Business Process Mapping in Entrepreneurial Universities

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Abstract

Business process mapping is no longer an option but a necessity for organizations that focus on sustainable growth. Efficient and effective business processes increase work productivity and potentially even reduce costs. This research maps business processes level 0 (function), level 1 (process), and level 2 (sub-process) with a value chain approach and BPMN (Business Process Modeling Notation) 2.0. This study aims to develop a comprehensive business process model by collecting qualitative data, which integrates the 9 (nine) criteria for university accreditation requirements, AUN-QA at institutional level, ISO 9001:2015, and ISO 21001:2018. Business process modeling is carried out through 3 stages namely data collection, analysis, and observation. Data was collected through Focus Group Discussions (FGD), literature studies, and observations which are then analyzed, classified, modeled, and validated horizontally and vertically. There are 14 primary activities and 11 supporting activities in universities, where teaching and learning, research, and community service are the core of the primary process. Business process modeling level 1 which is breakdown into level 2 and so on makes it easier to review the process so that an efficient and effective process model is obtained. The results of the mapping are also useful for preparing organizational structures and mapping KPIs (Key Performance Indicators) that support organizational achievements.

Keywords—Business Process, Higher Education, Process Model, Value Chain, BPMN
1. INTRODUCTION

The Business Process Model contributes to managing the flow of data and information in higher education so that it has the potential to increase productivity and reduce operational costs. However, not all universities have a standard and efficient business process model. Even between faculties or between study programs can sometimes apply different business processes. In entrepreneurial universities, the majority of employees have a high sense of achievement through creative & innovative ways. This of course has the potential to cause differences in quality standards that are delivered to customers, and data inconsistencies, which in turn can lead to inefficiency in management decision-making, and can even lead to cost inefficiencies. In addition, the benefit of the Business Process Model is to provide clarity of the department/position scope of work, to clarify the rules especially on key processes that affect customer satisfaction. Nowadays, external parties’ requirements from national or international accreditation and certification bodies, LLDikti and Dikti encourage universities to be able to provide fast, accurate, and comprehensive data. Thus, an integrated system based on the Business Process Model is not an option but a necessity to support the achievement of sustainable higher education performance.

Value chain mapping is a concept that has been tested since it was first coined by Michael Porter which consists of 2 categories primary process and supporting process [1]. Business process mapping through value chain mapping is then continuously refined and applied in various studies around business process models. In previous studies, [2] [3] [4] [5] mapped higher education business processes, focusing on the education process with a Value Chain approach that was adapted to the uniqueness of business processes in each educational organization. Another research in mapping business processes uses the SIPOC approach, which also focuses on the education process with several supporting processes [6]. Simamora et all [7] combine SIPOC with the Malcolm Baldrige Criteria for Performance Excellence (MBCfPE) indicator. In this research, there are 3 (three) core processes namely the process of Teaching and Learning, Research and Community Service, 4 (four) directing processes namely Strategic Planning, Quality Management & Quality Assurance, Performance Management and KPI as well as Organizational and Business Development and 5 (five) supporting processes namely HR management, ICT Management, General Affair Management, Financial and Accounting Management and Marketing and the Public Relationship Management.

This study maps a comprehensive higher education process using a value chain approach and Business Process Modeling Notation (BPMN) which has accommodated 9 BAN-PT accreditation criteria [8], ASEAN University Network-Quality Assurance (AUN-QA) [9], ISO 9001:2015 Quality Management System Requirements and ISO 21001:2018 Educational Organizations Management System. BPMN is the chosen tool because it is flexible, easy to use, and easy to understand by users ranging from process managers, business process owners, and business analysts to technical representatives [10][11]. This is reinforced by the research of Meidan et al [12] dan Saraeian et al [13] which showed that about 73.22% of business process modeling was carried out with BPMN.

2. METHODOLOGY

Business process mapping is carried out at the high-level process model (level 0), process (level 1), and sub-process (level 2) [14] [15]. The mapping process is carried out in 2 (two) stages, namely data collection and then followed by an analysis process, which can be detailed as follows:
2.1 Data Collection

The data collection stage is carried out so that the data and/or information obtained are accurate and represent all aspects of the scope of the study. The data collection methods used are as follows:

2.1.1 Focus Group Discussion (FGD)

FGDs were conducted on representatives of business process owners from all relevant departments to get an overview of business processes in their respective work areas. Representatives of the business process owner, in this case, prioritize the manager level so that they can provide a comprehensive picture of their work area. 14 business process owners are invited to this FGD with the quality assurance team. The objectives of FGD are to explore the list of activities, find out the relation between activities, relation or flow of data/information/document/money within departments and between departments. FGD duration varies between 2-3 hours for each department, starting from the primary process: marketing and admission department to the student and alumni affairs department. Then continue with supporting process exploration, from purchasing to quality assurance. FGD result archived as draft business process modeling.

2.1.2 Literature Review

The document reviewed includes policies that apply in the organization, organizational structure, long-term development plans, strategic plans, quality objectives, and job descriptions. These documents crosscheck with any literature, namely journals, books, and legal requirements.

2.1.3 Observation

In the next process, each business process owner details the business process model in each area. Each process in level 1, breakdown into sub-processes by subordinates. Managers observe and clarify the sub-processes mapping.

2.2 Analysis

The analysis, in this case, focuses more on understanding, mapping, and improving the organization's Business Processes so that recommendations can be made that are applicable & effective in their implementation. The data and information analysis technique consists of the following 3 (three) stages:

2.2.1 Causal Analysis

In the causal analysis stage, a logical relationship is studied between statements, facts, or data and the information obtained.

2.2.2 Process Classification

Process identification from the collected data and/or information is sorted and mapped according to the definition of core processes or supporting processes.

2.2.3 Process Modeling

The value chain is one of the platforms used in this stage. After obtaining a high-level process model (level 0 document), proceed with process modeling (level 1 document) and sub-process modeling (level 2 document). Modeling level 1 and level 2 using BPMN 2.0. In sub-process modeling, each business process owner details the business process model independently with colleagues in the same department.
2.3 Validation

In the next stage, the business process model is validated horizontally together with other departments involved, both from the department that provides input, partners in the process, or the department that receives the output. Vertical validation is carried out at the general manager level and process modeling experts from external parties.

3. RESULT & DISCUSSION

Business processes levels 0, 1, and 2 are mapping as shown in Table 1. Business process mapping level 0 aims to map processes at the organizational level, level 1 to map processes, and level 2 to map activities [16]. Process mapping level 0 using the value chain concept which is followed by BPMN 2.0 for mapping levels 1 and 2.

<table>
<thead>
<tr>
<th>Level</th>
<th>Mapping</th>
<th>Goal &amp; Measures</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Function</td>
<td>Organizational Goals and Measures of Organizational Success</td>
<td>Value Chain</td>
</tr>
<tr>
<td>1</td>
<td>Process</td>
<td>Process Goals and Measures of Process Success</td>
<td>BPMN 2.0</td>
</tr>
<tr>
<td>2</td>
<td>Sub-process</td>
<td>Activity Goals and Measures of Activity Success</td>
<td>BPMN 2.0</td>
</tr>
</tbody>
</table>

3.1 Business Process Model Level 0

The business process mapping begins with a value chain analysis with the following background:

- An organization's business processes can be categorized into two categories, namely core processes and supporting processes. Core processes are core business processes that create the main value stream and play a direct role in meeting the needs of external users. While the supporting process is a process that supports the core process in controlling or managing the operations of a system and ensuring the core process can run well but does not have a direct relationship with the value of the organization's benefits.

- The value chain framework has been widely applied in identifying the business processes of an organization. Even the identification of business processes is also recommended by the Ministry of Research, Technology, and Higher Education through guidelines for the forming and evaluation of business process maps and standard operating procedures within the Ministry of Research, Technology and Higher Education environment.

- The business process map can be divided into four levels, namely level 0 (function), level 1 (process), level 2 (sub-process), and level 3 (standard operating procedure). The value chain framework is appropriate in helping identify level 0 business process maps.

  The processes that occur in each department are identified through intensive focus group discussions involving 14 HoDs (Head of Departments) in separate meetings per department with the Quality Assurance department. Referring to Porter's value chain concept [1] and university business process research, namely Pathak & Pathak [4], Oncer [5], Simamora et al [7] by utilizing the results of FGD, causal analysis & process classification, it is found that:

  - Core process, consisting of:
    - Inbound logistics (involves relationships with suppliers and includes all activities that are required to receive, store, and distribute input): student recruitment.
Operations (involves a relationship with suppliers and includes all activities required to receive, store, and distribute input): the tridharma of higher education which includes teaching and learning, research, and community service, networking & partnership, student development & support, library, & profession certification.

Outbound logistics (activities that are required to collect, store, and distribute output): business incubator, career center, center as Revenue Generating Unit (RGU).

Marketing and sales (activities of informing buyers about products and services, encouraging buyers to buy them, and facilitating their purchase): brand development and market development.

Service (activities that are required to keep the product or service working effectively for the buyer after the sales and delivery process): Alumni relations & support.

Supporting Process

According to Porter's value chain concept, there are four categories of supporting processes which are then mapped to universities, namely,

- Procurement (procurement of inputs or resources for the organization): purchasing
- Human resources management (activities that include recruitment, training, development, compensation for the dismissal of personnel): talent acquisition & development, and services & remuneration.
- Technology development (related to equipment, hardware, software, procedures and technical knowledge in transforming inputs into outputs): teaching and learning development, research & community service development, information and communication technology development.
- Firm infrastructure (a set of functions or departments consisting of finance, accounting, legal, planning, public affairs, government relations, quality assurance, and general management): institutional planning, legal and institutional administration, property management, finance & accounting, and quality assurance.

Based on the description above, a value chain diagram is obtained as illustrated in Figure 1.
3.2 **Business Process Model Level 1**

The process modeling (level 1 document) and sub-process modeling (level 2 document) use BPMN version 2.0. The following is some background on the use of BPMN 2.0:

- Compared to other tools such as IDEF0, Flowcharts, Data Flow Diagrams, or Activity Diagrams, Business Process Modeling Notation (BPMN) is the most easily understood business process modeling for all business stakeholders, including business analysts who create and improve processes, technical developers who are responsible for implementing it, and the business manager who monitors and manages it [10][11].
- BPMN is a tool recommended by the Ministry of Research, Technology and Higher Education in the preparation and evaluation of business processes [17].

To make it easier for readers to understand the business process mapping that has been illustrated in the value chain diagram, a causal analysis was carried out and mapping uses the BPMN concept to describe the workflow between functions starting from P1 student recruitment to d. P14 alumni relations and support and S1. Purchasing s.d. S11 Quality Assurance. Figure 2 illustrates a level 1 business process map for the primary activities section. While Figure 3 illustrates the level 1 business process map for the supporting activities section.

![Figure 2. Primary Process Mapping - BPMN Level 1 (Discussion Results)](image-url)
3.3 Business Process Model Level 2

Sub-process modeling is a breakdown of the process modeling that has been done previously in Figure 2 and 3. This modeling is based on observations from each department which is then validated horizontally (with departments at the same level) and vertically (with superiors and business process modeling experts). In sub-process modeling using BPMN, an example process map is obtained which is illustrated in Figure 4 & Figure 5.
Figure 4. Sub-Process Mapping S01. Institutional Planning

Figure 5. Sub-Process Mapping S11. Quality Assurance

Thus, there are 2 categories, 9 sub-categories, 25 processes, and 130 sub-processes as listed in Figure 6.
4. CONCLUSION

After conducting a literature study and developing a conceptual model, we have discovered that there are 2 (two) process categories in higher education, primary and supporting process. There are 14 primary processes consisting of student recruitment processes, teaching and learning, research, community service, networking and partnerships, student development and support, libraries, professional certifications, business incubators, career centers, centers (RGU), brand development, market development, and alumni relations and support. Where teaching and learning, research, and community service are the core of the primary process. There are 11 supporting processes that support the primary process, namely purchasing, teaching and learning development, research and community service development, information and communication technology development, talent acquisition & development, services & remuneration, institutional planning, legal and institutional administration, property management, finance and accounting, and quality assurance. The results of business process mapping level 2 (two) where 130 sub-processes can break down to business process level 3 (three), in the form of Standard Operating Procedure/Guideline. The value chain framework can be implemented in various organizations, services or manufacturers, including social institutions like higher education. BPMN is useful for process reengineering, evaluating the efficiency of business process mapping, clarifying the scope of work, and identifying & criticize the critical process that affects customer satisfaction.

Figure 6. Business Process Mapping Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Code</th>
<th>Function</th>
<th>Process</th>
<th>Sub Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Inbound Logistics</td>
<td>P01</td>
<td>Student Recruitment</td>
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<td></td>
<td>Operation</td>
<td>P02</td>
<td>Teaching &amp; Learning</td>
<td>15</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>P03</td>
<td>Research</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P04</td>
<td>Community Service</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P05</td>
<td>Networking &amp; Partnership</td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>P06</td>
<td>Student Development &amp; Support</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P07</td>
<td>Library</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P08</td>
<td>Profession Certification</td>
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<tr>
<td></td>
<td></td>
<td>P09</td>
<td>Business Incubator</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P10</td>
<td>Career Center</td>
<td>4</td>
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<td></td>
<td></td>
<td>P11</td>
<td>Center (RGU)</td>
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<td></td>
<td>Outbound Logistics</td>
<td>P12</td>
<td>Brand Development</td>
<td>3</td>
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<td></td>
<td></td>
<td>P13</td>
<td>Market Development</td>
<td>2</td>
<td></td>
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<td></td>
<td></td>
<td>P14</td>
<td>Alumni Relation &amp; Support</td>
<td>3</td>
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<tr>
<td>Supporting</td>
<td>Procurement</td>
<td>S01</td>
<td>Purchasing</td>
<td>3</td>
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<td></td>
<td>Technology Development</td>
<td>S02</td>
<td>Teaching &amp; Learning Development</td>
<td>3</td>
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<td></td>
<td></td>
<td>S03</td>
<td>Research &amp; Community Service Development</td>
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<td>S04</td>
<td>Information &amp; Communication Technology Development</td>
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<td>Services &amp; Remuneration</td>
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<td></td>
<td></td>
<td>S07</td>
<td>Institutional Planning</td>
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<td>S08</td>
<td>Legal &amp; Institutional Administration</td>
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<td></td>
<td></td>
<td>S09</td>
<td>Property Management</td>
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<tr>
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<td></td>
<td>S10</td>
<td>Finance &amp; Accounting</td>
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<tr>
<td></td>
<td></td>
<td>S11</td>
<td>Quality Assurance</td>
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<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>96</td>
<td>130</td>
</tr>
</tbody>
</table>
5. RECOMMENDATION

This research develops business process mapping in higher education, especially in entrepreneurial universities. In further research, it is possible to analyze the maturity level of business processes and the readiness of information technology, and their influence on organizational performance. In addition, it can also be developed with performance measurement based on business process mapping.

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REFERENCES


