Framework Design of the Supplier Selection for Organization using Business Process Reengineering (BPR) Method at Telecommunication Industry in Indonesia

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Abstract

The development of digitalization for industrial sectors, especially the telecommunication industry, is increasing in Indonesia. Digital Transformation in organizations needs to cooperate with suppliers who provide value-added within increased digital capabilities and development of the company's business. This paper adopts the Business Process Reengineering (BPR) method for supplier selection. This supplier selection is the initiation of the cooperation process that will be implemented in business. Supplier Selection management needs to be built as an end-to-end process properly, especially in selecting an appropriate supplier that can support business advancement. Along with Organizational Transformation and several business process regulations that need to be adjusted to the current circumstances, all parts of supplier management are required to be adjusted based on the appointment of capable suppliers. The purpose of this research is to make an Automating of design framework of supplier selection in the telecommunication industry through digitalization with a Business Process method approach. The expected result of this design is to provide accurate information in conducting supplier selection assessments efficiently in the Telecommunication industry so that they can continuously assist to achieve an accelerated delivery of information in real-time.

Keywords
Supplier Selection, Automating, Telecommunication, Business Process Reengineering (BPR).

1. Introduction
The development of the Digital Economy in the world Geographically, the Asian continent occupies the largest number of internet users in the world. The need for connectivity services in supporting the smooth running of users will continue to grow. Indonesia is a country with a population that is included in the top 10 internet users in Asia. So that this provides opportunities for the openness of information systems and public acceptance of changing technology. A strong trend toward outsourcing in various industry sectors it must High purchasing costs (Vahidi et al., 2018), the most popular criteria considered by decision-makers for evaluating and selecting suppliers are delivery cost and Quality. the important risk dimension is for supplier quality and delivery (Torres-Ruiz and Ravindran, 2018) can be referred to as supply risk (Kellner and Sebastian, 2019).

An organization or company can grow rapidly with the support of supplier cooperation that can provide added value. The need for the purchasing power of customers is very influential on the implementation of their business. The need for supplier selection in business can increase productivity and time efficiency is needed to support the company's capabilities and business development, especially for supplier selection. The selection of suppliers in the telecommunications industry based on research by Banaeian and Mobli in 2015 is still relatively low at 5%. Based on a case study conducted by the author in one part of a telecommunications company in Indonesia, the supplier selection process that occurs is still done manually. During the transformation time in the last 12 years, the telecommunication industry in Indonesia continues to make development efforts, and various innovation strategies were carried out to follow the development of recent technology (Pramudita, P D., et.al 2019).

Automating the supplier selection procedures are very important for three reasons company, there are First, the volume of data that is available on the Internet is simply too much for manual processing; there must fully or semi-automated system to collect and process the huge amounts of data available on hundreds or even thousands of potential supplier's web sites. The second is that allowing an enterprise to conduct business all the time, the Internet enables business ubiquity; certainly, an autonomous system would be preferential than humans to work on a 24x7x365 basis, and third is that, as we have already started- a company with restricted revenue and production characterized by relatively high wages costs, cannot afford further labor costs for processing the enormous data from suppliers.

This paper adopts a study case for the telecommunications company situation in Indonesia, with the problem from the results of a survey conducted in that company, it was found that things needed special support in the management of documents organizing to obtain the effectiveness and efficiency of the company's operational processes. The survey was conducted on suppliers who have been registered. the document management process from the Cooperation agreement contractual process and documentation is still not timely and efficient. This process is an important part of the smooth running of business activities in the company. The contractual process of the cooperation agreement is closely related to the process of selecting a good supplier, but in practice, according to the survey results, this service process still requires improvement that supplier selection by Automating the digitalization methodologies and applied to the reengineering process business. The design framework of operational information systems by automating in the IoT division will help the company to execute its operational systems synergistically and successfully achieve services for customers. (Dachyar and Risky, 2014)

1.1 Objectives

The following objectives this paper considering that supplier selection with study case in Telecommunication company, the research aims to defined and analyze the current state business process of supplier selection in Telecommunication company and to learn design Automatization with Business Process Reengineering to support supplier. Future giving recommendation-based procedure for the company to efficiency times and operational working in supplier selection.

2. Literature Review

Telecommunications companies are pioneers in providing technological advancements in Indonesia. The technology applied in the business aspect influences accelerating the company's goals. Supply chain product needed of which has not been fulfilled by the company encourage companies to attract suppliers from outside to support the market customer. On the other that, implementation is hampered when the supplier selection process does not match the standards suitable company. The supplier problem from information files includes the name of each supplier, a list of material available from each supplier, the supplier's quality records, the supplier's overall desirability, and general information concerning the supplier's plant and management (Ware, et.al 2012). In this section, we ought to study with some models for supplier selection procedure with literature, from those models, we could develop a modeling approach that is modeling Automating supplier selection for a telecommunication company. the choice of analytic and necessary processes of the company, their ware of present of redesign and performance is structure approach for Business Process Reengineering.

2.1. The C &N Six Phase Model

From Charter and Narashiman (1990) A six-phase model identifying several steps of the supplier selection procedure is discussed. This Phase model focuses on a purchasing cycle that considers international purchasing. The six phases of the model. The modified C&N Model or re-model the supplier selection processes described by the C&N six-phase model by our modeling approach. The resulting model obtained by our modeling approach in tabular Compare the C&N six-phase model and then the modified C&N model. These two models have the same steps; however, the modified C&N model clearly illustrates the pre-selection, selection, and post-selection stages, whereas in the C&N six-phase model the division is not visible.

2.2. Multi-Agent Model

Multi-agent model for partner selection in virtual enterprises in Li et al (2000); a modified (simplified) version of this model is shown in figure 2. Process of multi-agent-based supplier selection, after the goals of the virtual enterprise, are identified, the virtual enterprise coordinator agent (VCA) decomposes the goal into sub-goals so that individual enterprise agents (EAs) can receive these sub-goals as requests (or requests for bids). When the EAs

respond with bids, these bids are evaluated using distributed constraint satisfaction techniques, so that a single most qualified supplier results.

Supplier selection in those study case procedures can be automated from the steps that are best left for human intervention. That procedure is broadly categorized into the following three stages: Pre-Selection stage to Management sets the strategic goals for procurement; Selection stage: The main selection procedures, starting with many potential suppliers and ending with the most preferred supplier. and Post Selection stage: Establishing collaboration with the selected supplier.

2.3. Multi-attribute model for configurable machining system selection

A multi-attribute model for the selection of complex and capital-intensive machining tools. Chick et al (2000) claim that this model was developed after several interviews with buyers and suppliers of machine tools. The multi-attribute model emphasizes the buyer-supplier relationship that is important for an a-long-life capital-intensive purchase. One of the aims of this model is to identify the part of the supplier selection process that can be supported by a decision support system with automize application. The Automation, the high speed, and the great precision (it is a particularly error-free system) guaranteed by a bar code structure permits a simple, more economical, and exact traceability system (Bevilacqua, et.al: 2009)

2.4 Business Process Reengineering (BPR)

Business Process Reengineering is an important method for the Organization to rethink and improve their working activity for efficiency with the engineering process (Analyzing, modeling, and design). (Sunil, Kumar, and Harshitha: 2019). To capture opportunities in the digital era to Automating fast process in Organization, governments and businessmen must innovate to create value through three-dimension which is (1) products and services, (2) business models, and (3) business processes (Pramudita, et.al 2019).

3. Methods

This study was conducted based on primary and secondary information in the form of reviews of academic journals, websites, performance reports from Telecommunication Company in Indonesia. We use a qualitative approach improvement a generic model for the supplier selection procedure in analyzing and identifying Business Process Reengineering (BPR) for Automizing supplier selection.

4. Data Collection

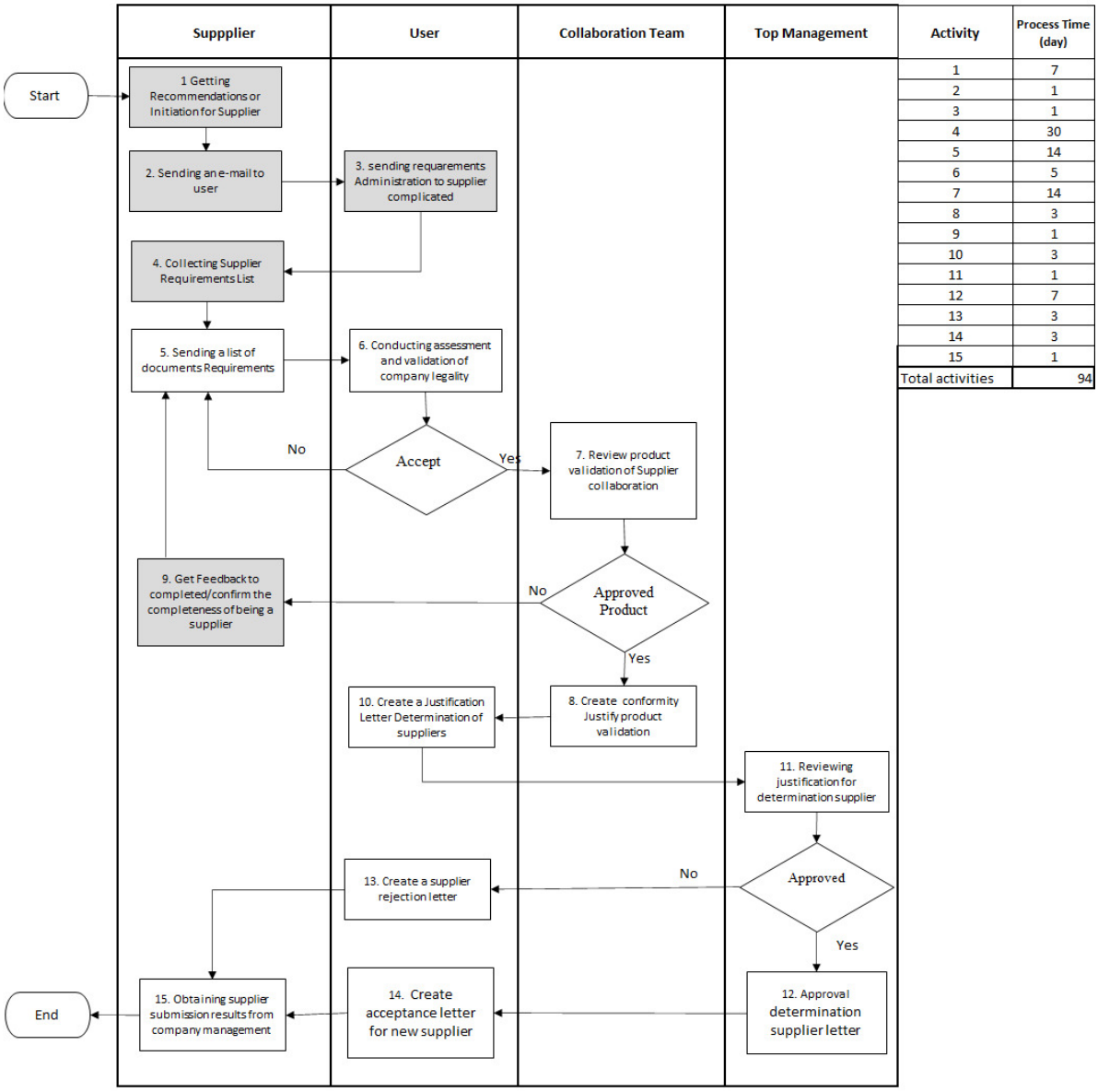
A Telecommunication company is large business telecommunication with the main business is service, offering complete installation and especially connectivity telecommunication. we use analysis our modeling supplier selection by the selection procedure. In the previous supplier selection, these models we studied for supplier selection in the previous section emphasize different aspects. Such as the first International Purchasing (C&N model), multi-agent model (coordinating process with contact person supplier), and multi-attribute model (buying capital equipment). This section applies supplier selection to model the supplier selection procedures of know enterprises, small-medium enterprises, and government product telecommunication. A six-phase model identifying several steps of the supplier selection procedure by study case in Telecommunication company, mapped in shown Table 1.

Table 1. Implement procedure Aspect address value to six-phase model

Addded Value	Phase I			Phase II			Phase III			Phase IV					Phase V	
	Definition of need	Review purchase requisition	Prepare RFQ	Source & product identification	Locate potential resourch	decision to buy	Supplier evaluation	List qualified suppliers	Re-evaluate qualified supplier list	Analyze supplier quotes	Quotes include necessary information?	Perform comparison analysis	Rank order suppliers	Prepare final list	Analyze subjective issues	Select supplier
Agency Letter from Principal which has a higher level than the Agency Letter owned by Telecommunication company that it can provide a more competitive price	1	0	1	0	0	1	0	1	1	0	0	0	1	0	0	0
Supplier has exiting, OGP, or Opportunity Project with the company	1	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0
Supplier have an Existing, OGP, or Opportunity Project outside the Company	1	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0
Supplier Have a market for certain competencies	0	1	1	1	0	1	0	0	0	1	0	0	0	1	1	0
Supplier Has an independent after sales system and resources	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0
Supplier has competencies that are not owned by the Telkom Group but are included in the Telkom Group Portfolio	0	0	1	1	0	1	0	0	0	0	1	1	0	0	0	0
Leaders in locations that are not reached by existing partners	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
Supplier can be provide free PoC for customers	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	1
Persentase Delivery time (delay or on time)	0	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0
Annual Report Audited minimal 2 years	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0	0
Have a bankruptcy report from the Commercial Court	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0

Besides the above table, the mapping of supplier selection conditions in telecommunications companies can be concluded that phase I - V is a procedure that needs to be automated with the development of its business processes. In the opportunity identification part, the right collaborating enterprises must be found operational and product users to selection part of the formation phase. The step for the Automated process there is the data collection system, the inference engine, and the performance evaluation engine that perform the automation (Reggie Davidrajuh: 2003).

For the mapping process of the supplier selection category, there are three stages, including pre-selection, selection procedure, and post-selection procedure. The third category is carried out to model the selection procedure on supplier selection automation for the multi-attribute model for capital-intensive machine tools procurement. Communication openness is considered important, and the guarantee is considered less important for supplier selection. All of them for the existing process supplier selection in the research to be shown in the business process. The company can consider the criteria for selecting the right supplier. (Yasmin, Dachyar and Farizal: 2018). For successes suppliers' most effective ways to process business As-Is for a telecommunication company are shown in Figure 1.



Activity	Process Time (day)
1	7
2	1
3	1
4	30
5	14
6	5
7	14
8	3
9	1
10	3
11	1
12	7
13	3
14	3
15	1
Total activities	94

Figure 1. Business Process As-Is Supplier selection

Based on the business process in Figure 1. the automation stage in the supplier selection process has not occurred, the process from the beginning of supplier submission is done manually by email and manually. The total amount of processing time is based on the results of observations at the company in 2020. The total time required from the supplier selection process is 94 days or about 3 months. This time is an opportunity for researchers to accelerate the assessment process by automating several stages of the assessment and streamlining business process time.

5. Results and Discussion

5.1 Discussion Supplier Priority by Study Case

Dada Collection Supplier to select from reading supplier data and case issues in the company through interviews from experts such as users, operational managers, and parts of the supplier control unit in the company. From supplier priority data, it is found that there are obstacles in the Contractual selection of suppliers and documentation timely and efficient, from data collected from one of the telecommunications companies in Indonesia, supplier data has increased every month so that the characteristics of the supplier selection procedure are needed. There is shown in Figure 2.

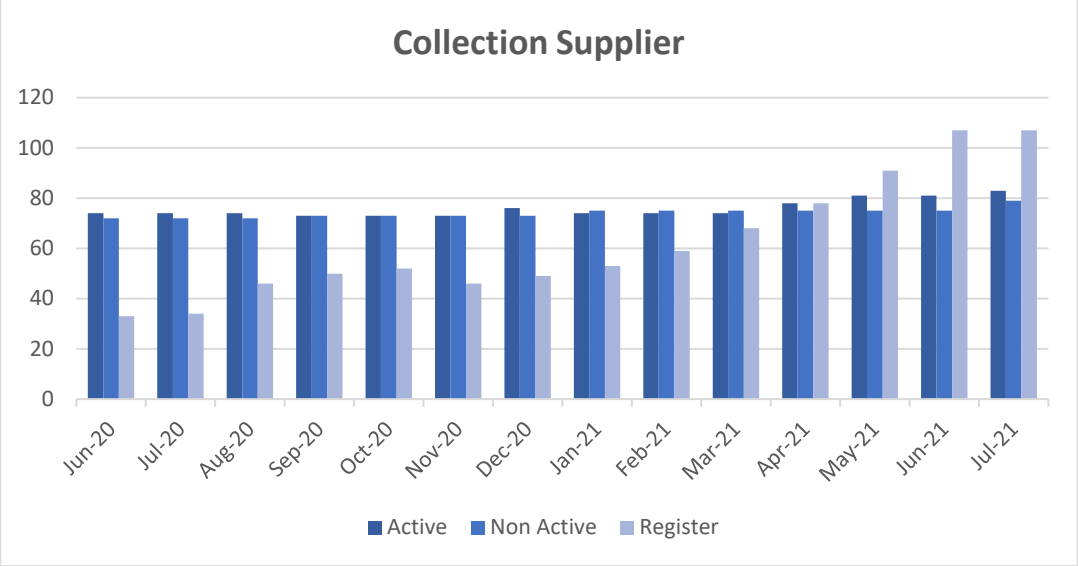


Figure 2. Data Collection Supplier (Juni 2020 -Juni 2021)

Selection Procedure with Automating Bidder Selection with the data collection system. From Table. 1, several assessment criteria can be used to identify the procedure model where the Automation process is adjusted in the procedure through Phase I – Phase V. Based on the registered supplier data, identification is carried out and recorded on the mobile datasheet of each supplier from several supplier selection phases. The focus of this research is data collection for the period June 2020 - June 2021. The supplier data increases periodically every month, if it continues to increase, it is necessary to support the acceleration of several steps which are critical processes that suppliers need to go through in the supplier selection process. Some of the objectives of this automation are the need for supplier data information related to delivery, cost, and quality of products offered by suppliers.

Automating Partner selection with the data Interface Engine is a follow-up to the data collection that has been done. This section looks at the supplier's ability to provide some of the necessities needed to support the company in developing products for customers. The realization of several technological updates and solution capabilities that are owned by processes carried out through the engine interface must offer fast computation to process these numerous data.

Evaluation of the supplier selection process procedure to measure the performance of the overall supplier assessment which will then be decided directly by top management for the Cooperation process to all company customers. This assessment will be carried out regularly every year to see the performance of the Cooperation which provides added value both in terms of quality and financially. There is shown in Table 2.

Table 2. The Model of Supplier Selection

Procedure	Stage	Automation	Steps six-Model
Pre-Selection	Strategic Requirement	-	1. Definition of need
		-	2. Review purchase requisition
		-	3. Prepare RFQ
Selection Procedure	Bidder Selection	Data Collection	1. Source & product identification
	(1st Level Selection)	Data Collection	2. Locate the potential resource
		Data Collection	3. decision to buy
	Partner Selection	Interface Engine	1. Supplier evaluation
	(2nd Level Selection)	Interface Engine	2. List qualified suppliers

Procedure	Stage	Automation	Steps six-Model
		Interface Engine	3. Re-evaluate qualified supplier list
		Interface Engine	1. Analyze supplier quotes
		Interface Engine	2. Quotes include necessary information?
		Interface Engine	3. Perform comparison analysis
		Interface Engine	4. Rank order suppliers
		Interface Engine	5. Prepare a final list
	Performance Evaluation	Performance Evaluation	1. Analyze subjective issues
	(3rd Level Selection)	Performance Evaluation	2. Perform final comparison
		Performance Evaluation	3. Select supplier
		-	4. Negotiate Price & terms
		-	5. Place the order
Post-Selection	Relationship maintenance	-	1. Manage the contract

5.2 Results Automizing Process Business

The automation process of the supplier selection procedure consists of the Data Collection System, Inference Engine, and Performance Evaluation Engine. Each process has a purpose that is prepared in carrying out the selection procedure for selecting the right supplier where the input starts from managing the existing database owned by the company and then produces potential supplier output which then becomes the input of the next automation process. As shown in Table 3.

Table 3. sub-stages of the selection stage for Automation

Selection Stage	Automation Proses	Purpose	Deciding factors	Input	Output
On-Site Selection	Data Collection System	To select a supplier to core competence product data and service capability	Broad margins for Quality, product service, and cost	Database Supplier in company	A list of potential suppliers
Partner Selection	Inference Engine	Selecting a supplier out of the best performance based on performance delivery on time	overall response time and quality assurance	A list of potential suppliers	Selected supplier
Performance Evaluation	Performance Evaluation Engine	To Evaluate how the selected supplier will total transaction deal collaboration	performance total project delivery	Selected Supplier	Accepted Partner

The Issue from Company to critical performance there are three factors each will be Time, cost, and Quality project for delivery measurement. (Reggie Davidrajuh, 2003) divides into there will be lower and upper set by the enterprise. for the example simulation (Table 3) matrix from the range supplier selection with three critical criteria there are:

CF-Time: Time Factor = (LOWER_DELIVERY< delivery _time <=UPPER_DELIVERY)
CF-Cost: Cost Factor = (LOWER_COST< cost <=UPPER_COST)

CF-Quality: Quality Factor = (LOWER_QUALITY< delivery _time <=UPPER_QUALITY)

CPM = CF-Time x CF-Cost x CF-Quality

The automation process will affect the changes in business processes that occur. Therefore, it is necessary to re-engineer new business processes. BPR tools support the re-think of business process, Workflow management system, and enterprise resource planning (ERP) is an application like automatization for their process that makes this reengineering process possible. It's that tool that requires an explicit representation of the business process to manage to operational process in an office company. For that process business reengineering from supplier selection to this research, As-Is process is shown Figure 2 To-Do Automatization process efficiency process will new design framework with iGrafx is shown Figure 3.

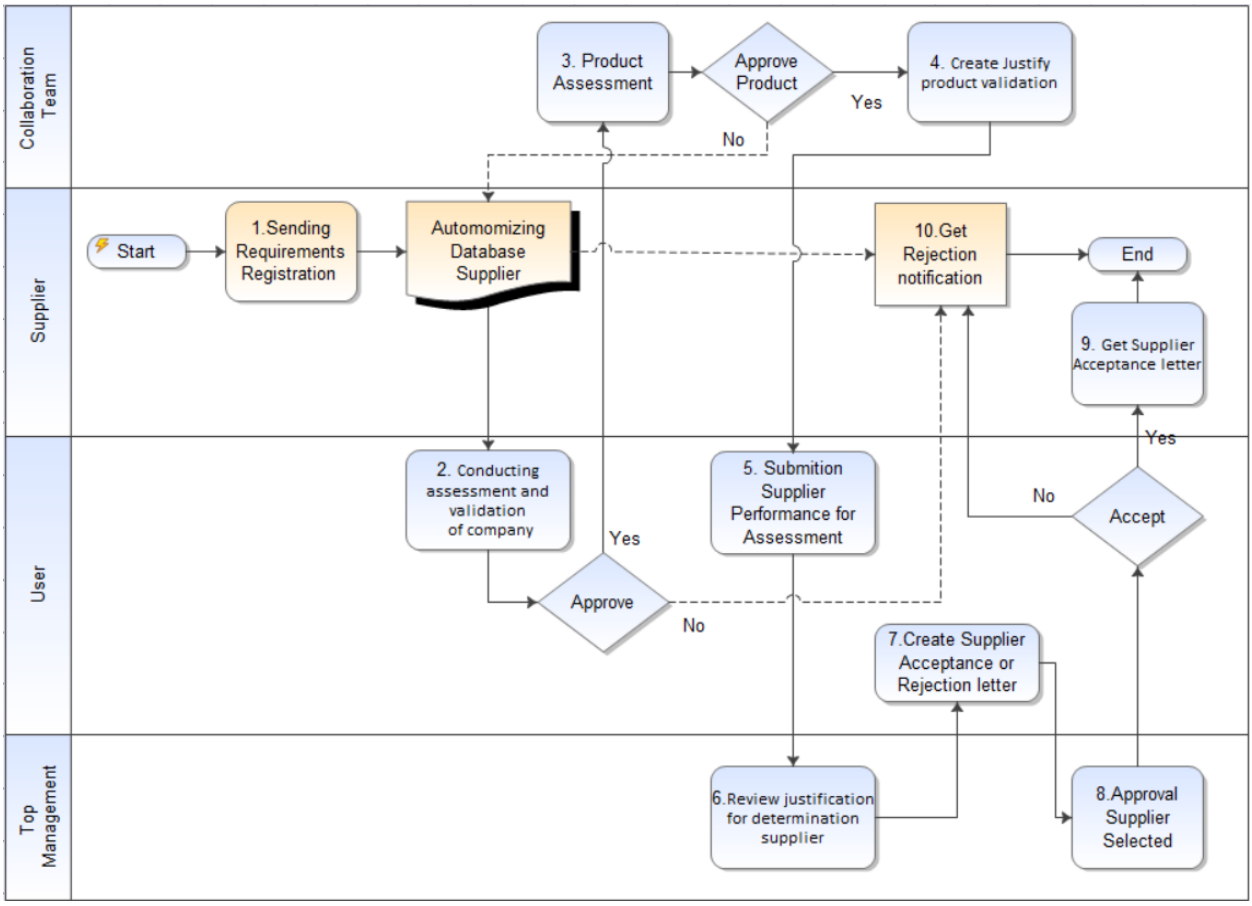


Figure 3. Framework To-Do Process Business Supplier Selection

Reduced business processes in supplier selection efficiency based on the As-Is flow, stages of collecting administrative documents from suppliers by the user, where previously the user confirmed two or more times to remind suppliers of the lack of administrative requirements, besides that the product delivery process can be submitted directly to the supplier. managers directly without intermediary users convey to the product validation team. This makes the processing time longer and human error can also occur because many supplier queues enter per month. This automation process can directly eliminate suppliers who have not completed the administrative requirements, thereby reducing circulation time and unnecessary processes such as correcting documents one by one and reconfirming to other units.

5.3 Proposed Improvements

The supplier selection process in a telecommunications company requires verification from all involved organizational units. Solution for Automation in supplier selection is an initial action that needs to be redeveloped. For the next future greetings, One Fundamental of digitalization being developed is the Enterprise Resource

Planning (ERP) module which consists of managing administration and authorization or access rights for each user, both for each work instruction, for each work procedure, as well as managing authorization and approval for all business processes, which can be arranged according to the conditions and needs of the company, starting from the process that deals with suppliers directly or indirectly. In addition, making reports for management needs that will be tailored to the needs that include all data and information related to the organization's operations so that it can be immediately known anytime and from anywhere.

6. Conclusion

This research aims to show procedure supplier selection procedure that automates the process partially. Therefore, the idea of automating supplier selection in telecommunications companies in Indonesia. Supplier selection is carried out by analyzing several procedures from the stages in the supplier selection carried out with a six-phase model which is included in the pre-selection, selection process, and post-selection stages. Automation is carried out in phases I – V with processes as inputs and outputs in the automation process, including the Data Collection System, Inference Engine, and Performance Evaluation Engine. Automation causes changes in business processes, especially in new business processes. Therefore, for the efficiency of the supplier process with supplier demand that continues to increase every month, it will help the company in supporting the acceleration of a more effective supplier selection process.

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Biography

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