Process Innovation Capabilities in Less-structured Business Processes

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Abstract

In a dynamic business environment, all organizations must respond to changes by incorporating new ideas into their business processes. Such processes can be complex, dynamic, interactive, socially constructed, and focusing more on the people. Numerous studies on process innovation capability or structured business process (SBP) are extensive; however, the study on process innovation capability in the less-structured business process (PIC-LSBP) is still a point of discussion [1]. We elaborate our research agenda into [1] Literature Review, [2] Optimization of the finding and proposed framework, [3] Theory Building. Through the Systematic Literature Review (SLR)[2], one of the initial findings indicates that further validation is required to build an appropriate framework for PIC-LSBP. Using Delphi study, we aim to investigate the main differences between innovating SBP and LSBP and identify the main success factors for innovating LSBP by developing an instrument to provide step-by-step guidance or to offer a brainstorming tool to assist organizations in identifying the core elements of their current and desired capabilities for their LSBPs.

Keywords

Process innovation capability, less-structured business processes, framework development

1. Research Problem and State of the Art

Different process types exist based on the business process structure. A business process is defined as *"a collection of inter-related events, activities, and decision points that involve a number of actors and objects, which collectively lead to an outcome that is of value to at least one customer"* [3] and graphically represented in a process model. The literature typically distinguishes between fully structured, semi-structured and unstructured processes (Table 1) [4] . The methods and practices of BPM in the structured process are well known in the industry [3]. However, BPM is no longer applied only to structured processes because of the increased needs to optimize resource utilization and innovate human-centric or knowledge work processes, artistic and creative processes [5]. Unstructured business process characterized by unpredictable situation [4, 6] involved ad hoc tasks and limited availability of detail flow [7-10]. Processes in the healthcare industry are an illustration of both structured and unstructured business processes. Administrative and organizational steps, such as patient registration/discharge and other diagnostic and treatment delivery activities (e.g., patient transfer, bookings, and lab testing), are typically structured, stable, and repetitive. Contrary, the diagnostic and therapeutic steps driven by clinical decision-making and medical case data are knowledge-intensive activities that lead to loosely structured or unstructured processes. Each decision may be based on the personal experience and expertise of each team member, or it may be the result of collaborative decision-making among clinical team members [10].

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Table 1
Classification of business process type

Typical classification Szelągowski and Berniak (2019) from van der Aalst et al. (2005); Kemsley (2011); Di Ciccio et al. (2012)	**Classification with an alternative structural angle Karande M Aarti and Kalbande D. R. (2015)**	**Example: Healthcare processes**
(Fully) structured process: fixed rules, completely pre-defined, with detailed descriptions of repetitive activities	**Sequential and simple process**: with a fixed sequence	**Structure processes:** Administrative and organizational steps, such as patient registration/discharge and other diagnostic and treatment delivery activities (e.g., patient transfer, bookings, and lab testing.
▪ **Semi-structured process**: a combination of structured and unstructured parts ▪ **Structured with ad hoc exceptions**: with detailed descriptions of the process flow and defined decisions to execute one-off, ad hoc tasks ▪ **Unstructured processes with pre-defined fragments**: a detailed flow description is only possible for selected fragments	• **Complex collaborative process**: complex, dynamic, and interactive • **Social environment business process**: social constructs, and highlighting more the people side	**Less-structure processes or unstructured processes:** The diagnostic and therapeutic steps driven by clinical decision-making and medical case data are knowledge-intensive activities.
Unstructured processes: when it is impossible to describe the flow in detail, but with clearly defined details		

In a dynamic environment characterized by uncertainty and rapid change that includes a variety of changes, like shifts in customers' attitudes or the implementation of new law [11], technology disruption, natural disaster, pandemic, political aftermath, or terrorist attack [12], the organization must respond to changes by adopting innovation to introduce something new that can be product, methods, new market, new supply, new form of competition [13] in its process [14] to create new ways to make its major outputs [15]. Our research focuses on process innovation, which is described as the visualization of new work strategies, the actual design of the process, and the implementation of the change in all of its technological, human, and organizational complexity[16]. Process innovation capability (PIC) is defined as a firms' ability to acquire, assimilate, transform, and technically related resources, procedures, and knowledge for process innovation purposes [17]. To build PIC, organizations need dynamic capabilities in sensing, seizing and transforming, enabling the organization to renew resources, assets, and ordinary capabilities to innovate and respond to market change [18].

Resource-based view (RBV) facilitates the collection and deployment of organization resources to identify and comprehend market needs and market conditions to develop the capabilities necessary for understanding their impact on PIC in order to obtained desired outcomes [19]. The RBV can be viewed in at least three theoretical concepts: structure-conduct-performance approach theories of industry determinants of firm performance, neo-classical microeconomics, and evolutionary economics. The resource-based perspective mainly focuses on how firms make use of their valuable, uncommon, and costly to imitate resources and capabilities [20]. The characteristics of LSBP required the organization

to continuously adapt to the changes, therefore we refer our study to the RBV research that are especially interested in how organizations' capacities evolve over time and how those changes affect competition have created evolutionary versions of resource-based logic [18, 21-23] and known as "capacity building" theories [24]. Using the content of the sampled papers in our first agenda, the SLR helped us in identifying resources, such as people, processes, and technology (PPT) to build PIC for LSBP in the organization. The previous studies showed that the RBV is used to explore how information system (IS) competencies affect process innovation in an organization [25-28].

We aim to better understand PIC in LSBP by addressing following research questions: 1) What is current the state of research into PIC for LSBP?; 2) What are the main success factors for innovating less-structured business processes?; and 3) To which extent does PIC positively affect organizational performance outcomes?. Therefore, in this study, we would like to formulate the framework of PIC-LSBP using dynamic capabilities and RBV to help stakeholders deploy IS competencies to cope with the change in the industry.

2. Research Methodology

The PhD project is situated in the behavioral-science paradigm. The purpose of this study is to investigate the appropriate framework PIC for LSBP. As a starting point, we need to explore previous studies on this topic through literature review. Our studies contain three projects (Figure 1). For the first project, we adopted systematic literature review (SLR) guidelines proposed by Kitchenham [2]. Secondly, based on the finding in project 1, we will validate the result using an expert panel and case study. Finally, we will use a survey to optimize the building and testing the theory in which the organization performance outcomes served as dependent variable.

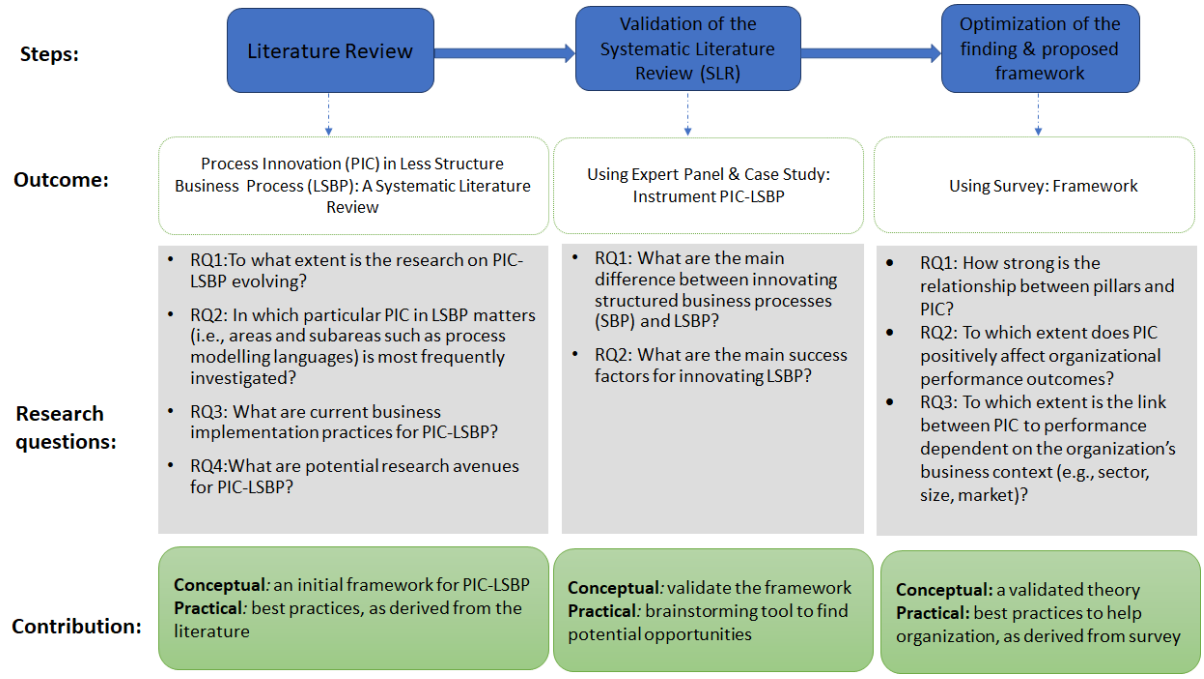

Figure 1: Research Agenda

2.1. *Step 1.* Systematic Literature Review

Using a well-defined methodology that is unbiased, the SLR protocol by Kitchenham is applicable to identify existing evidence of a specific field and any gaps in the current research for further investigation [2]. It also helps to provide a potential framework to position new research activities [29].

Following the guidelines protocol, we start defining the research objective, specifying research questions and the methods to perform the review. The main research question for this project is: What is the current state of the research into the PIC in LSBP?

From the SLR, we offer a conceptual framework for PIC in LSBP by underpin the six empirically observed capabilities along three pillars PPT as a reference to guide scholars and practitioners, categorize research avenues and we provide best practices based on the literature for practical implications. The next phase is to empirically validate the PIC-LSBP framework based on the SLR using expert panels and case studies.

2.2. *Step 2.* Expert Panel and Case Study

This project aims to optimize the finding from project 1. We can identify the different variables of works, even though we cannot confirm the casualty yet, as the finding is still at a high level. Using these variables, we proposed a framework base on the PPT model approach [30] as groundwork to provide a general overview of topics and formulated the research questions. We argue that an organization must build their process innovation capability to achieve the expected performance outcomes. Therefore, this study will elaborate on the foundation of the framework for PIC in LSBP. Accordingly, the research questions are:

RQ1: What are the main difference between innovating structured and less-structured business processes?

RQ2: What are the main success factors for innovating less-structured business processes?

Expert panel approach [31] and case study are employed to refined framework and hypotheses for theory building. In the first round, we begin with RQ1 to investigate the main differences between innovating SBP and LSBP. In the second round, we asked the experts to evaluate and rank the proposed framework to answer RQ2 about the main success factors for LSBP innovation. We aim to develop an instrument that provides step-by-step guidance or a brainstorming tool to assist organizations in identifying the core elements of their current and desired capabilities for their LSBPs, with the Delphi study as validation to the SLR. An expert panel will be conducted through an online interview with thirty experts and practitioners from academics and industry in the BPM field. The case study will be conducted from a Belgium/EU/Indonesia organization using semi-structured interviews with a 45'-1 hour in-depth interview. The content analysis will use NVIVO software.

2.3. *Step 3.* Quantitative Approach

Given the framework in figure 2 to validate the framework and theory for capacity building, this final project investigates and analyses the following questions:

RQ1. How strong is the relationship between PPT to PIC?

RQ2. To which extent does PIC positively affect the organization performance outcome?

RQ3. To which extent is the link between PIC to performance outcome dependent on the business context?

A questionnaire will be design base on the various related studies and finding from two previous projects. The data will be collected using a survey to the manager, owner or government organization using QUALTRICS and SEM software analyses.

3. Intermediate Result

3.1. Systematic Literature Review

In project 1, eights electronic databases were selected (1- Web of science, 2-Scopus, 3-Emerald, 4-Ebscohost, 5-Sciencedirect, 6-Jstor, 7-ACM Digital Library, 8-Springer) to gather a variety of research subjects and to cover all field of study until February 2021. The search based on peer review research papers for the combination of “process innovation” with four alternatives keyword and “less structured business process” with eleven alternatives keyword using the “AND” operator. We retrieved 1083 articles, and after applied exclusion and inclusion criteria in the protocol, 26 relevant articles were

identified. Composing the variables from the final relevant articles, we proposed a framework consist of [32]:

1. People: Employee skills, External partnership, Entrepreneurial capabilities
2. Process: Type of business process structured, Knowledge resource allocation
3. Technology: IS Capabilities

To achieve the expected performance outcome [33-36], the company must carry out process innovation. Three essential factors affect a company's process innovation capability, namely People, Process and Technology. People, which consist of employee skills [34, 37-41], managing external partnerships [33, 34, 40-44], and entrepreneurial capabilities [35, 38, 40, 43, 45] are important variables to build the process innovation capability. The second factor is the process. Business Process with LSBP characterized by a complex process, ad hoc [40, 42], requires good management [42], business practice and workplace organization. Moreover, IS capabilities (adopt technology [40], IT innovation governance, project management [25], and cross-functional interface [39]) is critical. The business environment conditions also playing important role as a control variable [33, 34, 37, 38, 44, 46, 47] [36, 39-41]. Validation of the framework is crucial to building a proper foundation of the PIC for LSBP. We have submitted the work and accepted in Business Process Management Journal and available online [32]. The PIC framework that we have developed with an emphasis on LSBP is entirely conceptual at this point, and it would be beneficial to validate it through the use of expert panels and cases that serve as illustrations of the framework to make more practical.

3.2. Delphi Study

We have 22 experts in the first round and 27 experts in the second and third round representing five continents, with a balanced composition of academics and practitioners. We have recently concluded interviewing the experts in the third round of the Delphi.

For RQ1, we identified five major differences. Innovating LSBPs are characterized by more flexibility, uncertainty, empowerment, collaboration, and less software support. Due to its structure with a well-defined work flow and a clear measurement system, LSBP is often more flexible, whereas SBP is more rigid overtime. It has a high level of uncertainty and unavailability of baselines, while SBP is a more standardized state with clear paths and rules that can be used as a benchmark for comparison. Individuals in LSBP has more empowerment; they use their own discretion to judge, whereas in SBP, individuals adhere to the defined rules and flows. In LSBP, the collaboration is linked to informal social interactions, in which tacit knowledge, values, and mental models can be, while SBP focuses more on systems of business activities and explicit knowledge. In comparison to SBP, which is typically well equipped with software-based monitoring systems, innovating in LSBP often requires more creative solutions to understand alternative technological solutions for improving and innovating the process. In addition, we identified some barriers in terms of control, outcomes, technology, people, time, and budget.

For RQ2, the three most essential factors affecting an organization's PIC-LSBP are traced back to PPT theory derived from the SLR. Additionally, characteristics related to the organization (e.g., entrepreneurship and knowledge management) and its ecosystem (e.g., partnerships) play an important role as an extension to PPT. We solicited feedback of the instrument from the experts in the third round, who suggested to test the instrument to determine if it fits for the company. Therefore, we intend to conduct a case study involving three organizations of differing sizes. We are currently analyzing on the Delphi result and preparing the phase 3.

4. Conclusion and Future Steps

In this paper, we described three steps to achieve our research objectives. As a result of the SLR as our first project, we answered the research questions on to what extent this topic is evolving, the area and sub-area of the research, and the practical implication and potential research opportunity in general. However, we have not found any indication of process modelling and framework for this topic. To our

knowledge, this is the first study to develop and investigate the framework of PIC-LSBP. This study will provide a base for the stakeholders to implement the PIC in their specific context.

The limited number of relevant articles on the SLR that only showed a high level of finding is the challenges from the first project. Therefore, we continue to investigates whether and under what conditions the finding and framework from the first project involve experts from academics and practitioners. In doing so, we would like to make sure relevant stakeholders requisite are captured.

Base on majority input from experts in the third round, we intend to provide an instrument as a brainstorming tools and step-by-step guidance to assist organization in identifying potential innovation opportunities in the next step of this study. The instrument offers reflective questions with the assessment to help organizations identify the core elements of their current and desired capabilities. We formulate the reflective questions based on the literature's definitions and the input of two previous rounds of experts. Below are examples of reflective question for the capability (Table 2).

Table 2

Example of reflective questions

Knowledge management (= an organization's ability for organizing, creating, using, and sharing collective knowledge for decision making)		
Definition	Differentiation LSBP vs SBP	Reflective Questions
Knowledge creation and sensing (= an organization's ability to adopt, refine, synthesize existing knowledge, and search for new knowledge beyond the organization's existing expertise)	LSBP innovation is characterized by more **undocumented** and **tacit knowledge** and **silos**. Organizations first gain access to different ideas and knowledge through collaboration, before leveraging existing expertise and exploring new opportunities. This knowledge assists in the creation of new process innovation. On the other hand, innovation in SBP is more defined and well documented, being easily accessible and manageable because of well-defined processes that allow for ideas through internal development.	1. In your organization, what possibilities exist for **adopting knowledge from previous innovation projects** (e.g., brainstorming, documentation, recording)? 2. In your organization, what possibilities exist for **searching for new knowledge (**e.g., interaction with partners)? 3. In your organization, what possibilities exist to **overcome silo** behavior when working on process innovation projects (e.g., by using collaboration tools such as a project management platform- Asana, ClickUp; or shared documents- google doc and google sheet)?

Following that, we will use an illustrative case study to test the instrument on selected organization.

Our main concern is the framework's completeness and how to structured it to ensure we can capture all the success factors for innovating in LSBP. A simple, practical and tailored reflective question for innovating in LSBP is another open point.

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