

Executive Summary

Fakhar Abbas, student of Hasselt University located in Diepenbeek, Belgium, carried out this research. This thesis was written for the purpose of answering the main research question: "*Why Business Process Management is important for every company*"?

The first part of this thesis explains about the concept of Business Process Management (BPM). In addition, this part includes the explanation about different phases of BPM lifecycle and business modeling. In the second part, the problems faced by companies without having BPM are recognized which includes business agility, cost structure, process visibility/transparency, complex and changing business operations, and business process automation.

The third of the thesis incorporate major BPM issues and its solutions. The issues and limitations are divided into three different levels (strategic level, tactical and operational level) for the ease of understanding. Some of the major issues recognized are lack of governance, lack of employee's acceptance, mismatch between BPM efforts and organizational strategy, lack of standards, lack of BPM understanding and knowledge, and others. The major solutions to these problems are to have proper certification of BPM authentication standards and the directories of organization that illustrate the flexibility of organizational structure to ensure governance. For employees acceptance top management should be supportive and involved in the process. To better link the organizational strategy with BPM efforts portfolios and strategy maps should be created to see the processes within an organization and how these processes are related to an overall strategy.

After analyzing all the problems and solutions of BPM. The best BPM software are analyzed. A list of 16 top BPM software is created. The top five of these sixteen software are BPM'

Online, Replicon, Zoho Creator, Bizagi and QuickFMS. These top 5 software/systems have high customer satisfaction rate, they provide various pricing schemes for all company sizes, and they support most of the operating systems and devices in the market. Moreover, Each of these software have there own unique features such as agility, creation of the tasks and actions that are native to companies, transition from analog processes to digital processes, tracking of companies projects and clients based on their parameters, accessing real-time data for better transparency and accuracy, helping companies in boosting their efficiency and productivity. The Last two parts of this thesis include conclusion and recommendation.

ACKNOWLEDGEMENTS

I am a student at University of Hasselt, studying masters of management majoring in business process management. This thesis was written for the purpose of finalizing my master's studies and to demonstrate my knowledge and skills that I acquired during the study period.

Before starting it, I would like to thank the personnel who were involved and helped me to complete this research project successfully. I would like to express my deep gratitude to my Educational Supervisor Mr. Koen Vanhoof, for guiding me in the right direction and for giving me the feedback that was really useful. Secondly, I would like to thank all my colleagues for being a support in the research and for advising me in certain difficult situations. I am also grateful to the experts who I interviewed. In addition, special thank to University of Hasselt.

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1.0 Introduction

Nowadays companies are not only required to do more than they did before but they need to do it better, faster and preferably with lower costs and higher return on investment. Moreover, to maintain the competitive advantage and to deal with rapidly increasing global competition, “companies must continuously implement the best practice management principles, strategies and technologies” (Carpinetti et al., 2003). According to (Kilmann, 1995) one of the best practice management principles is Business Process Management (BPM).

BPM is a method to improve and optimize the business processes that are aimed to contribute in enterprise value and performance. It is not only performed by the IT department but also requires the participation of business departments for defining and changing business rules etc.

This thesis provides the findings of the entire research carried out during last few months. It is divided into eight main chapters and several sub chapters. First chapter of this thesis includes brief introduction. The second chapter includes problem definition, research questions, and research methodology. The third chapter includes the literature review, which includes description of business process management and its components. The fourth chapter explains the problems and difficulties that companies face without having business process management and how does BPM help companies in resolving these issues and challenges. The fifth chapter focuses on the limitations of business process management.

The sixth chapters include the information about the top 16 business process management systems that are currently available in the market. Moreover, The last few chapters of this thesis provide conclusion, and recommendations, based upon the entire research.

2.0 Definition of the Problem

The circumstance leading to this research is the objective to obtain a clear insight of the problem faced by companies without having BPM, solutions/advantages of BMP and limitation of the BPM because every organization has mutual business processes that are designed to achieve objectives. Nevertheless, for many different reasons many of these processes may be inefficient, slow, and uncertain. Hence, to become and stay competitive and successful, organizations should constantly improve their processes. If these organizations fail to constantly improve their processes it is likely that it will result in lower revenues, high costs, more unmotivated employees and less satisfied customers.

BPM is a strong tool, which companies can use to keep every part of operations running smoothly because BMP lays all of these processes under fresh scrutiny by using different models, metrics and analysis to make evaluations and to identify required improvements that will offer better performance.

The main questions and sub-questions have been formulated in cooperation with the educational supervisor (Koen Vanhoof)

2.1 Main Question:

“Why Business Process Management is important for every company?”

2.2 Sub questions:

To answer the main question certain sub questions need to be answered which are listed below:

1. *What are the major difficulties, which companies faces without having business process management?*

2. *How does business process management help the companies to solve these problems?*
3. *What kind of business process management software/systems are available in the market?*
4. *What are limitations of business process management?*

2.3 Methods of Research:

Different research methods can be used to answer the following sub-questions. For instance, qualitative research, quantitative research. For this thesis qualitative research methods will be used. Which includes interviews with experts, Desk research and literature study. Please note that this Research Methodology may be subjected to some changes depending on the circumstances. For detailed information please consult appendix 1.

3.0 Literature STUDY

3.1 Business Process Management

Nowadays many companies emphasize on a process-oriented approach to manage their business. This kind of approach is driven from the concept of Business Process Management. Organizations try to enhance their business performance by using BPM methods. BPM has become a vital way of monitoring and controlling business processes. In order to increase the total revenue, customer satisfactions and for ensuring regulatory compliance, it is important for organizations to discover, control and improve it processes.

This chapter mainly focuses on the definition of Business Process Management and the explanation of business process management lifecycle. Section 3.3 gives an overview on business process modeling.

Definition of Business Process Management:

BPM is a holistic management concept, which stands for Business Process Management. It takes into account organizational as well as the technical aspects of an organization. The main focus of this concept is to improve existing business processes in their efficiency and effectiveness. BPM considers two main features: First, the business processes and second, their management. Business processes includes a set of related activities that are performed to reach a specific business goal. These business processes are the major instruments in BPM, and they are guided by organizational environment and the business objectives. Understanding the characteristics of these processes is crucial to apply correct management tools and to drive changes in processes. Many different techniques, software, and methods are being used to design, control, and analyze these business processes. BPM also incorporates organizational assets such as individuals, documents, applications and other information sources or systems. By having an active management, these strategic

measures can be taken and used to enhance the value of these business processes.

3.2 BPM Life Cycle

The management activities in BPM can be arranged in a process lifecycle. The process lifecycle consist of 5 phases design, modeling, execution, monitoring, and optimization. Figure 1 depicts all individual phases in their logical order.

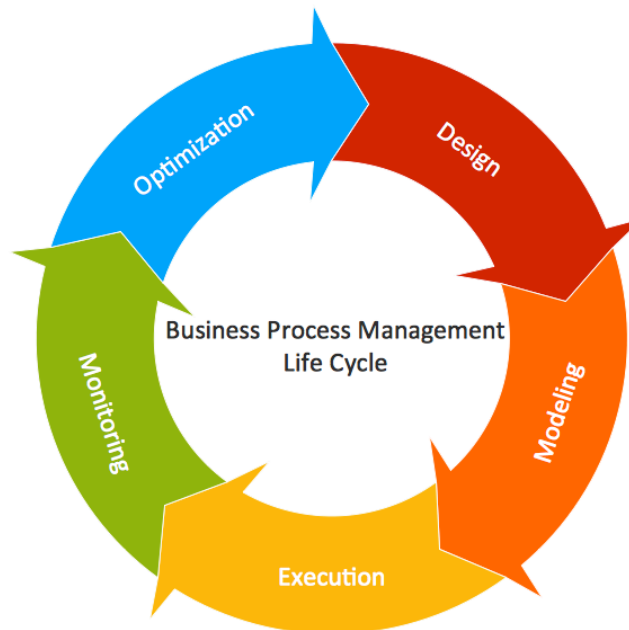


Figure 1: BPM Life Cycle

Design

The BPM Life Cycle starts with Design phase of any BPM project. Process design includes the identification of existing processes and the design of "to-be" processes. A good design decreases the number of problems over the lifetime of the process. The main goal of this

phase is to ensure that an appropriate and efficient theoretical design is created even when the existing processes are not taken into account. The proposed theoretical design could be system-to-system, system-to-human, and human-to-human workflows. It might also target market, competitive or regulatory challenges confronted by the businesses.

Modeling

Once the enhancements have been noted, Modeling is the next phase after design in BPM life cycle. It takes the theoretical design and presents combinations of variables. These variables determine how the process will operate under different circumstances.

Execution

Once the scenarios have been run and variables have been clarified, a process can be automated. There are two different approaches to automate processes. The first approach include buying or developing of an application that performs the mandatory steps of the process but in reality all these steps are hardly executed accurately or completely by these applications. The second approach it to use a combination of both human and software intervention. Nevertheless, the second approach is quite complicated which makes the documentation process more difficult.

As a solution to these problems many different software have been developed that allow the processes to be defined in a computer language so that the computer can directly execute these processes. The system has the ability to either use services in connected application to execute business operations or if a step is more complicated to automate then the system will request for human input. When compared to earlier approaches, executing a process definition directly can be straightforward and consequently easier to improve.

Monitoring

When a BPM system has been activated, it is vital to monitor and track all processes. In monitoring phase performance of process is measured. It includes tracking of individual process, so that information on process state can be seen easily. In addition, the statistics on the performance of processes can be provided.

Moreover, this information helps to improve the connected processes with customer and suppliers. Furthermore, in this phase major issues and potential opportunities for improvement are recognized. The level of monitoring depends on what kind of information business wants to analyze and evaluate and in what way business wants it to be monitored.

Optimization

Optimization phase includes getting performance information of the process from either modeling or monitoring phase that includes recognizing the potential or real bottlenecks and the potential opportunities for improvements. After recognizing this information, enhancements in the design of the process are applied which results in greater business value.

The Cycle Continues

Possibly the most significant aspect of BPM is one that is often ignored – continuous improvement. Since firm's change, the environment change, and the technology also change. Therefore the processes also need to change. So considering the 5 phases of BPM lifecycle as part of a continuous cycle is best because when a process changes are identified, the lifecycle starts again and the best improvements are ultimately implemented. This way continual and incremental improvements can be made to the process.

3.3 Business Process Modeling

Business Process Modeling is a crucial component of the whole Business Process Management. Even though these two concepts have the same abbreviation (BPM) but they should not be confused with each other (Business Process Modeling, 2010). “Models are real-world images, which reflect performance or look at reality. They allow us to develop better presentation, definition and understanding of the problem” (Kovačič & BosilijVukšić, 2005).

Business process models are mostly used to support the process improvement, process analysis, and development of software solutions. They help in getting to know the process, which provides better insight and overview. Business process modeling assist in identifying weaknesses in process implementation and also targets the main information needs that act as a basis for the information of the processes. Nonetheless, before completing any implementation, the renewed processes can be tested on models.

Formal process documentations are very important because without this documentation process complexities can burden an organization with unnecessary bottlenecks and hindrances. A well-created business process model can assist in tracing and eliminating those unseen costs, and delays. (Wahli, Avula, Macleod, Saeed & Vinther, 2007).

Business process model displays an abstract view of complex structures, which has many different advantages (Arjen & Petten, 2007):

- Clearly defined meaning of each process;
- Present graphical models which make it easier to understand and it allows different users to interpret it the same way;

- By combining existing processes new processes can be modeled.
- It allow to focus on specific parts of a structure, in such a way that key relationships are highlighted and irrelevant aspects are ignored.

Figure 2 illustrates the business process improvement process. As part of this process, modeling comes up in two phases (Kovačič, et al., 2004):

1. Process models “AS-IS” refers to the currently existing state of the business model. The current model has two primary goal: firstly, to identify problem areas such as inefficiencies and bottlenecks and secondly, presents a basis for the improved model.
2. Process models “TO-BE”: refer to various improved and optimized models, from which one model is acknowledged as the best solution.

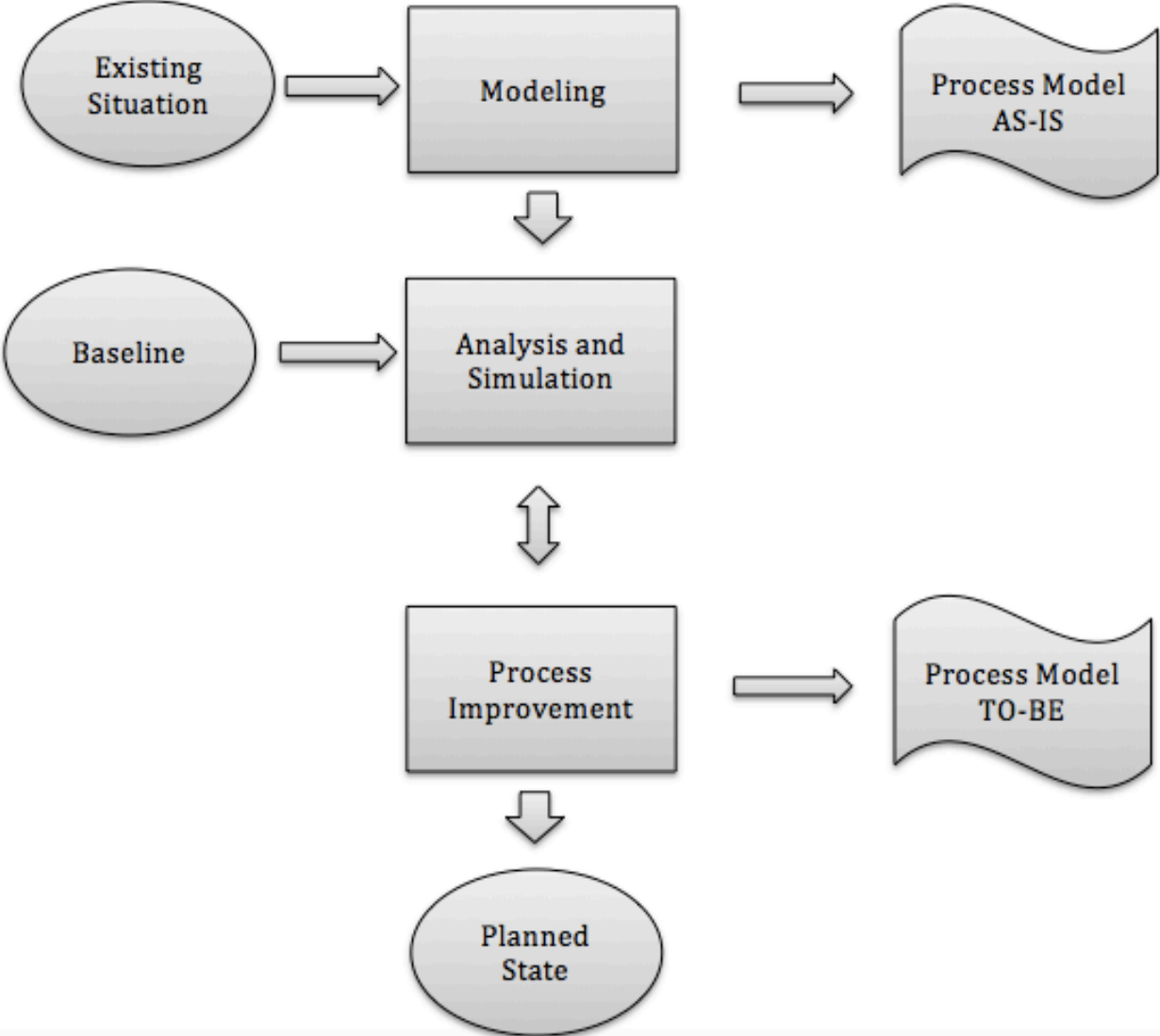


Figure 2: Business Process Improvement Process

4.0 ‘What are the major difficulties, which companies faces without having business process management and how does business process management help the companies to solve these problems?’

Business processes plays a serious part in facilitating companies to accomplish their business strategy by aligning companies resources, technology and supporting structures toward the achievement of desired business outcomes.

In 2016, Hochschule BonnRhein-Sieg, Vienna University of Economics, Hochschule Koblenz and Business in collaboration with the Advisory Council and Gesellschaft für Prozessmanagement conducted an international study known as “BPM Compass“. The major focus of the study was to identify business process management drivers, degree of implementation and current success factors. There were more than 400 participants (80 of them from non-German speaking countries). These participants include employees and management from different companies from different sectors.

According to this survey business process management has a high priority in the participants’ organizations at the moment and this importance will increase even more in the future. Around 85% of the participants states that the topic business process management will be an important or very important in the future. Just 5% of the participants state that business process management will remain a very unimportant topic both now and in the future. Figure 3 shows the outcome of the participant’s response.

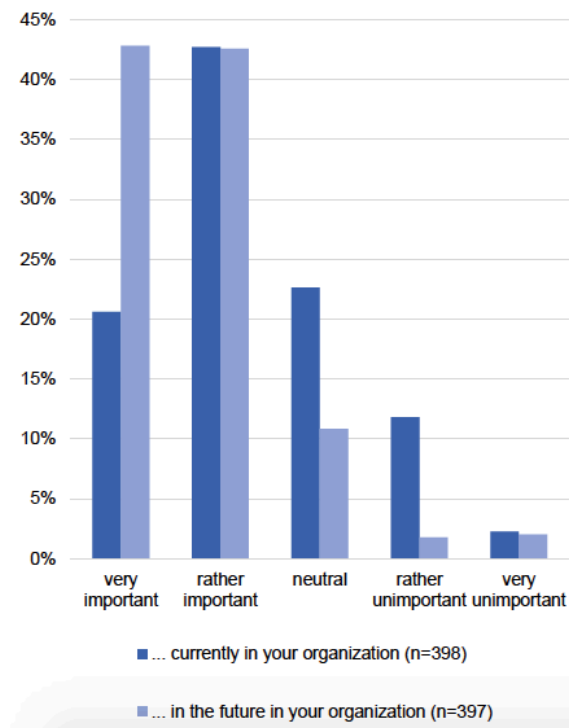


Figure 3: How Important is the topic Business Process Management (BPM Compass 2016)

However many companies still fail to recognize the important of these processes for their success, as a result companies face many problems. Some of the major problems are listed below:

- **Business Agility**

Many companies have to keep up with changing marketplaces associated to adjusting to their customer need, competitive needs, meeting regulatory requirements and/or developing to offer good customer experience. However, BPM provides business agility by allowing the companies to modify processes in a real-time manner. This result in a faster recognition of reduced process cycle time, improved customer service, and unique competitive advantage.

- **Cost Structure**

Many companies fail to understand their cost structure which can lead them to drastic problem or on the edge of bankruptcy because cost structure allow them to perceive exactly where there money is going. This information help companies to point out any unnecessary wastage/cost and enable them to make it more cost effective. Moreover by having a cost structure company will be able to examine each aspect of the process. BPM has major effect on an organization's cost structure because it enables cost reduction, quality improvements through automation efforts. Moreover, BPM can provide a unique insight of the cost structure by showing how costs are built up across the different processes. It may also identify exact areas for analysis that can result into a permanent removal of costs, without negatively impacting the output.

- **Process Visibility/Transparency**

Another problem that companies encounter today is an inability to proactively manage process/task service levels and to recognize where process issues exist. However, BPM solutions have the ability to provide Process Visibility/ Transparency. It facilitates a business process with the ability to manage process/task service level, escalations, arranging, and communication to proactively predict, manage and adjust current process problems while predicting and avert the future problems.

- **Complicated and Changing Business operations.**

Industries are developing together with the disruptive technologies (e.g cloud computing, social media and mobile) being fired at companies. Industrial development derives a change to company architecture.

Based on the Industrial Defender survey of 134 experts in critical infrastructure companies "the relationship between I.T. and operations is getting more complicated. 73% of those

surveyed expect to see either significant or moderate increases in connectivity between industrial endpoints and corporate IT infrastructure over the next three to five years."

These essential changes require an overhaul of business strategy. BPM goes further than outlining automation, I.T. assimilation, and workflow by concentrating on execution, and linking company processes to company's required goals and objectives.

- **Business Process Automation:**

Nowadays, businesses must follow strategies that reduce costs, save time, and increase efficiency. Business process automation (BPA) is a key method businesses often ignore when looking for ways to get an edge over the competition. BPA is important for all businesses no matter the size because large labor costs can incur when employees have to work overtime to perform certain tasks. Sometimes companies have to hire more employees to perform larger tasks to keep up the workload. Moreover, employees can spend many hours while performing repetitive task (e.g Generating reports and triggering data extracts). Worst of all is that human error can occur which can potentially cost million of euros etc.

Therefore BPA is crucial and BPM facilitate companies by making automation easier. It helps businesses create real working systems and it also help business owners in figuring out repetitive tasks that can be automated.

5.0 What are limitations of business process management?

So far we have found that business process management is important for businesses and organizations in many ways. As a result many businesses and organizations have already started the adoption of BPM initiatives. Business process management has many advantages for organizations. According to “BPM Compass” survey major factors for the sustainable success of business process management are mentioned in the figure 4.

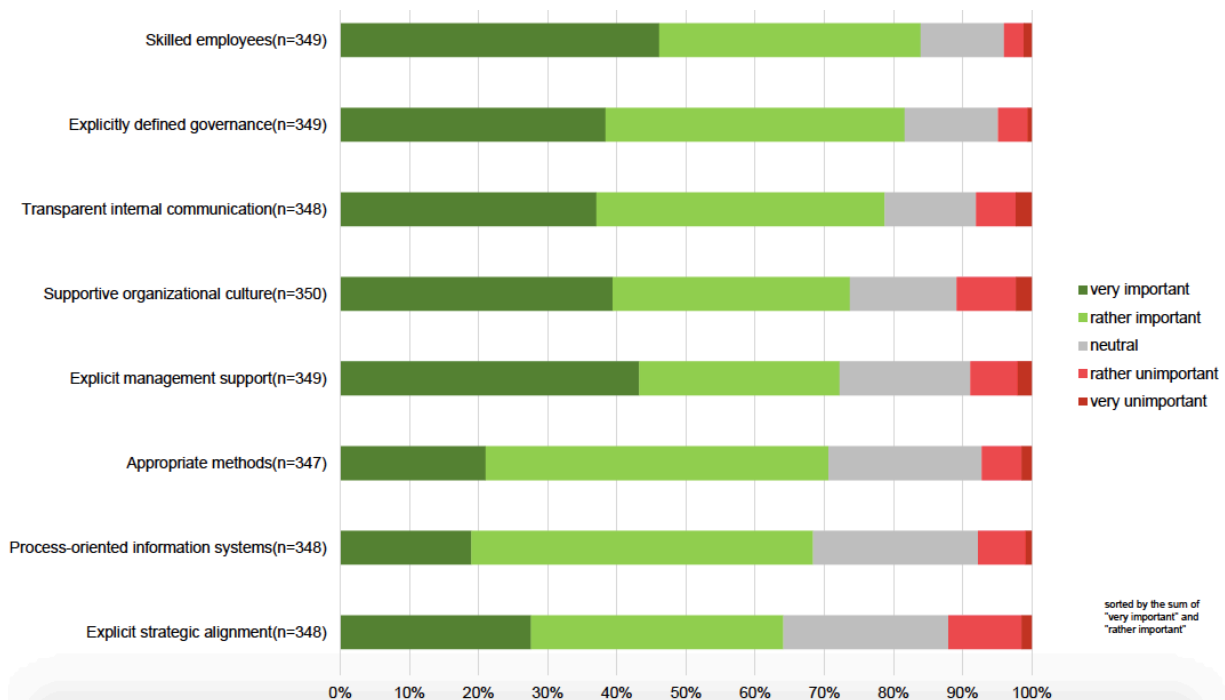


Figure 4: Major factors for the sustainable success of business process management (BPM Compass 2016)

This figure shows that more than 80% of the participants state skilled employees and defined governance as very important factors for sustainable success of an organization. The explicit strategic alignment is at the last for the participant’s relevancy, even though around 64% of the participants valued it as important factor. Remarkably, all the given factors were rated as important with more than 60%.

However, many companies still fail to understand and implement these success factors, which leads to problems or failure in business process management. In this chapter the main BPM limitations/issues observed by the experts that were interviewed and the experts at different organizational levels will be discussed. This chapter also includes data from the Survey conducted by BPM Trends focusing on “major issue in BPM”. In this survey fourteen international experts of business process management were interviewed during six-month period. The duration of each interview was around 45 minutes to 1 hour.

These limitations/issues are divided into three organizational levels; strategic level, tactical and operational level as indicated in Table 1. This method is used to understand the specific context of the limitations/issues. Firstly, three different organizational levels will be explained from the BPM perspective.

Strategic Level	Tactical Level	Operational Level
Lack Of Governance	Lack Of Standards	Lack of Tool support for process visualization
Lack of Employee’s acceptance	Weaknesses in process Specification	
Broken link between BPM efforts and organizational strategy	Lack of BPM Education Lack of methodology	Miscommunication of Tool capabilities

Table 1: BPM Limitations

Strategic level: It includes top management support, process organization, business/IT alignment and governance issues.

Tactical level: incorporates challenges that are related to business process modeling, process performance measurement, and business process management methodologies.

Operational level: Encompasses the technological issues in BPM adoption such as technology capability, Service Oriented Architectures (SOA), use of XML standards, maturity in the technology landscape etc.

5.1 Issues at the Strategic Level

- **Lack of Governance**

Lack of governance is a most common issue quoted by experts. To direct and manage companies, corporate governance system is used. Corporate governance system influences how a company set and achieves its objectives, how a company's performance is optimized and how a company monitor and assess its risks. (ASX Corporate Governance Council, 2003).

According to experts the biggest challenge for BPM is appropriate representation of organizations and assigning of the responsibilities and letting organizations to be very flexible whereas not losing track of any part of work at the same time. Moreover, ownership and control of process can be another problem from BPM perspective. There might be some questions raised, for instance who is the owner of the business process, who has the authority to change it, should I share my process with the competitors. Answering these questions is very important for effective implementation of BPM. However, there is no proper recommended procedure that will help in answering these questions.

It is claimed that resolving this problems is extremely difficult but there are few suggestions such as proper certification of BPM authentication standards and the directories of organization that illustrate the flexibility of organizational structures. Support

from the top management will also help to solve the issue mentioned above. Experts specified that governance is the real issue, “the biggest challenge for the next step forward in BPM is proper representation of organization and assignment of responsibility and allowing organizations to be extremely flexible while at the same time not losing track of any piece of work”.

- **Lack of employee’s Acceptance**

Employee’s acceptance can effect organization in a negative way if there is a lack of a mutual understanding of BPM. There are few reasons for this for instance, employees have lack of awareness of what BPM is about, there are range of views that exist of BPM because when comparing a manager with a technical person, their view about BPM would be different because business process management is a broad term. These different views and lack of understanding lead to misperception and dispute on the benefits of BPM. Moreover, middle management is also sometimes not supportive for BPM initiatives because they feel endangered by BPM because they lose control. The solution to this is to get top management support but obtaining top management support is itself a challenging task. However to get top management support it is important that management should be clearly explained the business need and how BPM help in achieving strategic goal and objectives.

Another major issue to employee’s acceptance is the shared opinion that BPM is about reducing employee-base. This problem is difficult to solve, because process automation and improvements do result in reduction in workforce. Nevertheless, this employee’s perception is common due to lack of understanding of BPM benefits.

- **Broken link between BPM efforts and organizational strategy**

BPM management should be a holistic approach. There should be no gap between organizational strategy and BPM efforts. There should be a complete alignment between strategic intent, strategic objectives to stakeholder and the processes, which contribute in

achieving these. When an organization run BPM project at different locations within organization, the problem of bringing these projects together within an overall process infrastructure may arise.

The solution to this problem is to use portfolios and strategy maps to see at the processes in an organization and how these processes are related to an overall strategy. This approach will also help organization to align different BPM projects together and aid in communicating the business value of BPM efforts to the appropriate stakeholders.

5.2 Issues at the Tactical Level

- **Lack of Standards**

Standards are terms that are approved by governing bodies or terms that are extensively accepted and used (de facto standards). In general, these standards provide an agreed upon basis with which hardware, communication and software can be specified. Therefore, these standards play a vital role in keeping consistency within and across organizations. In BPM perspective, these standards support completeness and consistency in BPM solutions, while allowing different departments within an organization to communicate their processes easily and effectively.

However, standards themselves can be problematic because BPM has various different views for different people, and standards groups. The application of standards is another related issue because it is difficult to decide when to use what standard and when to deviate from that standard. The simple solutions to this is to use these standards where they exist and they are good and then deviate from them if you have a valid reason to deviate.

- **Weaknesses in process specification**

Process specification is essential because it allows breaking up information islands in organizations to let people to have a wider look at the problem. To accomplish this organizations mostly use process modeling.

However, There is a difference between what could be modeled and what should be modeled and which modeling languages will really support it. Regarding the use of process modeling for process specification, organizations also usually over specify their process and by doing so they lose track of the bigger picture of the desired purpose of modeling; According to some Experts “Coming up with 400 different models is not important. Trying to analyze all the specifications is not important.” Some Experts suggested to model the processes at different levels of abstractions; “sometimes business people want to see their processes in a much more simple way so when we transform those processes to the technical view we still should be able to have that abstract view.”

- **Lack of BPM education**

Previous BPM studies have mentioned the significance of right skilled personnel and BPM education (Grover et al., 1998; Larsen and Myers, 1998; Murphy and Staples, 1998; Kettinger and Teng, 1997). Even tough after many years have been passed since the importance for need of BPM education has been identified, lack of proper BPM education is still a topic that is raised as a returning issue by the experts.

- **Lack of methodology**

According to some experts there is a need for methodology for BPM but it does not exist at this point. There are no methodologies, which means that there is not standardized approach of doing BPM. There is no consistent holistic methodology that directs the BPM projects end-to-end. According to many experts many companies get stuck to ad hoc-specific methodologies that occurs time-to-time. As a solution experts suggest that the

better approach is to use part of these different approaches and adapt to their own approach.

Moreover, according to expert there is a need for an overall encompassing methodology that focus on issues like, selection of appropriate tool and technique in BPM, BPM project scope management and maintenance of performance measures.

5.3 Issues at the Operational Level

Various organizations have numerous BPM technologies installed. But it does not mean that these technologies are BPM compliant because just having these technologies does not solve any issue nonetheless, it is important that how the technology is used. There are many different weaknesses from the tool vendors' side like, lack of tool support for process visualization, and miscommunication of tool capabilities.

- **Lack of tool support for process visualization**

“Process visualization is a core element within BPM projects, and this is often achieved with a series of as-is and to-be process modeling tasks. Process modeling is an approach for visually depicting how businesses conduct their operations by defining the entities, activities, enablers, and further relationships along control flows” (Curtis et al., 1992; Gill 1999). The graphical visualization of business processes in the form of process models is becoming very popular and important therefore a right tool support is crucial for successful process modeling (Bandara et al., 2005).

Experts, suggest that this gap that needs to be minimized. There are huge diagrams that are created through business process modeling software, and this adds visual complexity. Some tools try to minimize the complexity by breaking down the process but this

sometimes also introduce new complexities, particularly in regard to technology and process integration.

- **Miscommunication of tool capabilities**

The common problem that many users face when they purchase a tool is that they do not understand the full functionality of the tool(s). Vendors and consultants of the tool(s) have been blamed for providing inadequate details and/or deceptive information about the software.

5.3.1 General Problems with BPM

- Business process management has the ability to limit innovations because innovations that occur from process management are generally only incremental. As a result there are less chances that radical innovation will occur in a firm using business process management. According to Brenner and Tushman, companies that use BPM will have fewer chances of being successful during periods of rapid change than companies that do not use business process management. The solution to this problem is to build an ambidextrous firm because this kind of firms simultaneously manages exploration and exploitation. Moreover, according to Brenner and Tushman ambidextrous firms that use business process management are able to accomplish the purported benefits of business process management, while dodging the potential disadvantages.
- Another problem or situation, which can arise, is the belief that expensive BPM tools are needed to start. This assumption is mostly based on incorrect understanding of the BPM concept.

- Business Process Management Systems (BPMS) may cause additional costs for companies' in order to train their business users and operators with advanced technical skills and to make them understand and use the system.

5.3.2 Conclusion

Business process management offers many benefits to companies that have been mentioned earlier in the thesis. However, BPM can cause problems for companies at the same time when it is not executed or implemented in an appropriate manner. These problems incorporate lack of governance, lack of BPM understanding and knowledge, broken link between BPM efforts and organizational strategy, lack of employees acceptance, lack of standards, weak process specification, lack of methodology, lack of tool support for process visualization, miscommunication of tool capabilities and some general problems like limited innovation and incurrence of additional cost.

Therefore to have a successful BPM implementation, it is crucial to have management support, proper documentation of BPM authentication standards and the directories of organization that show the flexibility of organizational structure to ensure governance. In addition, portfolios and strategy maps should be created to check the processes within an organization and to relate them to an overall strategy. To avoid limited innovation an ambidextrous firm should be build because they are kind of firms that simultaneously manages exploration and exploitation

6.0 What kind of business process management systems/software are available in the market?

BPM software/systems help businesses by enabling them to quickly and easily create their workflows in an electronic environment and automate key processes. Businesses get the advantage of really seeing the bigger picture of their processes and they get the ability to easily manipulate the environment to accommodate changing business scenarios. Moreover, numerous BPM software/systems allow integration of different processes and applications, acting as the engine block to the component of Accounting, ERP, CRM, etc.

There is a reasonable amount of overlap between BPM software and other software verticals because it is a fairly comprehensive term for any software/system that models, maps, automates a specific function or process at a business. For examples software like professional services automation tools, project management software, salesforce automation systems, etc. In simple words, it means that project management software is a specialized version of BPM software that is specifically designed for project-based businesses.

Financesonline.com carried out a comparison study of different BPM software/systems in the market. Based on the functionality, and overall value, top BPM software/systems were ranked and scored. These top software/systems can be seen in Table 2.

Ranking	Name	Score
1	Bpm'online	9.3/10
2	TIBCO BPM	8.7/10
3	Mindbody	8.6/10
4	Laserfiche	8.6/10
5	Nintex	8.6/10
6	Replicon	8.5/10

7	Zoho Creator	8.5/10
8	Cleverbridge	8.5/10
9	Oracle BPM	8.4/10
10	KiSSFLOW	8.4/10
11	Process Street	8.3/10
12	Bizagi	8.3/10
13	IBM BPM	8.2/10
14	QuickFMS	8.0/10
15	Flow Centric	8.0/10
16	Zoolz Intelligent Cloud	8.0/10

Table 2: Top 16 BPM Software/Systems

Bpm'online

Bpm' online is on the top of the list of best BPM solutions. Apart from earning the top score, Bpm' online receives 100% rate of user satisfaction. This makes Bpm' online the leader in its category. Prestigious industry observers, such as, Gartner and Forrester, have acclaimed it for its end-to-end CRM, sales, and service capabilities.



Bpm'online is commonly known for its agility. It is among one of the few cloud solutions that allow companies to change CRM processes on the fly. This means that companies have the flexibility in scaling and adjusting processes that are aligned to companies marketing, sales, and service scenarios.



Bpm'online can create the tasks and actions that are native to organization.

Bpm'online is designed for both small businesses and large organizations because it offers companies various pricing option like, monthly payment, annual payment, quota based payment and one time payment. Moreover, Bpm' online has both options cloud and on-premise. Over 6,500 companies, including big brands across myriad industries, such as, Heinz, Bayer, Allianz, and L'OREAL trust Bpm' online.

This system/solution claims a range of task, activity, reporting many of these with drag-and-drop tools. Moreover, it has a mobile version with the same UI for various operating systems like mac, windows, android, iPhone/iPad, web-based and Linux. It also has the ability to easily integrate with popular apps, such as MS Outlook, MS Word, and Google Calendar. Furthermore, Bpm' online provide business process management tools that allow organizations to mash up data and generate insight allowing them to combine the activities such as sales, marketing, and service.

TIBCO BPM

The second popular BPM system/solution is TIBCO BPM. It also receives 100% rate of user satisfaction. It has been developed by one of the well-known software companies in the world; TIBCO BPM has the agility to match company's unique sales, marketing, and service scenarios. Though, its pricing is based on quote, which makes it less scalable than Bpm' online, which provides more flexible pricing for different business sizes.



TIBCO BPM help companies to adept their processes to the digital ecosystem. In fact, it is one of the best software/system to transition companies analog processes to digital. It also helps to combine these processes with company's people, activities, and scenarios to generate insights that are crucial to company's business routes. With real-time data analytics produced by the software, companies can make timely decisions, perform actions more efficiently, and provide more precise answers to its suppliers and clients. TIBCO can run on mac, windows, android, iPhone/iPad and web-based.

Other important features of TIBCO BPM include Intelligent Work and Resource Management. These features allow companies to see the overall progress at once and go deep into the data details in areas such as: key performance indicators (KPIs), project milestones, and service-level agreements (SLAs). Similarly, its business-reporting feature is adaptable to organization's decision-making logic; therefore, it is useful in planning company's best strategies or tactics.

Mindbody

Mindbody is a practical BPM platform for experts and small businesses. It offers monthly payment scheme to its customers and it receives 93% rate of user satisfaction. It is ranked amongst the top BPM systems/software because it includes the right tools for the right target users. However it lacks in agility to scale but it covers it by sticking to its core

value proposition like assisting small businesses in the health and wellness industry in developing corporate-level strategies with marketing insights and tactics. Mindbody is compatible with various operating systems and devices such as mac, windows, android, and iPhone/iPad.



The reason for including Mindbody in the list of BPM systems/software is because Mindbody platform features process automations such as, bookings, schedule management, and payments. It also contains payroll processing, which makes Mindbody possibly the only accounting tool a small operation requires. Additional features include automatic notification's, reminders, and confirmation alerts for booking and rescheduling. Another practical feature is it's reporting, which allow companies to track revenues, sales, inventory, trends, and attendance.

Laserfiche

Laserfiche was awarded by Gartner Magic Quadrant in 2015, Laserfiche easily earns its position in the top five BPM software/systems. It receives 99% rate of user satisfaction. It offers one time and quota based pricing to its customers. Laserfiche could have been in the top contenders if it was not limited to content management. However, if the companies only BPM needs are primarily to manage content and documents, Laserfiche is a best choice.



It captures processes, and secures company documents, for collaboration, individual use, or record keeping. It has the ability to easily route and track digital documents, so that companies don't lose important data. Moreover, archiving and retrieving vital documents can be done easily like searching for a specific keywords. Furthermore, it also allows companies to arrange documents in orderly manner especially when the companies are overwhelmed by thousands of documents.

Laserfiche has many useful benefits, but the most significant ones include: data visibility, team collaboration, document management, paperless work environment, secure archiving, and business insight reporting. Large companies in myriad fields as healthcare, education, government, and financial services mostly use Laserfiche.

Nintex

Nintex is a best BPM system/software for both small business and large companies. However, the pricing is on quote-basis, therefore it is more suitable for large organizations. It also receives 100% rate of user satisfaction. It mainly focuses on work automation for better and efficient team collaboration. It also includes document management, business insights, and IT service management.



Nintex help companies in reducing steps in their workflows, while not reducing their choices. That provides more agility on how companies can streamline their processes in different scenarios and with different aspects. Companies can link together team members, units, and departments, so that the communication gaps across the organization can be filled.

Nintex is also compatible with common and standard business apps. It also supports various devices and operating systems. Moreover, It can also be integrated with social media and messaging apps in order to extend teamwork outside organizational boundaries. When companies have their teams located at different locations, Nintex will play a crucial role in that situation as well.

Replicon:

Replicon is a resource management solution and SaaS workforce, which mainly focus on solving time tracking issues. It targets both large organizations and small business. Replicon has won few awards including “Best Customer Satisfaction of the Year Program” and “Bronze Stevie Award for Customer.”

The logo for Replicon features the word "REPLICON" in a bold, sans-serif font. The letters "REPLI" are in black, while "CON" is in blue. A small "TM" trademark symbol is positioned to the upper right of the letter "N".

Replicon can overcome inconsistencies in overtime and pay, which is stressing issues that bother HR managers. Replicon is in top 10 BPM contenders because it is noticeably strong in four key areas: configuration, integration, implementation, and compliance. It allows companies to track their projects and clients based on their parameters. It also enables companies to access real-time data for better transparency and accuracy. Companies can also see the bigger picture by using centralized dashboards and also monitor the details by billing/tracking projects at different levels. It also makes it easier for companies to keep records for different project or client portfolios. It also supports various operating systems and devices such as mac, windows, android, and iPhone/iPad

Other features of replicon include agile client management and billing tools. Similarly, the Professional Service Automation allows companies to customize time-tracking options. Replicons payroll management also aids companies’ management to manage employee attendance and pay calculations easily.

Zoho Creator

Zoho Creator is very unique software/system in the top BPM list for one thing because it allows companies to create their own app to automate or manage its business workflows. It receives 98% rate of user satisfaction.



It beats highly customizable software, however some companies think that they might require highly skilled technical employees to create the app but fortunately Zoho Creator is a drag-and-drop tools with visual interface that allows even non-technical users to create business process solutions. But, still more brainpower is required to use this solution when compare to an out-of-the-box BPM. If companies are willing to take the challenge of creating its own app to exactly match its automation process, Zoho Creator is a good option. Moreover, it offers its customers various pricing options such as, monthly payment, annual payment, and one time payment. These payment options make it more suitable for all company sizes even for freelancers.

The custom apps can be used to manage data, create online collaboration for teams, and streamline workflows. It also allows adding or modifying logic to the app so that it can be adjusted to current or specific situations. Zoho Creator is a cloud-based platform; this releases companies from concerning about downtime, backups, upgrades, and security. The other features of Zoho Creator include: user-friendly UI dashboards, host of rich tools like Workflow Builder, Notifications, tasks, and reminders.

Cleverbridge

Cleverbridge does not have a strong BPM features or agility like other software, because Cleverbridge is mainly focused on a niches (subscription businesses). It receives a user satisfaction rate of 94%.



It assists startups and growing subscription businesses to increase their subscriber list by improving customer relations because Cleverbridge improve companies' visibility to track down individual details for opportunities or resolving issues. Similarly, it also allows the companies to customize messages for their particular customers or events to keep its subscription base updated. Moreover, it supports different operating systems like mac, windows, and web-based. Cleverbridge offers quota based payment method for its customers, which makes it more suitable for large companies.

Other main features of Cleverbridge include Reporting and Analytics that allows companies to generate insights, apply them, and track them against their goals. It also has web-based affiliate management which help companies to further increase their subscription reach.

Oracle BPM

Considered the most complete BPM solution, Oracle BPM is backed by one of the world's leading software companies. But complete doesn't necessarily mean the best for businesses with scaled-down workflow automation needs; hence, this software is best



suiting for large corporations with complex BPM scenarios. In addition it has quota based pricing.

As an enterprise solution, the software features comprehensive BPM suite. The suite consolidates the design-time and automation of all processes, cases, rules, manual tasks, analytics, forms, and integrations. An organization with complex workflows can achieve greater process efficiency by increasing visibility, accessing real-time data, and simplifying user compliance. The result is better management agility throughout the organization. Moreover, its UI is suitable for various operating systems and devices like mac, windows, android, iPhone/iPad, web-based and Linux.

Oracle BPM is noted for its out-of-the-box modeling and optimization tools, system integration, comprehensive dashboards, and robust task and case management features. Some of its best features are: process simulation and analysis, business rules, and business architecture reports.

KISSFLOW

The last software in the top 10 is KiSSFLOW. It receives 92% rate of user satisfaction. Moreover, It is user-friendly workflow automation software that has been designed for lightweight processes. KiSSFLOW claims that over 10,000 companies that are possibly small to medium businesses are using it. This software/system attracts more to companies that want to create their own automation apps but the companies lack a technical team or whose management have no programming or technical skills.



KiSSFLOW have five simple steps process, which companies can follow to create an easy automation:

1. Decide a process,
2. Build the form,
3. Design the workflow,
4. Set permissions,
5. Then go live.

KiSSFLOW gives companies the power to match automation with their exact process scenario. Furthermore, KiSSFLOW UI is suitable for various operating systems and devices like mac, windows, android, iPhone/iPad, and web-based.

It guides companies with an app wizard. Aside from building from scratch, companies can either install pre-built apps or edit them to their own requirements. KiSSFLOW have around 50 pre-built apps for suppliers, HR, finance, and billing.

Process Street

Five more software have also been including in the list that may merit companies attention for the specific value they offer. For Example, Process Street provides a workflow and process management that helps companies to organize and automate its repetitive checklists and processes for free. It receives

user satisfaction rate of 96%. This software can be of great value to the companies that are on budget or want to get into the practice of process automation without the cost.



Process Street is very simple to use. Companies can simply make a process template then run it as recurring checklists, and use it as a part of collaborative workflows. This enable companies to scale projects, minimize errors, and create clear communication lines among members, staff, and leaders. However, Process Street is limited to basic workflow automation, but it can be integrated by Zapier (over 500 productivity apps) to scale automation. It supports various devices and operating systems like is mac, windows, android, and iPhone/iPad. Other features of Process Street include: drag-and-drop tools, forms, intuitive keyboard shortcuts, and user permissions.

Bizagi

Bizagi is amongst one of the most complete BPM suites. It includes three comprehensive modules: “BPMN Modeler”, “Studio”, and “Engine”. Bizagi offers enterprise-level process automation mostly for large companies to assist them in consolidating and coordinating their knowledge workers, processes, data, and devices. It has user



satisfaction rate of 98%. Bizagi offers various pricing packages for its customer like monthly payment, annual and one time payment, which makes it suitable for all companies.

Bizagi is well known for two things. First, it has low-code features that help companies to automate workflows fast. Second, it has agile architecture that allows companies to add a layer to its legacy systems. As a result, companies with old technologies can quickly enable the transition to a competitive digital economy. Bizagi is compatible with mac, windows, android, iPhone/iPad, windows phone, Linux and web-based. The other main features of Bizagi include process modeling, case management, and business transformation paths. It also provides customer support and a comprehensive e-learning process during onboarding.

IBM BPM

IBM BPM is complete business automation software with focus on increasing customer engagements via social and mobile. It receives 99% rate of user satisfaction. It has the full features of a BPM suite. It offers quota based pricing option thus; it is more suitable for large companies with a technical team.



IBM BPM has the ability to run on a single process server or an integrated model-driven environment; hence teams can view the same process throughout the organization. Companies can access and implement processes, activities, cases, and dashboards without interfering on user experience. This creates consistency among teams, front-end users, and departments, which helps in avoiding errors and gaps. Similarly, the software is adapted to mobile platform, which include case management capabilities. IBM BPM can run on mac, windows, android, iPhone/iPad, Linux and web-based.

Other features of IBM BPM include “business process execution language” (BPEL) orchestrations, complete process visibility, real-time collaboration, and enterprise integration. IBM BPM offers both on-premises and cloud configurations.

QuickFMS

QuickFMS is a powerful, scalable, and reliable facility management system, which is based on the cloud. This software has been developed to help companies in significantly boosting their efficiency and productivity. QuickFMS makes it easier for companies to manage all facets of their business and infrastructure such as



structuring, organizing and running all elements of their operations without changing from one system to another. It has 99% rate of user satisfaction. Quick FMS can be used by all companies' sizes due to its payment scheme of monthly and quota based pricing.

Companies can choose individual product modules that are mainly designed to serve to specific needs and areas of the business, enabling them to select and invest in a solution that has been customized to address the challenges of their business. Unfortunately, Quick FMS UI only supports mac, windows and web-based. The other features of QuickFMS include ability to manage and optimize space that improves companies' occupancy ratios and productivity for tracking payables and receivables for owned and rented properties.

Flow Centric

FlowCentric BMP is new business process management software. It allows companies to efficiently manage, fully understand, and effectively use their business processes and empowering users to get the most out of them. As a result, companies know how their business processes work, which enable them to recognize areas that need improvement and also recognize the approaches that improve business performance helping them in optimizing the way in which companies work and deliver significant, meaningful insights easily. It offers quota based pricing which makes it more suitable for large enterprises.



Flow Centric BPM is an agile platform, which helps companies in meeting their strategic objectives through process digitization, workflow management, and automation. It also provides its users the ability to create, manage, and optimize their workflows providing them full control and flexibility, which they cannot get with other systems. FlowCentric UI

supports various operating systems and devices such as mac, windows, android, and iPhone/iPad. Moreover, policies and processes link systems and data with people and their devices, which result in standardized processes, streamlined operations, and synchronized data.

Zoolz Intelligent Cloud

The last software on the list is Zoolz Intelligent Cloud. It has 97% user satisfaction rate. It is an innovative data management program that combines process and conventional data management tools with artificial intelligence. This distinctive approach results in improved discovery, distribution, access, organization, and protection of data.



Zoolz Intelligent Cloud helps companies in organizing their large data through a single centralized solution. As a result users can easily and accurately find the data they need by using specific phrases or keywords. Most of all, Zoolz Intelligent Cloud uses military-grade data encryption to protect the data stored in the system.

All this can be done from the system's intuitive and user-friendly dashboard. On this dashboard all high level stats are accessible. This ranges from user activity, storage consumption among others and usage of bandwidth. This dashboard supports various operating systems and devices such as mac, windows, android, and iPhone/iPad. The pricing of Zoolz Intelligent Cloud is also user-friendly because there are different packages that are suitable for small, medium, and large businesses.

True BPM is Not a Technology Product

BPM software/systems are very powerful, but in many situations technologists only use them to make software development easier. When these software/systems are paired with business-driven BPM techniques, it becomes a real catalyst for organizational change. Moreover, tight alignment between business and IT responsibilities will amplify BPM initiatives. This alignment supports an iterative approach to improving processes.

In order to accomplish this, a team should spend time in advance to make sure that the proper governance (a solid development and implementation methodology) is in place. However, this governance can be supported by the BPM platform because both the technology and business methodologies are interdependent.

Selecting Top 5 BPMS

Table 3 below summarizes the basic aspects of each BPMS mentioned above. These aspects include client satisfaction, company size, pricing scheme, and device support. Client satisfaction was included because it shows whether a company delivers what they have promised and it also indicates how happy their current customers are. Company size and pricing scheme was included because if all companies cannot afford certain system or if it is not suitable for all companies then it will contradict the main research question. Moreover, the reason for including device support is to check if the system is compatible with all the devices and operating systems in the market.

Name	Client Satisfaction	Company Size	Devices Support	Pricing Scheme
Bpm'online	100%	All Company Sizes	Windows, Android, Mac, iPhone/iPad, Linux and Web-Based	Monthly, Annual, Quota based and one time Payemnt
TIBCO BPM	100%	Large Companies	Windows, Android, Mac, iPhone/iPad	Quota Based
Mindbody	93%	Small Companies and Free lancers	Windows, Android, Mac, iPhone/iPad	Monthly Payments
Laserfiche	99%	Large Companies	Windows, Android, Mac, iPhone/iPad	One time Payment and Quota Based
Nintex	100%	Large Companies	Windows, Android, Mac, iPhone/iPad, Linux and Web-Based	Quota Bases
Replicon	100%	All Company Sized	Windows, Android, Mac, iPhone/iPad,	Monthly Payment and Quota Based
Zoho Creator	98%	All Company Sizes	Windows, Android, Mac, iPhone/iPad	Monthly , Annual and One time payment
Cleverbridge	94%	Large Companies	Windows, Mac and Web-based	Quota Based
Oracle BPM	100%	Large Companies	Windows, Android, Mac, iPhone/iPad, Linux and Web-Based	Quota Based
KISSFLOW	92%	Small and Medium companies	Windows, Android, Mac, iPhone/iPad, and Web-Based	Annual and Monthly payments
Process Street	96%	Small Companies	Windows, Android, Mac, iPhone/iPad	Monthly Payment
Bizagi	98%	All Company Sizes	Windows, Android, Mac, iPhone/iPad, Linux and Web-Based	Free, Monthly Payment, Annual Payment and One time payment
IBM BPM	99%	Large Companies	Windows, Android, Mac, iPhone/iPad, Linux and Web-Based	Quota Based
QuickFMS	99%	All Company Sizes	Windows, Mac and Web-based	Monthly payment and Quota Based
Flow Centric	100%	Large Companies	Windows, Android, Mac, iPhone/iPad	Quota Based
Zoolz Intelligent Cloud	97%	All Company Sizes	Windows, Android, Mac, iPhone/iPad, and Web-Based	Monthly and Quota based

Table 3 BPMS Summary

Based only on table 3 it can be clearly seen that BPM' Online, Replicon, Zoho Creator, Bizagi and QuickFMS are the top 5 BPMS. These top 5 systems have high customer satisfaction

rate, they provide various pricing schemes as a result they become suitable for all company sizes and lastly they support most of the operating systems and devices in the market.

6.1 Conclusion:

BPM software/systems assists companies in designing their workflows in an electronic environment and automate their main business processes faster and with ease. This enable companies to have a better view of their processes that allow them to easily adjust their environment to different business scenarios. BPM is comprehensive term for any software that models, maps, automate a specific function or process at a business due to this there is quite some overlap between BPM software and other software verticals. Some of the best business process management software include BPM' Online, Replicon, Zoho Creator, Bizagi and QuickFMS. These software are suitable for almost every company and different operating system/devices in the market.

7.0 Conclusion

As the competition in the global market is increasing and for keeping up with the competitors companies are not only required to do more than they did previously but they need to do it better, faster and rather with lower costs and higher return on investment (ROI). Moreover, to maintain the competitive advantage companies must constantly implement the best practice management principles, strategies, and technologies. Therefore, according to (Kilmann, 1995) one of the best practice management principles is Business Process Management (BPM).

BPM allow companies to improve and optimize their business processes that results in contribution to enterprise value and performance. Moreover, it play an important role in helping companies to attain their business strategy by aligning companies resources, technology and supporting structures toward the achievement of desired business outcomes. Even though BPM offer so many advantages to companies but still many companies does not use business process management in their companies, hence those companies face many problems. Some of the main problems are lack of business agility, higher cost or improper cost structure, failure to proactively manage process/task service levels, and lack of business process automation. BPM help companies in solving these problems, however, if BPM is not properly executed or implemented in a company it can also cause many issue. Some of these issues include lack of governance, lack of BPM understanding and knowledge. Therefore to have a successful BPM implementation, it is crucial to have management support, proper documentation of BPM authentication standards and the directories of organization that show the flexibility of organizational structure to ensure governance. In addition, portfolios and strategy maps should be created to check the processes within an organization and to relate them to an overall strategy.

Many Different techniques, software, and methods that are being used to design, control, and analyze these business processes. BPM software aids companies by allowing them to quickly and easily design their workflows in an electronic environment and automate their main business processes. This allows companies to see the bigger picture of their processes and the get the ability to easily change/adapt its environment to different business scenarios. There is quite some overlap between BPM software and other software verticals because BPM is comprehensive term for any software that models, maps, automate a specific function or process at a business. Some of the best business process management software include BPM' Online, Replicon, Zoho Creator, Bizagi and QuickFMS. These software provide fairly all the features and functionalities that companies require in order to have successful business process management within their company.

8.0 Recommendation

Based on the entire research it is recommended that companies should have business process management regardless of company size. However, it is very essential that companies implement business process management in an appropriate way otherwise they can face different challenges which have been mentioned earlier in the thesis. Companies should follow these instructions to successfully implement BPM in their company.

Companies should have strong vision and top management support because these are the keys to overcome barriers among organizational silos to make an environment for BPM success. Without top management support, a BPM initiative is mostly doomed before it even starts. Moreover, BPM is successful when it is implemented against clear business objectives. Companies use BPM programs for different reasons, therefore each business should identify and prioritize its own strategic objectives. Including top management in this process is an essential way to make sure that they take ownership of the subsequent program. Objectives should be related to the business as a whole, and not just for individual functions.

Setting and managing the right objectives, will help the companies to work as a single entity, instead in silos. Furthermore, companies should create a business case for BPM. The business case should equalize the needs of different parts of the organization as far as possible. It should also take account of benefits such as enhanced staff satisfaction and retention, reduced cost of training, and also financial benefits. It should also include a map with delivery milestones, to indicate when benefits will be realized. Successful BPM requires governance at all level in a companies therefore, proper documentation of BPM authentication standards and the directories of organization that show the flexibility of organizational structures should be created.

The adoption of a new culture and mindset on the both business and IT parts of a companies is required by BPM because both of these groups will have to adopt a new model of collaborative working. Primarily there is often resistance from both groups, but if top managers take ownership of BPM, it makes easier to gain the commitment of other staff members. Lastly, When applying BPM new BPM tools and suites are likely to be implemented, but many companies also need to consider its legacy back office applications but usually dramatic “rip and replace” systems migrations is not required. However, agile BPM tool or suite should be deployed because it can modernize, and extend the functionality of, legacy systems.

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Appendix 1

Method of Research:

Interviews:

There are several reasons to use interviews as a one of the research methods because by using this method more information will be gathered, Additionally, interviews will help to get better explanations on the different aspects that could not be answered by desk research.

Desk Research:

Desk research is the main method, which will be used throughout the research because this method is very adequate and can be carried out in preliminary phase of the research as it is relatively quick and cheap and most of the information could be easily found which can be used as benchmark in the research process. In addition, desk research requires less amount of time for data collection.

Literature study:

The main reason for using literature study is because it is more than search for information and it also includes the understanding of connection between the literature and the field research. Moreover, It can be used to create a theoretical framework of the problem. The major advantage of literature study is that the researcher would not have to gather the data because the data has been already gathered.

Sub Question	Research Methods	Justification
<i>What are the major difficulties, which companies faces without having business process management?</i>	Literature Study Desk Research Expert Interview	Literature study will be done for this sub question because some books, articles, and journals provide good information about the issues faced by the company. Hasselt and Diepenbeek libraries will be visited to read the books and journal. In addition, desk research will also be used to do literature review. Expert interviews with company managers will be conducted to find out about the major problem faced by the companies, which do not have business process management. To avoid wrong answers or personal like and dislikes unstructured interviews will be conducted mainly face to face or telephone calls. The unstructured interviews will be used instead of structured interviews because unstructured interviews are more flexible as questions can be modified or elaborated depending on the respondents' answers. Moreover, it generates qualitative data; which allows the interviewee to talk in depth, choosing their own words. This will help the researcher to develop a proper understanding of the situation.
<i>How does business process management help the companies to solve these problems?</i>	Desk Research Expert Interviews	To find out about the advantages or solution provided by BPM desk research will be used because by desk research all the information about BPM can be collected and analyzed easily. Moreover, During the expert interviews certain questions will be asked about how BPM will or could improve their company performance and value.

<p><i>What are limitations of business process management?</i></p>	<p>Desk Research Literature Study</p>	<p>Literature study will be done for this sub question because acquiring clear insight about the limitations of BPM will be easier to find by literature study due to the past researches that have been conducted on BPM. In addition, desk research will also be used.</p>
<p><i>What kind of business process management system is available in the market?</i></p>	<p>Desk Research Interview Experts</p>	<p>To get appropriate information about the BPMS desk research would be the most appropriate method because all the information about the BPMN will be easily accessible.</p>

Appendix 2

Interviews transcript:

Please note that these interviews were recorded and they are written exactly as the experts answered the questions.

Interview 1:

1. What is your name?

My Name is Koen Vanhoof

2. Please describe your role in relation to your BPM experience?

I have been in bpm for 7/8 years. When I started teaching about it lets say five or six years ago and I was working with a small company called Agilians and they are BPM consultants. I worked with them to find methodology to customers to sell BPM approach and I did one case study with them regarding a bank.

3. From your understanding, how can you describe Business Process Management (BPM) and Business Process Management Systems (BPMS)?

Well the most important thing is that it is a communication tool where you can describe the behavior of systems and people and applications. This is the most difficult part in developing software for administrative work lets say middle management work. Where you have combinations of people and information systems and data. Before there was no good methodology to gather all the requirements to model the wished dynamic behavior. Therefore the most part of this is this communicating of how your behavior should be. In the second step people are also using BPM systems to implement it as far as I know in Belgium only a few companies are doing this.

4. Why do you think business process management is important for companies' success?

Because in that way they can automate the work of the middle management. They can make the middle management more flexible, more agile, and more efficient and it results in creased services to its customers.

5. What are the major difficulties which companies face while using Business process management?

They underestimate the complexity. This is one of the disadvantage of BPM is the graphical language therefore a lot of people think that they can make it very easily because it's a graphical user interface so that they can start drawing without thinking and get a result. Exploiting the tool, the language, and the technology in a proper way is more difficult than expected. For example in that bank case study, they really make the big mess of all the processes it was not reasonable, very low quality and the main reason was that they did not give training to their people and no awareness of the processes.

6. What recommendations can you give in addressing some of these issues that you identified?

Well start very simple and some center of excellence and well train people that can train the other people and not think like everybody can do it.

7. Do you recommend any BPMS, which could help them?

No because this is a very difficult question. This is also a question about the budget. You have very powerful IBM solution but it is very costly and you have also a lot of more free software but they lack quality. I cannot give a clear answer to this question.

8. According to you what is the best BPM system available in the market? Why?

IBM and I know some other ones but I don't have practical experience with them. Signavio and bizagi also but signavio is conceptually very good because it has a nice integration between BPMN and DMN. It can execute DMN but they cannot execute more or less BPM, they have no solution workflow. For simple process its workflow is ok but for complex processes no.

Interview 2:

1. What is your name?

My name is Jan Mendling I am a professor at Vienna university of economics and business.

2. Please describe your role in relation to your BPM experience?

BPM is one of our central research questions. We look at various challenges that are associated with managing processes in a better way that mean that we have to on one hand side acknowledge that business activities are not in isolation they are usually embedded in an environment where you have division of labor and that makes it difficult to have a complete picture or overview of what is been done and how the different activities interrelate and therefore much of these challenges in terms of coordinating the different actors in the process. Sooner or later leads us to questions of how we can use information systems to organize this work more effectively.

3. How long have you been in this field?

I have been working in process management since 2002. Around 15 years.

4. From your understanding, how can you describe Business Process Management (BPM) and Business Process Management Systems (BPMS)?

Business process management is little bit idealistic or maybe didactical by referencing to process management lifecycle. Process management lifecycle is looking at how you can

manage processes in organizations. It has like two levels or two perspectives. One is broad and strategic looking at the overall process of an organization or a company. Sometimes it is also referred to as a multi process management perspective.

Since you are not looking into an individual process but into whole process generally. On that level deal with strategic questions in terms of how you select certain processes that you give more attention in terms of investing into their improvements and that means you typically pick with a BPM office or 2 or 3 processes at a time. Which you make subject to more detailed analysis and this is kind of the change from over-reaching multi process management towards a fine-grained single process management with a focus on only one process. So with that process you can step through the different stages of the BPM lifecycle, where you would analyze and investigate how is the process done today? What are the strengths and the weaknesses with how things are done today? So that it may reveal or provide you more detailed insights into problems/issues that need to be addressed or solved. From that you turn to the perspective of investigating, which are ways of making the process better so it's the process redesign question and from the process redesign you are at a concept of how the processes should be done in the future and this new process concept or to be process model you take down into the implementation. Which is on one side organizational implementation it means that you need to train staff, educate the people in the process in how to do the things in the future but it also entails technical questions like how you need to change existing information system or potentially new information system so that the process can run into the new plan. Once this is all setup you can start executing the process and that will lead you to collecting data about the process, about the execution, history which you can use on the one hand side for process monitoring where you get alerts about the single cases that somehow show wrong behavior but also from process control perspective you can look at cohorts of process over given period of time from which you can then talk about averages, deviations etc. which gives you the basis to say that ok the process is running fine or there are certain new issues that we need to tackle and then you

may start the whole procedure again. That's bit idealistic with this lifecycle because people maybe jumping little bit back and forth but its kind of overall logic.

5. Why do you think business process management is important for companies' success?

Well there are many facets to this, First of all when we try to look very generically at how and what companies try to achieve. It is that the companies try to efficient and effective in terms of conformance and performance. So these are like the major angles, Conformance has more of a perspective that are certain requirements that imposed on the organizations like laws/regulations or general objectives being defined by the stakeholders or shareholders, this is a conformance angle particular for companies that operate in like safety environments. This is very much strong focus when you introduce new medicine in the market and you want to make sure that the process that lead towards giving a green light into selling those products this is like all safe and sound. Then you have the performance dimension. It is often discussed in relations to like four major angles. This kind of generic perspective, we can have like more specific performance indicators beyond. engineerically when talk about the processes, the first this we have is a time. So when we look at the process we try to organize things that we don't loose time and that the thing are clear right from the start so that we can do things in a fast way.

Doing things in a fast way has many advantages, which bring us already to the second performance dimension that is called cost. When we talk about cost dimension there are cost that are directly influenced by speed since when you are fast in operations you build up less inventory and you have faster cash return. So these are things, which are, directly save money not beyond having things organized well, people like being happier etc but there is an direct impact on cost. There is also a strong connection with quality because when you have the process standardized and well defined then you also have good angle of quality insurance. Sometimes this can be conflicting with flexibility. So therefore one of the

challenges is to have things pre defined and standardized as much as possible but not too much because you don't to suffocate people working the process by too much bureaucracy. So it means like typically you have to preserve some level of flexibility to give people the chance to deal with uncertainty. If you put these four together time, cost, quality and flexibility this is sometimes what we call devils quadrangle because its difficult to achieve excellence in all four of these levels because there are some tradeoffs because when you are trying to make one of these dimensions better the other dimension might get sometimes worse.

6. What are the major difficulties which companies face while using Business process management?

Well there are different angles to this lets start with the perspective of companies that have a BPM office in place. There one very big challenge because these guys working in the BPM office many of these BPM offices have been grown out of a continuously existing quality management initiative. So it means that these are often guys that have been set up in place in order to keep handbooks up-to-date and write down how processes work. This is a little bit of hurdle for getting the full vision BPM in place because these people have been existing like this for years often have gained a reputation in company as those nasty guys asking all the employees to right down things and to keep documentation up-to-date and that is sometimes contributing to the reputation of these guys are just like that they are not creating value and they are just about writing things down etc.

That often consider with the fact that such BPM offices are often quite far away from the controlling guys and the controlling have really the operational data that process management guys could make good sense of. It means that the process perspective and the process culture is not so embedded, its kind of isolated in this BPM office. This is really painful for these guys since even when they are developed then over time in ambition to more

leverage performance and impact but they would not have the data. I see in many companies that often these BPM guys are kind of in a week position and behind because they have to ask the IT guys or the controlling guys to get the data so that they can really provide the benefit to the organization and that's really a pain for many of them and also a little bit of pain point for the whole BPM topic. The true value of doing BPM does not come from documentation but from actually going into the process, monitoring and using the tool set methods of BMP to understand how these process can be improved.

7. What recommendations can you give in addressing some of these issues that you identified?

There are some developments that offer some hope that things can also be improved for those guys in BPM offices. One thing that is helping these days is data signs, big data and all these digitization related fancy topics these days around and these topic even though they come round like best words they get management attention and this is what helping the BPM field and you see that there is also many of the tool vendors from the BPM domain are extending their portfolio towards analytical facilities that can actually contribute and connect to these topics. One of the example of this is the signavio, they are extending there portfolio towards facilities of process mining and analytics. When then the company has already signavio in place and now there is also this data analytics facilities there, this is actually then an excellent pitch to systemically set up the infrastructure that they can look at data from process oriented perspective and in this way also further extend their services that they can provide to their colleagues.

8. According to your what is the best BPM system available in the market? Why?

Difficult to say but there are at least three major angels for looking at BPMS. So one big stream is like this classical workflows systems stream, which often these days called BPMS simply these, are Bizagi, Zoho Creator, Camuna etc. Who offer facilities to execute processes operations within information system where design of those systems merely

depends on the specifications of process and assignment of roles and related items to this process. So that's like one big pocket. Second big pocket are the classical modeling tools (signavio, Bizagi also belongs to this box). There is a new box, which is a box that deals with certain perspective of process analytics and process mining, which include Lana systems, disco, tools that provide professional support for process mining. These are like the classical boxes. Each of the player is kind of trying to extend into one of the other boxes these days in order to provide a more holistic approach towards BPM.

Interview 3:

This interview was done via email:

1. What is your name?

Bart Verheijen

2. What is your position in the company?

Founding partner

3. What is the type of your Organization?

Knowledge Management Company; delivering consultative services with our own (software) tooling

4. What is the approximate size of the organization / company?

Currently about 5

5. From your understanding, how can you describe Business Process Management (BPM)?

BPM is about saving time and money by sharing learning's of the Business process through a system (and or systematic approach)

6. What can be the initial goal(s) of the company to use BPM Systems?

Cost saving and / or time saving

7. Do you know any Business Process Management Systems (BPMS)?

Yes, all ERP and Collaboration tools do (partial) BPM

8. What kind of challenges companies can face while using BPM systems?

Having to generalize and unify business processes; thereby being unable or inapt to handle one-off projects or other anomalies or new / innovative projects.

9. According to you how can these challenges be dealt with?

Allowing employees / participants do actively not use the 'standard'

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Abbas, Fakhar

Datum: **25/05/2017**