Exploring Business Process Management (BPM) Challenges in a Startup Environment

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***Abstract*— The primary aim of the article is to discover Business Process Management (BPM) challenges when applied in a startup environment. This concept is an increasingly popular concept nowadays where BPM is one of mature disciplines that drives companies' success. Whereas startup companies also becoming a trend as the Information Technology (IT) is developed and they have different organizational values compared to most companies in general. A Systematic Literature Review (SLR) is performed to offer an impactful and insightful literature concerning BPM in startup environment. The papers used in this article are from the most honored journal publishers such as Elsevier, Emerald Insight, Springer, Taylor and Francis, Wiley, and Sage Publications. A total of 3332 articles are picked based on the keyword. Then, 22 articles are picked according to the content of the article. Results show that there are 11 out of 30 BPM capability areas may be facing some challenges when applied in a startup environment. Therefore those 11 BPM capability areas need some improvement in order to be suitable for startup environment. Fortunately, the remaining are just good as is because they are compatible with startup environment.**

Keywords*— *Business Process Management, process management, process model, startup, new ventures

***Abstrak*— Tujuan utama artikel ini adalah untuk menemukan tantangan Business Process Management (BPM) ketika diterapkan di lingkungan startup. Kedua konsep tersebut menjadi konsep yang semakin populer saat ini dimana BPM merupakan salah satu disiplin ilmu yang matang yang mendorong kesuksesan perusahaan. Sedangkan perusahaan rintisan juga menjadi tren seiring berkembangnya Teknologi Informasi (TI) dan memiliki nilai organisasi yang berbeda dengan kebanyakan perusahaan pada umumnya. Kajian Literatur Sistematis (SLR) dilakukan untuk menawarkan literatur yang berdampak dan berwawasan tentang BPM di lingkungan startup. Makalah yang digunakan dalam artikel ini berasal dari penerbit jurnal ternama seperti Elsevier, Emerald Insight, Springer, Taylor and Francis, Wiley, dan Sage Publications. Sebanyak 3332 artikel dipilih berdasarkan kata kunci. Kemudian diambil 22 artikel sesuai dengan isi artikel tersebut. Hasil menunjukkan bahwa 11 dari 30 area kapabilitas BPM mungkin menghadapi beberapa tantangan saat diterapkan di lingkungan startup. Oleh karena itu 11 area kapabilitas BPM tersebut memerlukan beberapa perbaikan agar sesuai untuk lingkungan startup. Untungnya, sisanya baik-baik saja karena kompatibel dengan lingkungan startup.**

Kata Kunci*— *Manajemen Proses Bisnis, manajemen proses, model proses, startup, usaha baru

I. INTRODUCTION

Business Process Management (BPM) is one aspect in company that may be one of the significant reason that encourages company success by using process-oriented thinking. Process-oriented thinking is an accepted organizational design paradigm that can drive corporate success [1]. Therefore, many large companies have decided to use BPM to continuously improve their processes in order to remain successful and have a competitive value compared to its competitors. Failure to adopt BPM would mostly result in lower revenue, higher costs, fewer satisfied customers, and less motivated employees.

However, not traditional BPM can work in all company environments with varying values still remains a question. BPM is a recent management approach where the applications and theory have not yet comprehensively reached smaller or startup companies. Thus, there are some doubts about whether traditional BPM can be applied to small companies due to resource limitations and the lack of networks with external stakeholders [2]. In addition, along with the quick growth of globalization and technology, a company must be able to keep up with customer needs which will also change rapidly according to the prevailing market trends. Therefore, a company needs to continuously analyze the changes desired by customers. This results in companies needing to adjust their operating principles and update their knowledge of current and future customer requirements. In short, an organization must continue to learn how to take the right actions for the right conditions according to the market in the shortest possible time. The most particular aim is they have to stay afloat in the fast-changing technology and their environment. Businesses are bound to increase the attractiveness in what they be able to offer, not only by lowering the costs they make use of, and by increasing the efficiency, but also by products and services personalization [3]. The explanation is suitable with the explanation of startup companies.

Eric Ries, creator of Lean Startup Methodology, states that the definition of startup is a group modelled to create a fresh product or service in uncertain circumstances. In addition, startups are also designed to focus on market demand to

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develop viable products, services or platforms [4]. Startup companies are usually premature in business operations but have an aggressive goal of creating products and services that are innovative to widen the business in a scalable markets [5]. The focus of startups is on continuous experimentation, iteration, and growth. A startup company does not want to continue to be a small company, but they want to continue to grow into a large company. Therefore, startups are short-term business where a an unique business model must be created from an innovative point of view or prior flop matter to outgrow those challenges [4].

In the last decade, the growth of startup companies around the world has increased significantly [6]. The worldwide economic startup is valuable for $ 3 trillion. Nowadays, startups are no longer centralized in hubs such as Silicon Valley, they are popular around the world. There are 25 startup ecosystems worldwide with over $ 10 billion in each ecosystem value. In addition, even startup companies that have the support of all kinds of incubators or accelerators (Unicorn), have quite a phenomenal value of more than $ 1 billion [7]. However, along with the popularity of startup companies, over 90% startups are failed to build streamlined service innovations to preserve customer content over times [5]. The new company had the primary goal of making anything worth good enough that people would need a considerable amount of risk. Most failures are caused by absence of well-organized way to construct the startup and to the problems or challenges that are inevitable [5].

With an increased rate of changes, it became preposterous to undertake processes with an ordinary and standard business in mind. Consequently, executing and utilizing traditional BPM in these businesses has been faced with an increasing number of questions arised [3]. Hence, it is obligatory to possess a profound analysis of BPM in the startup environment. Two questions that need to investigated are: 1) What are the challenges if traditional BPM is applied to the startup environment, 2) What aspects of BPM need to be changed in order to adapt the startup environment?

In order to disclose this inquiry, a Systematic Literature Review (SLR) is arranged to present an impactful and insightful studies about BPM in startup environment. The sole objective of the study is to assess the restrictions of conventional process management which do not compatible with the requirements of the business. The paper also deliberates the efforts of adapting process management based on the requirements of the knowledge economy and the potential (and challenges) provided by startup environment.

The remaining of the article is arranged as follows. The Literature Review would contain the theoretic fundamental on startup environment. The Methodology would comprise the methods used in this study and the number of papers used. The Results and Discussion would cover the BPM challenges when applied in startup environment are assessed. Finally, conclusion as well as the implications, limitations, and future studies are presented in the later section.

II. LITERATURE REVIEW

A. Startup Environment

The definition of startup is specified as an premature phase of establishing a new business [8]. Startups are also can be defined as young high-tech companies which their major activity is to trying up new ideas up to the first phase, which occupies between one to five years. Startups can also be considered as ventures that follow opportunities from the time the ideas appear [8]. They usually try to build fresh products under circumstances of tremendous unpredictability [8]. A startup could also be illustrated as a non-permanent business to look for a profitable, repeatable, and scalable business model [9]. Startup companies are assembling up the new means of establishment. Some areas are more innovative than others. A considerable amount of startups are being established around an existing technology/opportunity, suggesting several added worth in approach or technology [8]. Startups possess a distinct organizational arrangement than established company. One of the distinguished distinction which cause startups different is the extent of distress embroil into the process of making decisions particularly in circumstances where the investment is scarce and the outcomes are unpredictable [10]. The rate of achievement in this area is comparatively low and studies have analyzed the conditions from several empirical and theoretical perspective. The notable excuses are the absence of knowledge regarding competition and unpredictability concerning prospective competition. The hit elements of startups are driven by rising customer base and booking profits to withstand competitiveness in the current market scenario [10], [11].

B. Business Process Management (BPM) Capabilities

Traditional business processes shift at a considerable later pace than the period entail for their performance, which enables us to deduce that the process does not experience alteration in the course of performance itself. It is probable to improve processes with the use of standard mechanisms [3], called Business Process Management (BPM) Capabilities. There are a few capabilities areas in BPM Capabilities, which is the Strategic Alignment, the Governance, the Methods, the Information Technology, the People, and the Culture. Each of these capabilities has several components under them that helps companies to manage their process business.

The Strategic alignment is defined as the connection among organizational prime concerns and company processes where it allows continuous and powerful measure to improve business performance. There are five elements of capability under the Strategic Alignment which is the Process Improvement Planning, the Strategy and Process Capability Linkage, the Enterprise Process Architecture, the Process Measures, the Process Customers and Stakeholders [12].

BPM *governance* is defined as a transparent and appropriate roles and responsibilities for distinct degree of BPM. Moreover, the design of decision-making fall under this category [12]. There are five capability areas that are grouped under the Governance which is the Process Management Decision-Making, the Process Roles and Responsibilities, the Process Metrics and Performance Linkage, the Process Related Standards, the Process Management Compliance.

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BPM Methods is established as the instruments and techniques that grant all activities on all degree of BPM. The capability areas under methods portray the process lifecycle phases rather than particular capabilities [12]. There are five capability areas that are grouped under the Methods which is the Process Design and Modelling, the Process Implementation and Execution, the Process Monitoring and Control, the Process Improvement and Innovation, the Process Program and Project Management.

The Information technology (IT) is referring to any hardware, software, and information systems that assist activities of the process. The factors of IT which is one of the BPM fundamental elements is built similarly with the methods of BPM which also referring to the process lifecycle phases. Identical to the methods capability, the IT capability focuses on the particular demands of each process lifecycle phases [12]. There are five capability areas that are grouped under the Information Technology which are identical as the Methods which is the Process Design and Modelling, the Process Implementation and Execution, the Process Monitoring and Control, the Process Improvement and Innovation, the Process Program and Project Management.

The *people* factor consists of employee aspects. This element is established as the groups and individuals who apply and elevate their process management proficiency and awareness to improve business performance continually [12]. There are five capability areas that are grouped under the People which is the Process Design and Modelling, the Process Implementation and Execution, the Process Monitoring and Control, the Process Improvement and Innovation, the Process Program and Project Management.

BPM *Culture*, the final BPM fundamental capabilities is referring to the beliefs and values that form process-related attitude that can enhance business performance. Culture is about how to create an environment that complements any BPM initiatives [12]. There are five capability areas that are grouped under the culture which is the Responsiveness to Change, the Process Values and Beliefs, the Process Attitudes and Behaviors, the Leadership Attention to Change and the Process Management Social Networks.

This BPM capability has been extremely effective when market changes, the competition, or client needs are minimal. When the rising pace of changes are high, it ended up improbable to undertake processes with a standard and average client in mind. In effect, executing traditional process management in a company has been encountered with increasing problems, [3] such as market changes, competition, and the client needs. The execution of traditional process management involved particular risks. Among them, the most malignant are as follows: (1) The impendence of becoming separated from the conditions of a changing market; (2) Generating losses as the consequence of undertaking the standard process, which does not correspond to the particular conditions; (3) No preference of process individualization; (4) Establishing or reinforcing a company culture of no accountability [3].

TABLE I The Business Process Management Capability Areas

Business Process Management (BPM) Capability Areas					
The Strategic Alignment	**The Governance**	**The Methods**	**The Information Technology**	**The People**	**The Culture**
The Process Improvement Planning	The Process Management Decision Making	The Process Design and Modelling	The Process Design and Modelling	The Process Skills and Expertise	The Responsiveness to Process Change
The Strategy and Process Capability Linkage	The Process Roles and Responsibilities	The Process Implementation and Execution	The Process Implementation and Execution	The Process Management Knowledge	The Process Values and Beliefs
The Enterprise Process Architecture	The Process Metrics and Performance Linkage	The Process Monitoring and Control	The Process Monitoring and Control	The Process Education	The Process Attitudes and Behaviors
The Process Measures	The Process Related Standards	The Process Improvement and Innovation	The Process Improvement and Innovation	The Process Collaboration	The Leadership Attention to Change
The Process Customers and Stakeholders	The Process Management Compliance	The Process Program and Project Management	The Process Program and Project Management	The Process Management Leaders	The Process Management Social Networks

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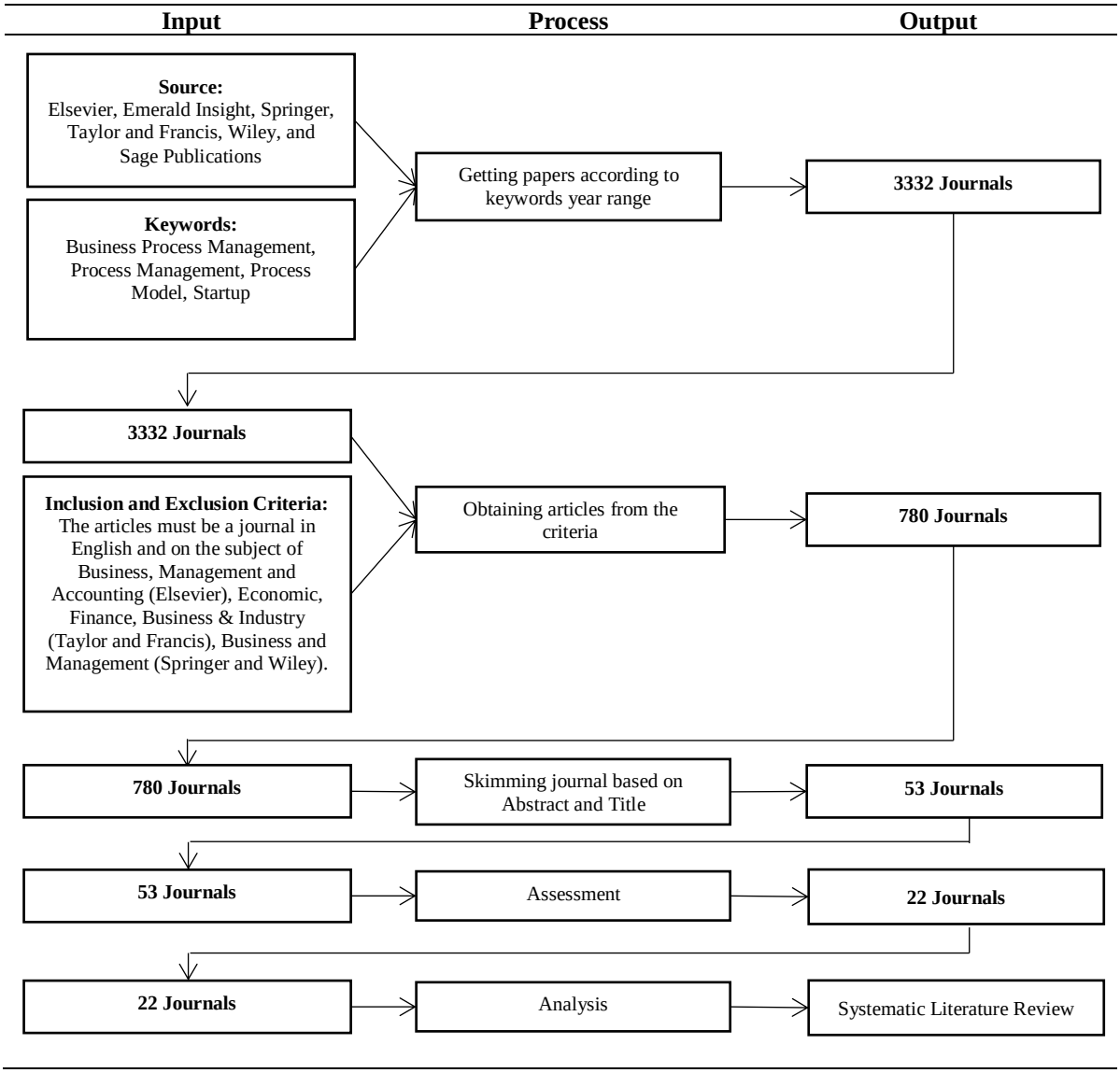
III. METHODOLOGY

The first stage carried out in reviewing the literature study of BPM in startup is to search journals based on keywords related to research theme. Then, an approach called conventional literature review is carried out where all the journals that have been obtained will be examined for their relevance to the research theme to be carried out. The whole phases in arranging a literature review can be refered in Table 1 which describes each stage along with the input and output that will be generated from each process.

TABLE II Research Methodology



The collected literature is literature that was published internationally and in English. This is done because then the results of the literature study that will be done can be a reference by many researchers from various countries in the world. The articles gathered are from a few publishers that are popular internationally and have a considerable amount of quality journals with levels Q1 to Q4. Some of the article publishers used are Elsevier, Emerald Insight, Springer, Taylor and Francis, Wiley, and Sage Publications. Initially, IEEE was also included in the process, but it is difficult to find articles that fit the research theme in IEEE because the articles contained in IEEE, the majority are technical and rarely themed articles about business process management. Therefore, IEEE was not included in the article search process.

The literatures acquired are papers related to business process management run in a startup environment. Keywords that are used in each search engine of the publisher are “business process management”, BPM, “process management”,

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"process model" and startup. After a search process based on keywords and a predetermined time range, a total of 3332 journals were obtained then narrowed down based on inclusion and exclusion criteria as shown on Table 1 which would later be used in the next phase, namely conventional literature review. Based on 780 articles that have been narrowed down, a skimming of journal based on abstract and title will be conducted to get the most appropriate journal for the research question. After a quick reading, 53 journals were closely connected to the theme of the study. Afterwards, a complete text analysis will be organized to answer the question of the study.

IV. RESULTS AND DISCUSSIONS

According to full text analysis, there are a few challenges that BPM capabilities face when implemented in a startup environment. The challenges will be explained in detail according to each BPM capability areas. The first BPM capability area is strategy alignment which is the link between company processes and organizational priorities where it allows continual and effective behavior to fix business performance [12].

TABLE III The difference between traditional BPM and startup environment when strategic alignment is implemented

	Capability Areas	Traditional BPM	Startup Environment
The Strategic Alignment	The Process Improvement Planning	Detailed plan [12]	Simple, fast and frugal plan [13]–[15].
	The Strategy and Process Capability Linkage	Strategy and the process need to have corresponded with each other [12]	Strategy and process are corresponded with each other [16]
	The Enterprise Process Architecture	High level architecture [12]	The architecture is being made as they do experimentation with their process [11].
	The Process Measures	Each process has a key performance index to measure the performance of each process [12]	Not mentioned
	The Process Customers and Stakeholders	Customers and stakeholders priority needs to be think about [12]	Customers and stakeholder plays as a one of a crucial aspects in determining the success of startup companies [2], [15]–[18].

The first capability element under strategic alignment is *Process Improvement Planning* which seizes the company's whole oncoming towards BPM. The planning should immediately gained from the firm's strategy along with outlining how process correction initiatives would meet the organization's objectives. The plan of improving process offers explanation about how the underlying projects relates to BPM initiatives [12]. This capability area might work just well in a large corporate environment, but in a startup environment, it might be a different story because according to the research conducted by Carroll, the recommended methodology in a startup environment is an experiment, not a detailed internal plan [13]. Because, the aim of startup is to establish a minimum viable product with an attempt to bring innovation quicker [13]. New small and entrepreneurial company were less likely to participate in setting up the groundwork of business. The research conducted by Liao argued that startup founders that works in substantially erratic circumstances might be less likely to carry out the planning process [14]. The reason being since they are convinced that attempts would not give them significant knowledge that can be beneficial if acted on. Entrepreneurs build their businesses and surroundings through their action [14]. Therefore, this capability area will face considerable challenges when applied to the startup environment due to the different focus between traditional BPM and startup environments. Whereas traditional BPM focuses on a detailed plan, startups are more likely to be centralized on creating nonexistent opportunities toward the correct chances. When doing so, they depended on frugal, easy, and fast oncoming [15]. Furthermore, because of this detailed plan that the organization should follow, the organization might transform at a lot delayed speed than the time entailed for their achievement whereas the startup is constantly changing at a much speedier times than most companies. Therefore, a detailed improvement plan might not be suitable for the constantly changing environment like startup.

The second capability area under strategic alignment is *Strategy and Process Capability Linkage.* This capability element is defined as the bidirectional relationship in the midst of business process and strategy. This also means that some business processes might be impacted by the change of a strategy. By having this capability, the company would be able to tell which process in the business are the core competency for the company and which one would be performed in-house and which one are more suitable for outsourcing [12]. This capability when aligned with the startup company environment, there is no need for major changes that may be updated related to BPM Capability. This is evidenced by research conducted by Niehaves where he revealed that a SAVINGS company which is also a startup company where the business processes at SAVINGS are aligned with their organizational priorities. In addition, their BPM strategy is always evaluated based on the business strategy [16].

Next capability area under strategic alignment is the *Enterprise Process Architecture* which is the most upper degree

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of abstraction in the absolute hierarchy of the processes. A wholesome planned process architecture gives a substantial degree of visualization which provides the staple process landscape and also gives a commencing period for further breakdown process [12]. Unfortunately for a startup companies where they operate in a dynamic and uncertain environment, this high-level architecture might not be existed just yet. Because to get to this high-level hierarchy of process, companies should be able to acquire knowledge and proficiency regarding the new company's capability to build the best suitable process for their companies and therefore would resulted in a high-level process architecture [11]. Therefore, a high-level process architecture might be something in BPM that should be changed for it to be suitable for startup environment.

The next element within strategic alignment is *Process Measures*. It is necessary to understand the concept of the outputs of process and Key Performance Indicators (KPIs) to evaluate the process performance and facilitates effective process control [12]. This research does not explain further regarding the process measures in a startup environment because according to the literature collected, there were no articles that discuss about process measures in a startup environment.

The final capability area under strategic alignment is *Process Customers and Stakeholders*. Strategies are specifically related to stakeholder. Therefore, a strategic evaluation of BPM has to assess the customer's and stakeholder's priorities [12]. This capability area is one of a few capabilities that may be similar with how startup works. External cooperation with the stakeholder and customer really affects the results of startups. Connection with customers and partners would have complete resources or capabilities that are ultimately entailed for startup organizations would influence the cultivation of startups positively [2], [15], [19]. The lack of network with external stakeholders are one of a few excuses why startups are more likely to fail and would not be able to withstand the competition against existing organizations [15]. Most startup founders depend on previous business networks, friends and relatives for the capital and physical resources, social support and sales, and information necessary to embody the concept into the reality of business. When those resources are insufficient for a startup to continue running, then a company needs complementary resources by creating proactive quests to discover partners that can offer fundamental resources [18]. These relationships are necessary for a startup to attain a specific basis degree where they could perform as a company [18]. Therefore, this capability supports how the startup works. However, in the case of SAVINGS where several interviewees revealed that their collaboration with clients still needs to be improved because they think that there are several potentials that are not visible to the company and clients [16].

The second BPM capability area is BPM Governance which is defined as a transparent and appropriate responsibilities and roles for diverse degree of BPM. Moreover, it designs their decision-making standard to give guidance about process-related measures [12].

TABLE IV The difference between traditional BPM and startup environment when governance is implemented

	Capability Areas	Traditional BPM	Startup Environment
The Governance	The Process Management Decision Making	Process change is being maintained and managed carefully [12]	Not mentioned
	The Process Roles and Responsibilities	Few people responsible for one process [12]	One people responsible for several processes [2], [8]
	The Process Metrics and Performance Linkage	Output of the process is assessed as part of the strategic alignment [12]	Operational process is audited [16]
	The Process Related Standards	Process standards need to be well-documented [12]	Eventually has to create BPM mechanism to grow [16]
	The Process Management Compliance	The Review cycles to preserve the quality of the principles of process management [12]	Not mentioned

The first capability area under governance is *Process Management Decision Making* which guides actions in anticipated or unanticipated circumstances. This proves to be rather challenging because not only it deals with who can make a decision, but it also deals with the pace of decision-making process and the resource allocation along with the organizational perception to the change of the process [12]. This research does not explain further regarding the process management decision-making in a startup environment because according to the literature collected, there were no articles that discuss about process management decision-making in a startup environment.

The second capability area under governance is *Process Roles and Responsibilities* which covers all roles starting from analysts of the business process to the owner of process up to the possible Chief Process Officers (CPO). This covers the entire committees on the boards of decision too [12].

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This might be a rather challenging task when applied in a startup environment because generally a startup company has a limited human resources [2]. Startups have relatively fewer human infrastructure than large companies or even general small and medium-sized enterprises [2]. Because of this insufficient amount of human resources, one person might be responsible for several process which is very different with traditional business process which there are only a few people responsible for one business process. Startup founders are fascinated in how to exploit the resources that are entailed for the startup [2] and that is why in most startup company there are many people responsible for several business processes as well. 5% of newly formed companies are established with over 20 workers in their initial year. The amount of these workers is difficult to supervise because of few rationales. Several small and young startups are not organized, roles and the duties of their workers are flexible and oftentimes are not specialized, and indeed a little bit fuzzy. Everybody is centralized on a primary task [8].

The next capability area under governance is *Process Metrics and Performance Linkage.* The accountabilities and the works for gathering the necessary metrics and connecting them to the criteria of the performance is considered as BPM governance [12]. This is also supported by SAVINGS where the company has a high maturity level. This is because BPM's operational processes and procedures are audited by external parties once a year [16].

Next capability area under governance is *Process Related Standards* which should be documented properly and well-established. This incorporates the coherence of process management initiatives within the business. It also includes guidance for the management and the formation of process measures, issue prescription, merit, and the structure of remuneration [12]. SAVINGS eventually created a department in charge of conducting internal audits with the aim of establishing a BPM mechanism and control process in conjunction with functional units [16].

The final capability area under governance is *Process Management Compliance* which covers the analysis cycles to preserve the quality of the principles of process management [12]. This research does not explain further regarding the process management compliance in a startup environment because according to the literature collected, there were no articles that discuss about process management compliance in a startup environment.

The third BPM capability is *Methods* which is specified as the techniques and tools that allow all actions on all degree of BPM [12]. The first capability area under methods is *Process Design and Modelling* which connected to the rules utilized to construct the as-is and to-be processes [12]. The second capability area under methods is *Process Implementation and Execution* which encompasses the upcoming phases of the lifecycle that is used to change models of the process into executable specifications of the business process [12]. The next capability area under methods is *Process Monitoring and Control* which the next stage of process lifecycle where it provides direction for the consolidation and the accumulatio of data concerning process [12]. The next element under methods is *Process Improvement and Innovation* which are the entire methods that covers the construction for better processes. This accommodates the approaches that assist the activities such as process improvement, process application, process degradation and process innovation (reference models, benchmarking, etc.) [12]. The final capability area under methods is *Process Program and Project Management* which asses the methods that are used. This requires an integration between BPM methods and specific project management approaches such as PMBOK or PRINCE2 [12]. SAVINGS has a standardized BPM method however, some of the methods used have different qualities. For example, in modeling a process, no certain notation is applied. However, SAVINGS uses textual illustration for the documentation of the process. Actually, people at SAVINGS are familiar with the information about the notation that should be used, but they think that textual modeling is easier to understand than visual modeling [16].

The fourth BPM capability area is *Information Technology (IT)* which SAVINGS does not possess a certain instrument for managing the process. However, they use regular office software. It's the same with managers where they use spreadsheets and text documents. However, actually SAVINGS already has a management workflow that already exists in the company. This is also supported by one of the functional departments where he stated that at SAVINGS, they do not have a single process that is not supported by IT in the SAVINGS company. However, in terms of the variety of IT tools used, they are still old and not modern [16].

The first element under IT is *Process Design and Modelling* which covers the IT solution that is needed to allows reduction of models of the process from the log files such as process mining. Other than that, this also covers instrument-support for analysis and modeling of the business process such as animation and simulation of the process [12]. The second capability area under IT is the *Process Implementation and Execution* which concentrates on the automatic revamp of models of the process toward executable specifications and the following workflow-based execution of the process. This accommodates related solutions such as business rules engines and case management systems [12]. The next capability area under methods is *Process Monitoring and Control* which simplify the semi-automated management of process enhancement, the handling of exception, visualization of a performance such as process controlling and dashboards [12]. The next capability area under IT is the *Process Improvement and Innovation* which offers semi-automated assistance on enhanced business processes. These could be the solutions that gives nimble instruments that tailored continuously to business processes based on the transformation [12]. The final capability area under IT is *Process Program and Project Management Process* which covers the whole management of distinct kinds of BPM initiatives. They also offer system of decision support for the process owners [12].

Considering the method and IT factor adapting the process lifecycle, therefore, the two capability areas within

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these two elements when applied into the startup environment, there will be no significant problems because the activities carried out in the startup environment are basically a lifecycle to make the process becoming better.

The *people* factor consists of employees' aspects. This element is established as the groups and individuals who employ and elevate their ability and knowledge in process management to enhance the performance of their business continually [12].

TABLE V The difference between traditional BPM and startup environment when people is implemented

	Capability Areas	Traditional BPM	Startup Environment
The People	The Process Skills and Expertise	The skills of the people within the organization is diverse [12]	The skills of the people within the organization may be limited due to insufficient human resources [13]
	The Process Management Knowledge	BPM knowledge [12]	Knowledge about process improvement [20], [21]
	The Process Education	Knowledge regarding BPM education programs need to be held [12]	Not mentioned
	The Process Collaboration	Collaboration between teams is crucial [12]	Communicating is one of the main skills needed in order for the startup to be successful [22]
	The Process Management Leaders	Willingness to lead is crucial aspects in the success of a process [12]	Survival probability of startup is being determined by the ability of its leader to lead [2].

The first capability area under people is the *Process Skills and Expertise*. This capability area is focused on the abilities of the stakeholders in light of the certain needs of a process. This is one of a few significant ability for owner of the process and the entire stakeholders entangle during the operation of the process because it consists not only methodological and technical abilities but also communicative and social abilities which based on research conducted by vom Brocke and Rosemann which are defined as the key for a successful BPM professionals [12]. Although, in startup environment these skills are more likely to be limited than those in large corporate companies. According to research conducted by Carroll, main sources such as expertise, finance, access to markets and logistics, and time are much more restricted and erratic than those of wider firms [13]. Activities in the SME are bound by the limitations of resources [13]. But, in terms of skill, the people in startup companies has high level of skill regarding to their ability to understand the market and the benefits sought and valued by the customers [13].

The second capability area under people is the *Process Management Knowledge* which incorporate the tacit and vivid knowledge about the foundation and application of BPM. This includes the degree of BPM concepts such as the process management methods and IT knowledge, and also their impact on business process outputs. Analysts of business process would analyze how to use their knowledge on process management into a several numbers of processes [12]. Unfortunately for startup environment, the knowledge they need for their companies to stay running is not related to BPM. On the contrary they relate to ways on how to sprout and allow company to participate in strategic process of renewal [20]. Startup founders oftentimes demand knowledge that does not exist in a tested or helpful form, instead it should be built [21]. That is why these knowledge are obtained by having to do some entrepreneurial learning. Entrepreneurial learning process is somewhat dynamic and emerges as continuous throughout the company's lifetime [20]. The process of entrepreneurial learning could be portrayed as a never-ceasing process which accommodates all workers to build and chase new growth opportunities [20]. The process of learning is caused by negative feedbacks, unforeseen and undesirable results of particular activities. Hence, mistakes are potentially causing the company to keep learning because negative results are more prominent to entrepreneurs than the positive results [21].

The next capability area under people is *Process Education* which defined as the responsibility of the company to develop and maintain the relevant process and the ability and knowledge of process management. This includes the presence of BPM education programs, educators of BPM and the certification programs on BPM [12]. This research does not explain further regarding the process education in a startup environment because according to the literature collected, there were no articles that discuss about process education in a startup environment.

The next capability area under people is *Process Collaboration* which defined as the methods how the groups and individuals work simultaneously with the aim of achieving desirable process results. This accommodates the related assessment of how the communication take place among stakeholders and also the ways how knowledge of the process is inquired and uncovered [12]. This area is suitable with the startup environment because according to research conducted by Kuckerts, there are six activities defining opportunity recognition which is the main focus on startup companies. One

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of those activities are communicating [22]. Communication is referring to having a conversation with colleagues, friends, mentors, potential customers, experts, and entrepreneurs regarding opportunity of the business [22].

The last element under people is *Process Management Leaders* which defined as the compliance to direct and take responsibility for business processes. This element seizes the ability of management styles and process leadership [12]. Meanwhile, the viability probability of startups relies on the participation of employees with no exception of the leaders which is more likely to be the founder of the startup. As more employees participating in the formation and the higher the innovation of technology, the viability probability of startups is also high [2]. Therefore the willingness for the startup leaders to lead is more likely to be supported by BPM.

The *Culture* which is the final BPM primary capability is referring to values and beliefs that form process-related activities that could enhance performance of the business. Culture is about how to create an environment that complements any BPM initiatives [12].

TABLE VI The difference between traditional BPM and startup environment when culture is implemented

	Capability Areas	Traditional BPM	Startup Environment
The Culture	The Responsiveness to Process Change	Organizations need to adaptive to change [12]	Startup is a companies which puts forward innovation [2], [8], [11], [13]–[15], [18]–[21]
	The Process Values and Beliefs	Organization needs to have process thinking [12]	Not mentioned
	The Process Attitudes and Behaviors	Organization needs to have doubt regarding the current process in order to have an improvement [12]	Plays as a one of a crucial aspects [2], [8], [11], [13]–[15], [18]–[21]
	The Leadership Attention to Change	The degree of commitment to change and consideration to processes shown by the senior executives need to be high [12]	Startup conditions where they are required to continue to develop and change, automatically their leaders also have a tendency to continue to change and develop as well [9].
	The Process Management Social Networks	BPM communities need to have an influence for organization [12]	Not mentioned

The first capability area under culture is *Responsiveness to Change* which is the openness of the company to transform, the company's tendency to admit change. It incorporates the capability for process change to cross-functional boundaries seamlessly and for the employee in organization to commit in the best attention of the process [12]. As previously mentioned, by many prior research, startup is a companies which puts forward innovation more than anything. Consequently, this one capability area is very supportive of startup companies because for startup companies to keep running smoothly, the whole organization would have the ability to change faster than any general companies [2], [8], [11], [13]–[15], [18]–[21].

The second capability area under culture is the *Process Values and Beliefs* which explores the wider process inside the company. For instance, the company's members ways to naturally notice processes as the most salient role in the organization vision, mission and value declarations. Moreover, this element focuses on the values and beliefs of the key stakeholders of BPM [12]. This research does not explain further regarding the process values and beliefs in a startup environment because according to the literature collected, there were no articles that discuss about process values and beliefs in a startup environment.

The next element under culture is *Process Attitudes and Behavior* which defined as the compliance to doubt the existing BPM applications in the light of potential process enhancements. It also seizes the absolute process-related activities such as the compliance to keep up with the designes of process [12]. The explanation of this capability area is more likely to be the same as responsiveness to change where every member within the organization have a tendency to accept change and therefore their ability to doubt existing process is high.

The next capability area under culture is *Leadership Attention to Change* which encompass the degree of concerns and commitment to processes shown by the senior executives [12]. This is consistent with characteristics that are particularly specified to startups such as the process of making decisions that is greatly affected by the founders' personalities [9]. Keep in mind that the startup conditions where they are required to continue to develop and change, automatically their leaders also have a tendency to continue to change and develop as well.

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The final capability area under culture is the *Process Management Social Networks* which covers the leverage and presence of BPM communities of application, the application of social network methods and the acknowledgement and utilization of informal BPM networks [12]. This research does not explain further regarding the process management social networks in a startup environment because according to the literature collected, there were no articles that discuss about process management social networks in a startup environment.

TABLE VII The Business Process Management Capability Areas that need improvement

Business Process Management (BPM) Capability Areas					
The Strategic Alignment	**The Governance**	**The Methods**	**The Information Technology**	**The People**	**The Culture**
The Process Improvement Planning	The Process Management Decision Making	The Process Design and Modelling	The Process Design and Modelling	The Process Skills and Expertise	The Responsiveness to Process Change
The Strategy and Process Capability Linkage	The Process Roles and Responsibilities	The Process Implementation and Execution	The Process Implementation and Execution	The Process Management Knowledge	The Process Values and Beliefs
The Enterprise Process Architecture	The Process Metrics and Performance Linkage	The Process Monitoring and Control	The Process Monitoring and Control	The Process Education	The Process Attitudes and Behaviors
The Process Measures	The Process Related Standards	The Process Improvement and Innovation	The Process Improvement and Innovation	The Process Collaboration	The Leadership Attention to Change
The Process Customers and Stakeholders	The Process Management Compliance	The Process Program and Project Management	The Process Program and Project Management	The Process Management Leaders	The Process Management Social Networks
Cell Color Symbol					
Light Grey Cells	Certain capability area can stay the same and there is no need for improvement despite being applied in a startup environment				
Dark Grey Cells	Certain capability area that may be facing some challenges and needs to have some changes when applied in a startup environment				
White Cells	Certain capability area that needs further research because it is not being mentioned yet in the literature obtained for this research				

Based on table 7 which shows which parts of the BPM may face problems. According to the table, we can conclude that 20 percent of the time, BPM will face a challenge when implemented in startup environments and 60 percent of the time will be successful when implemented in a startup. According to the analysis, it can be concluded that the problems that startups may face are problems related to planning, architecture, resources. This is quite convincing where these three things are the most striking differences between ordinary companies and startup companies. Detailed planning in a startup is not their main activities because they tend to just do experimentation while learning what could they have been done. On contrary, in BPM there needs to be detailed plan regarding how they can improve. Furthermore, the high-level process architecture is unavailable just yet in a startup companies. There are even some startup companies that do not know the process itself and just decide to make the process architecture as they go. Then, the third most different aspects of startup compared to other companies is the resources that they have, especially the human resources. Startup has little amount of human resources and that will contribute to several problems such as not enough skill to utilize BPM and also there is overlapped in terms of roles and responsibilities. Which means that there might be a few process that is being held responsible by only one person.

Meanwhile, there are also a few capability areas in BPM that are support the startup environment. Such as the process customers and stakeholders in which both have to create a great relationship with customers and he stakeholders. For startup companies, this is critical because the product or services that they provide is made based on what their customers want. Moreover the relationship between startup and the stakeholders is also plays a crucial part in successing the startup because as startup does not have plentiful of resources, they need the stakeholders to help to get the resources that the

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startup needs. Furthermore, the aspects related to change and innovativeness is the aspects that will support the startup environment. Capability area such as responsiveness to change and leadership attention to change is symbolize how the whole member of startup companies work. If they do not have the ability to create change then, their companies would not be able to survive and would fail miserably.

V. CONCLUSIONS

This research gives a SLR of how BPM would works when applied in a startup environment where BPM is mostly used in a large corporate companies that already has consumer base and many resources. On the contrary, startup has a different structure than those large companies because they do not have their consumer base and their resources are limited. This paper focused on the BPM core elements that may need some improvements when applied in a startup companies. The literatures used in this research are from the most popular journal publishers used widely, such as Elsevier, Emerald Insight, Taylor and Francis, Wiley, Sage Publications and Springer. The number of 3332 articles are picked according to the keyword typed on the journal publisher's website, then 22 journals are picked based on content of the papers. After assessing the articles, results indicate that there is a quite different condition between startup and companies that used BPM and that is why when startup decides to use BPM, there might be some challenges ahead. Based on the BPM core elements that analysed, there are six capability areas that might be facing a great challenge such as the Process Improvement Planning, the Enterprise Process Architecture, the Process Roles and Responsibilities, the Process Related Standards, the Process Skills and Expertise and lastly the Process Management Knowledge. Furthermore, there are also several capability areas in BPM that support the startup environment and the most crucial one is the Process Customers and Stakeholders, the Responsiveness to Process Change, and the Leadership Attention to Change are some of the recipe for a successful startup companies which is an adaptive environment who cares about what the customer and stakeholder wants. Therefore, when BPM is implemented in a startup environment, there is a probability of 0.6 that the startup will be successful. Also, there is a probability of 0.2 that the startup will fail when implementing BPM in their process management. Other than that, there are several capability areas that needs further research because there is still not being mentioned in the literature obtained in this research such as the Process Measures, the Process Management Decision-Making, the Process Management Compliance, the Process Education, the Process Values and Beliefs, and the Process Management Social Networks.

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