distinctive organizational contexts (American Productivity and Quality Centre, 1997). Figure 5 presents the steps of BP that they have proposed. Furthermore, the benefits of BPs are not limited to the sharing of superior practices to accomplish a particular task, but include the opportunity of learning from experiences and the mistakes and failures of others. Therefore, many researchers recommend the use of terms such as "good", "identified", "smart" and "recommended" practices instead of "best" practices (Vesely, 2011).

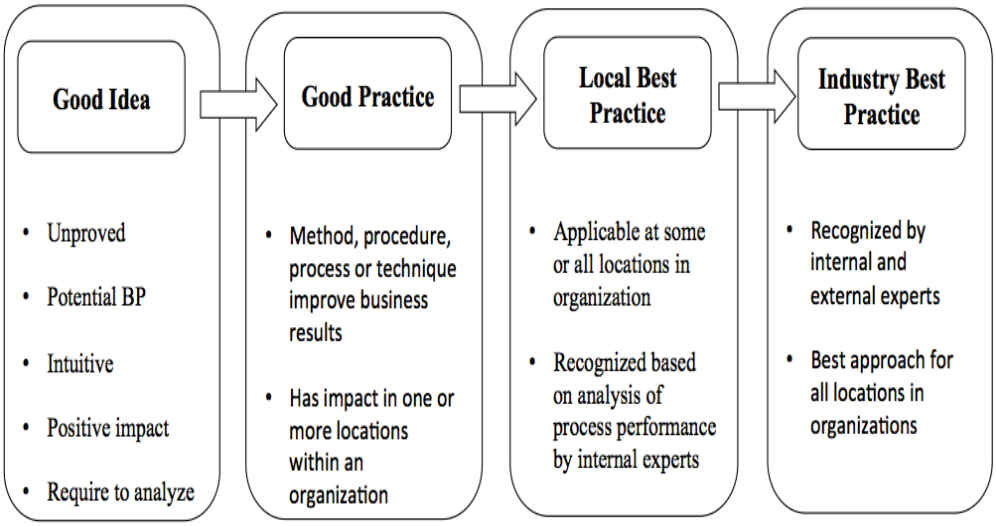

Figure 5. Four steps of BPs in an organization database, adapted from (American Productivity and Quality Centre, 1997)

A BP is intended to capitalize on an organization's internal knowledge, for example, by taking advantage of previous practices and experiences, in order to define the best ways to solve a problem. As its core, BP is intended to reuse the best ways to solve a problem or handle an issue. It is all about gaining the benefit from previous experience to define possible ways to conduct activities and solve problems (Axelsson et al. 2011).

In this thesis, a BP is a way of improving a practical example, approach, process, practice, technique or rule for successful implementation of a particular task, where this practice has been applied and, therefore, it is intended to replace an existing practice and to be followed. In this thesis, "practice" in the term 'best practice' refers to the repeated performance of a particular task. More precisely, practices are actions repeated over time and space, and embedded in a particular context, and are socially developed through learning and training (Adler and Pouliot, 2011). Adler and Pouliot (2011) present five characteristics of a practice: 1) practice is the process of doing something; 2) practices are actions repeated over time and

space (i.e., they are is patterned); 3) practices are actions that can be done correctly or incorrectly (and can therefore be validated by an individual or group); 4) practices rest on background knowledge; and 5) practices integrate the discursive and the material world, i.e., the written and spoken communications that describe the practice and are woven together with material artifacts that are used when performing the practice.

2.2.2. Cases of BP Implementations

There are several examples of BP implementations described in the literature in different areas, such as manufacturing, consulting and IT organizations. Consulting organizations, such as Price Waterhouse Coopers, were reported among the first to initiate and develop BP databases to support their business (O'Dell and Grayson, 1998).

General Motors Hughes Electronics used a BP database repository, in which each BP had a brief description and contact information (O'Leary, 1998).

Siemens documented both their own BPs and those of other organizations in a BP database, which was called Siemens Learning Landscape (Boshyk, 1999). Employees and managers at Siemens could find and retrieve BPs via Siemen's own intranet. The BP documents provided a learning environment that was exclusively dedicated to Siemens' specific knowledge, via their intranet.

Cheveron reduced the operation costs by more than $2 billion dollar by sharing BPs, and Texas Instruments increased its annual fabrication capacity of 13 fabrication projects by $1.5 billion dollar by sharing their BPs (O'Dell and Grayson, 1998).

Another example is British Aerospace that established a BP database, which stored BP documents, and called it "Best Practice Centre" which ensured synergy across all areas in the organization "*The understanding of knowledge management at British Aerospace can be described as a best practice approach: 'To capture and share best or good practices throughout the company'. We understand this concept of best practice in the following way: 'If you have a practice or process that has worked (i.e., has created something successful) then everybody should be able to use it as well'."* Mertins et al. (2003).

The telecom company, Ericsson, introduced a central committee of managers, which evaluated the company's BPs (Watson, 2007). These managers Ericsson met quarterly to decide which of the practices were best suited to be shared throughout the organization to convert the practices of all departments. This gave Ericsson a competitive advantage in their production processes through a high degree of standardization.

Related to the implementation of BP is the use of different quality standards. Graupner et al. (2009) call these a Best Practices Framework. In the quality management domain, popular quality standards are ISO 9000 (Peach, 2003), Lean (Boyle and Scherrer-Rathje, 2009) and Six Sigma (Pyzdek and Keller, 2009; Schonberger, 2008). They all provide BP processes and guidelines for higher quality and better performance. In the IT enterprise management and IT governance domains, the Control Objectives for Information and Related Technology (COBIT) framework is commonly used for assessing the quality of BPs (ISACA, 2012). The Information Technology Infrastructure Library (ITIL) is also a popular framework for IT services that are used as BPs (Hendriks and Carr, 2002). All these frameworks describe how work should be organized between people within a particular context (Graupner et al. 2009).

Table 5 shows an example of a BP. This is a fictitious example that helps supervisors to support students at the department of Computer and System Sciences, at Stockholm University, to refine an initial research idea into a feasible, relevant and well formulated research question.

Best Practice for refining and formulating research questions in bachelor and master theses
A common situation in the supervision of theses is that a student has an initial idea for the research question of his or her thesis. However, this idea may not work as it is but needs to be refined and reformulated in order to become a viable research question. Thus, the problem is how a supervisor should support the student in developing a research question that is feasible, relevant and well formulated. This best practice offers advice and guidelines for a supervisor to carry out this task. Discuss with the student to ensure the initial idea is not too broad. If it is, then suggest different ways on how to narrow it down. Make sure that the research question can be answered given available resources. If not, try to narrow down the question. Make sure the research question is formulated as concisely as possible. Encourage the student to reduce the length of the question. Suggest different reformulations and ask if they would still capture the original idea. Make sure the research question is of general interest and well justified. Ask the student if the results of the planned study would be of interest to other people and organizations, e.g. competitors. Ask the student what people would be interested in an answer to the research question and how they could benefit from it. Ensure that the research question is clearly related to the research problem. Ask the student if an answer to the research question would solve the entire research problem or parts of it. Ask the student to discuss possible answers to the research problem. Do not fix the research question too early. Ask the student to suggest at least three different research questions, and discuss these questions and choose one of them.

Table 5. A fictitious example of BP

2.2.3. Challenges for Applying BPs

In this section, a number of challenges for the successful application of BPs are presented, including the ones addressed in this thesis. The section also describes solutions for addressing each challenge.

- ***Difficulties in creating and identifying BPs***

Difficulties in creating and identifying BPs have been addressed in much of the BP literature (Dani et al. 2006; Shull and Turner, 2005). Hence, there are different approaches to addressing the challenges to creating and identifying BPs in an organization. Shull and Turner (2005) proposed an approach to identify BPs as part of five primary phases: *identification, quantification and qualification, characterization, validation,* and *packaging and dissemination*. Their method was applied in the context of the US Department of Defense. The approach was based on an in-depth study of all previous efforts to identify BPs. Among the other approaches for identifying BPs are 'benchmarking' and 'balanced scorecard'. For example, the balanced scorecard is a popular framework to measure the performance of an organization and then identify the BPs (Martinsons et al. 1999). Dani et al. (2006) stress the needs to first identify an organization's objectives, key processes, and key performance indicators as a base for identifying BPs. The difficulties of creating and identifying BPs are not a focus of this thesis.

- ***Difficulties in documenting BPs properly***

Without properly documented BPs, it is difficult to share them within an organization. More precisely, low quality BP documentation, in the form of incomplete descriptions, hinders the success of BP application. Examples of such incomplete documentation are lack of descriptions of the purpose of the BPs and how to measure the value of knowledge within them (Tabrizi et al. 2011; Aggestam and Persson, 2010; Dyer and McDonough, 2001), and a lack of descriptions of how BPs actually work in organizations and their usefulness (Dana and Smyrnios, 2010). Complete descriptions of BPs are important for their successful application (Dinur et al. 2009; Vesely, 2011; Motahari-Nezhad et al. 2010, Mansar and Reijers, 2007, Motahari-Nezhad et al. 2010, Dani et al. 2006). However, how a BP should be documented has not been examined extensively in the literature (Dani et al, 2006), and this a major focus of the research described in this thesis.

- ***Difficulties in finding and selecting appropriate BPs***

Many researchers have emphasized the difficulties in finding and selecting BPs in large collections, or repositories (Simard and Rice, 2007; Dani et al. 2006; Mansar and Reijers, 2007; Hanafizadeh et al. 2009; Vesely, 2011). In this thesis, the focus was on providing a domain-independent search index (Vesely, 2011; Smith et al. 2010; Zhu et al. 2007; Graupner et al. 2009), i.e., a search index that consists of terms that are not associated with a specific domain. As mentioned in Chapter 1, the lack of such indices makes it difficult for practitioners to find BPs in other domains then the one with which they are familiar.

- ***Difficulties in maintaining the content of the BPs properly***

Persson et al. (2008) determined that a major problem with BPs is that their usefulness decreases after a period of time because their content becomes less relevant and out-of-date for their users. Wagner et al. (2006) argued that BPs are a somewhat temporary asset that over time might be questioned by users. Therefore, the content of the BPs need to be updated. According to Asoh et al. (2002), BP documents may yield only limited temporary results if they are not properly managed. Therefore, a common cause for the problem of the decrease in the usefulness of BPs is that there is no continuous updating process of their content (Persson et al. 2008). Hence, Malhotra (1998) suggested the use of a number of processes to properly and continuously update and reassess BP documents. These processes are: construction and deconstruction; reinforcement and exploration; and programming and deprogramming. These processes ensure that a real time loop of feedforward and feedback activities is established within the organization to enable it to constantly scan its BP documents. Consequently, it is essential to review the BP documents and determine whether they have managed to achieve their expected results. Asoh et al. (2002) suggested that BP documents should be continuously updated and reassessed along with collaborative, innovative and learning processes in the organizations. Persson et al. (2008) added that updating and reviewing the content in the BP documents would support the users' trust in them. Therefore, there is a need to update, maintain and/or eliminate some BPs that have become obsolete. This results in making BP documents more accessible and trustworthy (Lloria, 2008). According to Niwe and Stirna (2009), continuous improvement of the BP documents can be achieved through feedback and corresponding adjustments. This is an ongoing validation process that increases the quality of the BP documents. The difficulties in properly maintaining the content of the BPs in not a focus of this thesis.

2.3. Annotating BPs

A growing number of researchers and practitioners are realizing the value of annotation within KM to improve access to information, leverage current content to generate new services, and facilitate business (Graef, 2001; Kaiser et al. 2008; Barnett et al. 2009; Wagner et al. 2006). Annotated BPs enables employees to find just the right BPs without having to browse through the repositories of stored BPs.

2.3.1. Key Concepts

In this section, key concepts related to the artifact BP Annotation Template are presented. To develop a BP Annotation Template was one of two goals of this thesis.

Annotation

Annotation can be defined as the process of labeling and indexing knowledge, that is, introducing a series of terms or metadata related to the knowledge in the repository in order to be able to find needed knowledge more easily. Annotating BPs improves the functionality of a BP repository by making the finding and selecting of BPs easier (Zhu et al. 2007; Mas and Marleau, 2009; Mansar and Reijers, 2007; Graupner et al. 2009). In principle, annotations facilitate the organization, navigation, and meta-analysis of BP documents.

Domain Independence

According to (Reymen et al. 2006), domain independence means that a concept or system must have no domain-specific features. The domain-independence feature of an annotation system for BPs helps an organization to be able to find an existing BP, independent of its domain. The challenge lies in presenting a BP in such a way that others, from different domains, can understand what these BPs can do. Also, annotating BPs independently from their domain is important for their evaluation, enabling organizations to realize which BPs they lack and how they can acquire them (North and Kumta, 2014).

High BP Recall and Precision

'Recall' is defined here as the fraction of relevant documents retrieved in a search (i.e., not missing relevant results). 'Precision' is defined here as the fraction of documents retrieved that are actually relevant (i.e., not including irrelevant results). That is, recall and precision measure the effectiveness of the search. More precisely, recall can be seen as a measure of completeness and precision as a measure of accuracy. Moreover, they are inversely related; therefore they always have to be considered in combination (Gehanno et al. 2009). Researchers emphasize that the labeling and tagging of essential features of a BP will increase BP recall and precision (Smith et al. 2010; Zhu et al. 2007).

2.3.2. Existing Solutions for the Annotation of BPs

In this section, existing solutions for the annotation of BPs are presented.

Different classification structures can be used to annotate a BP. Kwasnick (1999) introduces four classification structures: hierarchies, trees, paradigms and facets. Hierarchies and trees use generalization/specialization or part of relationships. A paradigm is a two-dimensional classification, while facets can handle three or more dimensions of classification. As an example of facets, a bottle of wine can be classified according to color, origin, grape, year, appellation, volume, and price (Denton, 2003). Using facets for classifying documents provides multiple navigation paths to any document.

Mas and Marleau, (2009) have proposed a faceted classification model to support the organization of corporate information through the classification and organization of digital documents.

- Context facets are facets that describe the administration or operational background, that is, functions and management production activities. Suggested facets are function, activity, content type, role, position, organizational structure and actor;
- Content facets are facets of the different parts of the document. Such facets describe what the document is about or what has been said or done with that document. Suggested content facets are title, author, recipient, date, reference to the information context, the body text and operational or transaction data, and complementary information, such as attachments or illustrations;
- Hybrid facets are facets that contain both context and content facets.

The artifacts of this thesis are based on attribute-value systems, which are representation frameworks of fundamental knowledge. The basic assumption of an attribute-value system is that there are objects that can be described by means of attribute-value pairs. For example, a person may exist who can be described by the attribute-value pairs <name, 'John Doe'>, <age, 33>, and <gender, male>. Attribute-value systems have been used extensively for the representation of knowledge. The assumptions and ideas behind attribute-value systems are also used in object-oriented programming, information modeling and other areas (Barsalou and Hale 1993; Barsalou, 2003). In this thesis, attribute-value systems are used for describing BPs.

Mansar and Reijers (2007) presents a framework for classifying 29 BPs for Business Process Redesign (BPR) found in seminal works on BPR. The BPs are classified in a set of framework components.

- Customers- internal or external
- Products or services
- Process- operation or behavioral view
- Participants- organization structure, population
- Information to use or create practice
- Technology to use practice
- External environment other than customer

These components can help the user of the framework to quickly identify highly promising BPs for their own purposes. To support this, all BPs are also categorized on their effects on process performance, i.e., how they generally affect cost, quality, time or flexibility. Each BP can also be ranked based on how often it is used by practitioners.

2.4. Documenting BPs

Renzl et al. (2006) emphasized that knowledge can only be shared smoothly if it is correctly and completely documented.

2.4.1. Key Concepts

In this section, key concepts related to the artifact BP Document Template are presented. To develop a BP Documentation Template is one of two goal of this thesis.

BP Document

A BP Document (BPD) is a structure that describes a BP. BPDs in organizations reside in various forms, such as structured documents in binders and electronic databases, and as un-

structured documents in the form of memos, manuals, notes, meetings minutes, etc. (Jashapara, 2011).

BP Document Template

A BP document template is a structure for describing BPs in a systematic way. The structure is a set of pre-specified attributes or fields, such as "Title of the BP", "Author of the BP", or "Description of the BP". These attributes or fields provide guidance when creating a BPD. That is, when a BPD is created, the BP author adds information (or values in an attribute-value system) about the BP according to the structure. Thereby, all BPDs based on the same BP template have the information about, for example, the title of the BP, in the same position in the document. Moreover, it guides BP authors in identifying what information to include in BPDs.

2.4.2. Existing Solution for Documentation of BPs

In this section, existing solutions for the documentation of BPs are presented.

Shull and Turner (2005) proposed an approach to documenting the context and result of BPs. This approach aims to provide a means to better estimate the effectiveness of a practice for a user by describing the BPs in a uniform way, supported by available evidence. They state: "Choosing a practice should be like choosing a medicine. They are indicated for certain problems and provide specific benefits. They can sometimes be harmful if used improperly, in combination with other practices, or in the wrong situation. Practices take differing amounts of time to produce their benefits. There are various levels of certification or caveat. There are usually specific instructions (like dosages or usage information). There is definitely a cost to be weighed against the benefit". The context description made it possible for the user to match the context with the user's context, and thereby helping the user select the right practice for his/her particular need.

The World Health Organization (2008) suggested a BPD format that included:

- Title of the BP
- Introduction and justification
- Implementation activity of BP (what, when and who) Results of the BP (outputs and outcomes)
- Lessons learned (what works well and why and what did not work well and why)
- Conclusion
- Further reading and references

Bubenko et al. (2001) proposed a detailed BP template. It consists of 16 fields: name, problem, context, forces, solution, rationale, consequences, related information, known applications, author, also known as, examples, usage guidelines, type, domain, and keywords.

Another example is the following sections for a BP template suggested by Renzl and his colleagues (2006):

- Title - brief descriptive title
- Profile - some short sections about author, function, processes, keywords, etc.
- Context – describe where is it applicable
- Resources – describe what skills and resources are needed
- Description – describe what steps are involved
- Lessons learned –describe what would the BPs do differently than regular practice
- Links to resources – describe contact details of experts, articles, etc.
- Tools and Techniques – describe tools and techniques needed

3. Research Methodology

This chapter describes the research methodology. It starts by describing design science, which is the overall research approach used. Then, the research processes for the BP Annotation Template and the BP Document Template are described.

3.1. Design Science

The overall research approach used in this thesis is design science. According to Hevner et al. (2004), design science creates new artifacts for solving practical problems. Design science is characterized by the design of artifacts, such as methods, models, constructs, frameworks, prototypes or IT systems, which will be "introduced into the world to make it different, to make it better" (Johannesson and Perjons, 2014). Therefore, design science research can be seen as an activity to generate artifacts and test hypotheses about them, i.e., artifacts that can, when introduced, solve problems for a practice and change its future behavior (Bider et al. 2012). Furthermore, an artifact needs to be a generic solution to be qualified as a design science solution (Sein et al. 2011). This means that the artifact needs to solve a problem in many different organizations and not only in one organizational setting.

Hevner et al. (2004) highlight the importance of evaluating a designed artifact. Such an evaluation assesses the ability of an artifact to solve a practical problem as well as fulfill stated requirements. Different strategies and approaches have been presented for carrying out evaluations of artifacts in design science. Two main evaluation strategies in design science are ex ante and ex post evaluation (Pries-Heje et al. 2008). In an ex ante evaluation, the artifact is evaluated without being used, while ex post evaluations require the artifact to be applied. An ex ante evaluation often uses interviews, where current and/or future users, and/or domain experts, discuss the artifact's ability to solve the problem at hand and fulfill stated requirements on the artifact. An ex post evaluation means that the evaluation is carried out after the artifact has been applied in a real setting. Ex post evaluations are seen as considerably stronger than ex ante evaluations, but in general, they require extensive resources and time since the artifact first needs to be introduced in a real setting and then evaluated.

Different researchers have contributed towards design science processes, for example, Alturki et al. (2011, 2013), Hevner et al. (2004), Kuechler and Vaishnavi (2008), Peffers et al. (2007), and Johannesson and Perjons (2014). Peffers et al. (2007) have designed and demonstrated a process for applying a design science methodology in IS. The activities in this process are problem identification and motivation, objectives for a solution, design and development, evaluation, and communication. These activities, but somewhat modified and renamed, are the base in the design science method framework suggested by Johannesson and Perjons (2014), as shown in Figure 6. The framework is visualized using the IDEF0 technique, where channels conveying data or objects are related to each activity, and represent different types of knowledge depending on the direction of the arrows. Johannesson and Perjons (2014) describe the channels in the following way (see Figure 6).

- *Input* (arrow from left) describes what knowledge or object is the input to an activity;
- *Output* (arrow to right) describes what knowledge or object is the output from an activity;

- *Controls* (arrow from above) describe what knowledge is used for governing an activity, including research strategies, research methods, and creative methods;
- *Resources* (arrow from below) describe what knowledge is used as the basis of an activity, i.e., the knowledge base including models and theories.

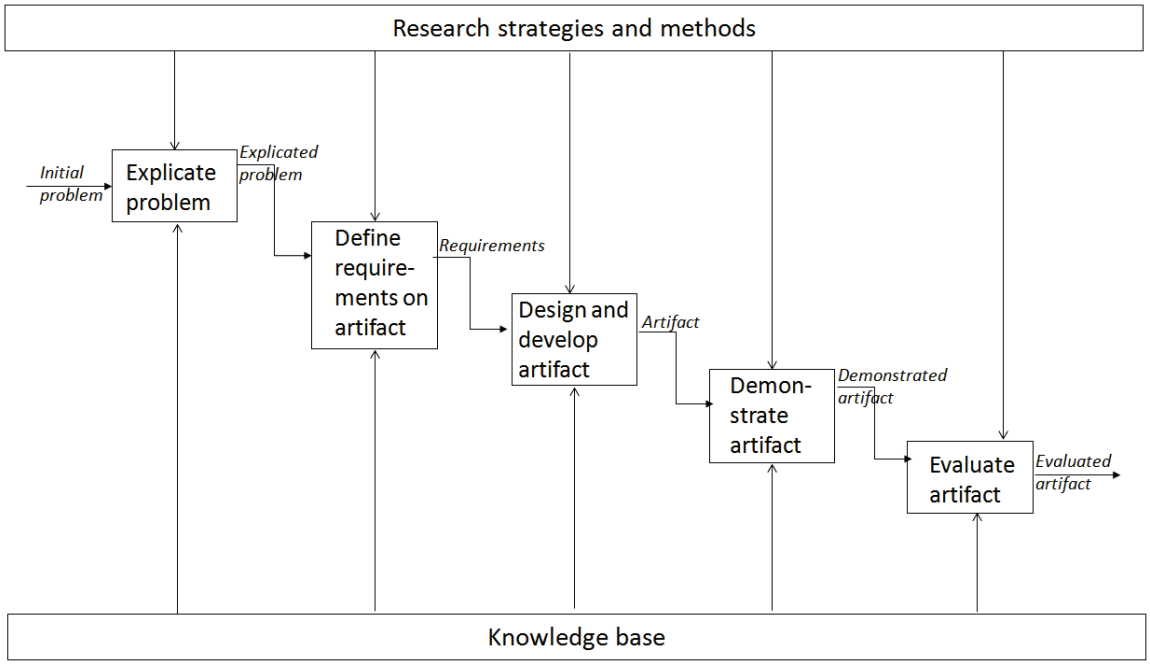

Figure 6. Activities and their outputs of the design science process, adopted from Johannesson and Perjons (2014)

Design science projects do not have to carry out all the activities in a design science process in depth (Johanesson and Perjons, 2014). Instead, the focus can be on some of the activities. In this thesis, the focus has been on two of the activities: Design and Develop Artifact and Evaluate Artifact, since the problems and requirements are known from literature.

The artifacts designed and developed as well as evaluated in this thesis are the BP Annotation Template and the BP Document Template. The research process for each of these artifacts is described below.

3.2. Research Process for the BP Annotation Template

This section describes the research process for the BP Annotation Template, see Figure 7.

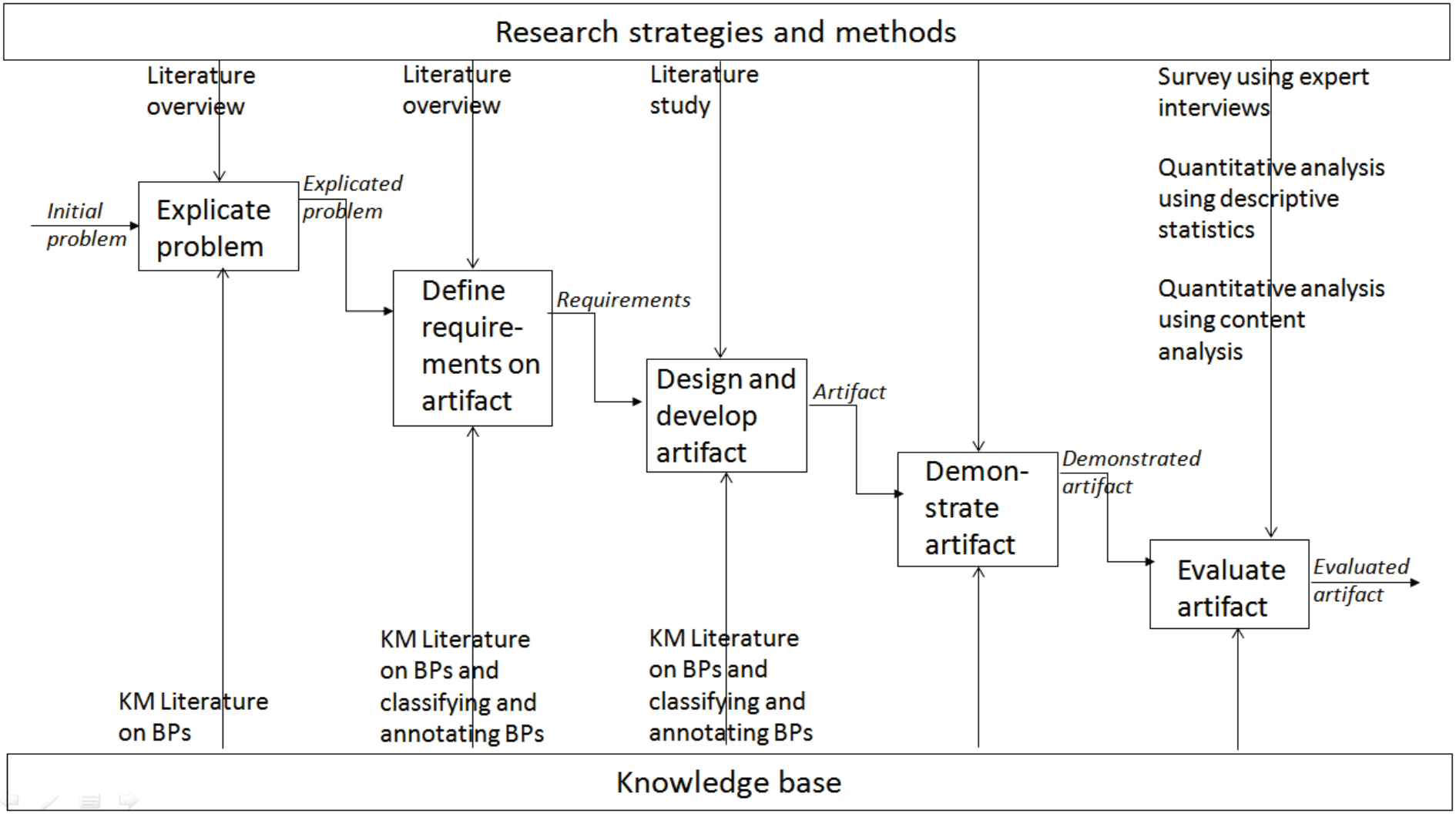

Figure 7. Research process for the BP Annotation Template

3.2.1. Explicate Problem

The first activity in the design science process for the BP Annotation Template is to explicate the practical problem that motivates why the artifact (i.e., in our case the BP Annotation Template) needs to be designed and developed. Based on an investigation of BPs in the KM literature, the practical problem was identified, as stated in Chapter 1. The practical problem is *the difficulty to find and select appropriate BPs in large collections of BPs impedes the use of BPs.* In this thesis, the solution that addresses this problem is a BP Annotation Template that can facilitate the searching and retrieving of BPs. The knowledge gap that further motivates the research presented in this thesis is that t*here is a lack of knowledge about IS artifacts for finding and selecting appropriate BPs in BP repositories,* as emphasized by Vesely (2011).

3.2.2. Define Requirements

The second activity in the design science process is to define the requirements of the BP Annotation Template. These requirements will guide the design and development of the artifact and will also form a basis for its evaluation. Based on a literature study, this research identified the following requirements on the BP Annotation Template.

Requirement 1 - *The BP Annotation Template should make it easy to annotate the BPs within an organization.*

'Easy to annotate' means that the content of a BP can be labeled and indexed without extensive resources. Researchers, such as (Mas and Marleau, 2009; Mansar and Reijers, 2007; Graupner et al. 2009; Dinur et al. 2009; Dana and Smyrnios, 2010) have confirmed the importance of an easy way to annotate BPs.

Requirement 2 - *The BP Annotation Template should be applicable to any BP within all types of organizations.*

Applicable to any BP within all types of organizations means that the practitioners should be able to apply the BP Annotation Template properly in all types of organizations (from different business sectors, IT- as well as non-IT-related organizations). This requirement has been affirmed by different researchers including Smith et al. (2010), Mansar and Reijers, (2007); Dani et al. (2006); Zairi and Ahmad, (1999).

Requirement 3 - *The BP Annotation Template should be domain independent.*

Domain independence means that the artifact is not associated with a specific domain. See the discussion about domain dependence in (Vesely, 2011; Smith et al. 2010; Zhu et al. 2007; Graupner et al. 2009). Fulfilling this requirement facilitates finding and selecting BPs from different domains (Simard and Rice, 2007), as the BP Annotation Template does not require that practitioners be familiar with the domain.

Requirement 4 - *The BP Annotation Template should improve recall and precision for people who search for BPs in large repositories.*

'Recall' is defined here as the fraction of relevant documents retrieved in a search (i.e., not missing relevant results). 'Precision' is defined here as the fraction of documents retrieved that are actually relevant (i.e., not including irrelevant results). This requirement means that the BP Annotation Template and its suggested annotations should support high recall and high precision when using a search system. Researchers emphasize that labeling and tagging

essential features of a BP will increase BP recall and precision (Smith et al. 2010; Zhu et al. 2007).

3.2.3. Design and Development

This section describes how the BP Annotation Template was developed, as shown in Figure 8. The development of the BP Annotation Template consisted of three major activities. The two first activities were part of a literature review carried out. In the final activity, the final BP Annotation Template was constructed.

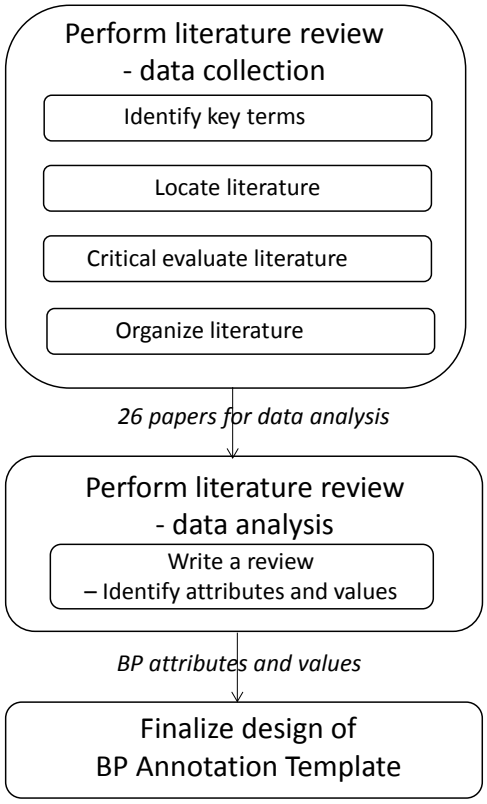

Figure 8. The activities in the development of the BP Annotation Template

In our research, the BP Annotation Template was developed based on an in-depth review of existing BP frameworks, BP collections or BP systems in literature. The literature review followed the five steps as proposed by Creswell (2008).

I. Identifying key terms

Based on our experience of working with KM, the following keywords were selected: "best practice", "knowledge management", "best practice framework", "best practice system", and "best practice model". Then, these keywords were used as a means for identifying relevant articles when we conducted the literature search.

II. Locating literature

Locating sources of relevant literature began with selecting e-resource databases, including journals and international conferences focusing on IS, KM and BP. The e-resource databases selected were ACM Digital Library, Emerald, Science-Direct (Elsevier), SpringerLink, Wiley, IEEE Xplore, Google Scholar, and Association for Information Systems Electronic Library (AISeL).

The researchers surveyed articles from the selected e-resources and collected those that matched the selected keywords in Step 1. Then, articles that expressed the selected keywords in the titles of the articles were collected. This step yielded 268 articles with relevant titles and keywords.

III. Critically evaluate and select the literature

Articles with relevant titles and keywords were then evaluated, based on the presence of a BP framework or a BP system within the abstract, i.e., articles that contained several related BPs and that presented different and varied aspects of the BPs. More precisely, the researchers selected articles that addressed the questions: does the paper present a framework or system for BPs and does it provide aspects that are relevant to that framework or system? This step yielded 102 articles.

IV. Organize the literature

The purpose of this fourth step was to select the most relevant papers for our study. The entire content of the 102 articles selected in the previous step was reviewed. Our goal was to identify relevant BP Properties that could form the basis of a new BP Annotation Template.

The inclusion and exclusion criteria, presented in Table 6, were the basis of the final selection. The exclusion criteria excluded BPs from two domains: health care and classroom education. The reason for excluding these two domains was that they include aspects that are not relevant to the framework or system, such as race, ethnicity, sex, age, stage of disease, treatment history, emotional conditions or the presence or absence of other materials or medical details. Also, it was based on the assumption that these domains are not sufficiently generic to be applicable to other domains. BPs from health care and classroom education often refer to features that are domain-specific and, therefore, not sufficiently generic. For instance, in healthcare domains, articles were excluded because they had specific categories in their frameworks that are very specific to a certain disease or treatment. Thus, the researchers believe that the specific nature of these domains makes them a more difficult target to obtain the generic parts of BP that can be applied to all types of practices and they are less amenable to general analysis. The final number of selected articles was 26. This small selection reflects the limited amount of research that has been conducted in this area (Dani et al. 2006).

Inclusion criteria	**Exclusion criteria**
Studies that present a BP framework, BP system or a process of generating BP are included.	Studies that present BPs related to teaching practices are excluded.
Studies that present an infrastructure for organizing or indexing BPs are included.	Studies that present guidelines for healthcare or medicine are excluded, e.g., BPs for nurses describing how to take care of a patient.
Studies that present a method/process of selecting best practices or sharing BPs are included.	
Studies that evaluate or present the findings of the application of BPs are included.	
Studies related to benchmarking BPs are included.	
Studies that discuss the issues of adapting BPs are included.	

Table 6. Inclusion and exclusion criteria

V. Write a review identifying attributes and values for the BP Annotation Template

In this step, the data analysis was carried out. Working with the 26 articles identified from the preceding step, a set of BP attributes with their values were identified, based on a content analysis. In this study, a BP attribute was included if it occurred at least once in the 26 selected articles to ensure the comprehensiveness of the list. Thus, no candidate attributes have been left out. A BP attribute is a property of a BP or its context, e.g., Organizational Area, which can have the values "operational", "tactical", and "strategic". This data analysis corresponds to the fifth step suggested by Creswell (2008). Inclusion and exclusion criteria to guide the selection of BP attributes are given in Table 7.

Inclusion criteria	Exclusion criteria
Attributes that are focused on representing, saving and indexing BP, thereby facilitating reusability and retrieval of BPs	Attributes that are specified on a particular organizational sector
Attributes that are focused on presenting generic parts of BP that can be applied to all types of practices and not just a particular type	Attributes that are focused on infrastructural requirements
Attributes that are focused on organizing, managing and classifying a large number of BPs	Attributes that are focused on technical support to classify BP
Attributes that are focused on improving the retrieval performance of BPs	

Table 7. Inclusion and exclusion criteria

In the final step of the design and development activity, the BP Annotation Template was developed based on identified BP attributes, which were a result of the data analysis. The final design of the BP Annotation Template is presented in Chapter 4.

3.2.4. Demonstration and Evaluation

The fourth activity in the design science process is 'demonstration' and the fifth activity is 'evaluation'. The demonstration is intended to show the use of the artifact in an illustrative or real-life case, thereby proving the feasibility of the artifact. This activity has not been carried out and, instead, the focus was on the evaluation activity. The evaluation activity determines how well the artifact solves the problem, taking the defined requirements into consideration. The evaluation strategy used in this study was to carry out an evaluation using a survey. The survey helped us to provide experts preferences, opinions and evaluation of the results. Chapter 5 describes the evaluation of the BP Annotation Template.

3.3. Research Process for BP Document Template

This section describes the research process for the design of the BP Document Template (see Figure 9)

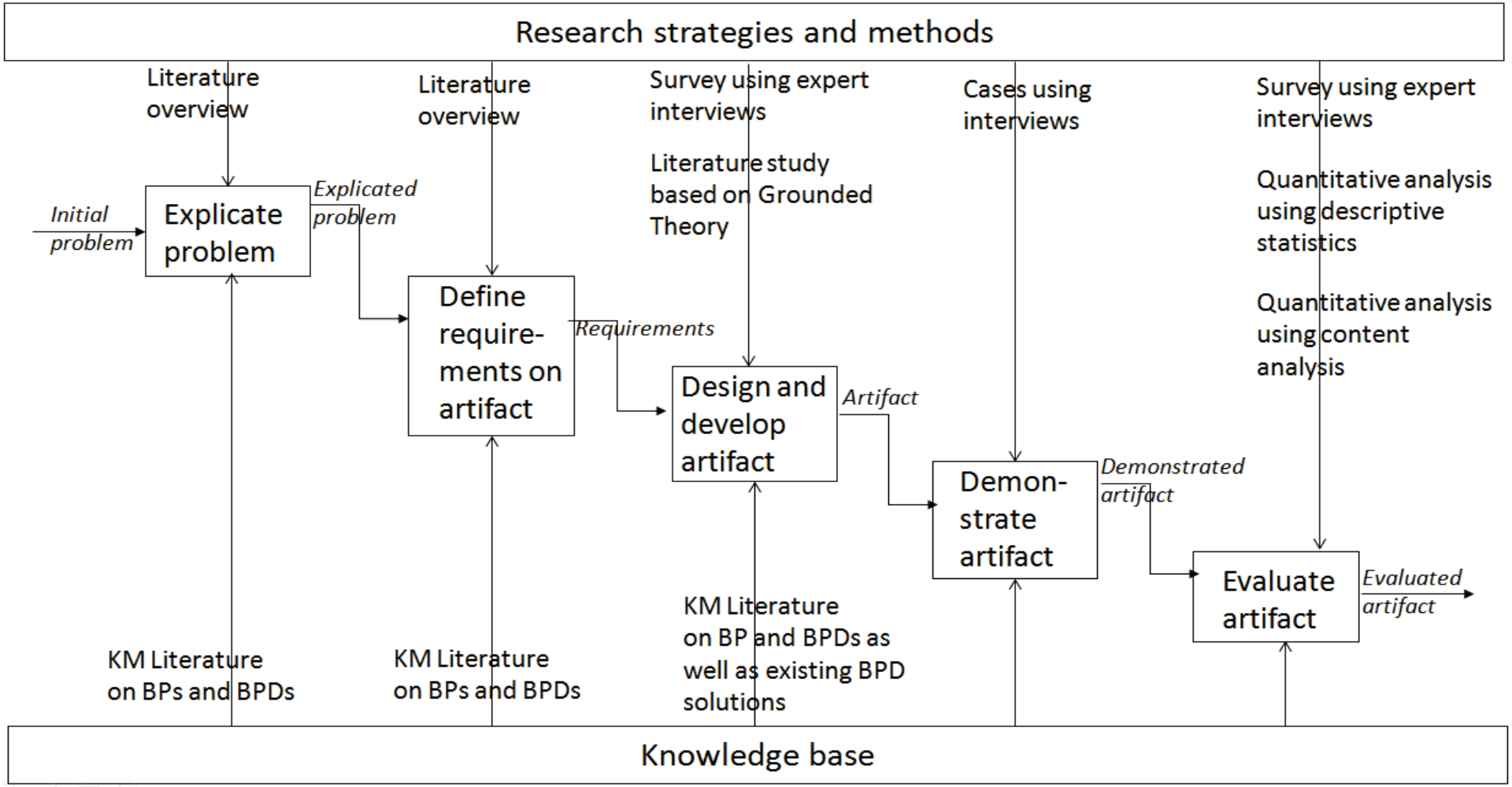

Figure 9. Research process for the design of the BP Document Template

3.3.1. Explicate Problem

The first activity in the design science method framework is to explicate the practical problem that justifies why the artifact needs to be designed. As stated in the previous chapter, the practical problem encountered here is that *the low quality of BPD hinders the success of BP application.* This problem not only hinders the implementation of BPs but also the success of their application. The knowledge gap that further motivates the research presented in this thesis is that *there is a lack of knowledge about IS artifacts for supporting the creation and evaluation of BPD.* The need for having instruments to enhance the quality of BPD has been emphasized by Kao et al. (2003) and Dani et al. (2006).

3.3.2. Define Requirements

The second activity in the design science method framework is to define the requirements of the artifact. These requirements guide the design of the BP Document Template as well as form the basis for its evaluation.

Dautovic et al. 2011; Hargis et al. 2014; Arthur and Stevens, 1990 and ISO/IEC 26514, 2008) have identified some standard requirements on documentation attributes. These works have inspired us to adapt some specified requirements for the BP Document Template.

Requirement 1 - *The BP Document Template shall be easy to use for practitioners in achieving their goals.*

Easy to use means that the user should be able to use the artifact to achieve a particular goal easily. For example, a clear documentation structure will distill information about a BP into a BPD that is easy to use (Shull and Turner, 2005; Niwe and Stirna, 2010; Fragidis and Tarabanis, 2006; Motahari-Nezhad et al. 2010). The major users for a BP Document Template are IT managers, business analysts, and business and IT developers.

Requirement 2 - *The BP Document Template shall support both the design of high quality BPs and the evaluation of already designed BPs.*

Researchers have emphasized the need of a structure for BPD that facilitates design but can also be used to evaluate already designed BPD (Smith et al. 2010; Fragidis and Tarabanis, 2006; Graupner et al. 2009; Motahari-Nezhad et al. 2010).

Requirement 3 - *The BP Document Template shall consist of a complete set of BP attributes to achieve its defined goal.*

Completeness means the degree to which the artifact includes all possible components that are needed to achieve its defined goal. The successful application of BPs depends on their complete documentation (Dinur et al. 2009; Vesely, 2011; Motahari-Nezhad et al. 2010). Researchers indicate improved results for the application and applicability of BPD if the description is complete (Mansar and Reijers, 2007, Motahari-Nezhad et al. 2010). Also, successful adoption of BP has strong and positive relationship with whether the BPD is complete or not (Dani et al. 2006).

3.3.3. Design and Development

The third activity was the design and development of the BP Document Template. The activity consisted of three main sub-activities, as described by Figure 10. The first two activities resulted in two tentative BP Document Templates, which were then merged into the final BP Document Template.

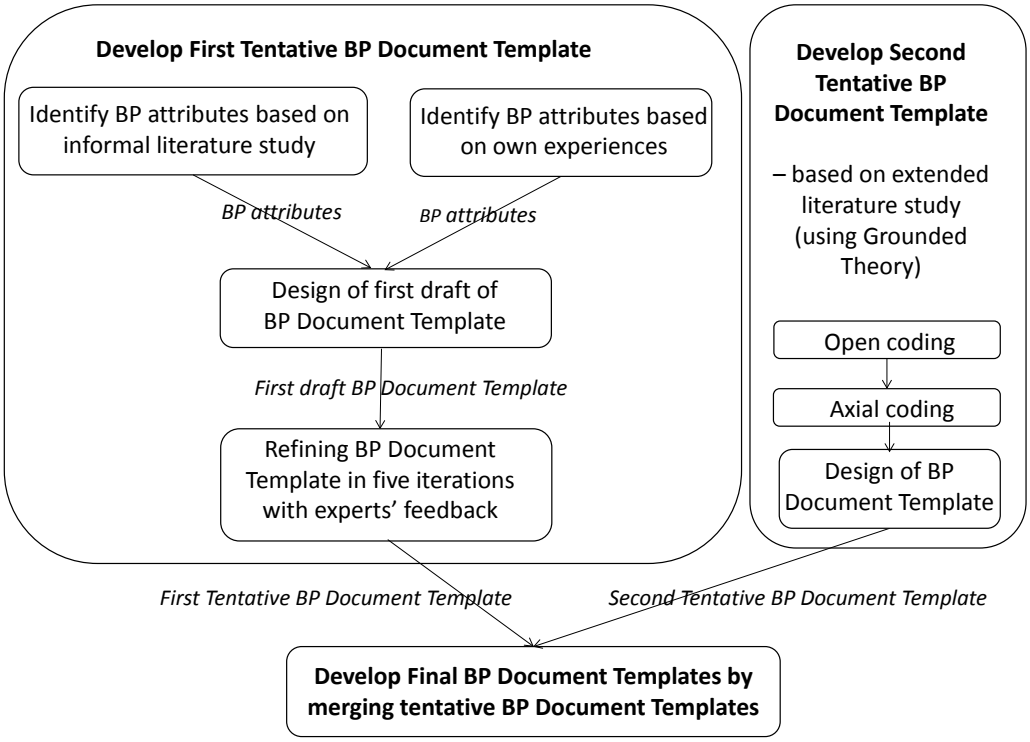

Figure 10. The activities to design and develop the BP Document Template

Development of the First Tentative Document Template

The development of the First Tentative Document Template was carried out in three main steps.

1. The first step in the process was to carry out an informal literature review. The literature review focused on papers describing BP attributes. The search terms, used in various combinations, were "quality measures", "criteria" and "guidelines", and "best practices" (and similar terms, such as "good practices" and "recommended practices"). The search involved selecting databases with e-resources, which included journals and international conferences related to KM. The e-resources selected were ACM Digital Library, Emerald, Science-Direct (Elsevier), SpringerLink, Wiley, IEEE Xplore, Google Scholar and AISeL. Based on this, ten articles that include BP attributes were identified.

2. The second step was to design a tentative BP Document Template based on results from the literature review and our own experiences. The experience-based input was based on our research in KM and enterprise modeling, including designing and applying BPs. The developed tentative template consisted of 37 BP attributes. In this step, the attributes were also categorized into ten categories.

3. The third step was to evaluate and refine the tentative BP Document Template into five refinement phases. In each phase, one or two practitioners or academic experts were asked to evaluate and refine the template, and based on their input, attributes were added, deleted or refined. In total, Interviews were carried out with seven practitioners and academic experts in the area of BP. The research strategy was a survey, and purposive sampling was applied to select participants. The selected participants were identified based on their expertise in KM and based on the researcher's contacts in Stockholm University and Uppsala University. Based on the respondents' recommendations, the First Tentative BP Document Template was designed. It comprises seven categories and 30 BP attributes. The template can be found in Appendix I.

Development of the Second Tentative Document Template

The development of the Second Tentative Document Template was carried out through a rigorous literature review based on grounded theory. Due to the variety and range of issues in the literature of BPs, grounded theory was considered to be the most appropriate method for analysis. The literature review followed the five phases and detailed steps described by Wolfswinkel et al. (2013), as described in Figure 11.

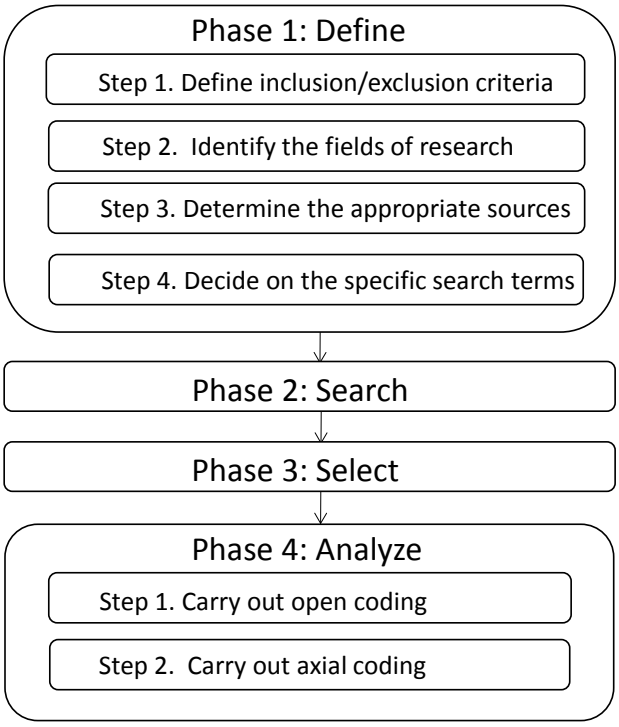

Figure 11. Five phases and included steps in grounded theory method for reviewing the literature, adopted from Wolfswinkel et al. (2013)

The five phases of the grounded theory process were carried out.

Phase 1. Define

Define means to set the scope for the literature review. This was done in four steps.

Step 1. Define the inclusion and exclusion criteria for searching of articles

The researchers identified the criteria for inclusion and exclusion of articles. The inclusion criteria were used for collecting relevant articles, while the exclusion criteria were used to eliminate irrelevant articles. Table 8 lists the inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Article is included if it focuses on documenting BP in KM.	Article is excluded if it is based only on expert opinion or it presents opinions, editorials and commentaries.
Article is included if it is based on empirical data and theoretical reviews.	Article is excluded if it is a preliminary conference version of included journal papers.
Article is included if it is published within the last two decades, i.e., from 1994 onwards.	

Table 8. Inclusion and exclusion criteria for article search

Step 2. Identify the fields of research

Since IS is an interdisciplinary field (Webster and Watson, 2002), the researchers identified the field of the study as IS and Management and Systems Thinking. This choice was based on Guo and Sheffield (2008), who proposed those fields in their study for a paradigmatic and methodological examination of KM research.

Step 3. Determine the appropriate sources

The third step was to determine appropriate sources. These sources included journals and international conferences related to KM found in the following e-resources/databases: ACM Digital Library, ProQuest, Emerald, Sage, Science-Direct (Elsevier), SpringerLink, Wiley, IEEE Xplore, Google Scholar and AISeL. These e-resources/databases were selected because they include various relevant journals and conferences focusing on IS, management and systems thinking. Those e-resources/databases were also selected because they have a search engine that allows keyword searching, using advanced search mechanisms.

Step 4. Decide on the specific search terms

The search terms reflect the entire scope of the chosen research field. The search terms used were "best practice", "best practices", "good practices", "recommended practices", "practice quality measures", "practice success factors", "practice template" and "practice documentation".

Phase 2. Search

4. Search means browsing and examining e-resources/databases, that is, an actual search through all the identified sources. This resulted in 470 candidate articles that needed to be examined in the next phase to select the relevant articles.

Phase 3. Select

Select means to select articles based on inclusion and exclusion criteria.

This third phase was to select the most relevant articles, which was done by applying the inclusion and exclusion criteria of Table 9.

Inclusion criteria	Exclusion criteria
Article is included if it focuses on documentation features, properties, or BP attributes.	Article is excluded if it is not based on or does not have any scientific contributions that were characterized by a specific and clear research method, how it was processed, and how data were collected and applied.
Article is included if it focuses on motivating and encouraging the implementation or application of BP.	
Article is included if it focuses on adapting, storing and saving BP knowledge.	

Table 9. Inclusion and exclusion criteria for article selection

The articles needed to fulfill at least one of the three inclusion criteria in Table 9 in order to be included in the final selection. Based on the criteria for inclusion and exclusion, the number of articles was reduced to 31.

Phase 4. Analyze

In the analyze phase, the researchers read the content of the 31 collected articles and collected relevant excerpts related to BP attributes. In total, 272 excerpts were collected. These excerpts

were organized using Dedoose software (Dedoose, 2015) in order to support tracking and analysis. The Dedoose software allows the researchers to import different types of data, such as text and images and categorize them according to the researchers' defined attributes. Then, these data can be segmented and organized into categories and sub-categories using codes created by the researchers before or during the analysis (Lewins and Silver, 2007). Open and axial coding were carried out, as described below. However, no selective coding was performed, as the only goal of the literature review was to provide a basis for the BP Document Template.

1. Open coding

Open coding is the activity in which the "*researchers engage in conceptualizing and articulating the often hidden aspects of a set of excerpts that they noted earlier as relevant during their close reading of a set of single studies*" (Wolfswinkel et al. 2013). The open coding started by re-reading the collected set of excerpts. Then, the researchers derived concepts from those excerpts. In the beginning of the ongoing coding, they generated many ideas and concepts inductively from the excerpts. Thus, they identified 68 BP attributes.

2. Axial coding

Axial coding is the activity in which "*the interrelations between categories and their subcategories (including their properties) are identified*" (Wolfswinkel et al. 2013). In this step, similar BP attributes were grouped together into categories and sub-categories. The initial proposed sub-categories were: Success Factor, Management Success Factor, Content Success Factor, BP Driver, Documenting Form of BP, and System Support.

This was an iterative process, in which the researchers compared and contrasted the generated attributes and sub-categories with their relevant excerpts. They delineated the boundary between similar attributes to facilitate understanding of the denoted attributes and removed irrelevant attributes, given the research goal. Finally, 24 BP attributes were identified with their supporting excerpts. Since axial coding involves relating narrow attributes to broader attributes, the researchers identified and renamed nine sub-categories: Document Metadata, Presentation Structure, BP Actor Resource, User Relationship, Internal BP Characteristics, Problem Relationship, BPs Relationships, Application, and Evaluation. In order to have a clear picture of the identified nine sub-categories, the researchers formed categories (sometimes referred to as themes), which are higher level categories under which the researchers grouped lower-level (sub-) categories, according to shared properties. The Second Tentative Document Template represents the results of the open and axial coding that are given in Appendix II.

Development of a Final BP Document Templates

The First Tentative BP Document Template and the Second Tentative BP Document Template were merged into the Final BP Document Template. The Second Tentative BP Document Template was used as the basis for this merge, meaning that all its BP attributes were included. Then, a number of attributes from the First Tentative BP Document Template were added. However, most of the BP attributes in the First Tentative BP Document Template corresponded to BP attributes in the Second Tentative BP Document Template and were, therefore, not added. These correspondences are shown in Appendix III. The Final BP Document Template is presented in Chapter 4.

3.3.4. Demonstration and Evaluation

The fourth activity in the design science method framework is 'demonstration' and the fifth activity is 'evaluation'. The demonstration activity requires the use of the BP Document Template in real-life cases to prove its feasibility. The evaluation is the fifth activity and it investigates whether the BP Document Template solved the identified problem and fulfilled the defined requirements. Chapter 5 discusses how the demonstration and evaluation the BP

Document Template were conducted.

3.4. Ethics

The ethical principles of the research, which were used in planning, conducting and documenting, are presented in this section. The researchers adopted four key principles as proposed by Denscombe (2014) to conduct their investigation in an ethical manner.

1. *Participants' interests are protected.*

Participants should not suffer as a consequence of their involvement in this research. The studies considered the likely consequences of participation that could happen to the people involved. The following steps have been taken for such consequences.

- The studies ensured that participants did not come to any physical danger or harm. Participants were informed about the procedures of the interviews and they chose a time and a means to conduct the interview. Also, participation in the study was anonymous, and thus, information was collected anonymously and identity of the respondents was not revealed. Hence, data is collected for specified research goal and not used in any manner incompatible with the research goal. This setting allowed respondents to be free of any bias and hesitance when agreeing to participate in the study.
- The studies ensured the avoidance of psychological harm that could result from the research. The researcher asked participants for their permission to audiotape and take notes during the interview. Participants were informed that if they felt uncomfortable at any time during the interview, they could decline to answer any questions, were free to stop taking part in the project at any time, and the recorder could be turned off at any time, at their request.
- The studies ensured avoidance of personal harm arising from the disclosure of information. To minimize the risks of violating confidentiality, personal information was only used to administer the studies. The interview data and transcripts were anonymized by random numbers associated with participants' names. The numbers were preserved in a separate password-protected document. The random numbers were archived until the studies were published. No personal data will be stored longer than necessary. Also, transcribed (anonymous) interviews and data will be stored securely by the researcher.

2. *Participation is voluntary and based on informed consent.*

The researcher asked participants for oral rather than signed consent. Also, participants confirmed their participation by replying back to the researcher.

3. *Researchers conduct the study in an open and honest manner with respect to the investigation.*

Participants were informed with brief information about the researcher's name, job and organization. Furthermore, participants were informed about the research problem and goal and the nature of the data that were to be collected. The researchers avoided misrepresentation or deception in their dealings with participants. The researchers provided unbiased interpretation of the results of the study. Also, the researchers acknowledged the sponsorship of the study.

4. *The research complies with the laws of the land.*

To stay within the law, the topic of the study is not sensitive. The researchers declared the following matters: ownership of the data, copyright and intellectual property rights.

4. Description of the Artifacts

This chapter describes the two artifacts, the BP Annotation Template and the BP Document Template. The chapter starts by describing the concepts used for building the artifacts and also how they are related.

4.1. BP Conceptual Model

A BP can be described in many, more or less structured ways. A straight-forward approach for describing a BP is to use an attribute-value system. A model for describing BPs by means of such a system is shown in Figures 12 and 13, which allows for both unstructured (marked with the gray background in Figure 12) and structured descriptions (marked with the gray background in Figure 13). In the latter case, the values for each attribute must come from a predefined set of possible values, while in the former case the values can be arbitrary strings.

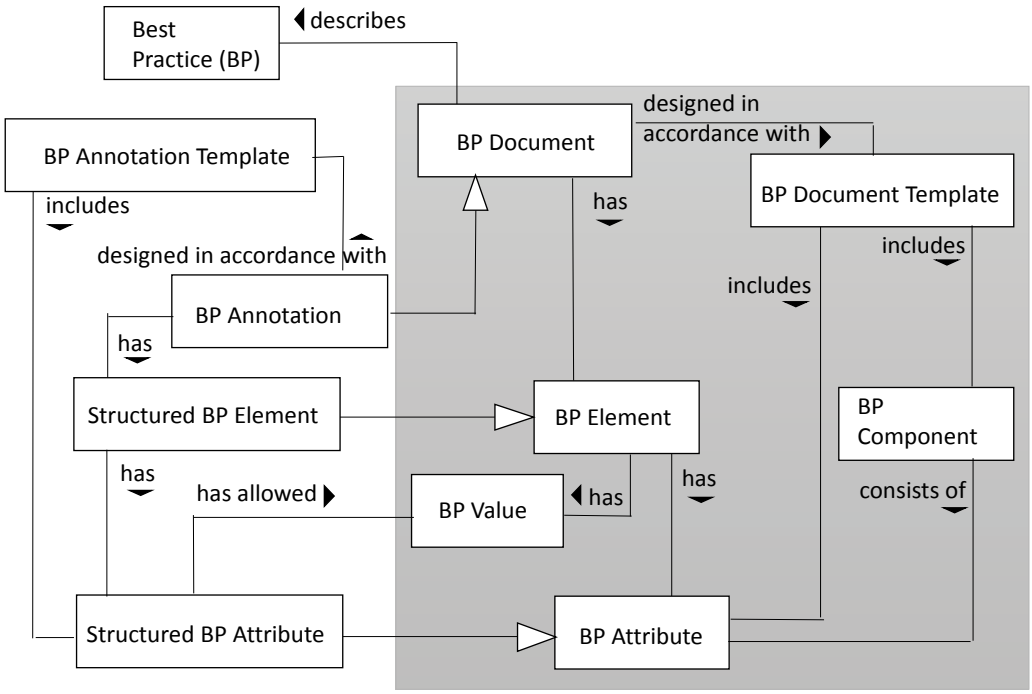

Figure 12. A conceptual model of BP concepts. The concepts needed for an unstructured description of BPs are marked with a gray background

A BP document describes a BP, and it consists of a number of BP elements. A BP element is an attribute-value pair, i.e., it consists of a BP attribute and a BP value, as shown in Figure 12. An example is <author, 'John Doe'>. For a BP attribute, there are no restrictions on its possible values, and the values can consist of entire text paragraphs.

A BP annotation is a special case of a BP document (therefore the generalization-specialization relationships between BP Document and BP Annotation as shown in Figure 13), meaning that it consists of a number of BP elements (but structured), and each such element is an attribute-value pair (therefore the generalization-specialization relationships between BP Element and Structured BP Element in Figure 13). However, the BP elements in a BP annotation are structured, meaning that they are restricted in the sense that a structured BP attribute can only take on a predefined set of BP values (therefore the generalization-specialization relationships between BP Attribute and Structured BP Attribute in Figure 13). In other words, there is a limited set of values that are allowed for a structured BP attribute. For example, a structured BP attribute BSC perspective has the allowed values: "learning and growth", "internal business processes", "customer perspective", and "financial perspective". In practice, a BP annotation is always small in size, while some BP documents can be quite large.

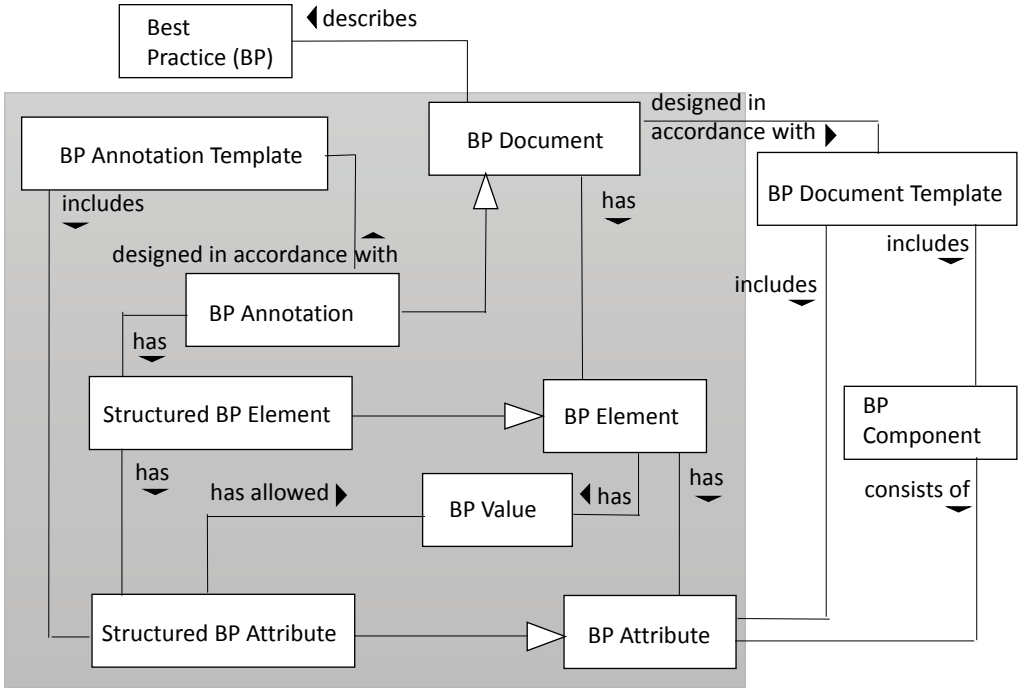

Figure 13. A conceptual model of BP concepts. The concepts needed for a structured description of BPs are marked with a gray background

There is also metadata that describe a BP document, e.g., title, author and versions. This metadata is structured by means of attribute-value pairs, consisting of a BP metadata attribute and a BP metadata value. Just as for BP attributes, some BP metadata attributes are structured, meaning that they can only take on a predefined set of values, as shown in Figure 14.

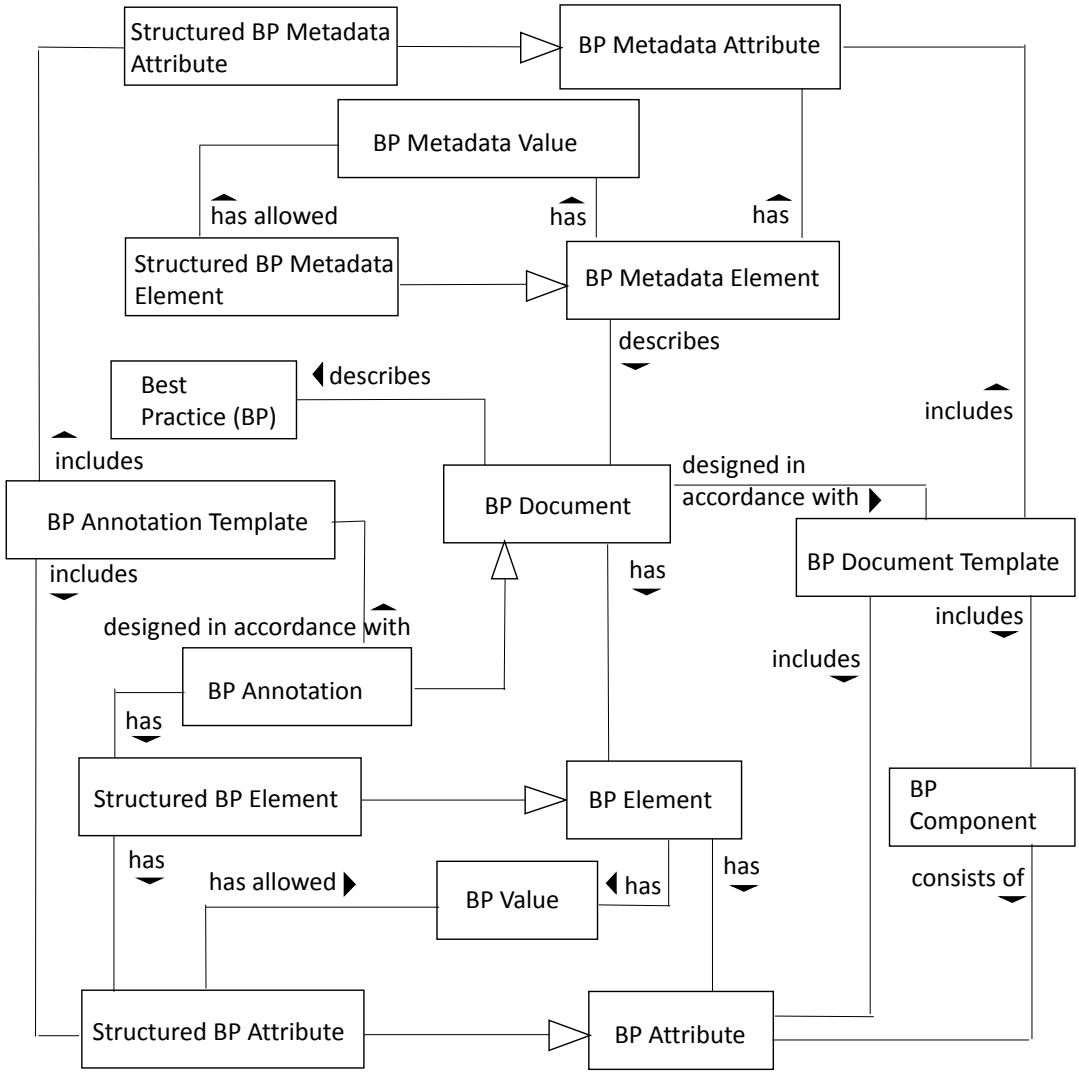

Figure 14. A conceptual model of BP concepts including metadata concepts

The model in Figure 14 also includes BP document templates and BP annotation templates, which consist of sets of BP attributes and BP metadata attributes, and structured BP attributes and structured BP metadata attributes, respectively. These templates support people in structuring their BP descriptions.

BP annotations are particularly useful in the KS and dissemination process, as they allow people to search for and identify relevant BPs using simple and highly structured queries. On the other hand, a BP annotation is not very informative and offers only a shallow description of a BP. Other BP documents can be much more detailed, providing a deep and rich picture of a BP through extensive textual descriptions. Such BP documents can be difficult to identify, as they only offer keyword or free text searches. However, they can be helpful for offering a comprehensive and solid understanding of BPs. Therefore, they are useful for the processes of knowledge acquisition and application. The BP Document Template can also support the capturing of knowledge, since it implicitly provides guidelines on which knowledge to capture, by specifying which attributes to focus on.

The two artifacts of this thesis are both attribute-value systems. The first artifact, the BP Annotation Template, is a BP Annotation Template that can be used for indexing and searching BP descriptions in large repositories. The second artifact, the BP Document Template, is to be used for describing BPs in detail, providing support for users in applying them.

4.2. The BP Annotation Template

In this section, a description of the BP Annotation Template is presented. The researchers reviewed twenty-six reference articles in order to identify BP attributes. These attributes were then modeled as structured BP attributes and structured BP metadata attributes, including their allowed values. The following attributes were identified.

1. *Degree of Cooperation* means that the BP focuses on either increasing competitive edge or increasing collaboration.

The twenty-six selected articles allude to the value of the "competitive" versus the "collaborative" perspectives of BP. Although both values are present in the selected literature, the "competitive" perspective of BP was referred to more frequently. The "competitive" perspective means that the BP focuses on making a practice, a product, or a service more competitive and was found in nineteen studies, including Dana and Smyrnios (2010), and Van Landeghem and Persoons (2001). On the other hand, a focus on the "collaborative" perspective means that BPs focus on collaborative KS for creativity and ingenuity/innovativeness and was found in seven studies, including Burke and Hutchins (2008) and O'Dell and Grayson (1998). This indicates that BP literature is focused more on competitive rather than on collaborative advantages.

The allowed BP values for this structured BP attribute are "competitive" and "collaborative".

2. *Organizational Level* means the level in an organization on which the BP focuses.

Regarding the attribute *Organizational Level*, the researchers were able to identify three key organizational levels that are deemed important by various authors: 1) operational, 2) tactical and 3) strategic. Operational means that the BP focuses on a particular operational routine or business process and can be found in seventeen studies, including Shull and Turner (2005), Jarrar and Zairi (2000), and Bergek and Norrman (2008). For the operational level, much progress has been made to develop a system of processes and tools that embody BP projects. The second level of organization is "tactical", which means that the BP focuses on tactical, short-term goals, that is, the goals related to resource allocation. This can be found in the recent works of Netland and Alfnes (2011), Done et al. (2011) and Dinur et al. (2009). They have proposed that sharing BPs across organizational boundaries is key to the effective use of knowledge. Furthermore, it can lead to the sharing of invaluable work experience from a variety of business units, creating a powerful learning experience for short-term, organizational goals. In the literature, "tactical" level was found in six studies. The third level of organization is "strategic", which means that the BP focuses on more overarching, strategic, long-term goals, such as which markets, products and customers to focus on. This can be found in three studies, including Olfman et al. (2003) and Zairi and Ahmed (1999).

The allowed BP values for this structured BP attribute are "operational", "tactical", and "strategic".

3. *Scope* means the area or extension on which the BP focuses.

In the twenty-six selected articles, the researchers found that many authors distinguish between "local enterprise" and "global enterprise". A third value, "department of enterprise" was identified after the initial evaluation of the system by Alwazae et al. (2013). The three values are: 1) "department of enterprise", meaning that the BP focuses on issues related to the specific work related tasks within a department; 2) "local enterprises", meaning that the BP focuses on issues related to a national, regional or local organization; and 3) "global enterprises", meaning that the BP focuses on issues related to a multinational organization. "Local enterprises" was found in seventeen studies, which include Reddy and McCarthy (2006), Smith et al. (2010) and Zhu et al. (2007). "Global enterprises" was found in nine studies, such

as Netland and Alfnes (2011), Dinur et al. (2009) and Xu and Yeh (2010). The value, "department of enterprise" was not found in any study.

The allowed BP values for this structured BP attribute are: "department of enterprise", "local enterprise", and "global enterprise".

4. *Completeness of Document* means that the BPD contains either necessary context for applying the BP without being familiar with the context, or the BPD does not.

Moving forward to the *Completeness of Document* of a BP, few studies were found that contain a context description for using the practice, while several studies contain just basic parts of such a description. The researchers refer to "complete with context" if the BP document includes its context (that is, when to apply, where to apply, who to apply, and how to apply), which makes it possible for the user to apply the BP without being familiar with the context. This is supported by Mansar and Reijers (2007), who suggest future research directions to develop a methodology for applying and investigating BPs related to where, when, and how to apply them, or how not to apply them. The "complete with context" value of the presented BPs can be found in four studies that depict our proposed context. These studies include Graupner et al. (2009), Smith et al. (2010) and Dana and Smyrnios (2010). The "basic parts" value means that the BP documents only contains basic parts, such as how to apply it, and which ones require that the user of the BP be familiar with the context in order to know-how to apply it. This can be found in twenty-two studies, including Done et al. (2011), Zandi and Tavana (2011), Fragidis and Tarabanis (2006), and Asrofah et al. (2010).

The allowed BP metadata values for this structured BP metadata attribute are "basic parts", and "complete with context".

5. *Degree of Quantification* means the type of measures assigned to the BP.

The attribute, *Degree of Quantification,* has the possible values "qualitative measures," "quantitative measures," or "mixed measures" for assessing BP models and their impact. The purpose of this attribute is to establish grounds for a directed methodology for BP selection and to provide a guideline for the conditions under which the BPs should be measured. A focus on "qualitative measures" means that interpretive, soft measures are assigned to BPs and can be found in nineteen studies, including Leskiw and Singh (2007), Done et al. (2011) and Beaumont (2005). A focus on "quantitative measures" means that numerical, hard, values are assigned to BPs and this focus is present in five studies, including O'Dell and Grayson (1998) and Jarrar and Zairi (2000). Quantitative articles use mathematical measures to evaluate differences between two or more practices by employing techniques, such as benchmarking and balanced scorecards. Only the studies of Shull and Turner (2005) and Asrofah et al. (2010) show the "mixed measures" of qualitative and quantification measures of BPs clearly. The mixed method means that both soft and hard measures are assigned to BPs and some articles used soft qualitative, informal, measures, which were found to be insufficient for drawing conclusions about BP assessment. In these cases, a later use of hard quantitative measures was required to attain indicative values for identifying BP.

The allowed BP values for this structured BP attribute are "qualitative measures," "quantitative measures" and "mixed measures".

6. *Implementation Areas* refers to the areas in which the BPs is intended to be applied.

Another annotation feature in BP studies, extracted from the selected articles, focused on the areas to implement BP according to 1) "technical area", 2) "business area", or 3) "management area". These annotations led us to group them collectively under the attribute, Implementation Areas. The value "technical area" means that the application area of the BP is technical. This was found in two studies: Zhu et al. (2007) and Shull and Turner (2005). The sec-

ond value is “business area”, which means that the application area of the BP includes some kind of business process, but not processes related management, leadership and governance. This value was found in 18 studies, including Mansar and Reijers (2007), Dana and Smyrnios (2010), Davies and Kochhar (2002), and Reddy and McCarthy (2006). As supported by Zandi and Tavana (2011), the researchers found that in our collected articles, implementing BP in business areas gives organizations many advantages, such as increased throughput and decreased costs, as well as enhancement of the following: quality in business processing, process adjustment, customer satisfaction, reporting capabilities, and capacity-planning among other users. The third value is “management area” which means that the application area of the BP is geared to upper-management, organizational leadership and governance. It was found in six studies, including Zairi and Ahmed (1999), Aluchna (2009), and Van Landeghem and Persoons (2001).

The allowed BP values for this structured BP attribute are “technical area,” “business area,” or “management area”. Simply put, “technical area” is the hardest annotation for implementation, and “management” is the softest.

7. Level of Formalization means the level of formalization of the BP.

The values of “informal,” “semi-formal,” or “formal” were categorized under the attribute, *Level of Formalization*. These values were grouped together in light of their recurring mentions in the literature. Declaring a BP as “informal” means that the BP has the form of soft, informal suggestions, as can be found in eighteen studies, such as Olfman et al. (2003), Netland and Alfnes (2011), Bergek and Norrman (2008) and Burke and Hutchins (2008). The value “semi-formal” means that the BP provides the means of directing functional considerations, for example, providing guidelines and business rules via established organizational procedures or expressed in official documents that are sometimes checked. This can be found in five studies, including Xu and Yeh (2010) and Szulanski (1996). The value “formal” means that the BP has the form of a formalized procedure that needs to be followed in detail and that, therefore, might be embedded in the IT implementation of BPs, such as Enterprise Resource Planning (ERP) or Business Process Management Systems. It can be found in three studies, including Zhu et al. (2007) and Zandi and Tavana (2011).

The allowed BP metadata values for this structured BP metadata attribute are “informal” “semi-formal” and “formal”.

8. Process area means the process area upon which the BP focuses its support.

The following values were found for the characteristics of a process area (including the articles in which the values were found).

a) “Internal” Process means that the BP focuses on supporting processes related to human resources, finance and accounting, and manufacturing. This value can be found in twelve studies, such as Davies and Kochhar (2002), Beaumont (2005), Jarrar and Zairi (2000) and Zandi and Tavana (2011).
b) “External Inbound Process” means that the BP focuses on supporting processes related to supply chain management and logistics. It can be found in four studies, including Netland and Alfnes (2011), Van Landeghem and Persoons (2001).
c) “External Outbound Process” means that the BP focuses on supporting processes related to marketing, customer services and sales. This value can be found in eleven studies, such as Mansar and Reijers (2007), Dinur et al. (2009) and Dana and Smyrnios (2010).

The allowed BP values for this structured BP attribute are “Internal”, “External Inbound Process” and “External Outbound Process”.

9. Balanced Scorecard (BSC) Perspective means the BSC perspective on which the BP focuses.

The following values were found for the attribute *BSC Perspective*.

a) "Learning and Growth Perspective" means that the BP focuses on supporting infrastructure for long-term learning, and growth and improvement. It can be found in eleven studies, including Dana and Smyrnios (2010), Xu and Yeh (2010) and Aluchna (2009).
b) "Internal Business Processes Perspective" means that the BP focuses on supporting the efficiency of the business processes of an organization. This value can be found in eight studies, such as Mansar and Reijers (2007), Zandi and Tavana (2011), Xu and Yeh (2010) and Graupner et al. (2009).
c) "Customer Perspective" means that the BP focuses on fulfilling customer satisfaction and their needs, i.e., it focuses on the value proposition. Customer perspective can be found in nine studies, including Dinur et al. (2009), Xu and Yeh (2010), Smith et al. (2010) and Asrofah et al. (2010).
d) "Financial Perspective" means that BP focuses on increasing revenue and reducing cost and risks. It can be found in four studies, including Xu and Yeh (2010) and Aluchna (2009).

The allowed BP values for this structured BP attribute are "Learning and Growth Perspective", "Internal Business Processes Perspective", "Customer Perspective" and "Financial Perspective".

10. Management Process (MP) means the MPs that the BP focuses on supporting.

The following values were found for MP attributes, informed by Hamel and Breen (2007).

a) "Authorization Process" means that the BP focuses on supporting an MP in which the people authorized to carry out an activity are specified. This value can be found in nine studies, such as Mansar and Reijers (2007), Beaumont (2005) and Aluchna (2009).
b) "Information Distribution Process" means that the BP focuses on supporting an MP in which the information needed to carry out activities is distributed to the people allocated to these activities. It can be found in four studies, such as Netland and Alfnes (2011), Van Landeghem and Persoons (2001), Graupner et al. (2009) and Zhu et al. (2007).
c) "Resource Allocation Process" means that the BP focuses on supporting an MP in which the people and other resources are allocated to work activities. It can be found in ten studies, including Graupner et al. (2009), Olfman et al. (2003), Leskiw and Singh (2007).
d) "Accountability Allocation Process" means that the BP focuses on supporting an MP in which the people accountable for an activity are specified. It can be found in eight studies, such as Burke and Hutchins (2008) and O'Dell and Grayson (1998).
e) "Planning Process" means that the BP focuses on supporting an MP in which the activities/tasks are planned and ordered. "Planning process" can be found in nine studies, such as Van Landeghem and Persoons (2001), Burke and Hutchins (2008), O'Dell and Grayson (1998) and Reddy and McCarthy (2006).
f) "Monitoring Process" means that the BP focuses on supporting an MP in which the execution of a process is monitored for problems and deviations from the plan. The data analysis revealed that "monitoring process" can be found in six studies, including Graupner et al. (2009) and Smith et al. (2010).
g) "Controlling Process" means that the BP focuses on supporting an MP in which actions are taken to address execution problems and plan deviations. The data analysis revealed that "controlling process" can be found in ten studies, including Netland and Alfnes (2011), Dinur et al. (2009) and Graupner et al. (2009).

h) "Evaluation Process" means that the BP focuses on supporting an MP in which process performance and the quality of results are evaluated. This value can be found in thirteen studies, such as Jarrar and Zairi (2000), Van Landeghem and Persoons (2001) and Leskiw and Singh (2007).

i) "Rewarding Process" means that the BP focuses on supporting an MP in which rewards are distributed based on excellence in performance. This value was found in nine studies, including Leskiw and Singh (2007) and Done et al. (2009).

j) "Development Process" means that the BP focuses on supporting an MP in which artifacts, such as IT systems, methods, and devices are developed. It can be found in eleven studies, such as Mansar and Reijers (2007), Dana and Smyrnios (2010) and Burke and Hutchins (2008).

k) "Maintenance Process" means that the BP focuses on supporting an MP where artifacts, such as IT systems, methods, and devices are maintained. It can be found in five studies, including Xu and Yeh (2010), Graupner et al. (2009) and Smith et al. (2010).

l) "Education Process" means that the BP focuses on supporting an MP where employees and business partners are educated. This value can be found in six studies, such as Dinur et al. (2009), Jarrar and Zairi (2000), Leskiw and Singh (2007) and Reddy and McCarthy (2006).

The allowed BP values for this structured BP attribute are "Authorization Process", "Information Distribution Process", "Resource Allocation Process", "Accountability Allocation Process", "Planning Process", "Monitoring Process", "Controlling Process", "Evaluation Process", "Rewarding Process", "Development Process", "Maintenance Process" and "Education Process".

The number of structured BP attributes is eight and the number of structured BP metadata attributes is two. The latter are *Completeness of Document* and *Level of Formalization*. The structured BP attributes are *Scope, Organizational Level, Implementation Areas, Degree of Quantification, Degree of Cooperation, BSC Perspective, Process Area and Management Process.*

Table 10 shows the number of times a value occurred in the reviewed literature and Appendix IV showed the corresponding literature for each values.

BP attributes	Allowed values	Occurrence in literature
Degree of Cooperation	Competitive	19
	Collaborative	7
Organizational Level	Operational	17
	Tactical	6
	Strategic	3
Scope	Local Enterprises	17
	Department of Enterprise	0
	Global Enterprises	9
Completeness of Document	Complete with Context	4
	Basic Parts	22
Degree of Quantification	Qualitative Measures	19
	Quantitative Measures	5
	Mixed Measures	2
Implementation Area	Technical Area	2
	Business Area	18
	Management Area	6
Level of Formalization	Informal	18
	Semi-formal	5
	Formal	3

Process Area	Internal Process	12
	External Inbound Process	4
	External Outbound Process	11
BSC Perspective	Learning and Growth	11
	Internal Business Processes	8
	Customer Perspective	9
	Financial Perspective	4
Management Process	Authorization Process	9
	Information Distribution Process	4
	Resource Allocation Process	10
	Accountability Allocation Process	8
	Planning Process	9
	Monitoring Process	6
	Controlling Process	10
	Evaluation Process	13
	Rewarding Process	9
	Development Process	11
	Maintenance Process	5
	Education Process	6

Table 10. Showing the number of time a value exist in literature

The final artifact is presented in Table 11.

BP attributes	Allowed values
Degree of Cooperation means that the BP focuses on either increasing competitive edge or increasing	**Competitive** means that the BP focuses on making a practice, a product, or a service more competitive
	Collaborative means that the BP focuses on collaborative KS for creativity and ingenuity/innovativeness
Organizational Level means the level in an organization on which the BP focuses	**Operational** means that the BP focuses on a particular operational routine or business process
	Tactical means that the BP focuses on tactical short-term goals, that is, the goals related to resource allocation
	Strategic means that the BP focuses on more overarching, strategic, long-term goals, such as which markets, products and customers to focus on
Scope means the area or extension on which the BP focuses	**Local Enterprises** means that the BP focuses on issues related to a national, regional or local organization
	Department of Enterprise means that the BP focuses on issues related to specific work related tasks within a department
	Global Enterprises means that the BP focuses on issues related to a multinational organization
Completeness of Document means that the BPD contains either necessary context for applying the BP without being familiar with the context, or the BPD does not	**Complete with Context** means that the BPD contains the context (that is, when to apply, where to apply, who to apply, and how to apply), which makes it possible for the user to apply the BP without being familiar with the context
	Basic Parts means that the BPD contains only basic parts, such as how to apply it, which requires that the user of the BP must be familiar with the context in order to know how to apply it
Degree of Quantification	**Qualitative Measures** means that interpretive, soft measures

refers to the type of measures assigned to the BP	are assigned to BPs
	Quantitative Measures means that numerical, hard, values are assigned to BPs
	Mixed Measures means that both soft and hard measures are assigned to BPs
Implementation Area means the area in which the BPs is intended to be applied	**Technical Area** means that application area of the BP is technical
	Business Area means that the application area of the BP includes some kind of business process, but not processes related management, leadership and governance
	Management Area means that the application area of the BP is geared to upper-management, organizational leadership and governance
Level of Formalization means the level of formalization of the BP	**Informal** means that the BP has the form of soft, informal suggestions
	Semi-formal means that the BP has the form of directing functional considerations, for example, providing guidelines and business rules via established organizational procedures or expressed in official documents that are sometimes checked
	Formal means that the BP has the form of a formalized procedure that needs to be followed in detail and which, therefore, might be embedded in the IT implementations of BPs, such as ERP or BPMSs
Process Area means the process area upon which the BP focuses its support	**Internal Process** means that the BP focuses on supporting processes related to human resources, finance and accounting, and manufacturing
	External Inbound Process means that the BP focuses on supporting processes related to supply chain management and logistics
	External Outbound Process means that the BP focuses on supporting processes related to marketing, customer services, and sales
BSC Perspective means the BSC perspective on which the BP focuses	**Learning and Growth** means that the BP focuses on supporting infrastructure for long- term learning, growth and improvement
	Internal Business Processes means that the BP focuses on supporting efficiency of the business processes of an organization
	Customer Perspective means that the BP focuses on fulfilling the customer satisfaction and their needs, i.e., it focuses on the value proposition
	Financial Perspective means that BP focuses on increasing revenue and reducing costs and risks
Management Process is the MPs that the BP focuses on supporting	**Authorization Process** means that the BP focuses on supporting an MP in which the people authorized to carry out an activity are specified
	Information Distribution Process means that the BP focuses on supporting an MP in which information needed to carry out activities is distributed to the people allocated to these activities
	Resource Allocation Process means that the BP focuses on supporting an MP in which the people and other resources are allocated to work activities
	Accountability Allocation Process means that the BP focuses

	on supporting an MP in which the people accountable for an activity are specified
	Planning Process means that the BP focuses on supporting an MP in which the activities/tasks are planned and ordered
	Monitoring Process means that the BP focuses on supporting an MP in which the execution of the process is monitored for problems and deviations from the plan
	Controlling Process means that the BP focuses on supporting an MP in which actions are taken to address execution problems and plan deviations
	Evaluation Process means that the BP focuses on supporting an MP in which process performance and the quality of results are evaluated
	Rewarding Process means that the BP focuses on supporting an MP in which rewards are distributed based on excellence in performance
	Development Process means that the BP focuses on supporting an MP in which artifacts, such as IT systems, methods, and devices are developed
	Maintenance Process means that the BP focuses on supporting an MP in which artifacts, such as IT systems, methods, and devices are maintained
	Education Process means that the BP focuses on supporting an MP in which employees and business partners are educated

Table 11. The BP Annotation Template

4.3. The BP Document Template

In this section, a description of the BP Document Template is presented in the form of a list of BP attributes and BP metadata attributes. For each attribute with a basis in the Second Tentative BP Document Template, relevant references are given. For each attribute with a basis in only the First Tentative BP Document Template, only a reference to (Alwazae et al. 2014) is given.

1. *Title* refers to an identifying name for the BPD (Alwazae et al. 2014).

2. *Summary* refers to a short description of the contents of the BPD (Alwazae et al. 2014).

3. *Pattern Attributes* contains attributes often used in pattern descriptions, such as problem, solution and context. The pattern attributes include a set of BP attributes, which can be contributed to the BPD and facilitate the search. It is used to denote the special BP attributes for enhancing the search. It is also used to give indication to build new BPDs if it combined with other patterns. *Pattern attributes* can be found in four articles: Niwe and Stirna (2009), Persson et al. (2008), Niwe and Stirna, (2010) and Dani et al. (2006). For example, Niwe and Stirna, (2010) suggest that *problem*, *solution* and *context* are common attributes of a pattern. In the BP Document Template, the pattern attributes *problem*, *solution* and *context* can be described by using this attribute. The attribute pattern attributes is optional to use. In fact, its content is captured through other attributes - Problem is covered by Goal, Solution by Activities, and Context by many of the other attributes in the template. However, it was decided to still include Pattern attributes, as some BPs in an organization may already be documented as patterns, and it then becomes easy to reuse existing headings as components of Pattern attributes. Furthermore, pattern attributes is useful for linking the BP

Document Template with the BP Annotation Template as it summarizes and captures three essential attributes that can be helpful in retrieval and search for BP documents.

4. *Revision Information* refers to information about all previous versions of the BPD. This attribute can be identified in nine articles, including Zhu et al. (2007), Asoh et al. (2002) and Zairi and Ahmed (1999).

5. *Author Contact Information* refers to information about the authors of the BPD, including, name, address and e-mail. This attribute was found in ten articles, including Dinur et al. (2009), O'Dell and Grayson (1998) and Done et al. (2011). The lack of this attribute is one of the barriers for the successful transfer of BPs, as reported by O'Dell and Grayson (1998).

6. *Reviews Information* refers to information about reviews of the BPD with URLs or other pointers (Alwazae et al. 2014).

7. *Goal* refers to the intended effect of applying the BP (Alwazae et al. 2014).

8. *Means* refers to the means that are needed for applying the BP, including people and technology (Alwazae et al. 2014).

9. *Skills* refers to the skills and competence required of the end-user for applying the BP (Alwazae et al. 2014).

10. *Costs* refers to an estimation of the costs for applying the BP (Alwazae et al. 2014).

11. *Barriers* refers to obstacles or problems that may occur before, during, and after the application of the BP (Alwazae et al. 2014).

12. *Barriers Management* refers to procedures to follow if certain obstacles or problems are encountered (Alwazae et al. 2014).

13. *Community of Practice* (CoP) refers to a CoP that may be interested in using the BP. A CoP is a group of people who share a concern or a passion for something they do and learn how to do it better, and who may, therefore, use the BP. The attribute was found in seven articles, such as Shull and Turner (2005), Fragidis and Tarabanis (2006) and Olfman et al. (2003). The focus here is to identify or develop and build a CoP to encourage the sharing of BPs. Fragidis and Tarabanis, (2006) stated that "*Communities of Practice (CoPs) can play a very significant role in the dissemination and sharing of best practice knowledge*".

14. *Champion* refers to the need and role of a champion for the BP. A champion is an individual or role that facilitates and supports the success of the BP. The empirical evidence revealed that *champion* can be found in seven articles, including Smith et al. (2010), Beaumont (2005) and Asrofah et al. (2010). For instance, Persson et al. (2008) stated "*the KM champion should not only orally support KM but also be active in knowledge sharing, for example, be visible in statistics about visits to the knowledge base, about knowledge objects read, commented, created; and participate in person in KM related events".*

15. *Owner* refers to an individual, role, unit or organization that owns the BP or is responsible for it. *Owner* was found in six articles, such as Szulanski (1996), Timbrell et al. (2001) and Jarrar and Zairi (2000). Olfman et al. (2003) stated "*Best practice mechanisms included ownership completely in the hands of the business units, or controlled by them.".*

16. *Training* refers to the degree to which a person has to be trained in order to use the BP. The open coding revealed that *training* can be found in six articles, including Burke and Hutchins (2008), Olfman et al. (2003) and Dani et al. (2006). It refers to the training of employees to support the successful implementation of BPs. Burke and Hutchins (2008) argued that "*Unfortunately, best practice reports in training, or specifically for the transfer of training, are limited, lacking in practicality, dated, or often anecdotal in nature".*

17. *Acceptability* refers to the degree of acceptance by domain experts - in general and/or in the organization - for resolving the problem addressed by the BP. *Acceptability* can be found in thirteen articles, which include Zandi and Tavana (2011), Shull and Turner (2005) and Done et al. (2011). It refers to employees' acceptance and understanding of the application of BPs. Szulanski (1996) stated "*The reluctance of some recipients to accept knowledge from the outside (the 'not invented here' or NIH syndrome) is well documented (e.g., Hayes and Clark, 1985; Katz and Allen, 1982). Lack of motivation may result in foot dragging, passivity, feigned acceptance, hidden sabotage, or outright rejection in the implementation and use of new knowledge (cf. Zaltman, Duncan, and Holbek, 1973)*.".

18. *Usability* refers to the degree to which a BP is easy to use. The data revealed that *usability* occurred in fifteen articles, such as Axelsson et al. (2011), Mansar and Reijers (2007). Persson et al. (2008) "*One important aspect in the enhancement of the approach was to develop method support for capturing specialist knowledge to be incorporated in a shared knowledge repository. Another important aspect was to develop a way of structuring knowledge that makes it perceived to be easy to use by its intended users*".

19. *Comprehensiveness* refers to the degree to which the BP offers a comprehensive and complete view of the problem and solution under consideration. The empirical evidence showed that this attribute can be found in thirteen articles, including Xu and Yeh (2010), Dana and Smyrnios (2010), and Niwe and Stirna (2009). Dana and Smyrnios, (2010) stated that "*Leaving individual family businesses to deal with the challenge of filtering and unpacking best practice without more comprehensive and detailed selection and implementation guidance is unlikely to be sufficient either to increase the take up rate of the practices, or the effectiveness of implementation* ".

20. *Relevance* refers to the degree to which the problem addressed by the BP is experienced as significant by practitioners. The empirical data indicated that *relevance* can be found in thirteen articles, including Zairi and Ahmed (1999), Zhu et al. (2007) and Asrofah et al. (2010). It is used to show how the BPD meets the expectation of practitioners. Persson et al. (2008) stated "*One of the problems with knowledge repositories in general is that their use decreases over time, often because their content becomes out of date and less relevant for its users. A common reason for this is that processes and responsibilities for continuously updating the content do not work in the organization*.".

21. *Justification* refers to the degree to which evidence exists that shows that the BP solves the problem. *Justification* can be found in eleven articles, such as Dana and Smyrnios (2010), O'Dell and Grayson (1998) and Szulanski (1996). For instance, Dana and Smyrnios (2010) used this attribute to examine the BP regarding "*What criteria do individual practices, or bundle of practices, have to meet to justify their characterization as best practices? What verifiable empirical evidence is there of their effectiveness?"*

22. *Prescriptiveness* refers *to* the degree to which a BP offers a concrete proposal for solving a problem. This attribute occurred in four articles, including Barclay and Osei-Bryson (2010) and Shull and Turner (2005). For instance, Niwe and Stirna, (2009) explained that this attribute "*clearly describes the solution to the problem addressed and lays out the individual elements of the solution and the steps for their implementation".*

23. *Coherence* refers to the degree to which a BP constitutes a coherent unit, i.e., all parts are clearly related. It can be found in nine articles, including Persson et al. (2008), Davies and Kochhar (2002) and Dana and Smyrnios (2010). For instance, Dana and Smyrnios (2010) examined BPD by asking whether "*individual practices can be implemented effectively in isolation or is it important that they be combined into coherent and integrated bundles of practices for effectiveness?"*

24. *Consistency* refers to the degree to which a BP is consistent with existing knowledge and the vocabulary used in the target industry sector or knowledge domain. The empirical evidence revealed that *consistency* can be found in eleven articles, such as Smith et al. (2010), Done et al. (2011) and Barclay and Osei-Bryson (2010). A BPD must be consistent with the workplace culture and vocabulary in order to achieve success in its application (Davies and Kochhar, 2002; Asrofah et al. 2010).

25. *Granularity* refers to the degree to which the BPD is appropriately detailed, i.e., includes appropriate details to address the problem. The empirical data revealed that *granularity* can be found in eight articles, including Motahari-Nezhad et al. (2010), Mansar and Reijers (2007) and Graupner et al. (2009). Niwe and Stirna (2009) explained this attribute as "*Granularity: The pattern provides a solution with a level of detail reflecting the level of abstraction of the problem addressed*".

26. *Adaptability* refers to the degree to which a BP can be easily modified and adapted to other situations. The open coding revealed that *adaptability* can be found in seventeen articles, including Chourides et al. (2003), Fragidis and Tarabanis (2006), Smith et al. (2010) and Dani et al. (2006). Dana and Smyrnios, (2010) reported that "*As a result, these researchers suggested that best practice guides ought to accompany lists of best practices and provide potential adopters with information on how particular best practices, or combination of practices, really work and how they can be adapted to particular organizations.".*

27. *Activity* refers to a task to be carried out in the BP. It can be found in eight articles, including Persson et al. (2008), Zairi and Ahmed (1999) and Beaumont (2005). Graupner et al. (2009) stated that "*Motivated by the goal of bridging the gap between the high level abstractions available in best practice processes, deriving actionable tasks and activities that can be automated, and retaining the flexibility of ad-hoc interactions among people while improving repeatability".*

28. *Integration* refers to the degree to which a BP is integrated with other BPs and KM components. The empirical evidence showed that *integration* can be found in nine articles, such as Dinur et al. (2009), Asoh et al. (2002) and Olfman et al. (2003). Asoh et al. (2002) argued that "'*Best practices are a good starting point, but organizations should be conscious of the pitfalls of using them. These practices should not be used in isolation. They should be integrated with other endeavors*".

29. *Demonstration of Success* refers to a case in which a BP has been successfully demonstrated. The empirical data revealed that this attribute can be found in six articles, including Persson et al. (2008), Jarrar and Zairi (2000) and O'Dell and Grayson (1998). Dani et al. (2006) explained that "*As economy grows, transfer and reuse of*

the best practices will enable growth without adding undue costs. No matter the industry, reusing successfully demonstrated practices can lead to shorter cycle times, faster ramp- up, higher customer satisfaction, better decisions".

30. *Installation Time* refers to the time it takes to introduce and implement a BP in an organization. The open coding revealed that *installation time* can be found in nine articles, including Zandi and Tavana (2011), Asrofah et al. (2010) and Burke and Hutchins (2008). Davies and Kochhar (2002) argued that "*Most of the studies carried out in the area of best practice do not take account of the extent of implementation of practices or the time it takes for practices to begin to impact performance. Practices may take a considerable amount of time before they are fully implemented and for the benefits to be realized".*

31. *Application Time* refers to the time it takes to apply a BP in an organization. It occurred in nine articles, such as Davies and Kochhar (2002), Done et al. (2011) and Dinur et al. (2009). Mansar and Reijers (2007) argued that "*a qualitative evaluation can be undertaken to assess the best practices against their impact on time, flexibility, quality and cost issues. It illustrates that, for example, it is sometimes impossible to reduce a process's duration (time) without increasing the process's operational cost of execution. Similarly, improving a process's quality may result in the loss of flexibility to deal with exceptions*.".

32. *Experiences and Feedback* refers to users' opinions, advice and experiences of the BP. The majority of the articles (i.e., eighteen articles) indicated this attribute, including in Niwe and Stirna (2010), Axelsson et al. (2011) and Zhu et al. (2007). Asoh et al. (2002) argued that "*The underlying argument is that yesterday's core capabilities embedded in today's best practices could become tomorrow's core rigidities. Therefore, there is a need for ongoing reassessment. In order to properly and continuously reassess these best practices, [42] suggests the use of a number of core processes such as programming and deprogramming; reinforcement and exploration; learning and unlearning; and construction and deconstruction. These processes ensure that a real time "feedback-and-feedforward" loop of activities is set up within the organization. This will enable the organization to constantly scan the environment for emerging patterns that suggest the emergence of something new before implementation of "Best Practices"."*

33. *Measurement* refers to indicators for measuring the quality and performance of a BP. The data analysis showed that *measurement* can be found in fourteen articles, including Xu and Yeh (2010), Chourides et al. (2003) and Done et al. (2011). Dana and Smyrnios, (2010) examined this attribute by asking "*How is the effect of those practices to be measured and assessed for ongoing evaluation and control purposes? Is it possible or feasible to measure performance improvement or deterioration (in terms of success and longevity) as a result of the implementation of certain practices?"*

Table 12 shows the number of times an attribute occurs in the collected literature and Appendix V showed the corresponding literature for each attribute.

Attributes	Occurrence in literature
Pattern Attributes	4
Author Contact Information	10
Revision Information	9
Community of Practice	7
Champion	7
Owner	6
Training Needs	6

Usability	15
Acceptability	13
Comprehensiveness	13
Relevance	13
Justification	11
Prescriptiveness	4
Coherence	9
Consistency	11
Granularity	8
Adaptability	17
Activity	8
Sequence of Activities	3
Integration	9
Demonstration of Success	6
Installation Time	9
Application Time	9
Experiences and Feedback	18
Measurement	14

Table 12. Showing the number of times an attribute occurs in literature

The BP Document Template is shown in Table 13.

Component	Attribute	Description
Summary of BP	**1.** Title	An identifying name for the BPD
	2. Summary	A short description of the contents of the BPD
BP Representation	**3.** Pattern Attributes	Contains attributes often used in pattern descriptions, such as problem, solution and context
	4. Author Contact Information	Information about the authors of the BPD, including, name, address and e-mail
	5. Revision Information	Information about all previous versions of the BPD
	6. Reviews Information	Information about reviews of the BPD with URLs or other pointers
Requirements for Applying BP	**7.** Goal	The intended effect of applying the BP
	8. Means	The means that are needed for applying the BP, including people and technology
	9. Skills	The skills and competence required of the end-user for applying the BP
	10. Cost	An estimation of the costs for applying the BP
	11. Barriers	Obstacles or problems that may occur before, during, and after applying the BP
	12. Barrier Management	Procedures to follow if certain obstacles or problems are encountered
BP Actor	**13.** Community of Practice	CoP that may be interested in using the BP
	14. Champion	The need and role of a champion for the BP
	15. Owner	The BP owner or responsible who might be an individual, role, department or organization
	16. Training Needs	The degree to which a person has to be trained in order to use the BP
	17. Acceptability	The degree of BP acceptance by domain experts - in general and/or in the organization - for re-

		solving the problem addressed by the BP
BP Properties	**18.** Usability	The degree to which the BP is easy to use
	19. Comprehensiveness	The degree to which the BP offers a comprehensive and complete view of the problem and solution under consideration
	20. Relevance	The degree to which the problem addressed by the BP is experienced as significant by practitioners
	21. Justification	The degree to which evidence shows that the BP solves the problem
	22. Prescriptiveness	The degree to which the BP offers a concrete proposal for solving the problem
	23. Coherence	The degree to which the BP constitutes a coherent unit, i.e., all parts are clearly related
	24. Consistency	The degree to which the BP is consistent with existing knowledge and vocabulary used in the target industry sector or knowledge domain
	25. Granularity	The degree to which the BPD is appropriately detailed
	26. Adaptability	The degree to which the BP can be easily modified and adapted to other situations
	27. Activity	The tasks to be carried out in the BP
	28. Integration	The degree to which the BP is integrated with other BPs and KM components
BP Implementation	**29.** Demonstration of Success	A case where the BP is successfully demonstrated
	30. Installation Time	The time it takes to introduce and implement the BP in an organization
	31. Application Time	The time it takes to apply the BP in an organization
	32. Experiences and Feedback	Users' opinions, advices and experiences of the BP
	33. Measurement	Indicators for measuring the quality and performance of the BP

Table 13. The final BP Document Template

An application of the BP Document Template is presented in table 14. It is used to further illustrate the applicability and usability of the BP Document Template in an example of BP, which is presented in section 2.2.2.

Attributes	**Description and example**
1. Title	*An identifying name for the BPD* Refining and formulating research questions in bachelor and master theses
2. Summary	*A short description of the contents of the BPD* Guidelines for a supervisor in supporting a student to refine an initial research idea into a feasible, relevant and well formulated research question
3. Pattern Attributes	*Contains attributes often used in pattern descriptions, such as problem, solution, and context* N/A as these attributes are covered elsewhere
4.Author Contact Information	*Information about the authors of the BPD, including, name, address, and e-mail*

	John Doe, 1 Main Street, Springfield, johndoe@uni.edu
5.Revision Information	*Information about all previous versions of the BPD* This version 1.0
6. Reviews Information	*Information about reviews of the BPD with URLs or other pointers* N/A
7. Goal	*The intended effect of applying the BP* The goal is to help the supervisor to support a student in developing a research question that is feasible, relevant and well formulated
8. Means	*The means that are needed for applying the BP, including people and technology* The supervisor and means for communication with a student, possibly computer supported tools
9. Skills	*The skills and competence required of the end-user for applying the BP* Basic knowledge about thesis supervisions and the area of the research question
10. Cost	*An estimation of the costs for applying the BP* Repeated meetings between supervisor and student are required
11. Barriers	*Obstacles or problems that may occur before, during, and after applying the BP* 1. Student and supervisor have different perspectives 2. Student and supervisor have too broad initial ideas 3. The student carries out the work at an external organization that has its own requirements
12.Barrier Management	*Procedures to follow if certain obstacles or problems are encountered* 1. Careful discussions between student and supervisor followed up with clear documentation 2. Check the feasibility of the research question 3. Ask the student to write two documents, one academic thesis and one report for the external organization
13.Community of Practice	*Community of practice that may be interested in using the BP* Supervisors of bachelor and master theses
14. Champion	*The need and role of a champion for the BP* Not needed
15. Owner	*The BP owner or responsible who might be an individual, role, department or organization* Director of studies
16.Training Needs	*The degree to which a person has to be trained in order to use the BP* No special training required
17.Acceptability	*The degree of BP acceptance by domain experts for resolving the problem addressed by the BP* High - the BP only complements the way of working of supervisors
18. Usability	*The degree to which the BP is easy to use* Medium - the advice given by the BP is straight forward but has to be applied in a complex situation, requiring considerable skills of the supervisor
19. Comprehensiveness	*The degree to which the BP offers a comprehensive and complete view of the problem and solution under consideration* High - if well applied, the BP will ensure that the research ques-

	tion is carefully refined since different aspects of the research question are considered, such as scope, conciseness, and resource availability
20. Relevance	*The degree to which the problem addressed by the BP is experienced as significant by practitioners* High - most supervisors would agree that the refinement of an initial idea into an adequate research question is one of the most challenging parts in a thesis project
21. Justification	*The degree to which evidence shows that the BP solves the problem* Medium - several supervisors have applied the BP and report success, but no systematic study has been carried out
22. Prescriptiveness	*The degree to which the BP offers a concrete proposal for solving the problem* High - the advice given by the BP is clearly action oriented
23. Coherence	*The degree to which the BP constitutes a coherent unit, i.e., all parts are clearly related* Low - the different aspects considered are not clearly related, in particular how they impact each other
24. Consistency	*The degree to which the BP is consistent with existing knowledge and vocabulary used in the target industry sector or knowledge domain* High - the BP is formulated using well-known terminology for research methodology, though the terminology in the area is not universal
25. Granularity	*The degree to which the BPD is appropriately detailed* Medium - there are several concrete advices but these are not discussed in detail and they are not adapted to fit a certain situation
26. Adaptability	*The degree to which the BP can be easily modified and adapted to other situations* Medium - some of the tasks of the BP can be used in all situations when a question is needed as part of a problem or a goal formulation
27. Activity	*The tasks to be carried out in the BP* • Discuss with the student to ensure the initial idea is not too broad. If it is, then suggest different ways on how to narrow it down. Make sure that the research question can be answered given available resources. If not, try to narrow down the question. • Make sure the research question is formulated as concisely as possible. Encourage the student to reduce the length of the question. Suggest different reformulations and ask if they would still capture the original idea. • Make sure the research question is of general interest and well justified. Ask the student if the results of the planned study would be of interest to other people and organizations, e.g. competitors. Ask the student what people would be interested in an answer to the research question and how they could benefit from it. • Ensure that the research question is clearly related to the research problem. Ask the student if an answer to the research question would solve the entire research problem or parts of it. Ask the student to discuss possible answers to the research problem.

	• Do not fix the research question too early. Ask the student to suggest at least three different research questions, and discuss these questions and choose one of them.
28. Integration	*The degree to which the BP is integrated with other BPs and KM components.* Medium - the BP are related to other BPs via the thesis process, but the consequences for these other BPs of carrying out or not carrying out the tasks are not specified
29. Demonstration of Success	*A case where the BP is successfully demonstrated* Link to relevant theses
30.Installation Time	*The time it takes to introduce and implement the BP in an organization* Low - the BP can be applied by a supervisor with minimal preparation.
31.Application Time	*The time it takes to apply the BP in an organization* Low - the BP is applied in the ordinary thesis supervision
32.Experiences and Feedback	*Users' opinions, advice and experiences of the BP* Link to user stories
33.Measurement	*Indicators for measuring the quality and performance of the BP* Throughout, time to completion, grade

Table 14. A fictitious example of applying the BP Document Template

5. Evaluation

The evaluation is an important part of the design science method framework. It examines how well an artifact has contributed to address a practical problem and whether it has achieved the defined requirements. This chapter presents the evaluation of the BP Annotation Template and the BP Document Template.

5.1. BP Annotation Template

This section describes the evaluation of the BP Annotation Template, including the research strategy and methods selected, and the evaluation result. The research strategy and method used for the evaluation are summarized in Figure 15.

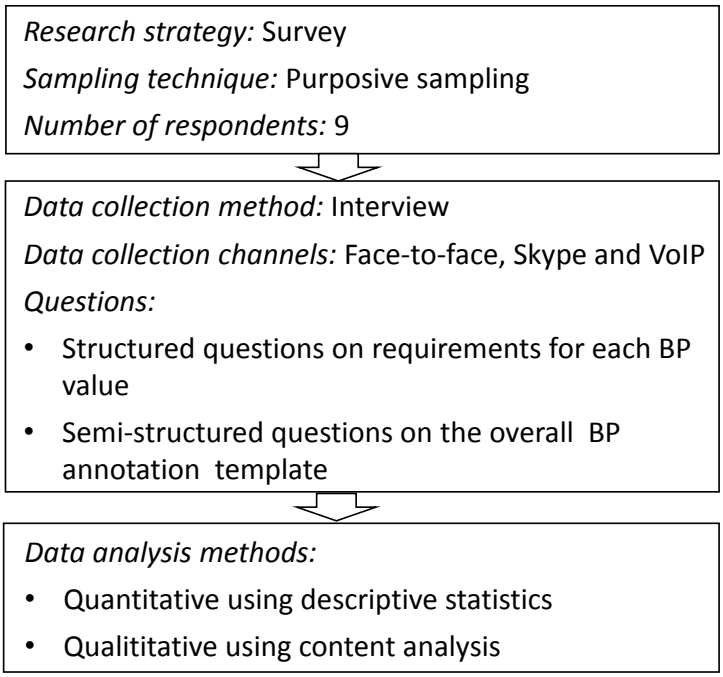

Figure 15. The research strategy and methods applied in the evaluation of the BP Annotation Template

5.1.1. Research Strategy

The research strategy refers to a plan of action designed to achieve the research goal. The research strategy used for evaluating the BP Annotation Template is a survey. The reason for choosing survey as research strategy was to obtain a broad view of the opinions of academics as well as practitioners.

Purposive sampling was applied to select participants in order to receive assessments from respondents with relevant knowledge and experience (Denscombe, 2014). The selected participants were identified via LinkedIn or based on the researcher's contacts.

The respondents selected fulfilled the following conditions.

1. The respondent should be at an organizational level that ensured his/her awareness of the organization's strategies.
2. The respondent should be either an academic expert or a practitioner from business or IT domains and should be interested in KM.
3. The respondent should have at least two years working experience in the same organization with involvement in different projects.

A letter (as shown in Appendix VI) was sent to the potential participants, and included some information about the researcher, goals and problems of the study, a request to conduct an interview and a consent form for participation in the study (as shown in Appendix VII).

In order to identify participants, the researcher subscribed to LinkedIn with a Premium Executive subscription. This allowed him to gain direct access to the respondents and contact them for their agreement to participate in the study. The following LinkedIn groups were chosen for contact their active users: APQC Knowledge Management, Best Practice in IT Management, and KM Practitioners.

Using LinkedIn privileged access allowed the researcher to ensure that a wide cross-section of practitioners of KM practices was included in the sample. By selecting participants who had experience and expertise in KM, the researcher ensured that he received the best quality of information and valuable insights for the BP Annotation Template and allowed him to reach prominent experts for the study worldwide.

The response rate refers to the number of participants who answered the survey, divided by the number of potential participants contacted. The response rate in LinkedIn was low, i.e., 13%, or four respondents out of the 31 contacted experts. This means that the researcher successfully conducted four interviews, after contacting 31 experts.

The researcher also invited six experts and successfully conducted five interviews. The six experts were invited based on earlier personal contact between the researcher and respondents. The response rate for personal contact was 83%, i.e., five respondents out of six contacted experts.

5.1.2. Data Collection

The data collection method selected for collecting the primary data was interviews. An interview can be structured, semi-structured or unstructured. In the study, the interviews with each respondent were both structured and semi-structured. The structured part of the interview was for evaluating the requirement on each BP value, while the semi-structured part was for evaluating the BP Annotation Template in general.

The interviews were carried out in the form of telephone and face-to-face interviews. The researcher conducted five telephone interviews through communication software: Skype for four interviews and VoIP for one interview. This software provided voice calls from computers and/or mobile devices via the Internet to other computers and mobile devices. In addition, the researcher conducted four face-to-face interviews. All interviews were audio recorded. This allowed him to capture the discussions that took place during the interviews and later transcribe all of the interviews.

For each of the interviews, the researcher started by presenting the practical problem that the artifact aimed to address, as well as the goal of the artifact, as shown in Appendix VIII. The researcher then presented the artifact in detail, including a full description of each BP attribute and its allowed values.

Each respondent was asked a number of structured questions about the requirements of the template. Furthermore, the respondents just evaluated the BP Annotation Template based on their previous experience in BPs. The evaluation is a summative evaluation that aims to assess the BP Annotation Template after it has been finally designed and developed. The respondents needed to assess (by using the answers: yes, maybe, no) the following requirements on each structured BP value: easy to annotate, applicable to any BP, and domain independent.

Each respondent was also asked 11 semi-structured questions about the BP Annotation Template. The questions were related to their overall opinion of the BP Annotation Template, and were intended to evaluate their opinions of the benefits and drawbacks, as well as to ask for their suggestions for the addition or removal of some of the BP attributes. Furthermore, the respondents were asked to address questions about whether or not the artifact fulfilled its stated requirements. The interview questions are listed below.

1. What is your overall opinion of the BP Annotation Template?
2. What, in your opinion, are the benefits of the BP Annotation Template? Why?
3. What, in your opinion, are the drawbacks of the BP Annotation Template? Why?
4. What changes of the BP Annotation Template do you suggest? Why?
5. Which BP attributes should be added? Why?
6. Which BP attributes should be removed? Why?
7. Do you think the BP Annotation Template is easy to annotate? Why, or why not?
8. Do you think the BP Annotation Template is applicable to any BP? Why, or why not?
9. Do you think the BP Annotation Template is domain independent? Why, or why not?
10. Do you think the template can facilitate high BP recall? Why? (By recall we mean the fraction of the BP that is relevant to the search and that is successfully retrieved. For example, if there are ten relevant BPs in the knowledge base, and only two out of ten are retrieved during a search, then you have low recall, but if you retrieve nine relevant BP out of ten then you have high recall.
11. Do you think the template can facilitate high BP precision? Why? By precision we mean the fraction of retrieved BPs that are relevant to the search. For example, if all BPs retrieved during a search are relevant, the precision is high, but if many of the retrieved BPs are not relevant, then the precision is low.

    (At the time of the interview, the term “classification system” was used instead of “annotation template”, “BP characteristics” instead of “BP attributes”).

A pilot interview was carried out with a researcher from the Department of Computer and Systems Sciences, Stockholm University before conducting the interviews to determine whether the formulation of the questions was clear.

5.1.3. Data Analysis

The data obtained from the interviews were analyzed quantitatively by means of descriptive statistics, and qualitatively through content analysis.

Quantitative data analysis

In this section, the result of the quantitative data analysis is presented. For each BP attribute and value, the respondents answered the following three questions that correspond to the requirements based on their own experience with BPs.

1. Is it easy to annotate?
2. Is it applicable to any BP?
3. Is it domain independent?

The allowed answers were “Yes”, “Maybe” and “No”. The answers were grouped and aggregated over each BP attribute, and the results are shown in Figures 16 – 21.

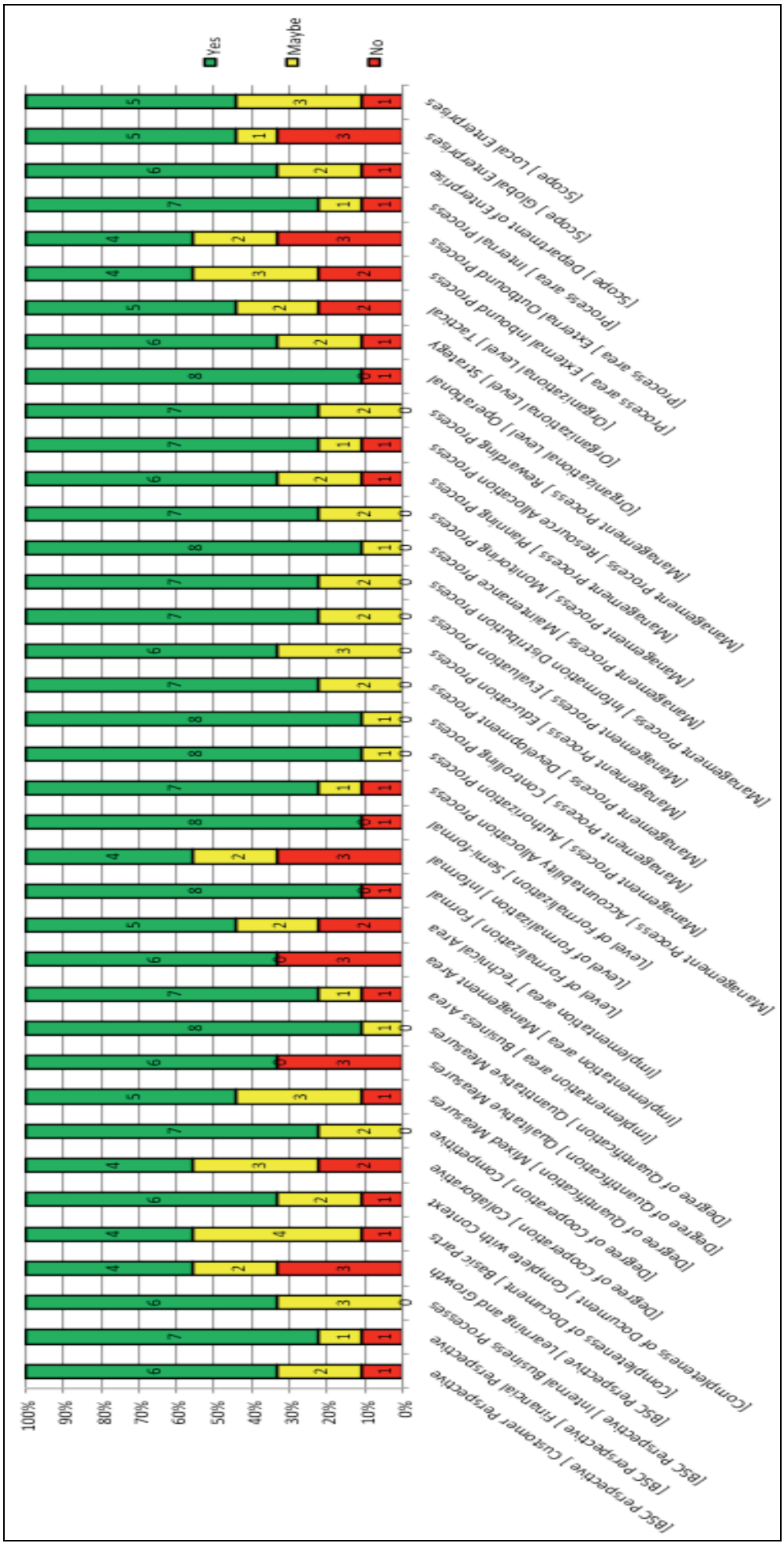

Figure 16. Aggregate of the answers across all of the BP values regarding the easy-to-annotate requirement

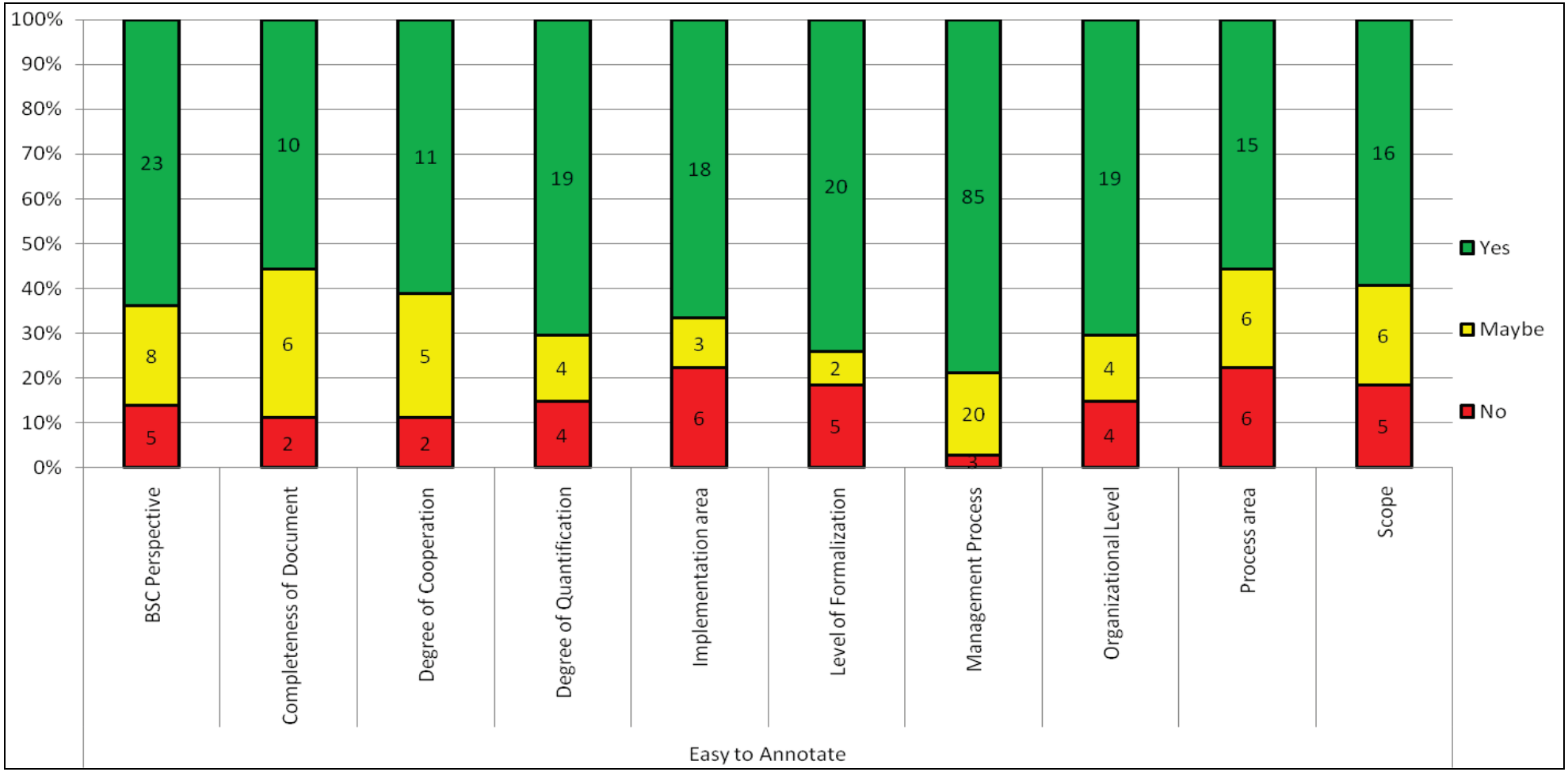

Figure 17. Aggregate of the answers across all BP attributes regarding the easy-to-annotate requirement

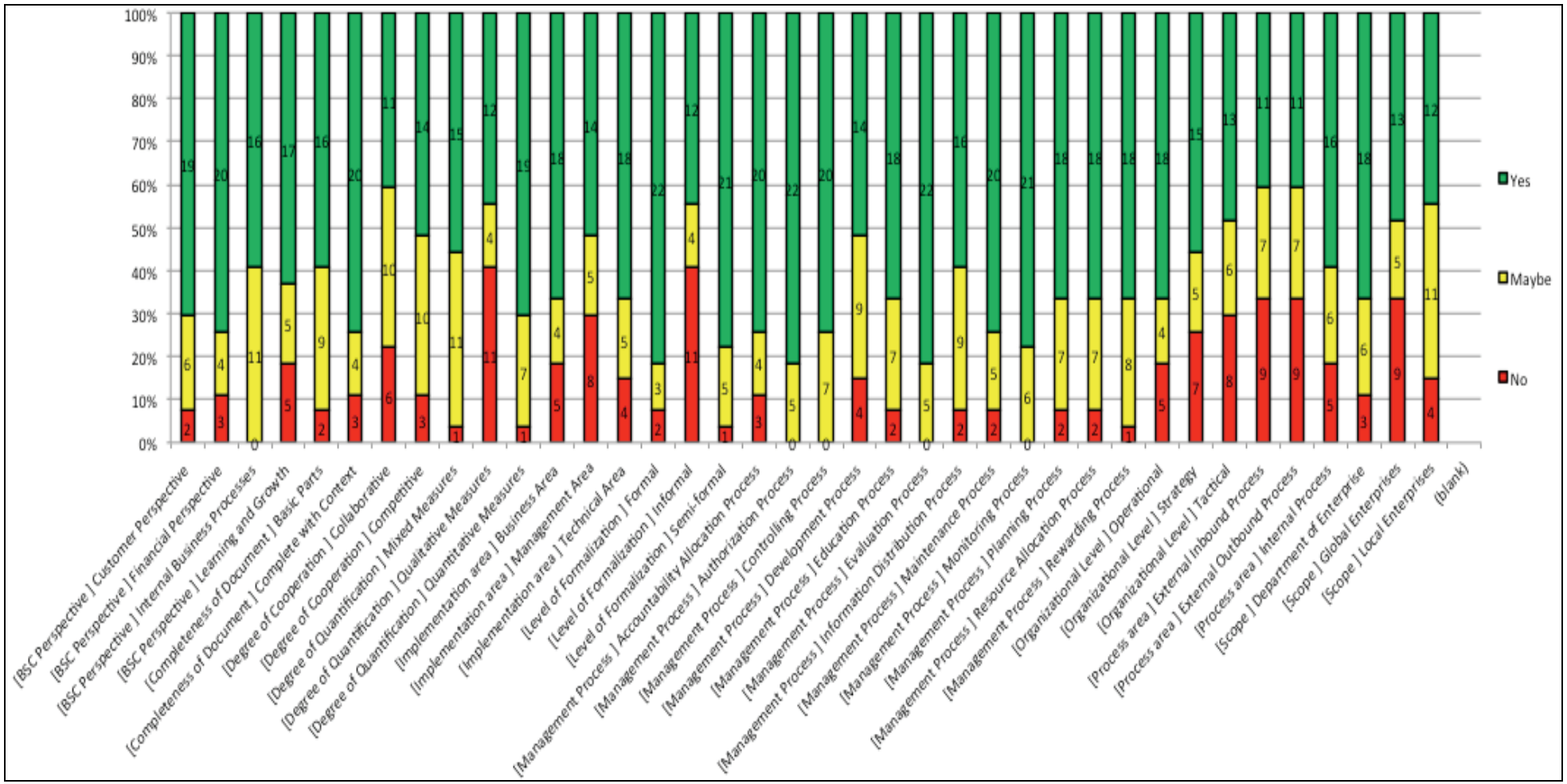

Figure 18. Aggregate of the answers across all of the BP values regarding the 'applicable to any BP' requirement

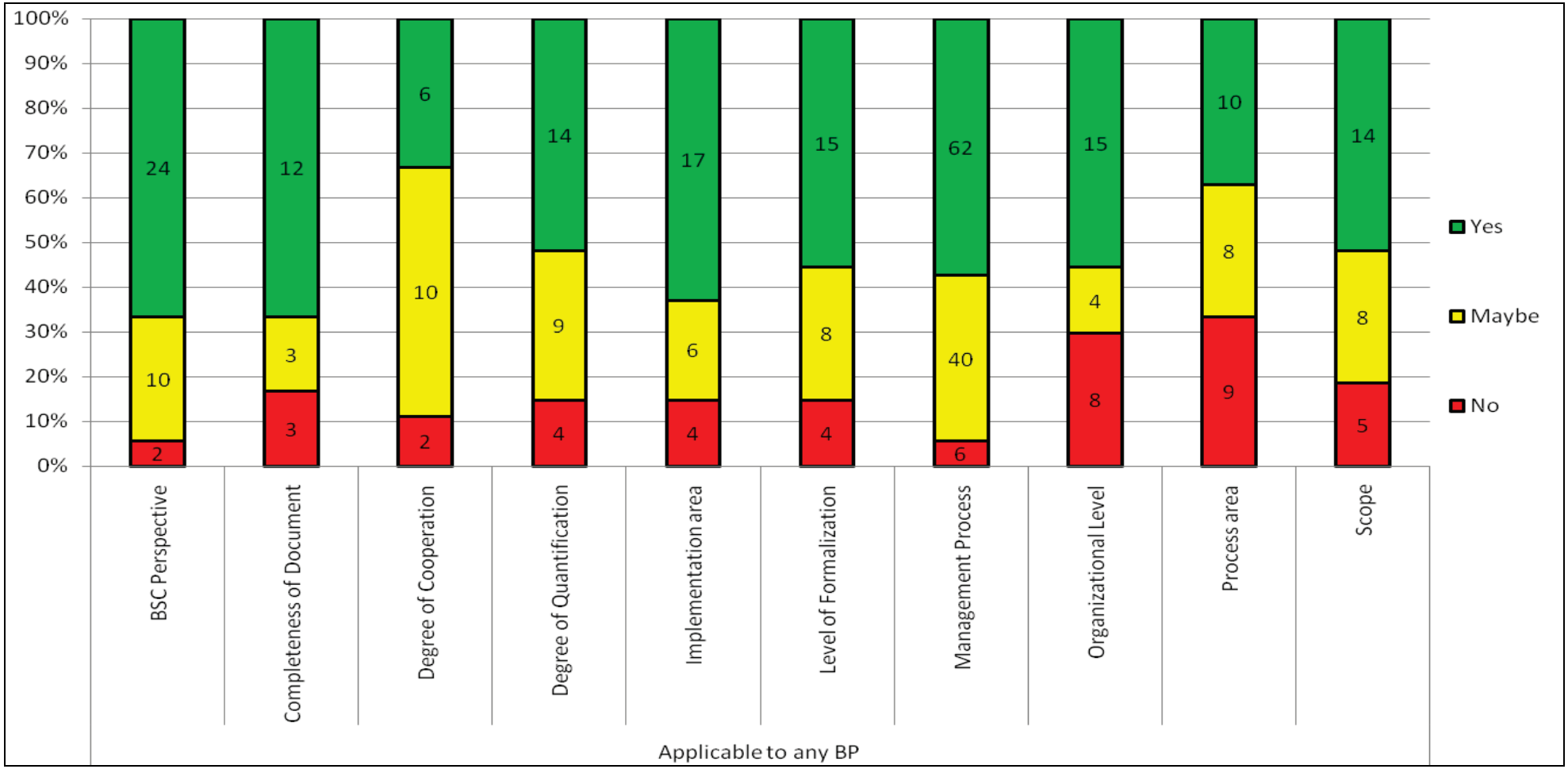

Figure 19. Aggregate of the answers across all BP attributes regarding the 'applicable to any BP requirement'

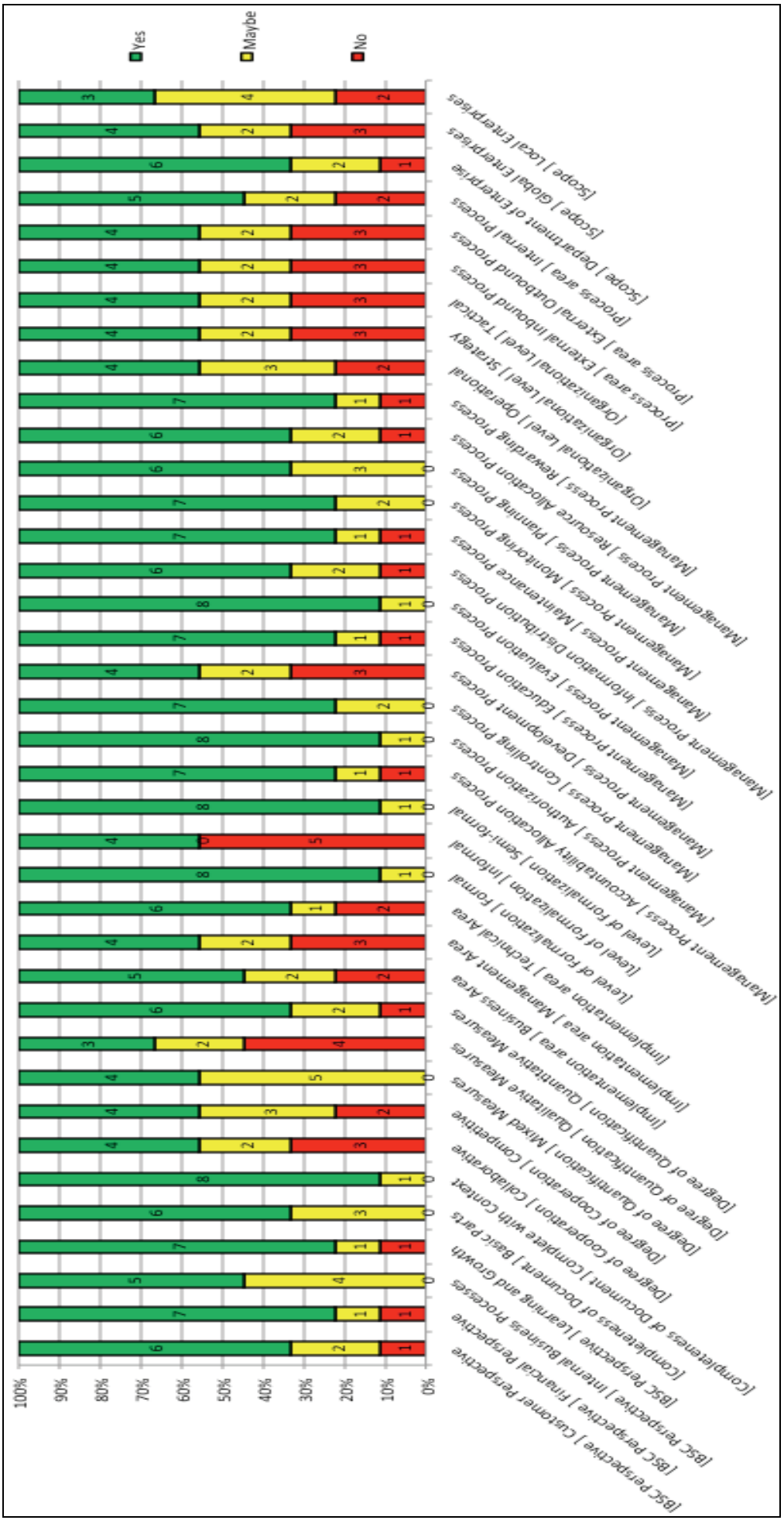

Figure 20. Aggregate of the answers across all of the BP values regarding the 'domain-independent requirement'

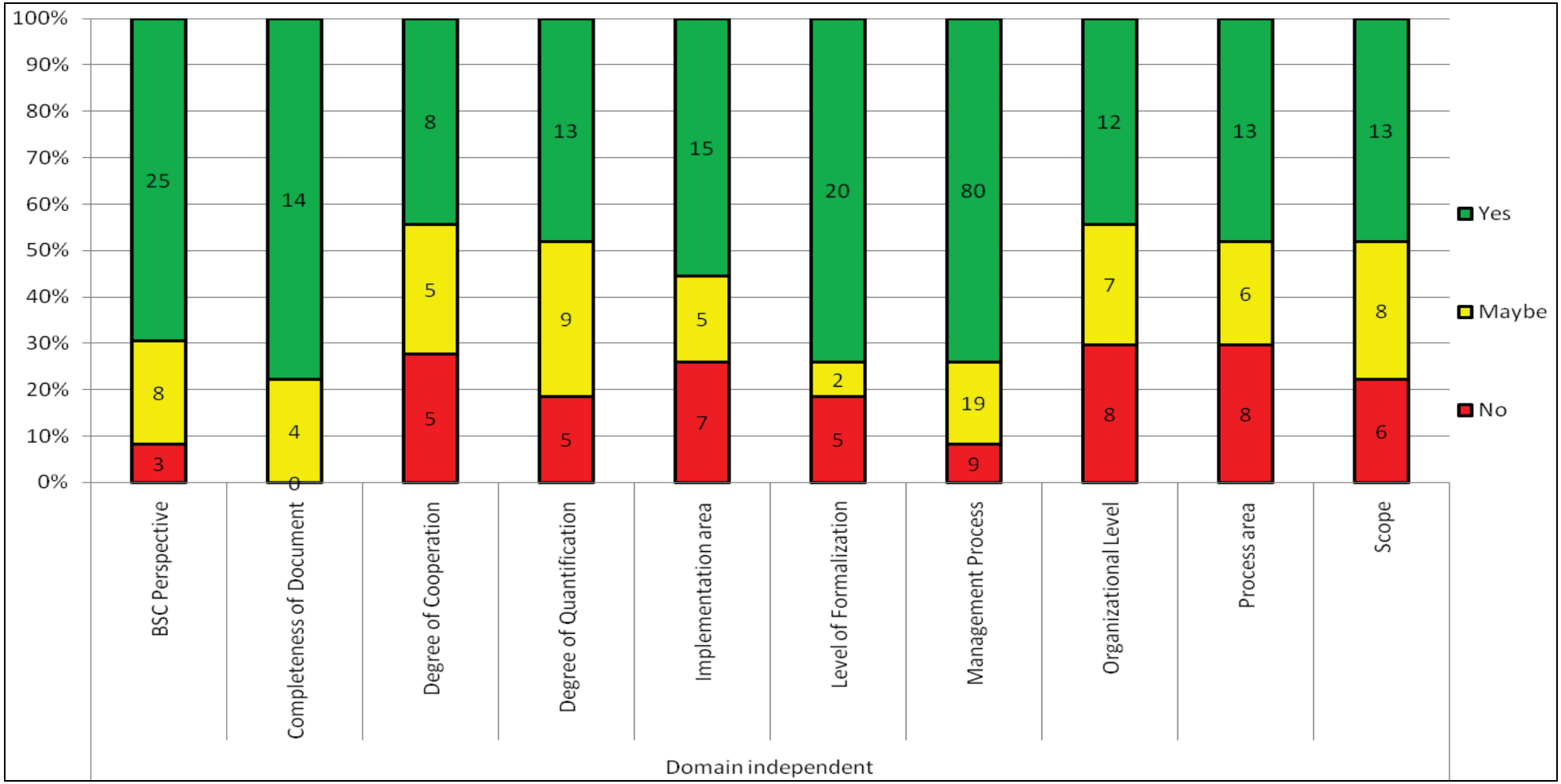

Figure 21. Aggregate of the answers across all BP attributes regarding the 'domain-independent' requirement

The evaluation shows that some BP attributes of the BP Annotation Template are mostly affirmed for all three requirements. These are: "Implementation Area", "Level of Formalization", "Completeness of Document", "BSC perspectives", and "Management Process". For instance, the experts affirmed the usefulness of having BSC perspectives and one expert (i.e., respondent 7) stated that "*many organizations now use two additional supplemental sections to make the BSC a sextant, not a quadrant: that is, ethics perspective and diversity perspectives."* However, the attribute "Process Area" was the lowest affirmed attribute for all three requirements.

Qualitative data analysis

To conduct the content analysis, the researchers followed the steps suggested by Denscombe (2014). These steps are to choose an appropriate text, break the text down into smaller units, develop relevant categories for analyzing the data, code the units in line with the categories, count the frequency with which these units occur, and analyze the text. Therefore, the transcribed interview texts have been coded, the code frequency computed, and the text analyzed.

The result of the qualitative data analysis is presented below, including the benefits and drawbacks of the BP Annotation Template, as well as the requirements for the BP Annotation Template (i.e., easy-to-annotate, applicable to any BP, domain-independent and high BP recall and precision).

Benefits of the BP Annotation Template

Benefit	**Description**	**Number of responses**	**Examples of citations**
Strong Foundation	The artifact represents a good foundation for classifying and annotating BPs	5	R3: "*I think it gives a good foundation for classifying BPs. This is my general comment*". R8: "*I think these values are really good. I think your way of organizing them is very good. First characteristics, then values. I like them and I feel familiar with it".*
Complete coverage	The artifact offers complete coverage of a BP as it includes all of the relevant aspects	6	R2: "*You should add nothing. You have all categories that are relevant".* R8: "*One of the most superior classification system I have had the opportunity to review. The taxonomy is bifurcated or trifurcated and it is broken down into numerous categories*".
Organized KM	The artifact helps the organization to maintain organized core knowledge represented in BPs	3	R1: "*It helps organization to maintain and organize their BPs, lead to success and facilitate people work so they can work with each others and understand each others ".*
Improved learning and growth	The artifact stresses the importance of values like learning and growth, and educational processes	4	R2: "*First, I really like that you stress the importance of employees, values like learning and growth, education process. This is highlighted and definitely will benefit for organizations".*

			R4: *"It can facilitate peoples' work by means of learning, so your employees can cooperate and understand each other".*
Improved structure of BP descriptions	The artifact helps an organization to structure the descriptions of its BPs rather than using employees own description and keywords	6	R3: "*The benefits are that you have this list and you have values that you select from them. You really have listed the option for a classification system rather than you put everything yourself".* R6: *"This is the benefit of a classification system that you have something to put on rather than counting on your descriptions and keywords".*

Table 15. Benefits of the BP Annotation Template

Drawbacks of the BP Annotation Template

Drawback	Description	Number of response	Example of citations
Complexity	The artifact is complex and time-consuming to use	5	R5: "*Complex and requires time to annotation. It takes the time of employees".* R9: "*I don't have so many drawbacks. Perhaps, it is a bit hard to fill out these criteria. But there are the same issues with each quality system; if you want a good quality system, you have to work more*".
Human dependence	The results of using the artifact depend heavily on the competence and commitment of humans	1	R2: "*The human factors are your weakest link. You can put rules but maybe many will not follow the rules and those will be troublesome for the organization*".

Table 16. Drawbacks of the BP Annotation Template

Suggested changes to the BP Annotation Template

Change	Number of response	Example of citations
Add educational model as an attribute	2	R7: "*an education model will definitely will be required to the target audience*".
Add lifecycle management facets as an attribute	1	R9: *"perhaps we could add a facet around lifecycle management because I did not find any. /.../ Perhaps something around if the BP is new, is always proven, updated. Life cycle as facets and have some values like written, verified, applied, updated recently and out dated, very efficient*".
Add another top level above the attributes	1	R3: "*You have ten top levels so it will be better if you have another three top levels. Missing structure is the drawback*".
Remove "degree of cooperation" as an attribute	3	R1: "*I suggest deleting degree of cooperation because it is broader".* R5: *"Completeness of document and degree of cooperation can be removed from the system".*
Remove "completeness of document"	2	R2: "*Remove completeness of document and degree of cooperation*".

Table 17. Suggested changes to the BP Annotation Template

5.1.4. Limitations

The response rate was low in this study, 13%. The researchers invited 31 people to participate in this study, but only nine of them accepted. The sample for evaluation was small, and therefore it could only lead to tentative conclusions. Increasing the sample of evaluation would give more strength and value to the study. However, the sampling is purposive and the researchers conducted interviews with experts in the field of the study. There are six participants who are academic experts and only three from the industry. This resulted in limited evaluation regarding the needs of industry. Additional experts from industry might contribute to more significant results for the study.

Another limitation is that some of the terms like easy to annotate could be interpreted in different ways. However, during the interview the interviewer defined the terms for the respondents by providing orally definitions of those requirements (see section 3.2 for the definitions).

5.2. BP Document Template Evaluation

This section discusses the methods used to evaluate the BP Document Template, including the research strategy and methods selected, and the evaluation result. The research strategy and method used for the evaluation are summarized in Figure 22.

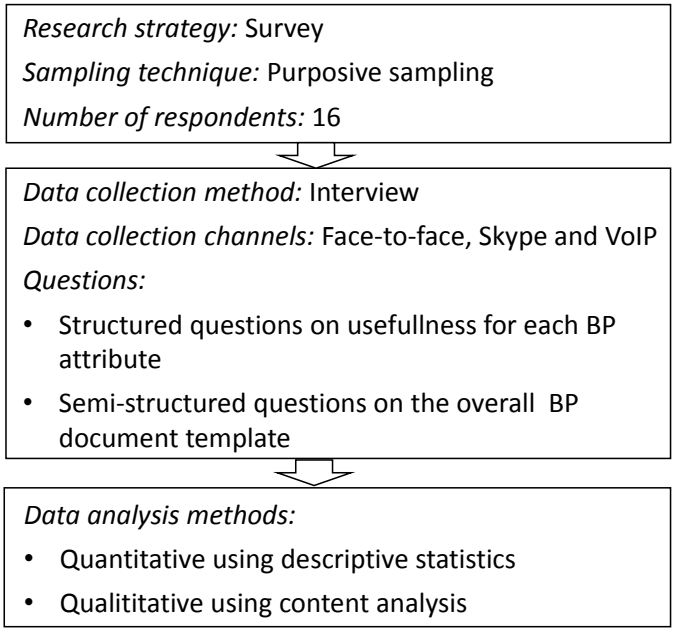

Figure 22. The research strategy and methods applied in the evaluation of the BP Document Template

5.2.1. Research Strategy

The research strategy for the BP Document Template is a survey. The reason for choosing survey as the research strategy was to obtain a broad view of the opinions of academics as well as practitioners.

Purposive sampling was applied to select participants in order to receive assessments from respondents with relevant knowledge and experience (Denscombe, 2014).

The respondents selected fulfilled the following conditions.

1. The respondent should be at an organizational level that ensured his/her awareness of organization's strategies.
2. The respondent should be either from business or IT domains and should be interested in KM.
3. The respondent should have at least two years working experience in the same organization with involvement in different projects.

A letter (as shown in appendix IX) was sent to potential participants, including information about the researcher, the goals and problems of the study, a request to conduct an interview and a consent form for participation in the study (as shown in Appendix X).

In order to identify participants, the researcher subscribed to LinkedIn with a Premium Executive subscription. This allowed him to gain direct access to the respondents and contact them for their acceptance to participate in the study. The following LinkedIn groups were chosen and contact was made with active users: APQC Knowledge Management, Best Practice in IT Management, Supply Chain Consortium Benchmarking and Best Practices, Information & Knowledge Management Executive Network, KM Practitioners, Knowledge Man-

agement, and The Brain Trust: Knowledge Management. Using LinkedIn privileged access allowed the researcher to ensure that a wide cross-section of practitioners of KM practices was included in the sample. By selecting participants who had experience and expertise in KM, the researcher ensured that he received the best quality of information and valuable insights on the annotation template. It allowed him to reach important experts.

The researcher contacted and invited 103 experts to participate in the study by sending them a letter to their inbox in LinkedIn and successfully conducted 16 interviews. The response rate was low, (15%, or 16 respondents out of 103). The respondents were from all over the world and from both public and private organizations.

5.2.2. Data Collection

The data collection method used to collect the primary data was in-depth interviews. An interview can be structured, semi-structured or unstructured. In the study, the interviews with each respondent was both structured and semi-structured. The structured part of the interview was for evaluating the requirement on each BP attribute and value, while the semi-structured part was to evaluate the BP Document Template in general.

The interviews were carried out in the form of telephone and face-to-face interviews. The researcher conducted 15 telephone interviews through communication software: nine with Skype and six with VoIP. In addition, he conducted one face-to-face interview in Stockholm. This allowed the researcher to interview participants across the world and not limit the study to one geographical location.

Only one participant refused to allow audio recording, while 15 interviews were audio recorded. The voice communication during the interviews and discussions were thus, captured. The researcher transcribed all 15 interviews and relied on field notes that were written during the unrecorded interview.

For each of the interviews, the researcher started by presenting the practical problem that the artifact aimed to address, as well as the goal of the artifact (as shown in Appendix XI). He then presented the artifact in detail, including a full description of each attribute. The interview included structured as well as semi-structured questions.

Each respondent was asked a number of structured questions about the BP attributes of the BP Document Template. The respondents just evaluated the BP Document Template based on their previous experience in BPs since they have been practically contacted based on their previous experience in BP documentations. The evaluation is a summative evaluation that aims to assess the BP Document Template after it has been finally designed and developed. The respondents needed to assess and comment about the usefulness of the BP Document Template for high quality descriptions of BP, using a value between 1 and 5, where 1 = Not useful and 5 = Very useful.

Each respondent was also asked nine semi-structured questions about the BP Document Template. The questions were related to their overall opinion of the template, they were asked for their opinions on benefits and drawbacks, as well for their suggestions for addition or removal of some of the BP attributes. Furthermore, the respondents were asked questions about whether or not the artifact fulfills its stated requirements.

The interview questions are listed below.

1. What is your overall opinion of the BPD template?
2. Which are, in your opinion, the benefits of the BPD template? Why?
3. Which are, in your opinion, the drawbacks of the BPD template? Why?
4. Which changes of the BPD template do you suggest? Why?

5. Which attributes should be added? Why?
6. Which attributes should be omitted? Why?
7. Which changes of the components do you suggest? Why?
8. Do you think the BPD template is easy to use? Why, or why not?
9. Do you think the BPD template can be used for both design of BP and evaluation of BP? Why, or why not?

(At the time of the interview, the term "guideline" and "element" was used instead of "attribute", and "category" instead of "component".)

A pilot interview was carried out with a researcher from the Department of Computer and Systems Sciences, Stockholm University before conducting any interviews in order to determine whether the formulation of the questions was clear.

5.2.3. Data Analysis

The data obtained from the interviews were analyzed quantitatively by means of descriptive statistics and qualitatively through content analysis. The researchers followed the steps suggested by Denscombe (2014) to conduct content analysis. These steps are: choose an appropriate text, break the text down into smaller units, develop relevant categories for analyzing the data, code the units in line with the categories, count the frequency with which these units occur, and analyze the text. Therefore, the transcribed interview texts have been coded, the frequency of occurrence counted and the data analyzed.

Quantitative data analysis

In this section, the result of the quantitative data analysis is presented. The 16 respondents assessed the requirements for each BP attribute. Their assessment addresses the usefulness of each attribute for high quality BPDs, using a value between 1 and 5, where 1 = Not useful and 5 = Very useful. Table 18 and Figure 23 show the result of the assessment.

Attribute number	Attribute name	Total assessment	Average	Median	Max	Min
1	Title	76	4.7	5	5	1
2	Summary	75	4.7	5	5	4
3	Pattern Attributes	64	4	4.5	5	1
4	Revision Information	59	3.7	4	5	1
5	Author Contact Information	66	4.2	5	5	2
6	Reviews Information	59	3.7	4	5	1
7	Goal	70	4.4	5	5	2
8	Means	66	4.1	4.5	5	2
9	Skills	62	3.9	4	5	2
10	Costs	50	3.1	3	5	1
11	Barriers	69	4.3	5	5	2
12	Barrier Management	69	4.3	4	5	3
13	Community of Practice	65	4.1	4.5	5	2
14	Champion	65	4.1	4	5	2
15	Owner	70	4.4	5	5	2
16	Training Needs	61	3.8	4	5	2
17	Acceptability	57	3.6	3.5	5	2
18	Usability	56	3.5	4	5	1
19	Comprehensiveness	59	3.7	4	5	2
20	Relevance	57	3.6	3.5	5	1
21	Justification	72	4.5	5	5	3

22	Prescriptiveness	61	3.8	4	5	1
23	Coherence	56	3.5	3.5	5	2
24	Consistency	64	4	5	5	2
25	Granularity	54	3.4	4	5	1
26	Adaptability	61	3.8	4	5	1
27	Activity	74	4.6	5	5	3
28	Integration	67	4.2	4	5	2
29	Demonstration of Success	66	4.1	4.5	5	2
30	Installation Time	60	3.7	4	5	1
31	Application Time	60	3.7	4	5	1
32	Experiences and Feedback	67	4.2	5	5	1
33	Measurement	71	4.4	5	5	1

Table 18. Assessment result for each BP attribute of the qualitative analysis

The assessment in Figure 23 shows that the BP attributes that were assessed by the experts as the lowest were *costs*, *granularity*, *usability*, *coherence*, *acceptability and relevance.*

The assessment also showed that the BP Document Template has useful attributes for the design of BPs with high quality descriptions. Some of the attributes received a high assessment from the experts and these are *title*, *summary*, *activity*, *justification*, *measurement*, *owner*, *goal*, *barriers*, *barrier management*, *integration*, and *experiences and feedback*.

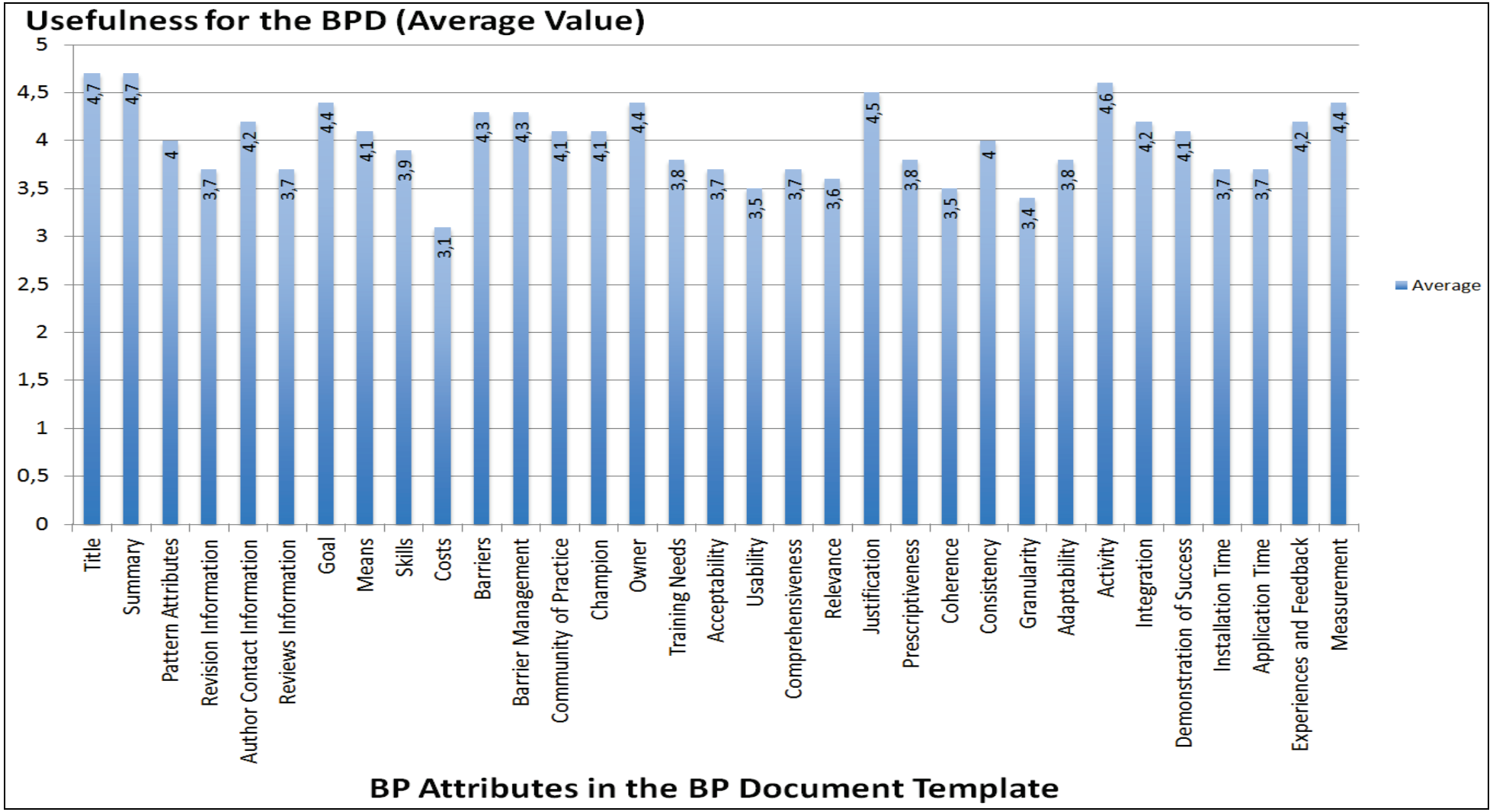

Figure 23. The overall assessed average value for 33 attributes in the BP Document Template

Qualitative data analysis

In this section, the result of the qualitative data analysis is presented. It shows the benefits and drawbacks of the document template as well as suggested changes.

Benefits of BP Document Template

Benefit	Description	Number of responses	Examples of citations
Designer support	The template supports experienced and non-experienced knowledge engineers with document BPs	5	R3: *"For design of BPs it gives a good outline of what should be included".* R15: *"You start thinking of the guidelines as a checklist but I think you can definitely use it to design BP".*
Uniformity	The template encourages the knowledge engineer to ensure that the BPs are documented in a uniform and standardized way	6	R3: *"I think it would provide some uniformity for the users and for the organizations".* R8: *"Standard format makes it easy and facilitates the ability to analyze data content".*
Reusability	The template encourages the knowledge engineer to ensure that the BP is reusable	4	R6: *"This is very useful in term of reuse knowledge and knowledge efficiency in BP guidelines".* R16: *"I think in certain context, you can take necessary BP or in my business case and adapt it and use it without reinventing the wheels."*
Relevance	The template encourages the knowledge engineer to focus on	4	R9: *"...allow the correct person to provide relevant information".*

	BPs that are relevant and useful for the organization		
Justification	The template encourages the knowledge engineer to ensure that the BP includes evidence	4	R6: *"To apply BP according to this system to make sure that people understand the BP. To get the feedback from people who apply BPs. This feedback gives practitioners an insight for how BP solves the problem"*. R16: *"it improves the quality of the submissions so it provides evidence…"*.
Efficiency	The template encourages knowledge engineers to document the BPs in such a way that users can identify and apply them efficiently	5	R6: *"This is very useful in term of reuse knowledge and knowledge efficiency in BP guidelines"*.
Effectiveness	The template encourages knowledge engineers to document the BPs in such a way that users can identify and apply them effectively	2	R4: *"They will see the impact of such an initiative, they will look at it from different perspectives. Effectiveness gained and time for implementation, cost, these guidelines look very holistically"*.
Completeness	The template encourages the knowledge engineer to provide a complete description of the BP	5	R4: *"You covered the entire picture and that what I see in this. You have different perspectives. There is no chance for any particular problem area or issued to be unanswered or not thought of"*. R9: *"You have a list of criteria basically that*

			characterize a complete BPD so it makes it easy to go through and see if you include all these areas both /.../ for submitter and the interviewer".
Consistency	The template encourages the knowledge engineer to ensure that the BP is described in a consistent way	3	R7: *"It makes it easier for people to be consistent".* R10: *"You ensure the quality output. /.../ Then, you have consistency in the outcomes".*
Contextualization	The template encourages knowledge engineers to document the BP in such a way that users can understand the BP context	1	R16: *"The benefits I think in certain context, you can take necessary BP or in my business case and adapt it and use it without reinventing the wheels".*

Table 19. Benefits of BP Document Template

Drawbacks of BP Document Template

Drawback	**Description**	**Number of response**	**Example of citations**
Extensive resources needs	The template requires extensive resources to store, implement and apply it	5	R9: "*The negative side is that someone may look at a long list of a criteria or guidelines and just say I am not going to take the time to make a submission into the system".* R10: *"It takes a long time. If you give it to a user, it is long".*
Complexity	The template is too complex for a simple case of BP	1	R5: "*The biggest risk is excessive rigor in a simple situation where heuristic BP may be better than these guidelines. I think also, there are some situations where guide-*

			lines simply will not be useful. I refer to an emergent or entirely novel undertaking where an organization is attending to something that is completely new".
Reduction of creativity and innovation	The template reduces creativity and innovation	2	R6: "*If you have guidelines, it gives you outlines for the work but it may trick the creativity, and innovation of people*".

Table 20. Drawbacks of BP Document Template

Suggested changes to the BP Document Template

Change	Number of response	Example of citations
Add organizational culture as an attribute and related values	1	R8: "*Add elements regarding organizational culture to facilitate adaptation of the template*".
Add lessons learned as an attribute	1	R4: "*In terms of adding, the template should have some component in terms of lessons learned from a particular industry or organization. There should be some component cover that".*
Add metrics supporting measurement of the template	1	R7: "*Suggest information about measurement and metrics. That is what people struggle with the most".*
Prioritize attributes	1	R9: *"I think it may be good to indicate which guidelines are more critical and you have high priority. So someone who has limited time to vote for it. Would know that certain guidelines are mandatory and they have to provide information in those areas where they can submit into the database".*

Table 21. Suggested changes to the BP Document Template

5.2.4. Limitations

The research conducted audio recording of 15 interviews and took field notes for one interview, based on the participant request. The researcher could not capture all of the information that each participant provided due to minor noise around the participant and the characteristics of the participant (i.e., fast speaker and accent).

The response rate was low in this study. The researchers invited 103 participants to cooperate in this study, while only 16 participants accepted. However, other participants, i.e., ten participants, replied positively and showed their interest to cooperate in the study. The researchers could not conduct interviews with them due to their busy schedules.

5.3. BP Document Template Demonstration

In this section, the researchers demonstrate the use of the BP Document Template in three real-life cases to prove its feasibility. The BP Document Template was presented to three organizations. One expert from each organization was asked to apply the BP Document Template on two or more BPDs from his/her organization. Experts filled the BP Document Template in their own BPDs and commented about what problem/s they experienced while applying the BP Document Template on their BPDs. The evaluation is naturalistic evaluation that indicates an assessment to demonstrate the BP Document Template in the practice for which it is intended. Hence, this involves real users and practitioners who are using the BP Document Template to solve their real problems (Sun and Kantor, 2006). Therefore, it helps to investigate the effectiveness of the BP Document Template with different users and practitioners from different organizations with different problems. Then, a semi-structured interview was conducted with each of the experts. In the beginning of each interview, the practical problem that the BP Document Template was intended to address was presented. The experts were then asked 14 semi-structured questions about the BP Document Template (as shown in Appendix XII). Questions were asked about which attributes were not used in the organizations' existing BPDs; which attributes were difficult to apply on existing BPDs and why; which attribute were not given any data/value during demonstration and why; overall opinions and obstacles of applying the BP Document Template and whether the experts had any improvements of the BP Document Template to suggest.

5.3.1. Description of Real-life Cases

In this section, the three real-life cases are described as well as the results of the demonstration related to each of these three cases.

- **First real-life case**

In the first real-life case, two BPDs were used to demonstrate the BP Document Template. The BPDs were from a global organization within the oil domain. The organization has more than 10 000 employees and operates in 37 countries. The researchers conducted an interview with a KM consultant within the organization that was responsible for developing the KM strategy and KM solution, and for management and maintenance of a knowledge resource portal for information and KS. KS in the organization was done through BPs and learning sessions.

The KM consultant and his colleagues adapted the BP Document Template and customized its attributes to make it suitable for their organization. More precisely, they added the following attributes to the BP Document Template: *project number and name, keywords, effective date, next review date, accountable function, accountable discipline, functional areas, sub-functional areas, technology platform, research and development platform, applicable process, co-authors* and *co-contributors*.

In the interview, the KM consultant affirmed that nine BP attributes (i.e., *skills*, *community of practice, training needs, acceptability, comprehensiveness, relevance, demonstration of success, installation time and application time*) from the BP Document Template do not occur in their BPDs. The majority of these attributes were related to the components BP actor (three attributes) and BP implementation (four attributes).

The expert claimed that they had difficulty applying five of the attributes (i.e., *skills*, *community of practice, training needs, acceptability and comprehensiveness*) due to lack of information in their BPDs. The expert stressed the difficulty to identify and specify data/values for some of the attributes if the users do not know for which situation and audience the BP is documented. One such attribute is *skills*.

- **Second real-life case**

In the second real-life case, three BPDs were used to demonstrate the BP Document Template. The BPDs were from a global organization within the IT domain with more than 1 000 employees operating mainly in Europe and Asia. The researchers conducted an interview with a KM consultant within the organization. The KM consultant was responsible for improving the way people communicate, directly or through information technology, and for using BPs for Business Process Management.

The respondent affirmed that twelve of the attributes (i.e., *goal, means*, *skills*, *costs, training needs, usability, activity, integration, demonstration of success, installation time, application time and measurement*) from the BP

Document Template do not occur in the organization's BPDs. The majority of these attributes were related to the components Requirements for applying BP and BP properties.

The expert had difficulty applying nine of the attributes (i.e., *goal, barriers, usability, comprehensiveness, justification, coherence, adaptability, demonstration of success* and *measurement*) due to lack of information in their BPDs. The expert emphasized the difficulty of specifying the data/values for some attributes because post action feedback was not applied in the organization. One such attribute was *justification*. Another problem was that the documentation of data/values for some attributes are rather subjective.

- **Third real-life case**

In the third real-life case, three BPDs were used to test the BP Document Template. The BPDs were from an organization within the IT industry with more than 500 employee operating nationally. The expert applying the BP document template was a KM manager with expertise in innovation, change management, strategy development, business processes improvement and IT consulting.

The respondent stated that six attributes (i.e., *skills*, *barriers, community of practice, champion, usability* and *granularity*) did not occur in their BP documents.

The expert has difficulty applying seven attributes (i.e., *skills*, *barriers, champion, usability, coherence, granularity* and *adaptability*). These difficulties are related to the lack of information in their BPDs. This expert also, as the expert in real-life case 2, emphasized the difficulty of documenting data/values for attributes that are rather subjective.

5.3.2. Overall Result of the Demonstration

This section presents the overall result of the demonstration of the BP Document Template.

The demonstration showed that all three experts from the three real-life cases manage to apply 14 attributes in all of their BPs. These attributes were: *title, summary, pattern attributes, revision information, author contact information, reviews information, barrier management*, *owner*, *justification*, *prescriptiveness*, *coherence*, *consistency, adaptability and experiences and feedback*.

The demonstration also showed that 18 of the attributes were very easy to apply in BPDs, according to the three experts, that is, the experts did not encounter any difficulties applying them. These attributes were: *title, sum-*

mary, pattern attributes, revision information, author contact information, reviews information, means, costs, barrier management, *owner*, *relevance*, *prescriptiveness*, *consistency*, *activity*, *integration, installation time*, *application time* and *experiences and feedback*.

Moreover, the demonstration showed that one BP attribute, *skills,* did not exist in any of the three organizations BPDs. However, the expert from real-life case 2 would like to use it in some of their BPDs. Also, the attribute, *training needs,* did not exist in real-life cases 1 and 2. Four other attributes (i.e., *usability*, *demonstration of success*, *installation time* and *application time*) did not occur in two of the real-life cases. One expert (i.e., real-life case 2) confirmed the possibility of adding these attributes to their BPDs, since they would enhance the application of the BP.

Two experts (i.e., real-life cases 2 and 3) confirmed that the BP Document Template covers almost all of the attributes in their BP documents, and one of them (i.e., real-life case 3) stated "*I suppose your template is quit full. I think it is the most full template I have seen in my practice*". In real-life case 1, the expert found some parts in their BP documents that were not covered in our BP Document Template. These parts are: *keyword, accountability, co-authoring and co-contributors*. However, these parts are specific and can be covered in the following attributes in the BP Document Template: *summary*, *revision information*, *author contact information* and *reviews information*.

Two experts (i.e., real-life cases 1 and 3) stated that the description of the attributes is exhaustive, clear and straight-forward, and there is no need for reformulation. In real-life case 2, the expert suggested the reformulation of the description of the attributes, *usability and comprehensiveness,* as the reader might not see intuitively how to apply them and the user who should document the BP might not be able to estimate the comprehensiveness and easiness of use.

The three experts were asked to identify which attributes from the BP Document Template were not filled in when applying it to the BPD from their organizations. The three experts found, in general, that the unfilled attributes were due to the incomplete and unstructured descriptions in their own BPDs.

The experts were asked to express their overall opinion about applying the BP Document Template. They indicated that it represents a good foundation to structure and articulate BPDs as one expert (i.e., in real-life 1) stated "*the template gives you a proper structure for what things you have to document, and it makes a BP a lot easier to use*". They also remarked that the BP Document Template is relatively straight-forward and complete and, therefore, it seems to be useful for any industry.

The experts provided some concerns about applying the template in full scale: 1) people need to be encouraged to fill out 33 elements since it requires some time to do that; 2) the often informal and loose structure of existing BPDs makes it difficult to structure the BPDs according to the template; 3) there is a need of technical support for applying the BP document template. Two experts suggested the creation of a KM tool for applying the BP Document Template that included clear instructions and examples for its application.

6. Conclusion

This chapter summarizes the main contributions of the thesis by presenting a summary of the practical and theoretical contributions. The research quality is then discussed, followed by recommendations for future work.

6.1. Summary and Contributions

This section presents a summary of the thesis, followed by practical and theoretical contributions.

6.1.1. Summary

The overall goal of this thesis was to design IS artifacts for improving the use of BPs in organizations. This goal was addressed through the following two sub-goals:

- to design a BP Annotation Template for supporting the identification and selection of BPs in BP repositories;
- to design a BP Document Template for supporting the creation and evaluation of BP documentation.

Based on literature studies and expert interviews, these two artifacts have been designed and developed. These two artifacts have 43 BP attributes in total. They have been evaluated through expert interviews involving practitioners as well as academics, and one of the artifacts has been demonstrated in real-life cases. The evaluations show that the artifacts can help to improve the use of BPs in organizations.

6.1.2. Practical Contributions

The BP Annotation Template can be used as a basis for BP repositories and can support BP users in identifying and selecting BPs, independent of the domains in which they are to be applied. When BPs in a repository are annotated in accordance with the template, users can more easily browse and search them as well as understand their contents, independent of domains. Thus, the BP Annotation Template is primarily useful for BP users.

The BP Document Template can help BP designers to create high quality BP descriptions. Furthermore, the template can support BP managers in evaluating BPs. BPs described by means of the template will also be structured in such a way that users can more easily understand them. Thus, the BP Document Template is useful for BP designers and managers as well as for BP users.

6.1.3. Theoretical Contributions

A key question in the academic study of BP documentation is how to structure BP documents. This thesis has contributed to answering this question by consolidating, integrating and extending existing results on BP document structures. Furthermore, the thesis has shown that different kinds of BP documentation structures are needed, depending on the use of the documentation. For BP identification and selection, highly structured documentation is preferable, as realized in the BP Annotation Template. In contrast, for BP creation and evaluation, less structured documentation is more appropriate, as realized in the BP Document Template.

The thesis has also contributed a common model for different kinds of BP documentation, the BP Conceptual Model, which is based on attribute-value systems. The model has been the basis for both the BP Annotation Template and the BP Document Template. Also, the BP Annotation Template and the BP Document Template are generic in their nature and can be tailored and customized to specific needs and requirements in different industries, thereby being useful for any domain.

6.2. Research Quality

In order to design and evaluate the two artifacts presented in this thesis, a number of research studies have been carried out. In this section, the research quality of each of these studies is discussed.

6.2.1. Research Quality of the BP Annotation Template Study

The BP Annotation Template was designed based on a literature study and evaluated based on an expert interview. The literature study followed the method presented in Creswell (2008). A strength of this study was that Creswell's method was strictly applied, contributing to the transparency of the research. A weakness of the study was that only one person, the author of this thesis, carried out all the steps in the method. This could have decreased the dependability of the results, since the author could have missed or incorrectly interpreted some of the concepts in the papers used in the literature review.

The evaluation was carried out as an expert review. One weakness of this study concerns the sampling, as the response rate for the potential respondents contacted by LinkedIn was low. However, as the purpose was not to obtain a representative sample, but an explorative one, this weakness should not have had serious effects on the validity of the evaluation. A strength was that the use of LinkedIn for recruitment ensured highly competent respondents.

6.2.2. Research Quality of the BP Document Template Study

The BP Document Template was designed based on a literature study and an expert interview study. The literature study followed the method proposed by Wolfswinkel et al. (2013). A strength of the study is that it adhered to the method strictly. A weakness of the study was that only one person, the author of this thesis, carried it out, which could have had an impact on the dependability of the results. The expert interview study was limited in scope, with only seven respondents, which could have affected the validity of the results. However, the expert interview results were triangulated with those from the literature study, thereby improving their validity.

The BP Document Template was demonstrated by means of real-life cases, though the two of these was relatively small. Thereby, a form of naturalistic evaluation was obtained. Furthermore, the use of interviews contributed to the validity of the research, as it allowed the researcher to have direct contact to check the accuracy and relevance of the collected data.

The evaluation of the BP Document Template was carried out through an expert review study. A further strength of the study is that as many as 16 respondents participated. A weakness was that only practitioners and no academics were included in the sample. In the evaluation of the BP Annotation Template, a further weakness was the low response rate for the potential respondents contacted by LinkedIn. However, this should not have affected the results in a major way, as the purpose was not to obtain a representative sample, but an explorative one.

6.3. Future Research

The thesis has focused on designing and evaluating two artifacts, the BP Annotation Template and the BP Document Template. An immediate suggestion for future research is to perform a case study to check their feasibility. This can provide valuable and unique insights into the usability and applicability of the two artifacts. It can also be used to investigate the artifacts in depth and provide an understanding of measures to cope with the complexity and subtlety of real cases (Denscombe, 2014). That is, ex post evalu-

ation of the artifacts in real-life situations is needed to further establish their relevance. This is an important issue to address in future research. This can also be conducted by tailoring the BP attributes based on the result obtained in the evaluation chapter.

Another direction of future work is to extend the artifacts in order to fit different domains. The BP Document Template can be customized according to the requirements and needs of a specific domain by identifying and including domain-specific BP attributes and values. This could also be the case for the BP Annotation Template. For example, when used in a certain domain, such as IT, both domain independent as well as domain-dependent (IT) attributes can be used to classify annotate the BPs. Future research into the development of a the BP Annotation Template can be used by experts and practitioners to efficiently index their BPs and improve the quality of their search for BPs.

The evaluation of the BP Document Template identified a number of potential drawbacks:

- Extensive resource needs - The template requires extensive resources to store, implement and apply it;
- Complexity - The template is too complex for a simple case of BP;
- Effects on creativity and innovation - The template reduces creativity and innovation.

These drawbacks offer suggestions for future work. The complexity of the template can be countered by supporting flexibility in its use, e.g., by ranking the included BP attributes so that a user can easily select among them in order to construct a customized template. The resource need can also be addressed by flexibility and customization, as well as tool support that enables reuse of BP document components. The issue of reduced creativity and innovation is common for many structured methods, including template-based ones, and needs to be taken seriously. It can be addressed by complementing the template with suggested ways-of-working that encourage creative and imaginative solutions.

Future work may also include writing a software system to automate the processes of the BP Annotation Template and the BP Document Template. A software system can save employees time and effort. The extensive resources needed have been suggested by respondents as a drawback in the second artifact. Future work can also address the easiness of effective documentation and annotation of BPs. This can also lead to configuring the two artifacts according to specific project requirements, as suggested in the work by Berzisa and Grabis (2011). This can enhance the application of the two

artifacts by developing case specific configurations for selecting appropriate BP attributes.

Directions for future research can also refine and further evaluate the method of build in the BP Annotation Template. This can be enhanced by examining the requirements of the design with practitioners in industry, and can include them in the design process.

Another direction could be to design methods for measuring the current BP documents for organizations and proposing a maturity model. This could also be used to highlight the current weaknesses in KM in organizations.

References

Abd Rahman, A.A. Sahibuddin, S. and Ibrahim, S. (2011). A study of process improvement best practices. Information technology and multimedia (ICIM), International Conference on IT & Multimedia at UNITEN (ICIMU 2011) Malaysia, 1-5.

Ackoff, R.L. (1989). From Data to Wisdom. Journal of Applies Systems Analysis, 16, 3-9.

Adler E. and Pouliot, V. (2011). International practices: introduction and framework. In: Adler E, Pouliot V (eds) International Practices. Cambridge University Press, 3-35.

Aggestam, L. and Persson, A. (2010). Increasing the quality in it-supported knowledge repositories: Critical success factors for identifying knowledge. 43rd Hawaii International Conference on System Sciences (HICSS), Honolulu, HI, USA.

Alavi, M. and Leidner, D.E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. MIS Quarterly, 25, (1), 107-136.

Alexander, C. Ishikawa, S. Silverstein, M. Jacobson, M. Fiksdahl-King, I. and Angel, S. (1977). A pattern language: Towns, Buildings, Construction. New York: Oxford University Press.

Alturki, A. Gable, G. and Bandara, W. (2011). A design science research roadmap. In: Jain H, Sinha AP, Vitharana P (eds), Service-Oriented Perspectives in Design Science Research. Springer, Berlin, 107-123.

Alturki, A. Gable, G. and Bandara, W. (2013). The design science research roadmap: In Progress evaluation. Pacific Asia Conference on Information Systems (PACIS), Jeju Island, Korea.

Aluchna, M. (2009). Implementation of best practice code: Practical implications from the Warsaw Stock Exchange. Social Responsibility Journal, 5 (1), 123-140.

Alwazae, M. Perjons, E. and Kjellin, H. (2013). Verifying the Usefulness of a Classification System of Best Practices. 5th International Conference on Knowledge Management and Information Sharing, Portugal, SciTePress, 405-412.

Alwazae, M.M.S. Perjons, E. and Kjellin, H. (2014). Quality Measures for Documentation of Best Practices. 47th Hawaii International Conference on System Sciences*(HICSS)*, HI, USA, 3410-3419.

American Productivity and Quality Centre (1997). What is Benchmarking?, APQC Report, Houston, TX.

Argote, L. (2013). Organizational Learning: Creating, Retaining and Transferring Knowledge. 2nd Ed. Springer Science and Business Media, New York.

Arthur, J.D. and Stevens, K.T. (1990). Document Quality Indicators: A Framework for Assessing Documentation Adequacy. Virginia Polytechnic Institute, State University.

Asoh, D., Belardo, B., and Neilson, R. (2002). Knowledge Management: Issues, Challenges and Opportunities for Governments in the New Economy. Proceedings of the 35th Hawaii International Conference on System Science, USA.

Asrofah, T. Zailani, S. and Fernando, Y. (2010). Best practices for the effectiveness of benchmarking in the Indonesian manufacturing companies. Emerald Group Publishing Limited, Benchmarking: An International Journal, 17 (1), 115-143.

Awad, M.A. and Ghaziri, H.M. (2004). Knowledge Management, Pearson Education, Prentice Hall, Upper Saddle River, New Jersey.

Axelsson, K. Melin, U. and Söderström, F. (2011). Analyzing best practice and critical success factors in a health information system case - Are there any shortcuts to successful IT implementation?. 19th European Conference on Information Systems, (Tuunainen V, Nandhakumar J, Rossi M, Soliman W Ed.), Helsinki, Finland, 2157-2168.

Axon, D.J. (2010). Best Practices in Planning and Performance Management: Radically Rethinking Management for a Volatile World. 3rd Edition. John Wiley and Sons Ltd.

Bacchus, F. and Kabanza, F. (2000). Using Temporal Logics to Express Search Control Knowledge for Planning. Artificial Intelligence Volume 116, (1-2), 123-191.

Barclay, C. and Osei-Bryson, K-M. (2010). An exploration of knowledge management practices in it projects: A case study approach. The Americas Conference on Information Systems (AMCIS 2010), 1-10.

Barnett, T.J., Harding, J.A. and Nurse, A. (2009). Design and development of a classification system for knowledge management tools and methods. Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture, 224 (B6), 981-993.

Barrett, P. and Stanley, C. (1999). Better Construction Briefing. Blackwell Science, John Wiley & Sons.

Barsalou, L.W. and Hale, C.R. (1993). Components of conceptual representation: From feature lists to recursive frames. In Iven Van Mechelen, James Hampton, Ryszard S. Michalski, and Peter Theuns. Categories and Concepts: Theoretical Views and Inductive Data Analysis. London: Academic Press, 97-144.

Barsalou, L.W. (2003). Abstraction in perceptual symbol systems. Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 358(1435), 1177-1187.

Bazerman, M.H. (2006). Judgment in Managerial Decision Making. 6th Edition. Wiley, New York.

Baziz. M. (2004) Towards a Semantic Representation of Documents by Ontology-Document Mapping. The Eleventh International Conference on Artificial Intelligence, Varna, Bulgaria, Christoph Bussler, Diete Fensel (Eds.), Springer- Verlag Germany, 33-43.

Beaumont, N. (2005). Best Practice in Australian manufacturing sites. Elsevier Ltd, Technovation, 25, 1291-1297.

Beijerse, R.P. uit (2000). Knowledge management in small and medium-sized companies: knowledge management for entrepreneurs. Journal of Knowledge Management. Kempston, 4 (2), 162-179.

Bennis, W. and O'Toole, J. (2005). How Business Schools Lost their Way. Harvard Business Review.

Bergek, A. and Norrman, C. (2008). Incubator best practice: A framework. Elsevier Ltd, Technovation, 28, 20-28.

Berzisa, S. Grabis, J. (2001). Evaluation of Similarity and Reuse of Project Management Processes. IT and Management Science. 49, 59-65.

Bider, I. Johannesson, P. and Perjons, E. (2012). Design science research as movement between individual and generic situation-problem-solution spaces, In Baskerville R., De Marco, M., Spagnoletti, P. (eds.) Organizational Systems. An Interdisciplinary Discourse, Springer.

Blumenberg, S. Wagner, H.T. and Beimborn, D. (2009). Knowledge transfer processes in IT outsourcing relationships and their impact on shared knowledge and outsourcing performance. International Journal of Information Management, 29 (5), 342-352.

Boshyk, Y. (1999). Business-driven action learning: global best practices, Edited by: Boshyk, Y. London: Palgrave Macmillan.

Boyle, T.A. and Scherrer-Rathje, M. (2009). An empirical examination of the best practices to ensure manufacturing flexibility: Lean alignment. Journal of Manufacturing Technology Management, 20(3), 348-366.

Brassil, D. Hogan, C. and Attfield, S. (2009). The centrality of user modeling to high recall with high precision search. Proceedings of the 2009 IEEE International Conference on Systems, Man and Cybernetics, San Antonio, TX, USA, 91-96.

Braun, F. and Avital, M. (2006). The role of accountability in motivating knowledge sharing among team members in information technology projects. 12 American Conference on Information Systems, AIS electronic library, Acapulco, Mexico, 3776-3781.

Bubenko, J.A. Persson, A. and Stirna, J. (2001). User guide of the knowledge management approach using enterprise knowledge patterns, deliverable D3, IST programme project hypermedia and pattern based knowledge management for smart organizations. Project no. IST-2000-28401. Department of Computer and Systems Sciences, Royal Institute of Technology. Stockholm, Sweden. Accessed (2014-08-24) at http://www.dsv.su.se/~js/ekd_user_guide.html

Bukowitz, W. and William, R. (2000). The Knowledge Management Fieldbook. London: Prentice Hall.

Burke, L.A. and Hutchins, H.M. (2008). A study of best practices in training transfer and proposed model of transfer. Human Resource Development Quarterly, 19 (2), 107-128.

Cabrera, A. Collins, W.C. and Salgado, J.F. (2006). Determinants of individual engagement in knowledge sharing. International Journal of Human Resource Management, 17(2), 245-264.

Camp, R. (1989). The Search for Industry Best Practices that Lead to Superior Performance. Productivity Press.

Chen, J.C. and Huang, S.J. (2009). An empirical analysis of the impact of software development problem factors on software maintainability. Journal of Systems and Software, Elsevier Science Inc., 82, 981-992.

Choo, C. W. Detlor, B. and Turnbull, D. (2000). Web work (Vol. 1). Springer Science & Business Media.

Chourides, P. Longbottom, D. and Murphy, W. (2003). Excellence in knowledge management: An empirical study to identify critical factors and performance measures. Measuring Business Excellence, 7 (2), 29-45.

Cook, S.D. and Brown, J.S. (1999). Bridging epistemologies: The generative dance between organizational knowledge and organizational knowing. Organization Science, 10 (4), 381-400.

Cormican, K. and O'Sullivan, D. (2004). Auditing best practice for effective product innovation management. Technovation, 24 (10), 819-829.

Creswell, J. (2008). Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research, 3rd Edition. Upper Saddle River, N.J. Pearson/ Merrill Education.

Dalkir, K. (2011). Knowledge Management in Theory and Practice. The MIT Press.

Dana, L.E. and Smyrnios, K.X. (2010). Family business best practices: Where from and where to. Elsevier Ltd, Journal of Family Business Strategy, 1, 40-53.

Dani, S.S. Harding, J.A. Case, K. Young, R.I.M. Cochrane, S. Gao, J. and Baxter, D. (2006). A methodology for best practice knowledge management. Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture, 220 (10), 1717-1728.

Darroch, J. and McNaughton, R. (2002). Examining the link between knowledge management practices and type of innovation. Journal of Intellectual Capital, 1 (3), 210-222.

Dautovic, A. Plosch, R. and Saft, M. (2011). Automatic checking of quality best practices in software development documents. Quality Software (QSIC), 11th International Conference on Quality Software, IEEE Computer Society, 13-14 July, Madrid, 208-217.

Davenport, T. De Long, D. and Beers, M. (1998). Successful knowledge management projects. MIT Sloan Management Review, Winter, 39 (2), 43-57.

Davenport, T.H. and Probst, G.J.B. (2002). Knowledge Management Case Book: Siemens Best Practices. 2nd Edition. Publicis Corporate Publishing, Erlangen.

Davenport, T.H. and Prusak, L. (1998). Working Knowledge: How Organizations Manage What They Know, Harvard Business School Press, Boston, MA.

Davies, A.J. and Kochhar, A.K. (2002). Manufacturing best practice and performance studies: a critique. International Journal of Operations & Production Management, MCB University Press, 22 (3), 289-305.

Dedoose, (2015). Great Research Made Easy. Accessed (2015-06-10) at http://www.dedoose.com/

Denning, S. (2001). The Springboard: How Storytelling Ignites Action in Knowledge-Era Organizations. Butterworth-Heinemann, Boston, Oxford

Denscombe, M. (2014). The Good Research Guide: For Small-Scale Social Research Projects. 5th Edition. Mc Graw Hill, Open University Press, Buckingham.

Denton, W. (2003). How to Make a Faceted Classification and Put It On the Web, Nov. 2003. Accessed (2015-06-06) at https://www.miskatonic.org/library/facet-web-howto.html

Dinur, A. Hamilton, R. and Inkpen, A. (2009). Critical context and international intrafirm best-practice transfers. Elsevier Inc, Journal of International Management, 15, 432-446.

Done, A. Voss, C. and Rytter, N. (2009). Best practice interventions: Short-term impact and long-term outcomes. Elsevier, Journal of Operations Man-

agement, Special Issue on Field Research in Operations and Supply Chain Management, 29 (5), 500-513.

Dourish, P. Edwards, W.K. LaMarca, A. Lamping, J. Petersen, K. Salisbury, M. Terry, D.B. and Thornton, J. (2000). Extending document management systems with userspecific active properties. ACM Transaction on Information Systems, 18 (2), 140-170.

Dyer, G. and McDonough, B. (2001). The state of KM. Knowledge Management, 4 (5), 31-36.

Dyer, J. and Nobeoka, K. (2000). Creating and managing a high performance knowledge-sharing network: The Toyota case. Strategic Management Journal, 21 (3), 345-367.

Fensel, D. (2003). Ontologies: a silver bullet for Knowledge Management and Electronic Commerce. Springer-Verlag New York, Inc., Secaucus, NJ.

Fragidis, G. and Tarabanis, K. (2006). From Repositories of Best Practices to Networks of Best Practices. International Conference on Management of Innovation and Technology, IEEE, 370-374.

Frappaolo, C. (2006). Knowledge Management. Capstone Publishing Ltd, West Sussex.

Gamma, E. Helm, R. Johnson, R. and Vlissides, J. (1994). Design Patterns. Addison-Wesley.

Gatterbauer, W. Bohunsky, P. Herzog, M. Krüpl, B. and Pollak, B. (2007). Towards domain-independent information extraction from web tables. Proceedings of the 16th international conference on World Wide Web, Banff, Alberta, Canada.

Gehanno, J.F. Rollin, L. Jean, L.T. Louvel, A. Darmoni, S and Shaw, W. (2009). Precision and recall of search strategies for identifying studies on return-to-work in Medline. Journal of Occupational Rehabilitation, 19 (3), 223-230

Geppert, M. and Clark, E. (2003). Knowledge and learning in transnational ventures: An actor-centred approach. Management Decision, 41 (5), 433-442.

Ghoshal, S. (2005). Bad management theories are destroying good management practices. Academy of Management Learning and Education, 4 (1), 75-91.

Gill, P. Stewart, K. Treasure, E. and Chadwick, B. (2008). Methods of data collection in qualitative research: Interviews and focus groups. British Dental Journal, 204 (6), 291-295.

Gold, A.H. Malhotra, A. and Segars, A.H. (2001). Knowledge Management: An organizational capabilities perspective. Journal of Management Information Systems, 18 (1), 185-214.

Goodman, B.D. and Goldman, S.N. (2007). Freeing creativity by understanding the role of best practices. IEEE Engineering Management Conference, Austin, TX,USA, 308-311.

Graef, J. (2001). Managing taxonomies strategically. Montague Institute Review. Accessed (2013-04-29) at http://www.montague.com/abstracts/taxonomy3.html

Graupner, S. Motahari-Nezhad, H.R. Singhal, S. and Basu, S. (2009). Making processes from best practice frameworks actionable. Enterprise Distributed Object Computing Conference Workshops, 13th IEEE, 1-4 September, 25-34.

Gregor, S. and Hevner, A. (2013). Positioning and presenting design science research for maximum impact, MIS Quarterly, 37 (2), 337-355.

Guo, Z. Sheffield, J. (2008). A paradigmatic and methodological examination of knowledge management research: 2000 to 2004, Decision Support Systems, 44 (3), 673-688.

Hall, R.H. (2002). Organizations: Structure, Processes, and Outcomes. 8th Edition. Prentice Hall, Upper Saddle River, New Jersey.

Hamel, G. and Breen, B. (2007). The Future of Management. Harvard Business School.

Hanafizadeh, P. Moosakhani, M. and Bakhshi, J. (2009). Selecting the best strategic practices for business process redesign. Business Process Management Journal, 15 (4), 609-627.

Hansen, M.T. Nohria, N. Tierney, T. (1999). What's your strategy for managing knowledge?. Harvard Business Review, 77 (3-4), 106-116.

Hargis, G. Carey, M. Hernandez, A.K. Hughes, P. Longo, D. Rouiller, S. and Wilde, E. (2014). Developing Quality Technical Information: A Handbook for Writers and Editors. 3rd Edition. IBM Press Book.

Hendriks, L. and Carr, M. (2002). ITIL: Best practice in IT service management. In: Van Bon, J. (Hrsg.): The Guide to IT Service Management, Band 1, London u. a. 131-150.

Hevner, A.R. March, S.T. Park, J. and Ram, S. (2004). Design science in information systems research. MIS Quarterly, 28 (1), 75-105.

Hooff, B. and Ridder, J. (2004). Knowledge sharing in context: The Influence of organizational commitment, communication climate and CMC use on knowledge sharing. Journal of Knowledge Management, 8 (6), 117-130.

Ipe, M. (2003). Knowledge sharing in organizations: A conceptual framework. Human Resource Development Review, 2(4), 337-359.

ISACA. (2012). The Control Objectives for Information and related Technology COBIT. Accessed (2013-03-10) at http://www.isaca.org/Knowledge-Center/Pages/default.aspx

ISO/IEC 26514:2008. (2008). Systems and software engineering -- Requirements for designers and developers of user documentation. Accessed (2013-03-10) at http://www.iso.org/iso/catalogue_detail?csnumber=43073

Jackson, S.E. Chuang, C.H. Harden, E.E. Jiang, Y. and Joseph, J.M. (2006). Towards developing human resource management systems for knowledge-intensive teamwork. In J.M. Joseph (Ed.), Research in personnel and human resources management, 27-70, Amsterdam, The Netherlands:JAI.

Jafari, M. Fathian, M. Jahani, A. and Akhavan, P. (2008). Exploring the contextual dimensions of organization from knowledge management perspective, Vine: The Journal of Information and Knowledge Management Systems, 38 (1), 53-71.

Jarrar, Y.F. and Zairi, M. (2000). Internal transfer of best practice for performance excellence: A global survey. Benchmarking: An International Journal, MCB University Press, 7 (4), 239-246.

Jashapara, A. (2011). Knowledge Management: An Integrated Approach, 2nd Edition. Pearson Education, Harlow, Essex.

Johannesson, P. and Perjons, E. (2014). An Introduction to Design Science. Springer International Publishing, Switzerland.

Kaiser, J.M. Conrad, J. Koehler, C. Wanke, W. and Weber, C. (2008). Classification of tools and methods for knowledge management in product de-

velopment. International Design Conference – DESIGN. Dubrovnik - Croatia, May 19-22, Design information and knowledge, 809-816.

Kao, A. Quach, L. Poteet, S. and Woods, S. (2003). User assisted text classification and knowledge management. Twelfth International Conference on Information and Knowledge Management, New Orleans, LA, USA.

Kiang, M.Y. (2003). A comparative assessment of classification methods. Decision Support Systems, 35 (4), Elsevier Science B.V., 441-454.

Knowledge Management Toolkit. (2009). SDC Knowledge and Learning Processes Division in Cooperation with Agridea Lindau, Swiss Agency for Development and Cooperation. Accessed (2014-11-20) at www.daretoshare.ch

Kothari, A. Hovanec, N. Hastie, R. and Sibbald, S. (2011). Lessons from the business sector for successful knowledge management in health care: A systematic review. BMC Health Services Research, 11 (173).

Kuechler, B. and Vaishnavi, V. (2008). On theory development in design science research: anatomy of a research project. European Journal of Information Systems, 17, 489-504.

Kwasnick, B.H. (1999). The role of classification in knowledge representation and discovery. Library Trends. 48 (1), 22-47.

Lahaie, D. (2005). The impact of corporate memory loss: What happens when a senior executive leaves?. Leadership in Health Services, 18 (3), 35-48.

Lakshman C. (2007). Organizational Knowledge Leadership: A Grounded Theory Approach. Leadership & Organization Development Journal, 28 (1), 51-75.

Larsen, T.J. Finnegan, P. Galliers, R.D. and Jarvenpaa, S.L. (2000). Integrating eBusiness, Knowledge Management and Policy Considerations Within an Information Systems Strategy Framework. ECIS 2000 Proceedings, 191, AIS Electronic Library.

Lee, S. Suh, E. and Lee, M. (2014). Measuring the risk of knowledge drain in communities of practice. Journal of Knowledge Management, 18 (2), 382-395.

Leskiw, S. and Singh, P. (2007). Leadership development: Learning from best practices. Leadership & Organization Development Journal, 28 (5), 444-464.

Lewins, A. and Silver, C. (2007). Using Software in Qualitative Research: A Step-by- Step Guide. Sage Publications, Inc.: Thousand Oaks, CA.

Lewis, L. (2000). "Blindsided by that one" and "I saw that one coming": The relative anticipation and occurrence of communication problems and other problems in implementers' hindsight. Journal of Applied Communication Research, 28(1), 44-67.

Liew, A. (2007). Understanding data, information, knowledge and their inter-relationships. Journal of Knowledge Management Practice, 8(2), 1-16.

Lloria, M.B. (2008). A review of the main approaches to knowledge management.
Knowledge Management Research & Practice. 6, 77-89.

Lucas, L.M. (2005). The impact of trust and reputation on the transfer of best practices. Journal of Knowledge Management, 9 (4) 87-101.

Maier, R. (2007). Knowledge Management Systems Information and Communication Technologies for Knowledge Management. 3rd Edition. Springer-Verlag, Berlin.

Maier, R. Hadrich, T. and Peinl, R. (2009). Enterprise knowledge infrastructures. Springer Science & Business Media.

Malhotra, Y. (1998). When 'Best Practices' Become 'Worst Practices'.

Mansar, L.S. and Reijers, H.A. (2005). Best practices in business process redesign: Validation of a redesign framework. Computers in Industry, 56 (5), 457-471.

Mansar, S. and Reijers, H. (2007). Best practices in business process redesign: Use and impact. Business Process Management Journal, Emerald Group Publishing Limited, 13 (2), 193-213.

Martinsons, M. Davison, R. Tse, D. (1999). The balanced scorecard: A foundation for the strategic management of information systems. Decision Support Systems, 25 (1), 71-88.

Mas, S. and Marleau, Y. (2009). Proposition of a faceted classification model to support corporate information organization and digital records man-

agement. 42nd Hawaii International Conference on System Sciences (HICSS), Big Island, HI, USA.

Mertins, K. Heisig, P. and Vorbeck, J. (Eds). (2003). Knowledge Management: Concepts and Best Practices. 2nd Edition. Springer-Verlag Berlin Heidelberg.

Meyer, M. and Zack, M. (1996). The design and implementation of information products. Sloan Management Review, 37 (3), 43-59.

Motahari-Nezhad, H.R.M. Graupner, V. and Bartolini, C. (2010). A framework for modeling and enabling reuse of best practice IT processes. Business Process Management Workshops, 226-231.

Myers, M.D. (2009). Qualitative Research in Business & Management. SAGE Publications Ltd.

Netland, T. and Alfnes, E. (2011). Proposing a quick best practice maturity test for supply chain operations. Measuring Business Excellence, 15 (1), 66-76.

Newell, S. Robertson, M. Scarbrough, H. and Swan, J. (2009). Managing Knowledge Work and Innovation. Palgrave Macmillan, Basingstoke, Hampshire.

Niwe, M. and Stirna, J. (2009). Organizational Patterns for B2B Environments-Validation and Comparison. Terry Halpin et al. (eds.) Enterprise, Business-Process and Information Systems Modeling, Springer LNBIP 29.

Niwe, M. and Stirna, J. (2010). Examining Knowledge Capture for the B2B Domain. International Journal for Infonomics Society (IJI), 3 (2), 353-362.

Nonaka, I. and Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. California Management Review, 40 (3), 40-54.

Nonaka, I. and Krogh, G. (2009). Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. Organization Science, 20 (3), 635-652.

Nonaka, I. and Takeuchi, H. (1995). The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation, Oxford University Press, New York.

North, K. and Kumta, G. (2014). Knowledge Management Value Creation Through Organizational Learning. Springer International Publishing Switzerland.

O'Dell, C. and Grayson, C.J. (1998). If only we knew what we know: Identification and transfer of internal best practices. California Management Review, 40 (3), 154-174.

O'Dell, C. Grayson, C.J. and Essaides, N. (2003). If Only we Knew What we Know: The Transfer of Internal Knowledge and Best Practice. Free Press, New York.

O'Leary, D.E. (1998). Enterprise knowledge management. IEEE Computer, 31 (3) 54-61.

Olfman, L. Bostrom, R. and Sein, M. (2003). A best-practice based model for information technology learning strategy formulation. SIGMIS Conference ACM.03, Pennsylvania, 10-12 April, 75-86.

Osterloh, M. and Frey, S.B. (2000). Motivation, knowledge transfer, and organizational forms. Organization Science, 11 (5), 538-550.

Palmer, D.E. and Zakhem, A. (2001). Bridging the gap between theory and practice: using the 1991 federal sentencing guidelines as a paradigm for ethics training. Journal of Business Ethics, 29 (1/2), 77-84.

Payne, G. and Payne, J. (2004) Key Concepts in Social Research. London, Sage Publications Ltd.

Peach, R.W. (2003). The ISO 9000 Handbook. 3rd Edition. New York, McGraw- Hill.

Peffers, K.T. Tuunanen, M. Rothenberger, and Chatterjee, S. (2007). A design science research methodology for information systems research. Journal of Management Information Systems, 24 (3), 45-77.

Persson, A. Stirna, J. Aggestam, L. (2008). How to disseminate professional knowledge in healthcare - The case of Skaraborg hospital. Journal of Cases on Information Technology, 10 (4), IGI Global, 42-64.

Pfeffer, J. and Sutton, R. (2006). Hard Fact, Dangerous Half-Truths and Total Nonsense. Boston MA: Harvard Business School Press.

Pries-Heje, J. Baskerville, R. and Venable, J. (2008). Strategies for design science research evaluation. In: Proceedings of the 16th European Conference on Information Systems (ECIS), Galway, Ireland, 87.

Prusak, L. and Matson, E. (2006). Knowledge Management and Organizational Learning. Oxford University Press Inc., New York.

Pyzdek, T. and Keller, P. (2009). The Six Sigma Handbook: A Complete Guide for Green Belts, Black Belts, and Managers at all Levels. 3rd Edition. McGraw-Hill Professional, New York.

Rainey, H.G. (2003). Understanding and Managing Public Organizations. 3rd Edition. Jossey- Bass, San-Francisco.

Reddy, W. and McCarthy, S. (2006). Sharing best practice. International Journal of Health Care Quality Assurance, 19 (7), 594-598.

Renzl, B. Matzler, K. and Hinterhuber, H. (2006). The Future of Knowledge Management. Palgrave Macmillan, New York.

Reymen, I.M.M.J. Hammer, D.K., Kroes, P.A., van Aken, J.E. Dorst, C.H., Bax, M.F.T. and Basten, T. (2006). A domain-independent descriptive design model and its application to structured reflection on design processes. Research in Engineering Design, 16 (4), 147-173.

Riehle, D. and Zullighoven, H. (1995). A pattern Language for tool construction and integration based on the tools and materials metaphor. In J.O Coplian and D.C Schmindt (Eds.), Pattern Languages of Program Design, Addison Wesley Professional.

Sagsan, M. (2009). Knowledge management discipline: Test for an undergraduate program in Turkey. Electronic Journal of Knowledge Management, 7 (5), 627-636.

Schonberger, R.J. (2008). Best practices in Lean Six Sigma Process Improvement. John Wiley & Sons.

Sein, M. Henfridsson, O. Purao, S. Rossi, M. and Lindgren, R. (2011). Action design research. Management Information Systems Quarterly, 35 (1), 37-56.

Serenko, A. and Bontis, N. (2004). Meta-Review of knowledge management and intellectual capital literature: Citation impact and research productivity rankings. Knowledge and Process Management, 11 (3), 185-198.

Serenko, A. Bontis, N. and Grant, J. (2008). A scientometric analysis of the proceedings of the McMaster world congress on the management of intellectual capital and innovation for the 1996–2008 period. Journal of Intellectual Capital, 10 (1), 8-21.

Shull, F. and Turner, R. (2005). An empirical approach to best practice identification and selection: The US department of defense acquisition best practices clearinghouse. Proceedings of International Symposium on Empirical Software Engineering, Australia, 133-140.

Simard, C. and Rice, R.E. (2007). The practice gap: Barriers to the diffusion of best practices. (McInerney, C.R. and Day R.E. Ed.), Re-Thinking Knowledge Management: From Knowledge Objects To Knowledge Processes, Dordrecht, The Netherlands: Springer-Verlag, 87-124.

Skyrme, D. and Amidon, D. (1997). The Knowledge Agenda. The Journal of Knowledge Management, 1 (1), 27-37.

Skyrme D.J. (2002). Best practices in best practices. K-Guide. Highclere, England, David Skryme Associates.

Smith, F.I. Kisamore, J.L. Stone, T.H. and Jawahar, I.M. (2010). Decision-Making biases and affective states: Their potential impact on best practice innovations. Canadian Journal of Administrative Sciences, ASAC, John Wiley & Sons, Ltd, 277-291.

Snowden, D. (2002). Complex acts of knowing: Paradox and descriptive self- awareness. Journal of Knowledge Management, 6 (2), 100-111.

Sole, D. and Wilson, D. (2002). Storytelling in organizations: The power and traps of using stories to share knowledge in organizations. Boston: LILA, Harvard Graduate School of Education.

Stephenson, C. and Bandara, W. (2007). Enhancing Best Practices in Public Health: Using Process Patterns for Business Process Management. In Proceedings ECIS 2007 - The 15th European Conference on Information Systems, St. Gallen, Switzerland, 2123-2134.

Sun, Y. and Kantor, P.B. (2006). Cross-evaluation: A new model for information system evaluation. Journal of the American Society for Information Science and Technology, 57 (5), 614-628.

Swan, J. Newell, S. Scarbrough, H. and Hislop, D. (1999). Knowledge management and innovation: Networks and networking. Journal of Knowledge Management, 3(4), 262-275.

Swan, J.A. Newell, S. and Robertson, M. (2000). Limits of IT-driven knowledge management initiatives for interactive innovation processes: Towards a community-based approach. The 33rd Hawaii International Conference on Systems Sciences (HICSS), 4-7 January, Maui, HI, USA.

Syed-Ikhsan, S.O.S. and Rowland, F. (2004). Benchmarking knowledge management in a public organisation in Malaysia. Benchmarking: An International Journal, 11 (3), 238-266.

Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. Strategic Management Journal, 17, 26-43.

Szulanski, G. (2003). Sticky Knowledge: Barriers to Knowing in the Firm. 1st Edition. Sage Strategy Series, London.

Szulanski, G. Cappetta, R. and Jensen, R.J. (2004). When and how trustworthiness matters: Knowledge transfer and the moderating effect of causal ambiguity. Organization Science, 15, 600-613.

Tabrizi, R.S. Ebrahimi, N. and Al-Marwai, S.A. (2011). On the comparison of KM criteria classifications. World Conference on Information Technology, Procedia Computer Science, 3, 684-690.

Timbrell, G. Andrews, N. and Gable, G. (2001). Impediments to Inter-firm Transfer of Best Practice: in an Enterprise Systems Context. In 7th Americas Conference on Information Systems, Boston, MA.

Tiwana, A. (2000). The Knowledge Management Toolkit: Practical Techniques for Building a Knowledge Management System. Prentice Hall PTR Upper Saddle River, NJ, USA.

Tough, A. and Moss, M. (2003). Metadata, controlled vocabulary and directories: Electronic document management and standard for records management. Records Management Journal, 13 (1), 24-31.

Turban, E. Sharda, R. and Delen, D. (2011). Decision Support and Business Intelligence Systems, 9th Edition. Upper Saddle River, Pearson, New Jersey.

Usman, M. (2013). Using Knowledge Management for Organisational Learning. International Journal for Management Science and Technology (IJMST), 1-12.

Van Landeghem, R. and Persoons, K. (2001). Benchmarking of logistical operations based on a causal model. International Journal of Operations & Production Management, MCB University Press, 21 (1/2), 254-266.

Verity (2004). Classification, taxonomies and you. Verity White paper. Accessed (2013-04-28) at http://www.weitkamper.com/download/verity/verity_mk0648.pdf

Vesely, A. (2011). Theory and methodology of best practice research: A critical review of the current state. Central European Journal of Public Policy 2, 98-117.

Wagner, E.L. Scott, S.V. Galliers, R.D. (2006). The creation of 'best practice' software: Myth, reality and ethics. Information and Organization, 16 (3), 251-275.

Wan, J. and Wan, X. (2012). Case study on M company best practice with global IT management. Technology and Investment, 3 (3), 143-148.

Wang, S. and Noe, R.A. (2010). Knowledge sharing: A review and directions for future research. Human Resource Management Review, 20, 115-131.

Watson, G.H. (2007). Strategic Benchmarking Reloaded with Six Sigma: Improve your Company's Performance Using Global Best Practice. John Wiley & Sons, Inc., Hoboken, New Jersey.

Webster, J. and Watson, R.T. (2002). Analyzing the past to prepare for the future: Writing a literature review. Journal MIS Quarterly, 26 (2).

Wenger, E. and Snyder, W. (2000). Community of practice: The organizational frontier. Harvard Business Review, 139-145.

Whittle, S. Smith, S. Tranfield, D. and Foster, M. (1992). Implementing total quality: The downside of best practice. 7th Annual Conference of the Operations Management Association on International Operations, Crossing Borders in Manufacturing and Service, UMIST, Manchester, 23-24 June, 247-252.

Wiig, K.M. (1994). Knowledge Management Foundations: Thinking about Thinking - How People and Organizations Represent, Create, and Use Knowledge. Arlington, TX: Schema press.

Wiig, K.M. (2004), People-Focused Knowledge Management: How Effective Decision Making Leads to Corporate Success. Elsevier Butterworth-Heinemann, Amsterdam.

Wikipedia contributors (2015). "Knowledge Sharing". Accessed (2015-06-28) athttps://en.wikipedia.org/wiki/Knowledge_sharing

Wolfswinkel, J.F. Furtmueller, E. and Wilderom, C. (2013). Using grounded theory as a method for rigorously reviewing literature. European Journal of Information Systems, 22, 45-55.

World Health Organization: Guide for Documenting and Sharing "Best Practices" in Health Programmes. (2008). Brazzaville: WHO.

Xu, Y. and Yeh, C. (2010). An optimal best practice selection approach. The 3rd International Joint Conference on Computational Science and Optimization (CSO), (2), 28-31 May, 242-246.

Zack, M.H. (1999). Managing codified knowledge. Sloan Management Review, 40 (4), Summer, 45-58.

Zairi, M. and Ahmed, P. (1999). Benchmarking maturity as we approach the millennium?. Total Quality Management, Taylor & Francis Ltd, 10 (4-5), 810-816.

Zandi, F. and Tavana, M. (2011). A fuzzy multi-objective balanced scorecard approach for selecting an optimal electronic business process management best practice (e-BPMBP). Business Process Management Journal, 17 (1), 147-178.

Zhu, L. Staples, M. and Gorton, I. (2007). An infrastructure for indexing and organizing best practices. The 2nd International Workshop on Realizing Evidence-Based Software Engineering, IEEE, Computer Society Washington, DC, USA, 20-26 May.

Glossary

Annotation - the process of labeling and indexing knowledge, that is, introducing a series of terms or metadata related to the knowledge in the repository in order to be able to find needed knowledge more easily

Artifact - an object that has been made by humans with the purpose of addressing a practical problem

Best Practice - a way of improving a practical example, approach, process, practice, technique or rule for successful implementation of a particular task, where this practice has been applied and, therefore, it is intended to replace an existing practice and to be followed. In this thesis, "practice" in the term 'best practice' refers to the repeated performance of a particular task

BP Annotation Template - is a structure for describing BPs in a concise and high level way. The template can be used for organizing and indexing the contents of BPDs in a domain-independent way

BP Attribute - a property of a BP or its context, e.g., Organizational Area, which can have the values "operational", "tactical", and "strategic"

BP Document - a structure that describes a BP

BP Document Template - a structure for describing BPs in a systematic way. The structure is a set of pre-specified attributes or fields, such as "Title of the BP", "Author of the BP", or "Description of the BP"

BP Element - an attribute-value pair, i.e., it consists of a BP attribute and a BP value. An example is <author, 'John Doe'>. For a BP attribute, there are no restrictions on its possible values, and the values can consist of entire text paragraphs

Precision - the fraction of documents retrieved that are actually relevant (i.e., not including irrelevant results)

Recall - the fraction of relevant documents retrieved in a search (i.e., not missing relevant results)

Community of Practice - a work-related group of people who share common problems or interests, and who meet informally to learn from each other through ongoing interactions

Domain Independence - a concept or system must have no domain-specific features

Explicit Knowledge- is expressed in the form of text, numbers, codes, and formulas

Knowledge Management - the effective learning process associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organization's intellectual capital and performance

Knowledge Management System - any kind of IT system that stores and retrieves knowledge, locates knowledge sources, improves collaboration, captures and uses knowledge, mines repositories for hidden knowledge, or in some other way enhances the KM process

Knowledge Manager - a role in an organization with operational and development responsibility to implement and promote KM practices and principles

Knowledge Repository - a place to store and retrieve explicit knowledge

Knowledge Sharing - the provision of know-how and other types of knowledge to help employees to cooperate with others to develop new ideas, solve problems or apply procedures or policies to make the organization more effective and efficient

Pattern - a pattern describes a solution to a specific problem, which recurs in a variety of cases in the context of an organization

Tacit Knowledge - is situated in the minds of people and, therefore, is often difficult to formulate in an explicit way

Appendices

Appendix I

The First Tentative Document Template (Alwazae et al. 2014)

Component	Attributes
General style	1. BP shall include the essential elements of its nature
	2. BP shall contain a dramatic climax or some information that highlights what is most important in the BP
	3. BP shall contain information of the date when it was written and who wrote the BP
Summary of BP	4. BP's summary shall encompass the most significant and identifiable aspects of the BP
	5. BP's summary shall contain information about the area/field in which the BP is to be applied
	6. BP's description shall include a summary or abstract outlining the BP
Motivation for using the BP	7. BP shall describe the advantageous outcome of its application
	8. BP shall describe in which respect it is better than other alternative practices
	9. BP shall describe the targeted user or the role of the BP
	10. BP shall describe the context/situation to determine if the BP is relevant or not
Core BP knowledge	11. BP shall describe problems/challenges that the BP addresses
	12. BP shall have information to solve different types of similar problems or variations of the problem
	13. BP shall have elements/rules/principles describing a clear method for replicable application of the BP
	14. BP shall describe the expected results/outputs/outcomes of applying the BP
Requirements for applying BP	15. BP shall describe the supplementary and peripheral means that are necessary to be able to apply the BP
	16. BP shall describe the potential ability and skill of the end-user to apply the BP
	17. BP shall indicate an estimation of time/costs needed to apply the BP

	18. BP shall describe the obstacles/unexpected problems that may occur before, during, and after the application of the BP
	19. BP shall describe procedures to follow if certain obstacles/unexpected problems are encountered
Previous result and experiences	20. BP shall have references to previously successful and/or failed applications of the BP
	21. BP shall describe the results of previously successful applications of the BP
	22. BP shall describe the possible failure that may occur from applying the BP
	23. BP shall show example(s) (i.e., a demonstration) that illustrates how the BP can be used in a specific situation
	24. BP description shall contain user feedback assessing the productivity or payoff or economic advantages of the current BP documented
Categorization support	25. BP shall be classified as being aimed at increasing the competitiveness of a product or service or increasing the internal collaboration within the organization
	26. BP shall be classified as belonging to the type of (strategic, or tactical or operational) planning that BP is focused on
	27. BP shall be classified as belonging to an organizational scope that is (an individual, a group or enterprises)
	28. BP shall be classified as being implemented in a Technical, a Business and/or a Management area
	29. BP shall preferably be measured in qualitative or quantitative measures or a mix of them
	30. BP shall be classified to its degree of formalization as formal, semi-formal or informal

Appendix II

The Second Tentative Document Template

Category	Sub-category	Definition	Concepts	Definition
BP Representation-Related to documentation and presentation of a BP	Presentation Structure	Presentation Structure is a template to represent a BP	Pattern Attributes	Contains attributes often used in pattern descriptions, such as problem, solution and context
	Document metadata	Document metadata provide information about aspects of the document	Revision Information	Information about revisions and reviews of the BP
			Author Contact Information	Information about author and contact information
BP Actor-Related to user relationship and BP actor resource	BP actor Resource	BP actor Resource is an individual, group or role involved in the use of a BP	Community of Practice	Group of people who share a concern or a passion for something they do and learn how to do it better, and who may therefore use the BP
			Champion	An individual or role that facilitates and supports the success of the BP
			Owner	An individual, role, unit or organization that owns the BP
	User Relationship	User relationship is a relationship between a user and a BP	Training Needs	The degree to which a person has to be trained in order to use the BP
			Usability	The degree to which the BP is easy to use
			Acceptability	The degree of acceptance of the BP to be used by domain experts for resolving a particular problem of interest
BP Proper-	Problem	Problem Rela-	Comprehen-	The degree to which

ties- Related to Internal BP characteristics and problem relationship	Relationship	tionship is the relationship between a business problem and a BP	siveness	the BP offers a comprehensive and complete view of the problem under consideration and of the proposed solution
			Relevance	The degree to which the BP addresses a significant problem as experienced by practitioners
			Justification	The degree to which there exist evidence that shows that the BP solves the problem
			Prescriptiveness	The degree to which the BP offers a concrete and tangible proposal for solving a problem
	Internal BP Characteristics	Internal BP Characteristics is the characteristics description of internal knowledge of BP	Coherence	The degree to which the BP constitutes a coherent unit
			Consistency	The degree to which the BP is consistent with existing knowledge and vocabulary used in the target industry sector or knowledge domain
			Granularity	The degree to which the description of the BP has appropriate details to address the problem
			Adaptability	The degree to which the BP can be easily modified and adapted to other situations
			Activity	Task to be carried out in the BP
	BPs rela-		Integration	The degree to which

	tionships			the BP is integrated with other BPs and KM components
BP Implementation-Related to evaluate and apply BP	Application	Application is about applying the BP in practice	Demonstration of Success	A case where the BP is successfully demonstrated
			Installation Time	Time it takes to introduce and implement the BP in an organization
			Application Time	Time it takes to carry out the BP in an organization
	Evaluation	Evaluation is a systematic determination of a BP merits, worth and significance	Experiences and Feedback	Users' opinions, advices and experiences
			Measurement	An indicator for the quality and performance of the BP

Appendix III

Correspondences between First Tentative BP Document Template and Second Tentative BP Document Template

First Tentative BP Document Template	Second Tentative BP Document Template
1. BP shall include the essential elements of its nature	No correspondence but this is merged with the Summary attribute from the First Tentative BP Document Template)
2. BP shall contain a dramatic climax or some information that highlights what is most important in the BP	No correspondence but this is covered by the Summary attribute in the Final BP Document Template (and first presented in the First Tentative BP Document Template)
3. BP shall contain information of the date when it was written and who wrote the BP	Revision Information, which is information about when the BP was recently revised reviewed and renewed. And Author Contact Information, which is author contact information exchange
7. BP shall describe the advantageous outcome of its application	No correspondence, but this was covered with four attributes that are: Demonstration of success, which is a case where the BP is successfully demonstrated Acceptability: The degree of acceptance of the BP to be used by domain experts for resolving a particular problem of interest. Relevance: The degree to which the BP addresses a significant problem as experienced by practitioners Justification: The degree to which there exist evidence that shows that the BP solves the problem
8. BP shall describe in which respect it is better than other alternative practices	No correspondence, but this was covered with four attributes that are: Demonstration of success, which is a case where the BP is successfully demonstrated Acceptability: The degree of acceptance of the BP to be used by domain experts for resolving a particular problem of interest. Relevance: The degree to which the BP addresses a significant problem as experienced by practitioners Justification: The degree to which there exist evidence that shows that the BP solves the prob-

	lem
10. BP shall describe the context/situation to determine if the BP is relevant or not	No correspondence, but this attribute is covered by most of the attribute in the Final BP Document Template. It can also be covered in the Pattern Attributes, which can contain Context as a value
11. BP shall describe problems/challenges that the BP addresses	No correspondence, but this was merged with Goal from the First Tentative BP Document Template. This attribute can also be covered in the Pattern Attributes, which can contain Problem as a value
12. BP shall have information to solve different types of similar problems or variations of the problem	Adaptability, which is the degree to which the practice can be easily modify and adapted in other situation
13. BP shall have elements/rules/principles describing a clear method for replicable application of the BP	Activity, which is task to be carried out in the BP
14. BP shall describe the expected results/ outputs/outcomes of applying the BP	No correspondence, but this was merged with Goal from the First Tentative BP Document Template
17. BP shall indicate an estimation of time/costs needed to apply the BP	Installation Time, which is time it takes to introduce and implement the BP in the organization And Application Time: Time it takes to carry out the BP
23. BP shall show example(s) (i.e., a demonstration) that illustrates how the BP can be used in a specific situation	Demonstration of Success, which is a process where a BP is successfully demonstrated
20. BP shall have references to previously successful and/or failed applications of the BP	Experiences and Feedback, which is users' opinions, advices and experiences
21. BP shall describe the results of previously successful applications of the BP	Demonstration of Success, which is a case where a BP is successfully demonstrated
24. BP description shall contain user feedback assessing the productivity or payoff or economic advantages of the current BP documented	Experiences and Feedback, which is users' opinions, advices and experiences
25. BP shall be classified as being aimed at increasing the competitiveness of a product or service or	This attribute is one of six attributes aimed to be used mainly as indexing BPs and were therefore not of interest for the Final BP Document Tem-

increasing the internal collaboration within the organization	plate
26. BP shall be classified as belonging to the type of (strategic, or tactical or operational) planning that BP is focused on	This attribute is one of six attributes aimed to be used mainly as indexing BPs and were therefore not of interest for the Final BP Document Template
27. BP shall be classified as belonging to an organizational scope that is (an individual, a group or enterprises)	This attribute is one of six attributes aimed to be used mainly as indexing BPs and were therefore not of interest for the Final BP Document Template
28. BP shall be classified as being implemented in a Technical, a Business and/or a Management area	This attribute is one of six attributes aimed to be used mainly as indexing BPs and were therefore not of interest for the Final BP Document Template
29. BP shall preferably be measured in qualitative or quantitative measures or a mix of them	This attribute is one of six attributes aimed to be used mainly as indexing BPs and were therefore not of interest for the Final BP Document Template
30. BP shall be classified to its degree of formalization as formal, semi-formal or informal	This attribute is one of six attributes aimed to be used mainly as indexing BPs and were therefore not of interest for the Final BP Document Template

Appendix IV

Corresponding literature for each vale in BP Annotation Template

BP Attribute	Value	Corresponding Literature
Degree of cooperation	Competitive	Aluchna (2009); Asrofah et al., (2010); Beaumont (2005); Bergek and Norrman (2008); Dana and Smyrnios (2010); Davies and Kochhar (2002); Dinur et al., (2009); Done et al., (2011); Jarrar and Zairi (2000); Mansar and Reijers (2007); Netland and Alfnes (2011); Leskiw and Singh (2007); Shull and Turner (2005); Smith et al., (2010); Szulanski (1996); Van Landeghem and Persoons (2001); Xu and Yeh (2010); Zairi and Ahmed (1999); Zandi and Tavana (2011)
	Collaborative	Burke and Hutchins (2008); Fragidis and Tarabanis (2006); Graupner et al., (2009); O'Dell and Grayson (1998); Olfman et al., (2003); Reddy and McCarthy (2006); Zhu et al., (2007)
Organizational level	Operational	Aluchna (2009); Asrofah et al., (2010); Beaumont (2005); Bergek and Norrman (2008); Burke and Hutchins (2008); Dana and Smyrnios (2010); Davies and Kochhar (2002); Fragidis and Tarabanis (2006); Graupner et al., (2009); Jarrar and Zairi (2000); Mansar and Reijers (2007); Leskiw and Singh (2007); Reddy and McCarthy (2006); Shull and Turner (2005); Smith et al., (2010); Xu and Yeh (2010); Zhu et al., (2007)
	Tactical	Dinur et al., (2009); Done et al., (2011); Netland and Alfnes (2011); Szulanski (1996); Van Landeghem and Persoons (2001); Zandi and Tavana (2011)
	Strategy	O'Dell and Grayson (1998); Olfman et al., (2003); Zairi and Ahmed (1999)
Scope	Local enterprises	Aluchna (2009); Asrofah et al., (2010); Beaumont (2005); Bergek and Norrman (2008); Burke and Hutchins (2008); Dana and Smyrnios (2010); Done et al., (2011); Fragidis and Tarabanis (2006); Graupner et al., (2009); Netland and Alfnes (2011); Olfman et al., (2003); Leskiw and Singh (2007); Reddy and McCarthy (2006); Shull and Turner (2005); Smith et al., (2010); Zandi and Tavana (2011); Zhu et al.,

		(2007)
	Global enterprises	Davies and Kochhar (2002); Dinur et al., (2009); Jarrar and Zairi (2000); Mansar and Reijers (2007); O'Dell and Grayson (1998); Szulanski (1996); Van Landeghem and Persoons (2001); Xu and Yeh (2010); Zairi and Ahmed (1999)
Completeness of document	Complete with context	Dana and Smyrnios (2010); Graupner et al., (2009); Olfman et al., (2003), Smith et al., (2010)
	Basic parts	Aluchna (2009); Asrofah et al., (2010); Beaumont (2005); Bergek and Norrman (2008); Burke and Hutchins (2008); Davies and Kochhar (2002); Dinur et al., (2009); Done et al., (2011); Fragidis and Tarabanis (2006); Jarrar and Zairi (2000); Mansar and Reijers (2007); Netland and Alfnes (2011); Leskiw and Singh (2007); O'Dell and Grayson (1998); Reddy and McCarthy (2006); Shull and Turner (2005); Szulanski (1996); Van Landeghem and Persoons (2001); Xu and Yeh (2010); Zairi and Ahmed (1999); Zandi and Tavana (2011); Zhu et al., (2007)
Degree of quantification	Qualitative measures	Aluchna (2009); Beaumont (2005); Bergek and Norrman (2008); Burke and Hutchins (2008); Dana and Smyrnios (2010); Dinur et al., (2009); Done et al., (2011); Fragidis and Tarabanis (2006); Graupner et al., (2009); Mansar and Reijers (2007); Netland and Alfnes (2011); Olfman et al., (2003), Leskiw and Singh (2007); Reddy and McCarthy (2006); Smith et al., (2010); Szulanski (1996); Van Landeghem and Persoons (2001); Xu and Yeh (2010); Zhu et al., (2007)
	Quantitative measures	Davies and Kochhar (2002); Jarrar and Zairi (2000); O'Dell and Grayson (1998); Zairi and Ahmed (1999); Zandi and Tavana (2011)
	Mixed measures	Asrofah et al., (2010); Shull and Turner (2005)
Implementation areas	Technical area	Shull and Turner (2005); Zhu et al., (2007)
	Business area	Asrofah et al., (2010); Beaumont (2005); Bergek and Norrman (2008); Burke and Hutchins (2008); Dana and Smyrnios (2010); Davies and Kochhar (2002); Dinur et al., (2009); Done et al., (2011); Fragidis and Tarabanis (2006); Graupner et al., (2009); Jarrar and Zairi (2000); Mansar and Reijers (2007); Netland and Alfnes (2011); Olfman et al., (2003); Reddy and McCarthy (2006); Szulanski (1996); Zandi and Ta-

		vana (2011); Xu and Yeh (2010)
	Management area	Aluchna (2009); Leskiw and Singh (2007); O'Dell and Grayson (1998); Smith et al., (2010); Van Landeghem and Persoons (2001); Zairi and Ahmed (1999)
Level of formalization	Informal	Aluchna (2009); Asrofah et al., (2010); Beaumont (2005); Bergek and Norrman (2008); Burke and Hutchins (2008); Dana and Smyrnios (2010); Davies and Kochhar (2002); Dinur et al., (2009); Done et al., (2011); Fragidis and Tarabanis (2006); Graupner et al., (2009); Mansar and Reijers (2007); Netland and Alfnes (2011); Olfman et al., (2003), Leskiw and Singh (2007); Reddy and McCarthy (2006); Smith et al., (2010); Van Landeghem and Persoons (2001)
	Semi-formal	Jarrar and Zairi (2000); O'Dell and Grayson (1998); Szulanski (1996); Xu and Yeh (2010); Zairi and Ahmed (1999)
	Formal	Shull and Turner (2005); Zandi and Tavana (2011); Zhu et al., (2007)
Process area	Internal process	Smith et al., (2010); Dinur et al., (2009); Mansar and Reijers (2007); Beaumont (2005); Asrofah et al., (2010); Xu and Yeh (2010); Burke and Hutchins (2008); Netland and Alfnes (2011); Davies and Kochhar (2002); Leskiw and Singh (2007); Jarrar and Zairi (2000); Zandi and Tavana (2011)
	External inbound process	Van Landeghem and Persoons (2001); Xu and Yeh (2010); Olfman et al., (2003); Netland and Alfnes (2011)
	External outbound process	Smith et al., (2010); Dinur et al., (2009); Mansar and Reijers (2007); Beaumont (2005); Van Landeghem and Persoons (2001); Xu and Yeh (2010); Burke and Hutchins (2008); Davies and Kochhar (2002); Leskiw and Singh (2007); Bergek and Norrman (2008); O'Dell and Grayson (1998)
BSC perspective	Learning and growth	Zairi and Ahmed (1999); Xu and Yeh (2010); Olfman et al., (2003); Burke and Hutchins (2008); Zandi and Tavana (2011); Leskiw and Singh (2007); Szulanski (1996); Fragidis and Tarabanis (2006); O'Dell and Grayson (1998); Dana and Smyrnios (2010); Aluchna (2009)
	Internal business processes	Done et al., (2011); Beaumont (2005); Xu and Yeh (2010); Zandi and Tavana (2011); Jarrar and Zairi (2000); Fragidis and Tarabanis (2006); Mansar and

		Reijers (2007); Graupner et al. (2009)
	Customer perspective	Done et al., (2011); Beaumont (2005); Asrofah et al., (2010); Zairi and Ahmed (1999); Xu and Yeh (2010); Zandi and Tavana (2011); O'Dell and Grayson (1998); Dinur et al. (2009); Smith et al. (2010)
	Financial perspective	Dinur et al., (2009); Xu and Yeh (2010); Zandi and Tavana (2011); Aluchna (2009)
Management process	Authorization process	Done et al., (2011); Graupner et al., (2009); Leskiw and Singh (2007); Jarrar and Zairi (2000); Bergek and Norrman (2008); Mansar and Reijers (2007); Beaumont (2005); Aluchna (2009), Dinur et al. (2009)
	Information distribution process	Van Landeghem and Persoons (2001); Shull and Turner (2005); Graupner et al., (2009); Netland and Alfnes (2011); Zhu et al. (2007)
	Resource allocation process	Smith et al., (2010); Mansar and Reijers (2007); Done et al., (2011); Shull and Turner (2005); Olfman et al., (2003); Graupner et al., (2009); Bergek and Norrman (2008); O'Dell and Grayson (1998); Dana and Smyrnios (2010); Leskiw and Singh (2007)
	Accountability allocation process	Shull and Turner (2005); Graupner et al., (2009); Leskiw and Singh (2007); Jarrar and Zairi (2000); Szulanski (1996); Aluchna (2009); Burke and Hutchins (2008); O'Dell and Grayson (1998)
	Planning process	Done et al., (2011); Beaumont (2005); Van Landeghem and Persoons (2001); Shull and Turner (2005); O'Dell and Grayson (1998); Dana and Smyrnios (2010); Burke and Hutchins (2008); Reddy and McCarthy (2006), Leskiw and Singh (2007)
	Monitoring process	Dinur et al., (2009); Beaumont (2005); Asrofah et al., (2010); Aluchna (2009); Graupner et al. (2009); Smith et al. (2010)
	Controlling process	Mansar and Reijers (2007); Van Landeghem and Persoons (2001); Shull and Turner (2005); Olfman et al., (2003); Davies and Kochhar (2002); Dana and Smyrnios (2010); Aluchna (2009); Netland and Alfnes (2011); Dinur et al. (2009); Graupner et al. (2009)
	Evaluation process	Smith et al., (2010); Dinur et al., (2009); Mansar and Reijers (2007); Zairi and Ahmed (1999); Xu and Yeh (2010); Olfman et al., (2003); Zandi and Tavana (2011); Davies and Kochhar (2002); Leskiw and Singh (2007); Jarrar and Zairi (2000); Szulanski

		(1996); Dana and Smyrnios (2010); Van Landeghem and Persoons (2001)
	Rewarding Process	Dinur et al., (2009); Done et al., (2011); Zairi and Ahmed (1999); Olfman et al., (2003); Reddy and McCarthy (2006); Leskiw and Singh (2007); Szulanski (1996); O'Dell and Grayson (1998); Dana and Smyrnios (2010)
	Development Process	Done et al., (2011); Beaumont (2005); Shull and Turner (2005); Olfman et al., (2003); Zandi and Tavana (2011); Reddy and McCarthy (2006); Leskiw and Singh (2007); O'Dell and Grayson (1998); Mansar and Reijers, 2007; Dana and Smyrnios, 2010; Burke and Hutchins, (2008)
	Maintenance Process	Shull and Turner (2005); Graupner et al., (2009); O'Dell and Grayson (1998); Xu and Yeh, (2010); Smith et al. (2010)
	Education Process	Dinur et al., (2009); Burke and Hutchins (2008); Dana and Smyrnios (2010); Jarrar and Zairi, (2000); Leskiw and Singh (2007), Reddy and McCarthy (2006)

Appendix V

Corresponding literature for each BP attributes in BP Document Template

BP Attributes	Corresponding Literature
Pattern Attribute	Niwe and Stirna (2009), Persson et al, (2008), Niwe and Stirna, (2010) and Dani et al, (2006)
Revision Information	Zhu et al, (2007), Asoh et al, (2002), Zairi and Ahmed (1999), Niwe and Stirna (2009), Niwe and Stirna (2010), Graupner et al, (2009), Persson et al, (2008), Motahari-Nezhad et al, (2010), O'Dell and Grayson (1998)
Author Contact Information	Dinur et al, (2009), O'Dell and Grayson (1998), Done et al, (2011), Dani et al, (2006), Niwe and Stirna (2010), Burke and Hutchins (2008), Zhu et al, (2007), Graupner et al, (2009), Jarrar and Zairi (2000), O'Dell and Grayson (1998)
Community of Practice	Shull and Turner (2005), Fragidis and Tarabanis (2006), Olfman et al, (2003), Asoh et al, (2002), Shull and Turner (2005), O'Dell and Grayson (1998), Dani et al, (2006)
Champion	Smith et al, (2010), Beaumont (2005), Asrofah et al, (2010), Persson et al, (2008), Done et al, (2011), Olfman et al, (2003), Zairi and Ahmed (1999)
Owner	Szulanski (1996), Timbrell et al, (2001), Jarrar and Zairi (2000), Persson et al, (2008), Olfman et al, (2003), Shull and Turner (2005)
Training Needs	Burke and Hutchins (2008), Olfman et al, (2003), Dani et al, (2006), Reddy and McCarthy (2006), Persson et al, (2008) and Jarrar and Zairi (2000)
Acceptability	Zandi and Tavana (2011), Shull and Turner (2005) and Done et al, (2011), Timbrell et al, (2001), Niwe and Stirna (2010), Zairi and Ahmed (1999), Reddy and McCarthy (2006), Shull and Turner (2005), O'Dell and Grayson (1998), Dani et al, (2006), Graupner et al, (2009), Smith et al, (2010) and Szulanski (1996)
Usability	Axelsson et al, (2011), Mansar and Reijers (2007), Persson et al, (2008), Shull and Turner (2005), Smith et al, (2010), Szulanski (1996), Jarrar and Zairi (2000), Shull and Turner (2005), Zandi and Tavana (2011), Asoh et al, (2002), Dani et al, (2006), Reddy and McCarthy (2006), Niwe and Stirna (2010), Niwe and Stirna (2009), Zairi and Ahmed (1999)
Comprehensiveness	Xu and Yeh (2010), Dana and Smyrnios (2010) and Niwe and Stirna (2009), Niwe and Stirna (2010), Reddy and McCarthy (2006), Shull and Turner (2005), O'Dell and Grayson (1998), Beaumont (2005), Timbrell et al, (2001), Asrofah et al, (2010),

	Motahari-Nezhad et al, (2010), Persson et al, (2008) and Graupner et al, (2009)
Relevance	Zairi and Ahmed (1999), Zhu et al, (2007), Persson et al, (2008), Asrofah et al, (2010), Reddy and McCarthy (2006), Done et al, (2011), Fragidis and Tarabanis (2006), Szulanski (1996), Smith et al, (2010), Xu and Yeh (2010), Niwe and Stirna (2009), Shull and Turner (2005), Dani et al, (2006)
Justification	Dana and Smyrnios (2010), O'Dell and Grayson (1998), Szulanski (1996), Done et al, (2011), Smith et al, (2010), Zhu et al, (2007), O'Dell and Grayson (1998), Persson et al, (2008), Dinur et al, (2009), Niwe and Stirna (2009) and Timbrell et al, (2001)
Prescriptiveness	Barclay and Osei-Bryson (2010), Shull and Turner (2005), Niwe and Stirna, (2009) and Szulanski (1996)
Coherence	Persson et al, (2008), Davies and Kochhar (2002), Dana and Smyrnios (2010), Niwe and Stirna (2009), Reddy and McCarthy (2006), Shull and Turner (2005), Done et al, (2011), Dani et al, (2006), Graupner et al, (2009)
Consistency	Smith et al, (2010), Done et al, (2011), Barclay and Osei-Bryson (2010), Davies and Kochhar (2002), Asrofah et al, (2010), Dana and Smyrnios (2010), Niwe and Stirna (2009), Barclay and Osei-Bryson (2010), Shull and Turner (2005), Axelsson et al, (2011), Graupner et al, (2009) and Jarrar and Zairi (2000)
Granularity	Motahari-Nezhad et al, (2010), Mansar and Reijers (2007), Graupner et al, (2009), Niwe and Stirna (2009), Szulanski (1996), Persson et al, (2008), Shull and Turner (2005) and Dani et al, (2006)
Adaptability	Chourides et al, (2003), Fragidis and Tarabanis (2006), Smith et al, (2010), Dani et al, (2006), Dana and Smyrnios, (2010), Done et al, (2011), Szulanski (1996), Reddy and McCarthy (2006), Zairi and Ahmed (1999), Motahari-Nezhad et al, (2010), Mansar and Reijers (2007), Shull and Turner (2005), O'Dell and Grayson (1998), Persson et al, (2008), Asrofah et al, (2010), Jarrar and Zairi (2000) and Niwe and Stirna (2009)
Activity	Persson et al, (2008), Zairi and Ahmed (1999), Beaumont (2005), Jarrar and Zairi (2000), Motahari-Nezhad et al, (2010), Done et al, (2011), Dani et al, (2006), Graupner et al, (2009)
Integration	Dinur et al, (2009), Asoh et al, (2002), Olfman et al, (2003), Persson et al, (2008), Dana and Smyrnios, (2010), Szulanski (1996), Graupner et al, (2009) and Timbrell et al, (2001)
Demonstration of Success	Persson et al, (2008), Jarrar and Zairi (2000), O'Dell and Grayson (1998), Dani et al, (2006), Dana and Smyrnios, (2010) and Zairi and Ahmed (1999)
Installation Time	Zandi and Tavana (2011), Asrofah et al, (2010), Burke and

	Hutchins (2008), Davies and Kochhar (2002), Persson et al, (2008), Mansar and Reijers (2007), Done et al, (2011), Niwe and Stirna (2009) and Jarrar and Zairi (2000)
Application Time	Davies and Kochhar (2002), Done et al, (2011), Dinur et al, (2009), Motahari-Nezhad et al, (2010), Asoh et al, (2002), Burke and Hutchins (2008), Graupner et al, (2009), Persson et al, (2008) and Dani et al, (2006)
Experiences and Feedback	Niwe and Stirna (2010), Axelsson et al, (2011), Zhu et al, (2007). Asoh et al, (2002), Fragidis and Tarabanis (2006), Szulanski (1996), Zairi and Ahmed (1999), Motahari-Nezhad et al, (2010), Xu and Yeh (2010), Shull and Turner (2005), Zhu et al, (2007), Dinur et al, (2009), Mansar and Reijers (2007), Niwe and Stirna (2009), Smith et al, (2010), Dani et al, (2006), Persson et al, (2008) and Jarrar and Zairi (2000)
Measurement	Xu and Yeh (2010), Chourides et al, (2003), Done et al, (2011), Dana and Smyrnios, (2010), Done et al, (2011), Niwe and Stirna (2010), Zandi and Tavana (2011), Davies and Kochhar (2002), Zairi and Ahmed (1999), Dani et al, (2006), Shull and Turner (2005), Beaumont (2005), Timbrell et al, (2001) and Smith et al, (2010)

Appendix VI

A letter sent to the participants to invite them to participate in evaluation the BP Annotation Template.

Dear Sir/Madam,

My name is Meshari Alwazae. I'm a senior PhD candidate at the Department of Computer and Systems Sciences (DSV), at Stockholm University. I am a member of the Information Systems research unit that specializes on IT Management.

As part of my PhD program at Stockholm University, I am conducting an empirical study on the area of knowledge management (KM) focusing on presenting a classification system to facilitate effective retrieval of best practices (BPs). I would like to cordially invite you to participate in my study since your profile and background makes me interested in your views regarding KM, and any further insights would be greatly appreciated.

Participation is anonymous, thus, information is collected anonymously and does not include content of the respondents' work. This means that no one will know what you have answered. This setting allows respondents to be free of any bias and hesitance when accepting to participate in the study.

Your help is of immense value to provide a pragmatic view on KM practices through organizations. In return to your effort and time, you will be given a free copy of the results as a small token of appreciation.

If you agree to participate in my study, I will conduct an interview with you at a time and a means of your choice. The interview will involve assessment for BP characteristics and eleven semi-structured questions about BP classification system. Therefore, please confirm your participation by replying back to me for arranging further details.

If you require more information please do not hesitate contacting me. I am looking forward to hearing from you positively.

Kind regards,

Meshari Alwazae
PhD Candidate
Department of Computer & Systems Sciences (DSV), Stockholm University
Office number: 7438
Tel: +46 8 161681
Mob: +46 700 297706
Skype: mesharysa

Appendix VII

Consent form to participate in research regarding evaluation of BP Annotation Template

Introduction and Purpose

My name is Meshari Alwazae. I am a senior PhD candidate at Stockholm University, Sweden, working with my faculty advisors, Professor Paul Johannesson and Dr. Erik Perjons in the Department of Computer and Systems Sciences (DSV). I would like to invite you to take part in my research study, which concerns to propose a classification system to facilitate effective retrieval of best practices (BPs).

Procedures

If you agree to participate in my research, I will conduct an interview with you at a time and a means of your choice. The interview will involve assessment of the BP classification system including 11 semi-structured questions about the system. The assessment is estimated to last about 30 minutes. With your permission, I will audiotape and take notes during the interview. The recording is to accurately record the information you provide, and will be used for transcription purposes only. If you choose not to be audiotaped, I will take notes instead. If you agree to being audiotaped but feel uncomfortable at any time during the interview, I can turn off the recorder at your request. Similar, if you do not wish to continue the interview, you can stop it at any time.

I expect to conduct only one interview. However, follow-ups may be needed for added clarification or final assessment of the modified classification system. If so, I will contact you by mail/phone to request this clarification or assessment. If needed, the follow-up interviews will occur within 6 months after conducting the first interview.

Benefits

In return to your effort and time, you will be given a free copy of the results as a small token of appreciation.

Confidentiality

Your data will be handled as confidentially as possible. If results of this study are published or presented, individual names and other personally

identifiable information will not be used, unless you give explicit permission for revealing your organization or your name.

To minimize the risks to violating confidentiality, you will be asked for oral rather than signed consent. Personal information is only used to administer the study. The interviews data and transcripts will be anonymized by random numbers associated with your name. The numbers is preserved in a separate password-protected document. The random numbers are archived until the thesis is published. No personal data will be stored longer than necessary. Also, transcribed (anonymous) interviews and data will be stored on my dropbox and I am responsible for them.

When the research is completed, I save the audiotapes and notes for use in my future research. I will retain these records for up to five years after the study is over and later I will destroy them. The same measures described above will be taken to protect confidentiality of the study data.

Compensation

You will not be paid for taking part in this study.

Rights

Participation in research is completely voluntary. You are free to decline to take part in the project.

You can decline to answer any questions and are free to stop taking part in the project at any time.

Questions

If you have any questions about this research, please feel free to contact me. I can be reached at 0046700297706 or meshari@dsv.su.se.

If you have any questions about your rights or treatment as a research participant in this study, please contact Professor Paul Johannesson at 00468161671, or e-mail pajo@dsv.su.se.

****

Consent

If you agree to participate, please say so. You will be given a copy of this form to keep for your own records.

Appendix VIII

Evaluation of the BP Annotation Template

My name is Meshari Alwazae, a PhD candidate at Stockholm University. I would like to invite you to take part in my research study, which concerns a classification system for best practices (BPs). The practical problem that triggered my work is that effective retrieval of BPs can be hindered because of low quality classification of the BP documents. In order to address this problem, I have proposed a classification system to facilitate effective retrieval of BPs.

The goal of this interview study is to evaluate the BP classification system.

For each of the characteristics below, please assess whether it is ***easy to annotate***, ***applicable to any BP***, and ***domain independent***. Please assess by using the values: **Yes**, **Maybe**, or **No**. Please feel free to comment your assessment.

List of classification system component

BP characteristics	Allowed values	Easy to annotate	Applicable to any BP	Domain independent	Comments
Degree of Co-operation means that the BP focuses on either increasing competitive edge or increasing	**Competitive** means that the BP focuses on making a practice, a product, or a service more competitive				
	Collaborative means that the BP focuses on collaborative KS for creativity and ingenuity/innovativeness				
Organizational Level means the level in an organization on which the BP focuses	**Operational** means that the BP focuses on a particular operational routine or business process				
	Tactical means that the BP focuses on tactical short-term goals, that is, the goals related to resource allocation				
	Strategic means that the BP focuses on more overarching, strategic, long-term				

	goals, such as which markets, products and customers to focus on				
Scope means the area or extension on which the BP focuses	**Local Enterprises** means that the BP focuses on issues related to a national, regional or local organization				
	Department of Enterprise means that the BP focuses on issues related to specific work related tasks within a department				
	Global Enterprises means that the BP focuses on issues related to a multinational organization				
Completeness of Document means that the BPD contains either necessary context for applying the BP without being familiar with the context, or the BPD does not	**Complete with Context** means that the BPD contains the context (that is, when to apply, where to apply, who to apply, and how to apply), which makes it possible for the user to apply the BP without being familiar with the context				
	Basic Parts means that the BPD contains only basic parts, such as how to apply it, which requires that the user of the BP must be familiar with the context in order to know how to apply it				
Degree of Quantification refers to the type of measures assigned to the BP	**Qualitative Measures** means that interpretive, soft measures are assigned to BPs				
	Quantitative Measures means that numerical, hard, values are assigned to BPs				
	Mixed Measures means that both soft and hard measures are assigned to BPs				
Implementation Area means the area	**Technical Area** means that application area of the BP is technical				

in which the BPs is intended to be applied	**Business Area** means that the application area of the BP includes some kind of business process, but not processes related management, leadership and governance				
	Management Area means that the application area of the BP is geared to upper-management, organizational leadership and governance				
Level of Formalization means the level of formalization of the BP	**Informal** means that the BP has the form of soft, informal suggestions				
	Semi-formal means that the BP has the form of directing functional considerations, for example, providing guidelines and business rules via established organizational procedures or expressed in official documents that are sometimes checked				
	Formal means that the BP has the form of a formalized procedure that needs to be followed in detail and which, therefore, might be embedded in the IT implementations of BPs, such as ERP or BPMSs				
Process Area means the process area upon which the BP focuses its support	**Internal Process** means that the BP focuses on supporting processes related to human resources, finance and accounting, and manufacturing				
	External Inbound Process means that the BP focuses on supporting processes related to supply chain management and logistics				
	External Outbound Process				

	means that the BP focuses on supporting processes related to marketing, customer services, and sales				
BSC Perspective means the BSC perspective on which the BP focuses	**Learning and Growth** means that the BP focuses on supporting infrastructure for long- term learning, growth and improvement				
	Internal Business Processes means that the BP focuses on supporting efficiency of the business processes of an organization				
	Customer Perspective means that the BP focuses on fulfilling the customer satisfaction and their needs, i.e., it focuses on the value proposition				
	Financial Perspective means that BP focuses on increasing revenue and reducing costs and risks				
Management Process is the MPs that the BP focuses on supporting	**Authorization Process** means that the BP focuses on supporting an MP in which the people authorized to carry out an activity are specified				
	Information Distribution Process means that the BP focuses on supporting an MP in which information needed to carry out activities is distributed to the people allocated to these activities				
	Resource Allocation Process means that the BP focuses on supporting an MP in which the people and other resources are allocated to work activities				
	Accountability Allocation Process means that the BP				

	focuses on supporting an MP in which the people accountable for an activity are specified				
	Planning Process means that the BP focuses on supporting an MP in which the activities/tasks are planned and ordered				
	Monitoring Process means that the BP focuses on supporting an MP in which the execution of the process is monitored for problems and deviations from the plan				
	Controlling Process means that the BP focuses on supporting an MP in which actions are taken to address execution problems and plan deviations				
	Evaluation Process means that the BP focuses on supporting an MP in which process performance and the quality of results are evaluated				
	Rewarding Process means that the BP focuses on supporting an MP in which rewards are distributed based on excellence in performance				
	Development Process means that the BP focuses on supporting an MP in which artifacts, such as IT systems, methods, and devices are developed				
	Maintenance Process means that the BP focuses on supporting an MP in which artifacts, such as IT systems, methods, and devices are maintained				

	Education Process means that the BP focuses on supporting an MP in which employees and business partners are educated				

Questions about the BP classification system:

- What is your overall opinion of the BP classification system?
- Which are, in your opinion, the benefits of the BP classification system? Why?
- Which are, in your opinion, the drawbacks of the BP classification system? Why?
- Which changes of the BP classification system do you suggest? Why?
- Which BP characteristics should be added? Why?
- Which BP characteristics should be removed? Why?
- Do you think the BP classification system is easy to annotate? Why or why not?
- Do you think the BP classification system is applicable to any BP? Why or why not?
- Do you think the BP classification system is domain independent? Why or why not?
- Do you think the system can facilitate high BP recall? Why? By recall we mean the fraction of the BP that are relevant to the search that are successfully retrieved. For example, if there are ten relevant BPs in the knowledge base and only two out of ten are retrieved during a search then you have low recall, but if you retrieve nine relevant BP out of ten then you have high recall.
- Do you think the system can facilitate high BP precision? Why? By precision we mean the fraction of retrieved BPs that are relevant to the search. For example, if all BPs retrieved during a search is relevant, the precision is high, but if many of the retrieved BPs are not relevant then the precision is low.

Appendix IX

A letter sent to the participants to invite them to participate in evaluation the BP Document Template.

Dear Sir/Madam,

My name is Meshari Alwazae. I'm a senior PhD candidate at the Department of Computer and Systems Sciences (DSV), at Stockholm University. I am a member of the Information Systems research unit that specializes on IT Management.

As part of my PhD program at Stockholm University, I am conducting an empirical study on the area of knowledge management (KM) focusing on presenting guidelines for best practices documentation (BPD). I would like to cordially invite you to participate in my study since your profile and background makes me interested in your views regarding KM and the practicality of the BPD guidelines, and any further insights would be greatly appreciated.

Participation is anonymous, thus, information is collected anonymously and does not include content of the respondents' work. This means that no one will know what you have answered. This setting allows respondents to be free of any bias and hesitance when accepting to participate in the study.

Your help is of immense value to provide a pragmatic view on KM practices through organizations. In return to your effort and time, you will be given a free copy of the results as a small token of appreciation.

If you agree to participate in my study, I will conduct an interview with you at a time and a means of your choice. The interview will involve assessment for BPD guidelines and nine semi-structured questions about BPD guidelines. Therefore, please confirm your participation by replying back to me for arranging further details.

If you require more information please do not hesitate contacting me. I am looking forward to hearing from you positively.

Best Regards,
Meshari Alwazae
PhD Candidate
Department of Computer & Systems Sciences (DSV), Stockholm University
Tel: +46 8 161681
Mob: +46 700 297706
Mob: 00966505555503
Skype: mesharysa

Appendix X

Consent form to participate in research regarding evaluation of BP Document Template

Introduction and Purpose

My name is Meshari Alwazae. I am a senior PhD candidate at Stockholm University, Sweden, working with my faculty advisors, Professor Paul Johannesson and Dr. Erik Perjons in the Department of Computer and Systems Sciences (DSV). I would like to invite you to take part in my research study, which concerns to define high quality guidelines for best practice documentation (BPD).

Procedures

If you agree to participate in my research, I will conduct an interview with you at a time and a means of your choice. The interview will involve assessment of BPD guidelines including nine semi-structured questions about the guidelines. The assessment is estimated to last about one hour. With your permission, I will audiotape and take notes during the interview. The recording is to accurately record the information you provide, and will be used for transcription purposes only. If you choose not to be audiotaped, I will take notes instead. If you agree to being audiotaped but feel uncomfortable at any time during the interview, I can turn off the recorder at your request. Similar, if you do not wish to continue the interview, you can stop it at any time.

I expect to conduct only one interview. However, follow-ups may be needed for added clarification or final assessment of the modified guidelines. If so, I will contact you by mail/phone to request this clarification or assessment. If needed, the follow-up interviews will occur within 6 months after conducting the first interview.

Benefits

In return to your effort and time, you will be given a free copy of the results as a small token of appreciation.

Confidentiality

Your data will be handled as confidentially as possible. If results of this study are published or presented, individual names and other personally identifiable information will not be used, unless you give explicit permission for revealing your organization or your name.

To minimize the risks to violating confidentiality, you will be asked for oral rather than signed consent. Personal information is only used to administer the study. The interviews data and transcripts will be anonymized by random numbers associated with your name. The numbers is preserved in a separate password-protected document. The random numbers are archived until the thesis is published. No personal data will be stored longer than necessary. Also, transcribed (anonymous) interviews and data will be stored on my dropbox and I am responsible for them.

When the research is completed, I save the audiotapes and notes for use in my future research. I will retain these records for up to five years after the study is over and later I will destroy them. The same measures described above will be taken to protect confidentiality of the study data.

Compensation

You will not be paid for taking part in this study.

Rights

Participation in research is completely voluntary. You are free to decline to take part in the project. You can decline to answer any questions and are free to stop taking part in the project at any time.

Questions

If you have any questions about this research, please feel free to contact me. I can be reached at 0046700297706 or meshari@dsv.su.se.

If you have any questions about your rights or treatment as a research participant in this study, please contact Professor Paul Johannesson at 00468161671, or e-mail pajo@dsv.su.se.

****

Consent

If you agree to participate, please say so. You will be given a copy of this form to keep for your own records.

Appendix XI

Evaluation of the BP Document Template

My name is Meshari Alwazae, a PhD candidate at Stockholm University. I would like to invite you to take part in my research study, which concerns documentation of best practices. The practical problem that triggered my work is that Best Practices (BPs) can be difficult to use because of low quality descriptions of the BPs. In order to address this problem, I have developed a number of guidelines for BP documentation (BPD).

The goal of this interview study is to evaluate the BPD guidelines.

For each guideline below, please assess its usefulness for high quality descriptions of BPs, using a value between 1 and 5, where 1= Not useful and 5 =Very useful. Please feel free to comment your answers.

List of BPD Elements

Category	Elements	Usefulness	Comments
Summary of BP	1. The BPD should include a title outlining the BP		
	2. The BPD should include a summary outlining the BP		
BP Representation	3. The BPD should include attributes often used in pattern descriptions, such as problem, solution and context		
	4. The BPD should specify information about revisions of the BP		
	5. The BPD should specify author and contact information		
	6. The BPD should specify information about reviews of the BP		
Requirements for Applying BP	7. The BPD should specify the goal of the BP		
	8. The BPD should specify the means that are needed for applying the BP		
	9. The BPD should specify the skills required of the end-user for applying the BP		
	10. The BPD should specify an estimation of the costs for applying the		

	BP		
	11. The BPD should specify the obstacles/ problems that may occur before, during, and after the applying the BP		
	12. The BPD should specify procedures to follow if certain obstacles/problems are encountered		
BP Actor	13. The BPD should specify the communities of practices that may be interested in using the BP		
	14. The BPD should specify the role of a champion for the BP		
	15. The BPD should specify the BP owner/responsible who might be an individual, role, unit or organization		
	16. The BPD should specify the degree to which a person has to be trained in order to use the BP		
	17. The BPD should specify the degree of BP acceptance by domain experts - in general and/or in the organization - for resolving the problem addressed by the BP		
BP Properties	18. The BPD should specify the degree to which the BP is easy to use		
	19. The BPD should specify the degree to which the BP offers a comprehensive and complete view of the problem and solution under consideration		
	20. The BPD should specify the degree to which the problem addressed by the BP is experienced as significant by practitioners		
	21. The BPD should specify the degree to which evidence shows that the BP solves the problem		
	22. The BPD should specify the degree to which the BP offers a concrete proposal for solving the problem		

	23. The BPD should specify the degree to which the BP constitutes a coherent unit, i.e., all parts are clearly related		
	24. The BPD should specify the degree to which the BP is consistent with existing knowledge and vocabulary used in the target industry sector or knowledge domain		
	25. The BPD should specify the degree to which it is appropriately detailed		
	26. The BPD should specify the degree to which the BP can be easily modified and adapted to other situations		
	27. The BPD should specify the tasks to be carried out in the BP		
	28. The BPD should specify the degree to which the BP is integrated with other BPs and KM components		
BP Implementation	29. The BPD should specify a case where the BP is successfully demonstrated		
	30. The BPD should specify the time it takes to introduce and implement the BP in an organization		
	31. The BPD should specify the time it takes to carry out the BP in an organization		
	32. The BPD should include users' opinions, advices and experiences		
	33. The BPD should specify some indicators for measuring the quality and performance of the BP		

Questions about the BPD guidelines.

- What is your overall opinion of the BPD guidelines?
- Which are, in your opinion, the benefits of the BPD guidelines? Why?

- Which are, in your opinion, the drawbacks of the BPD guidelines? Why?
- Which changes of the BPD guidelines do you suggest? Why?
- Which guidelines should be added? Why?
- Which guidelines should be omitted? Why?
- Which changes of the categories do you suggest? Why?
- Do you think the BPD guidelines are easy to use? Why or why not?

Do you think the BPD guidelines can be used for both design of BP and evaluation of BP? Why or why not?

Appendix XII

Demonstration of BP Document Template

Applying BP Document Template

My name is Meshari Alwazae, a PhD candidate at Stockholm University. I would like to invite you to take part in my research study, which concerns documentation of best practices. The practical problem that triggered my work is that Best Practices (BPs) can be difficult to be used because of low quality descriptions of the BPs. In order to address this problem, I have developed a template that consists of a number of attributes for BP documentation (BPD).

The goal of this interview study is to apply the template on some BPs from your organization.

For each element below, please comment what problem/s you have experienced while applying the BPD on BPs from your organization.

List of BPD Elements

Category	Elements	Experienced Problem/s while applying
Summary of BP	1. The BPD should include a title outlining the BP	
	2. The BPD should include a summary outlining the BP	
BP Representation	3. The BPD should include attributes often used in pattern descriptions, such as problem, solution and context	
	4. The BPD should specify information about revisions of the BP	
	5. The BPD should specify author and contact information	
	6. The BPD should specify information about reviews of the BP	
Requirements for Applying BP	7. The BPD should specify the goal of the BP	
	8. The BPD should specify the means that are needed for applying the BP	
	9. The BPD should specify the skills required of the end-user for applying the BP	
	10. The BPD should specify an estimation of the costs for applying the BP	

	11. The BPD should specify the obstacles/ problems that may occur before, during, and after the applying the BP	
	12. The BPD should specify procedures to follow if certain obstacles/problems are encountered	
BP Actor	13. The BPD should specify the communities of practices that may be interested in using the BP	
	14. The BPD should specify the role of a champion for the BP	
	15. The BPD should specify the BP owner/responsible who might be an individual, role, unit or organization	
	16. The BPD should specify the degree to which a person has to be trained in order to use the BP	
	17. The BPD should specify the degree of BP acceptance by domain experts - in general and/or in the organization - for resolving the problem addressed by the BP	
BP Properties	18. The BPD should specify the degree to which the BP is easy to use	
	19. The BPD should specify the degree to which the BP offers a comprehensive and complete view of the problem and solution under consideration	
	20. The BPD should specify the degree to which the problem addressed by the BP is experienced as significant by practitioners	
	21. The BPD should specify the degree to which evidence shows that the BP solves the problem	
	22. The BPD should specify the degree to which the BP offers a concrete proposal for solving the problem	
	23. The BPD should specify the degree to which the BP constitutes a coherent unit, i.e., all parts are clearly related	
	24. The BPD should specify the degree to which the BP is consistent with existing knowledge and vocabulary used in the target industry sector or knowledge domain	
	25. The BPD should specify the degree to which it is appropriately detailed	

	26. The BPD should specify the degree to which the BP can be easily modified and adapted to other situations	
	27. The BPD should specify the tasks to be carried out in the BP	
	28. The BPD should specify the degree to which the BP is integrated with other BPs and KM components	
BP Implementation	29. The BPD should specify a case where the BP is successfully demonstrated	
	30. The BPD should specify the time it takes to introduce and implement the BP in an organization	
	31. The BPD should specify the time it takes to carry out the BP in an organization	
	32. The BPD should include users' opinions, advices and experiences	
	33. The BPD should specify some indicators for measuring the quality and performance of the BP	

Questions about the BPD:

1. Which parts of your BP were easy to fit into the template? Why?
2. Which parts of your BP were difficult to fit into the template? Why? If there were such parts, please elaborate on the following:
A. Some parts of your BP fit into two or more elements in the template.
B. Some parts of your BP did not fit into the template.
C. Some elements should be added to the template.
D. Some elements should be reformulated.
3. Which elements of the template were not filled in? Why?
If there were such elements, please elaborate on the following:
A. The unfilled element does not seem important and could be removed.
B. The unfilled element could be removed because it is covered by other elements in the template.
C. The unfilled element is important in general, but not for this specific BP.
D. The unfilled element is important in general, but we did not have any information about it for our BP.
4. What is your overall opinion about applying the template and its elements?
5. Which are, in your opinion, the obstacles you encounter while applying the template and its elements? Why?
6. Do you suggest any modifications to improve the template and its elements?