A Systematic Business Process Management Application of an Imports Process on a Commercial Company

Odette Chams-Anturi
Department of Economic Science
Universidad de la Costa, Barranquilla, Colombia
ochams@cuc.edu.co

Juan P. Escorcia-Caballero
Department of Entrepreneurship and Management
Universidad del Norte, Barranquilla, Colombia
juane@uninorte.edu.co

Anamaria P. Gomez
Department of Educational Leadership, Research and Technology
Western Michigan University, Kalamazoo, MI 49008, USA
anamaria.penalozagomez@wmich.edu

Milton Soto-Ferrari
Marketing and Operations Department
Indiana State University, Terre Haute IN 47807, USA
milton.soto-ferrari@indstate.edu

Abstract

In recent years, companies have tried to understand their processes' functionality and response capability to the forces of the environment using information systems. This research developed an automated Business Process Management (BPM) model of the import process in a commercial company located in Colombia. First, a survey was applied to the stakeholders to ascertain the challenges presented at the company' import process. Later, a process flow was proposed based on BPM. The model results indicate a 43% reduction in the execution times of activities in the import area, a 30% decrease in default costs, and a 70% reduction in storage costs for the company.

Keywords
Business Process Management, Imports Process, Automation.

1. Introduction
Business process management (BPM) aims to improve systematic process management efficiency when combined with information management systems. BPM provides control over the processes and resources using technology to connect the stakeholders. It also focuses on the knowledge, mastery, and continuous improvement of the processes and resources to control operational risks and meet organizational objectives (Holzmüller-Laue et al., 2013; Sinur and Bell, 2003).

The benefits reported by companies implementing BPM include significant cost savings and reduced service times, which supports the premise that directing the processes and resources towards the organizational goals also requires knowing the system's restriction to achieve success (Dani et al., 2019).

This research aims to verify the benefits of BPM in a Colombian commercial company positioned nationally with around 270 chain stores. The import process is selected for its strategic position and reported problems with the

information's traceability and internal clients' response capability. The company states that an ineffective follow-up in the international purchases and product nationalization process and delays in identifying the process bottlenecks on time causes misdirection through all the business activities.

We propose the import process's automation, aligning the operational activities with the department's objectives and strategies, and concentrating the efforts on value creation. Implementing a business software tool to analyze their process management will give permanent visibility and measurement of each stage, providing a significant improvement in the response time to changes in the environment, productivity, and performance. It will also show an increase in innovation, customer satisfaction, and staff efficiency levels.

The following sections of this article consider the theoretical framework of BPM, the methodology of the study, the results of the implementation, and the conclusions of the evaluation.

2. Theoretical Framework

2.1 Definition of Business Process Management

Chang (2016) describes Business Process Management (BPM) as a business method that improves business process management efficiency through modeling, automation, monitoring, and optimization. BPM uses technologies, tools, techniques, and management methods to identify, analyze, execute, and improve business processes. Companies continuously need to improve their processes, but some of them are not prepared to explore new opportunities and quickly adapt to the unexpected conditions presented by challenging environments. BPM has become a key process to provide companies with the flexibility to review and modify activities along the way, ensuring that those involved can respond efficiently (Castillon-Mendoza and Solorzano-Aranzamendi, 2012).

Smith and Fingar (2003) state the importance of the information technology infrastructure in the BPM method, since it allows companies and their departments to model, implement, and manage their business processes. BPM is considered as a platform to build new applications or as an ability to improve existing ones, which allows exploring various ways of managing processes and resources, contributing to an enhanced achievement of the objectives (Zhang et al., 2004).

Finally, Van der Aalst et al. define BPM as a "supporting business processes using methods, techniques and software to design, enact, control and analyze operational processes involving humans, organizations, applications, documents and other sources of information" (Ko et al., 2009; p.2). Moreover, the software tools that support operational processes management are called business process management systems (BPMS).

2.2 BPM Origins-Current Research and Life Cycle

The first definitions of work improvement methodologies emerged with Fredrick Taylor in 1920, who published his book: Principles of Scientific Management. He studied production and analysis to design and implement effective methods in the operation of work activities. Peter Drucker designed later new theories of managing and directing an organization with his book: Business Management (1954). He proposed a new system based on the fulfillment of objectives and goals covering the organization's levels. Up to this point, the administration and improvement of objectives were widely studied and applied, but it was with William Demingen in 1986 with his book: Out of the Crisis, when aspects of quality were mentioned. These emphasized the concept of total quality administration (TQM) at the beginning of the 80s. Subsequently, Michael Porter in 1985 introduced the origin of ERP systems, which brought up the concept of the value chain, where the organization is visualized with a decomposition of its parts, identifying with them the sources of competitive advantage in activities that generate value. This first stage is recognized in the literature as the "first wave."

However, it was not until 1990 when James Champy and Michael Hammer discussed the process of re-engineering with their book: re-engineering, which explained the parameters of review and redesign of processes to improve measurement systems, by signifying it in a process-oriented form. The appropriate application of continuous improvement and innovation gave way to competitiveness. The role of information technologies appears with Tomas Venport, in the post-re-engineering term, where through re-engineering, innovation, and continuous improvement, the author introduces the stage with a touch of cultural change. This stage in the evolution is considered the "second wave."

In re-engineering, concepts such as streamlining, restructuring, transformation, and reinvention of processes with downsizing are usually prompted. BPM was promoted as a third wave by Smith and Fingar in 2002, where all the technologies and techniques of ERP and re-engineering were also included with the objective of establishing an organization more adjusted to business processes and management (Castillon-Mendoza and Solorzano-Aranzamendi, 2012). BPM takes up the technologies and techniques of the three waves, constituting an organization more in tune with the new nature of business processes. Figure 1 shows a simplified timeline of the evolution:

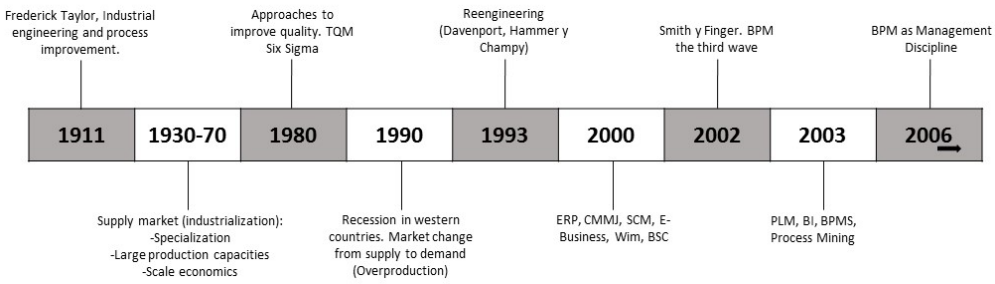

Figure 1. BPM evolutionary processes

Table 1 shows the three waves of the evolution of business management and its importance.

Table 1. Waves of the evolution of the business management

MOVEMENT	EVOLUTION	IMPORTANCE
First Wave	ERP systems emerged.	Productive processes.
Second Wave	Re-engineering and post-engineering.	Strategic processes.
Third Wave	BPM.	Strategic and support processes.

BPM modeling techniques have expanded in recent decades. Some researchers emphasized the significant advantages of BPM modeling combined with information systems management. Swan (2007) studied the effects of process management and inquired about the conceptualization that BPM offers to managers in terms of design, configuration, enactment, supervision, and diagnosis of the business process. The latter, based on the Graphical Process Models (GPM), such as meta graphs, are derived from graph theory, which portrays the information of BPM to provide useful information for the decision-making process and communication between stakeholders. Sun (2007) presented studies about the analysis and design of workflow in BPM, stating that the successful management of BPM depends on the good modeling of the workflow, which is limited in the control and coordination of activities. Cernauskas and Tarantino (2009) studied operational risk management with process control and BPM modeling, proposing a model for financial institutions based on a methodology that integrates process modeling and statistical control. These terms are used in electronic workflows as a tool to improve processes. Often BPM seeks to reduce costs and cycle times, reducing operational risk and monitoring activities.

Business process management covers cultural, organizational, and legislative aspects, including the technological level, which expands the design, execution, and measurement of the processes. There are several views on BPM's life cycle (Van der Aalst, 2004a, 2004b; Van der Aalst et al., 2003; Havey, 2005; Hill et al., 2006). According to Van der Aalst et al. (2003), the BPM life cycle consists of four cyclical points: Process design, system configuration, process enactment, and general diagnosis, described in Figure 2.

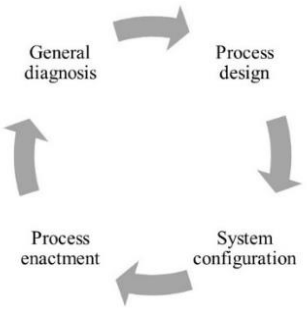

Figure 2. BPM life cycle

In this context, process design refers to paper-based business processes modeled electronically in BPMS, whose graphical standards are essential in the life cycle. System configuration synchronizes the previous step with the system infrastructure, such as the synchronization of roles and organization charts on the company directory. Process enactment consists of implementing the business process modeling in the BPMS engines. In the general diagnosis phase, a BPM analyst identifies and improves all the processes by implementing a cyclical approach.

3. Methodology

We analyze a case study of the largest retail chain in Colombia. The company has approximately 70 years in the retail market, with 100% national capital, and a fair market share of 22 percent. It has more than 400 stores across the national territory, and it is recognized as the leading company in the commercialization of optimal quality consumer products. The company markets a wide portfolio of private and store-brand products in several categories: grocery, textiles, toys, sports, home appliances, technology, and others. Specifically, we focus on the import business unit, which involves the activities of international purchasing and nationalization of merchandise. The company imports products from different countries, including the United States, China, Panama, Canada, Netherlands, Ecuador, Mexico, Peru, Turkey, Argentina, and Chile, among others. However, the unit reports issues with the traceability of information and the ability to respond to internal customers because the tasks are performed manually using spreadsheets. The process considers only the orders from SAP into purchases, cost settlements, and receipt of merchandise. Likewise, the lead times of the processes are not visible, and it is not possible to determine in which position of the chain the disadvantages are located.

To understand the most significant problems in the import area of the company, we initially applied a structured questionnaire technique to the participating stakeholders in the import process, in particular to the commercial directors, customs agency, international freight forwarders, and transporters. As a reference, we used key points from the research presented by Huang (2010); and we fulfill an adaption to the logistics area of the company. The items were as follows: Q1. Compliance in the delivery of cargo from suppliers, Q2. Level of knowledge about the documentation required for an import, Q3. Imports tracking management, Q4. Import application process, Q5. Coordination process for imports shipments, Q6. Credit letter management process on imports, Q7. Imports delivery process, Q8. Payment process to suppliers abroad, Q9. Management and time of nationalization in imports, Q10. Supplier tracking level, Q11. Resources for receiving imported indicators, Q12. Relevance and opportunity in receiving imported indicators, Q13. Reception and delivery times of imports notifications.

All items from the survey were measured using a Likert scale with values ranging from 1 (very bad) to 5 (very good). A pilot test was carried out with academic researchers and practitioners. The process was important to assess the content validity of the construct scales, giving them consistency, coherence, and understandability. Later, the final questionnaire was sent by e-mail with a link to an online survey to the informants. Twenty questionnaires were answered. After the initial diagnosis of the stakeholders' perceptions, we describe the current import process and detected critical points for improvement. Then, we modeled the proposed process flows based on BPM, and the identification of improvements was discussed with the managers.

4. Results and discussions

4.1 Perception of company stakeholders

Figure 4-6 shows the results obtained from the survey developed by the stakeholders participating in the process.

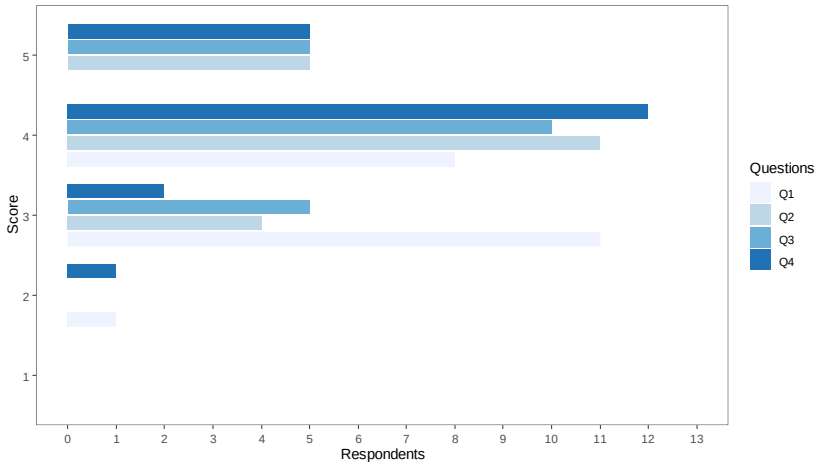

Figure 4. Results of questions Q1-Q4 from the stakeholder survey

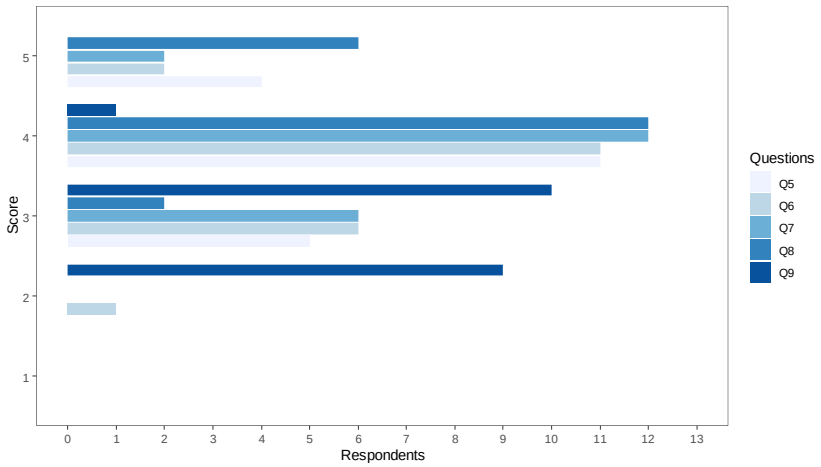

Figure 5. Results of questions Q5-Q9 from the stakeholder survey

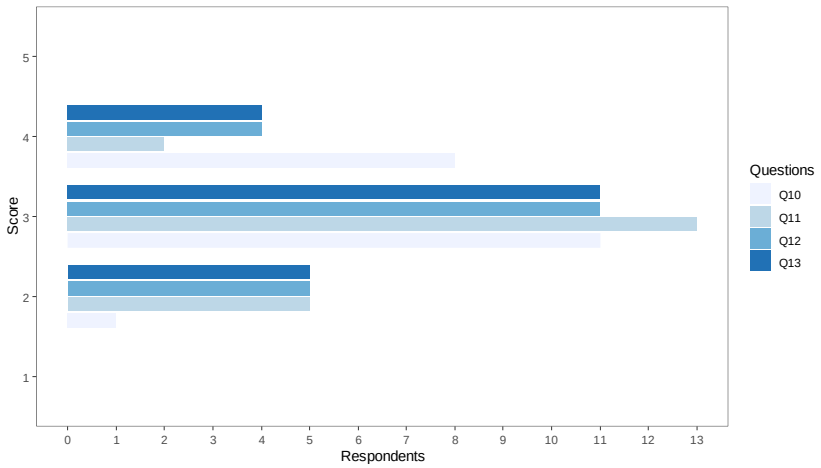

Figure 6. Results of questions Q10-Q13 from the stakeholder survey

As a result, 44% of the respondents considered that cargo delivery from their suppliers complies with the requirements; the remaining 56% classify it as regular. 56% of the respondents mentioned having a good knowledge of the documentation required to carry out an import. However, 25% consider themselves experts on the subjects, and 19% know the basics. In reference to import monitoring, 50% of the respondents considered that there is good management of import monitoring, and 25% reflected that there is very good management, and the remainder 25% expressed that management is regular. Besides, 63% of the surveyed stakeholders articulated that there is a good process for requesting an import, 25% answered that it is very good, and 12% that it is regular. Moreover, 56% reported that there is a good process for coordinating import shipments, 25% consider it very good, and 19% shows that it is regular. 56% said that there is a good process for the management of credit letters in imports, 13% showed that it is very good, and 31% that it is regular.

Furthermore, 63% reported that they have a good import delivery process, 6% consider it very good, and 31% showed that it is regular. Also, 63% communicated that there is a good payment process to suppliers abroad, 31% indicated that it is very good, and 6% that it is regular. 50% of those surveyed disclosed that the management and nationalization times of an import is regular, 44% that it is bad, and 6% that it is good. 62% of the respondents consider that the suppliers' level of monitoring is regular, and 38% revealed that it is good. 69% of those surveyed show that the resources for receiving imported indicators are regular, 25% expressed that it is bad, and 6% that it is good. 56% of the respondents consider that the relevance and opportunity receiving imported indicators are regular, 25% disclosed that it is bad, and 19% that it is good. Finally, 56% of the respondents showed that the reception and delivery times of import notifications are regular, 25% considered that it is bad, and 19% denoted that it is good.

The obtained results support the assumption that, in the view of the stakeholders, the fulfillment and monitoring of the process might be improved. We can also denote that the delivery to the suppliers and follow-up management activities are in an acceptable compliance level, despite not having a systematized structure of the processes. The general management of the process, including the knowledge of the required documentation, the request for an import, the coordination of the shipment, the management of the credit letter, the dispatch, and the payment to suppliers, displayed a good compliance level. However, activities such as the management and time of product nationalization are presented with a low compliance level. Finally, the process's indicators and notifications are not communicated on time, which delays any action for improvement.

The described situation can be enhanced using BPM tools to understand the business process by analyzing the existing problems to provide practical improvement actions.

4.2 Description of the Current Import Process

The import process starts with a market study to review the impact of the purchase. Estimates from suppliers are evaluated in aspects as price, freight, and terms of negotiation. Then, after a supplier is selected, the import application process is put in place, and the required form and permits are submitted and shared with the supplier. The next step is to coordinate the shipment with the cargo agent or intermediary of the transportation process. The supplier is then asked for the invoice supporting documentation, which is a requirement for merchandise nationalization.

The merchandise nationalization process begins with completing the credit letter or direct payment order. The clearance process refers to the arrival of the cargo to Colombia, where the customs agency performs the nationalization process. A pre-inspection process is performed on-site, and if it is approved, the unloading is made according to the cargo and documentation. Once the product is nationalized, the company is notified that the shipment was sent from the port container to the company warehouses. The promptness of this last step is critical to avoid late fees. Finally, payments are made to suppliers.

The process is executed using spreadsheets to purchase orders, perform cost settlements, and receive goods (using an ERP-SAP technique). Then the current approach is not providing the required visibility of the process to determine the root causes of the problems, supporting the idea that an efficient information system is required to avoid delays and ineffective processing times.

4.2.1 Proposed Workflow Process for Import

We modeled the import process using BIZAGI®, one of the leading solutions in Business Process Management for flexible process automation. The software provides full visibility and traceability of orders send to suppliers, cargo movements, shipping details, and the status of events throughout the logistics chain. Including unlimited web access

from anywhere in the world, unlimited automatic notifications, and alerts of any event in the logistics chain to e-mail/cell phone and administration of suppliers and consignees (minutes to associate reports, notifications, or accesses) (Bizagi, 2020).

The modeling of the process required the study of all the key points of the importation process. A total of 16 processes were modeled. Fig 7-9 show examples of the modeled processes. Table 2 shows a brief description of all modeled processes with their respective automation scope.

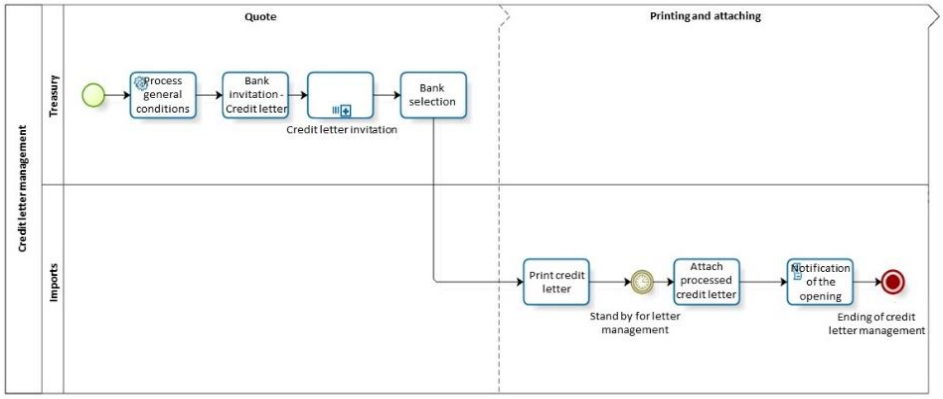

Figure 7. Credit letter management

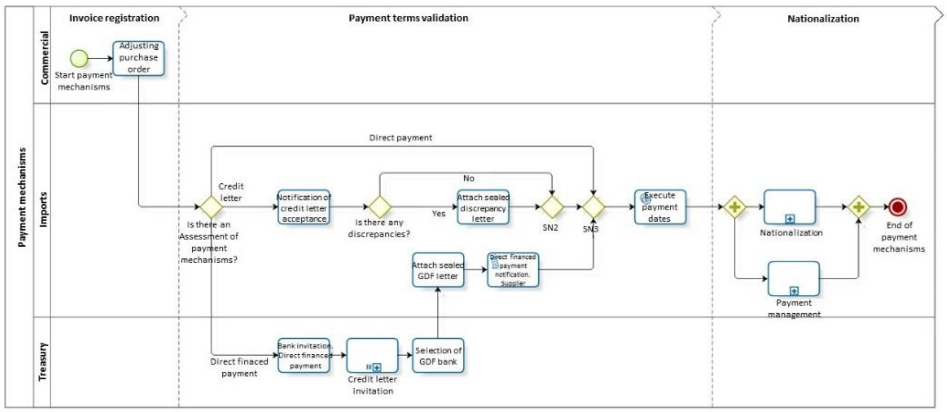

Figure 8. Payment mechanisms

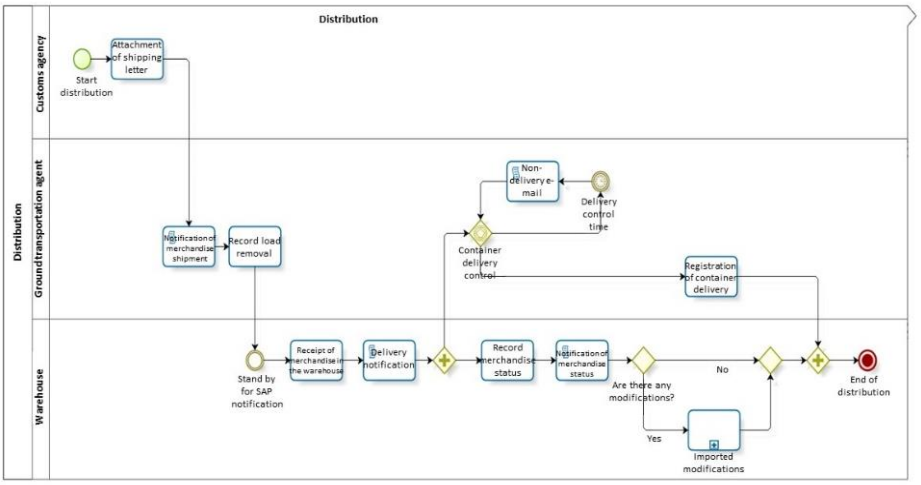

Figure 9. Distribution

Table 2. Description of modeled processes and automation scope.

Stage	Description	Scope
Creation of the Supplier's entry	Uploading of the supplier's information. Managing and validating SAP information through a web service and simultaneously updating Bizagi's supplier information.	(1) An entry is created or modified to upload the supplier's information. (2) The director/manager approves the entry (3) The data is validated by the standardization area. (4) The web service updates the information in SAP.
Request of estimates and approval	Requesting estimates or quotes for services/products to potential suppliers. Approval or rejection of the received estimates.	(1) The commercial area submits a request for an estimate. (2) An authorization for uploading the estimate is provided to each potential supplier. (3) The commercial area verifies and analyzes the received estimates of each potential supplier simultaneously. (4) The commercial director/manager approves, requests adjustments, or rejects each estimate. (5) The suppliers are notified via e-mail of the decision (5) Generation of purchase orders for each approved supplier are sent.
Formalization	Sending the form for formalization. Generating the purchase order.	(1) An authorization for uploading the final quote is provided to each approved supplier. (2) The form for formalization is sent to the approved suppliers, including a file of the legal requirements to be met. (4) The suppliers submit the form and other required documents to comply with the requirements. (5) Adjustments are made to the purchase order if required. (6) The supplier is notified.
Invitation and generation of credit letter.	Generating the credit letter (Optional) and ending the request to financial institutions.	(1) An evaluation is performed to the credit letter's term of conditions. (2) An offer is sent to the banks via e-mail (3) A bank is selected after accepting the conditions. (4) The credit letter is generated. (5) The credit is approved.
Verification of pending shipments	Tracking the shipments that are pending due to legalization or nationalization.	It tracks and notifies the shipments' state for legalization and nationalization within a specific range of time.
Shipping	Managing the shipping conditions.	(1) The cargo requirements and booking conditions are confirmed. (3) The supplier uploads the shipping information. (4) The company is notified of the shipping. (5) A confirmation of the payment terms is agreed with the supplier.
License	Acquiring the license to comply with the import requirements.	(1) The company manages the process of requesting the import license. (2) The certificates of the nature of the product are sent to the supplier.
Cargo shipment validation	Tracking the shipments pending to be assigned to a cargo agent.	(1) Tracks the pending shipments. (2) A cargo agent is assigned. (3) The shipping process is authorized.
Payment conditions	Agreeing on the payment conditions and recording the agreement in SAP.	(1) The payment conditions are checked before formal payment. Changes are made if required. (3) The invoice is registered in SAP.

Table 3. Description of modeled processes and automation scope (*Continue*)

STAGE	DESCRIPTION	SCOPE
Payment	Managing the payment.	The payment is made.
Nationalization	Managing legal formalities of the goods Delivered at Place.	(1) The company is notified of the goods arriving at the port. (2) A pre-inspection of the merchandise is carried-out. (3) Legal formalities are managed. (4) An actualization is uploaded in SAP (5) The Delivered in Place step starts.
Delivered in Place	Managing the Delivered in Place of the goods.	(1) It manages the process of loading in port and delivery at the warehouse.
Warehouse management	Managing the merchandise that is placed at the warehouses.	It manages the imported merchandise that was delivered at a particular warehouse.
Requests management	Managing the requests in pending shipments.	(1) The system automatically uploads pending applications for legalization. (2) The pending request is selected and modified. (3) The manager/director approves. (4) An e-mail is sent to the commercial and import area, informing about the approval or rejection of changes.

5. Discussion

The proposed process flow model provides control and monitoring in real-time of all processes with its actors' integration. However, the proposed model presents new challenges for the workers in the commercial area. Including:

- The proposed model contemplates that the traceability of the process would be obtained in real-time, generating the possibility of designing timely control mechanisms. The workers must have the disposition towards the continuous improvement of the processes, implying having personnel for whom this challenge generates high-intensity motivation. That, accompanied by a process aligned with the strategy. Both will generate a path in meeting the goals of the project.
- Process changes involve trial-and-error actions, which can generate dissatisfaction among employees who participate in the import area. Thus, it is essential to maintain effective communication with all those involved, not only in the import area but also with all internal suppliers and customers, to evolve consistently and quickly when these types of situations arise.
- Once the new process is implemented, more information would be obtained on its performance (management indicators). Requiring workers to analyze facts and data to take advantage of the information that this new model generates. The company must exploit the information for an improved decision-making process, primarily when investing in training and technology acquisition.
- The flow of information regarding the process performance will require greater employee empowerment accordingly to their levels of competence and responsibility.

To develop work strategies, managers must consider and coordinate the activities required to move forward to the new business process model (Escorcia-Caballero et al., 2019; Moreno-Luzon et al. 2019). Using this new model, we can ensure that all stages of the process are visualized. However, each company is responsible for the culture of acceptance of the strategy formation process. Company management recognizes the challenge of resistance to change. Managers are aware of the depiction required to develop attitudes and open-mindedness assessment to new scenarios (Chams-Anturi et al., 2020). The strategies related to this new model must be explicitly defined for the business areas involved in this process, which are the ones that would lead the acceptance initiative.

6. Conclusions

To increase competitive advantages and achieve the company's strategic objectives, we designed and applied an automated BPM approach. The company's import area under study had drawbacks with information traceability and the ability to respond to internal customers' inquiries. Thus, we studied the current process flow of the import business process to propose a new model based on BPM. Using the advisement from the company's managers, we used a modeling software that provides solutions in the automatization of processes in a flexible scheme that offers visibility and traceability of each section of the process.

The benefits of the BPM automation process were calculated after six months of its implementation, contemplating a 43% reduction in the execution times of activities in the import area. A 30% decrease in default costs and a 70% reduction in storage costs. These reductions are considered significant to the company because the automation of the process has allowed:

- An automated notification system provides information in real-time of the import process, reducing delays, extra fee charges, and storage costs.
- Availability of the information to improve the decision-making process.
- Accurate indicators of cost overruns caused by foreign suppliers not sending documentation on time and/or poorly completed.
- Control of loading times and reception times.

Therefore, the company presents significant reductions in time and costs. Retaining control and real-time monitoring of the import process. It is recommended for some strategies to be developed in the business area, through human resource training, individual-group consultations, and fostering teamwork to reduce the resistance to change for employees at the company.

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8. Biographies

Odette Chams Anturi is a professor at the Science Economics Department, Universidad de la Costa (Colombia). Her research interests are Supply Chain Management, Organizational Learning, Innovation, and Ambidexterity. She has worked in public and private companies of mass consumption and healthcare entities. Currently, she is part of a research project about Quality Management and Ambidexterity in the Organic Agro-Food Industry.

Juan P. Escorcia Caballero is a professor of the Business School at the Entrepreneurship and Management Department, Universidad del Norte (Colombia). His research interests are Supply Chain Quality Management, Innovation, and Ambidexterity. He has published several journal and conference papers. He has participated in three research projects funded by the Administrative Department of Science, Technology, and Innovation of Colombia. Currently, he is part of a research project about Quality Management and Ambidexterity in the Organic Agro-Food Industry.

Anamaria P. Gomez is a graduate assistant on the Department of Educational Leadership, Research and Technology at Western Michigan University. Her research interests include technology-education and human resources management. She has worked for several private and public companies in the areas of risk management and human resources.

Milton Soto-Ferrari is an Assistant Professor of the Operations and Supply Chain Management program in The Scott College of Business at Indiana State University. He has published in recognized journal and research conference proceedings. His research interests include business and healthcare analytics, supply-chain management, logistics, and industry application of forecasting policies. Currently, he is the director of a research project related to the automation of advanced forecasting techniques in the industry.