Challenges Facing Port Logisticsin Cameroon, Using The Bpmn Model

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Abstract: This paper has addressed different issues of logistics operationsat the Douala seaport in Cameroon. The key focus has been made on the Douala seaport for its recipients in different neighbouring countries. Furthermore, the implication of the BPMN model has also been applied to determine the issues in the logistics operations and different improvisations can be induced for enhancing the effectiveness of the Douala seaport in Cameroon. The key factors were logistics services and costs that wereanalyzed in comparison with the logistics operations. The implication of the BPMN model is significant by which supply chain optimization can be performed and desired results will be obtained.

Keywords: Logistics, Challenges, Operations, BPMN model.

1. Introduction

This paper mainly focuses on the logisticsoperations conducted atthe Douala Seaport in Cameroon which is the main transportation hub to neighbouring countries like the Central African Republic and Chad; as well as the challenges of high logistics costs and long delivery time in the country under study. In this paper, scientific literature is used to present the findings and different aspects are determined that could be used to mitigate the risks associated with logistical challenges in Cameroon. Furthermore, this paper has also highlighted the tailbacks and logistical processes from the Douala seaport in Cameroon and various aspects associated with the logistical operations. Moreover, a standard that has been adopted for business process modelling known as "*Business Process Model and Notation (BPMN)*" has also been applied in this paper, thusthe analysis of the current logistical processes employed at Douala seaport in Cameroon is described in detail.

Lastly, several recommendations on logistics operations have been made to induce different improvisations in the Douala seaport in Cameroon by which effective supply all over Sub-Sahara Africa can be observed. However, this paper is significant for the players in the field of logistics and recommendations are made for improving logistics services and costs, at the Douala seaport in Cameroon.

2. Literature Review

2.1 Challenges Identified for Cameroon as a Country

According to the research of Kouty (2021), several issues have been determined in Cameroon because of their unsustainable processes and there are no such measures present within the country that could be used to address the processes producing different development challenges in the country. Moreover, the study conducted by Nzudie et al., (2021) has further described that Cameroon has been identified with different challenges in terms of leadership and governance issues, development, low infrastructure development, lack of education and insufficient use of technology. All these challenges are not present in Cameroon only but various other countries of Sub-Saharan Africa are being impacted by these challenges.

Besides this, the study conducted by Muogboh & Ojadi (2018), which describes that the issues present in Cameroon also results in different challenges for Cameroon because of low efficiency in their logistics operations. However, Sub- Saharan Africa is held at the macro-level and it is required that the issues present in the country should be addressed accordingly to have efficient logistics processes within Cameroon and Africa overall.

Furthermore, there are different challenges associated with economics and trade in Cameroon. Lekane & Asuelime (2017) have described in their study that several aspects associated with economic mismanagement have been identified, that result in the poor economic condition of Cameroon. The policies implemented in Cameroon have significantly reduced the import and export activities in the country by which not only low economic development is observed but different trade challenges as well. On the other hand, the study of Puatwoe & Piabuo (2017) has further defined that several barriers were identified in Cameroon because of different interventions made by IMF (International Monetary Fund). These interventions have produced adverse results for the economic infrastructure in Cameroon because several restrictions were imposed that not only restrict the trade but a barrier was also put in place for the economic development of the country. Besides this, there are different issues associated with high public debt causing different challenges for the trade and

economic development in Cameroon. A rise of 45.8% in the debt has been observed in 2020 from the year 2007 that results negatively for the country because low trade is observed by which several economic challenges are determined that negatively impact the overall GDP of the country (Group A, 2021).

2.2 Logistics and Logistics Performance in Cameroon

According to the research of LeMay et al., (2017), the term supply chain refers to the planning and management of the activities associated with sourcing and procurement along with all the activities used for logistics management. This also includes the collaboration with the supplier along with third-party resources from whom the material has been procured. Furthermore, the study conducted by Kamgang et al., (2020) defines that logistics and its management is used to perform different planning activities and the flow of goods are evaluated from the point of origin to point of consumption. It has been analyzed from the study of Bölsche & Herbinger (2014) that defines the importance of terms effective and efficient in the logistics operations. This study has further described that for the humanitarian firms, it is required to have effective and efficient logistics operations considering the overall logistics cost. With the influence of optimal logistics service that is safe, quick and reliable, the logistics operations performed by humanitarian organizations provide vital means to vulnerable people. On the other hand, Piyachat (2017) has also defined the importance of saving logistics costs that describes the level of efficiency of the logistics performance system.

In a report published by WTO (2015), it has been analyzed that Kenya and Nigeria in Sub-Saharan Africa have been listed at the top position with LPI ranks of 75 and 74 respectively. However, the score of Cameroon is determined to be below average (see figure 1).

	Cameroon (Rank 142)	Sub-Saharan Africa	USA (Rank 9)	Germany (Rank 1)
1) Customs	1.86	2.27	3.37	4.10
2) Infrastructure	1.85	2.27	4.18	4.32
3) International shipments	2.20	2.49	3.45	3.74
4) Logistics competence	2.52	2.41	3.97	4.12
5) Tracking and tracing	2.52	2.48	4.14	4.17
6) Timeliness	2.80	2.84	4.14	4.36
LPI score	**2.30**	**2.46**	**3.92**	**4.12**

Figure 1: Logistics Performance Index Score (Source: Schumann-Bölsche et al., 2015)

Arvis et al., (2014) further described in their study that the score of logistics performance index (LPI) is based on the weighted average of the country. However, in Cameroon, it has been determined that several shortcomings are present by which different lacks in the connectivity with the logistical processes are determined. This produces an adverse impact for Cameroon to have effective supply chain operations and various lacks are also identified in connection with global supply networks. On the other hand, different other issues were also determined in the logistics management of Cameroon because a noticeable lack in the visibility and controllability of logistics is present that significantly reduces the logistics performance of the country. Based on these factors, several negative consequences for the logistics performance of Cameroon are determined because congestion with the sensitive hubs are obtained and the required connection with central distribution hubs and ports are not present in the operations. However, the study conducted by Schumann-Bölsche (2018) has described that in Cameroon the issues in their logistics management also leads towards high supply chain cost along with the lead time by which the required material is not delivered to the people within the given time. Another study of Motta et al., (2019) has mentioned that in Cameroon different issues associated with transportation, storage and distribution also result adversely on the logistics management in the country.

2.3 Cost Challenges for Douala Seaport

According to the report published by the World Bank, it has evaluated significant issues are present at the Douala seaport, which result in the high cost of the logistics operations (Cameroon, 2021). It has been determined that the Douala seaport is the central hub in Cameroon and it is also recognized as a major constraint in the growth of Cameroon. Various inefficiencies were observed at the Douala seaport since 1990 and till today have not been resolved yet. Based on these factors, Douala Seaport has been recognized as the least efficient port in Cameroon that does not increase the overall cost of the logistics operations but the associated parties also face different issues because of several delays they have to face during the seaport operations (Cameroon business report, 2021).

On the other hand, Kahyarara (2018) has also described that long cargo dwell time are present at the Douala seaport, with more than 45% of the container traffic generated through theport and it is the largest container traffic that has been observed from any port in Cameroon. This results in various challenges because an average of 19 days' delay is observed for the containers to transit towards their respective locations. This has been further evaluated from the study of Lee et al., (2018) that describes that high cost at the Douala Seaport is observed because of the broad-tailed multimodal distribution. This cause several uncertainties within the cargo ship and high shipping costs are observed because the associated parties are required to increase their inventory levels resulting in low logistics operations within Cameroon (Muogboh & Ojadi, 2018). This further describes that the use of classical parametric distributions also results in significant delay and the shippers are required to pay high costs because of the long delays as the ship has to wait for approximately 19 days to move towards their required destination (Syler & Venkatesh, 2018). Furthermore, Bile (2020) has also described that the distribution methods are least considered which results in different delays within the shipment and they have affected adversely because of the high dwell time and the cost of the overall shipment is increased to the desired extent. More than 50% of the shipments have to pay high costs because of the long delays and several issues are also obtained because of different policies that have been implemented at the Douala seaport. These delays have been recognized as abnormal delays and in various cases, the ships can take time up to 200 days to be cleared from the port. Moreover, the study conducted byAminatou et al., (2018) has also addressed that the concentration of the shipping flows has been identified as another issue that increases the shipment cost and delays are observed in the transition period from the Douala seaport. The disruption pattern results in different congestions by which later clearance of shipment is observed and high penalties have to be paid by the shippers, which increases the overall cost of the final product (Duzbaievna Sharapiyeva et al., 2019).

3. Materials and Methods

This paper aims to evaluate the on-time optimization of logistics at the Douala seaport in Cameroon in which different aspects have been evaluated to induce different strategies by which the identified shortcomings can be addressed in the desired manner. However, the method adopted in this paper is to evaluate the processes at the Douala seaport by which different logistical practices are analyzed. However, the BPMN model has been applied to perform the analysis. The BPMN model was sufficient in this study because different flow objects are interconnected that mainly include pools, objects, artifacts and swim lanes and they are used as the standard method within this paper. On the other hand, several other models are also present like the *"Supply Chain Operations Reference Model (SCOR)",* but this model is not sufficient for this study because it mainly focuses on the logistics operation within an organization and only delivery processes are evaluated. However, there are several limitations determined in using the SCOR model because only performance measures can be evaluated but in the case of Cameroon, several benchmarks and metrics are also required to be evaluated by which the overall performance of Douala seaport logistics can be analyzed.

The reason to select Cameroon for this paper because different issues were determined in their logistics operations at the Douala seaport and this seaport has been recognized as a prime significance for different supply chain activities in Sub-Saharan Africa. Based on the importance of Cameroon, a comparison has been made with other seaports like Dar Es Salaam port located in Tanzania. Moreover, the seaport is selected in this paper because the low importance of railways and airports is present in Sub-Saharan Africa. Seaports are the main channel by which international supply chain operations are performed and road transport is used to supply the goods within the country (Schumann & Streit-Juotsa, 2014).

4. Results and Discussion

This paper provides detailed information regarding the use of the BPMN model. However, further analysis has been conducted to evaluate the logistical processes associated with the logistics costs and logistics services. Below figure 2 describes the operations that are performed at the Douala seaport. Furthermore, the key factors are involved in the process model starting from top to bottom covering eight lanes of pools and swim of the BPMN model. All the recipients are present on the top in grey colour covering different humanitarian

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organizations, customs authorities, port authorities. Furthermore, the truck carrier and ocean carrier are also present as highlighted in yellow at the bottom of figure 2. On the other hand, various parts of figure 2 are further scaled in Figures 3 and 4 because of the complex nature of the model. This allows to have clear visibility of all the processes and a detailed understanding can be developed.

Figure 2:Business Process Model for Logistics in Cameroon in Douala Seaport

Figure 3below illustrates the view of one pool and swim lanes among the eight as it has been described in figure 2. However, each pool and swim lane defines each actor that is present in the whole logistics operations and figure 3 defines the forwarding agent. All the accepted requests for the processes are followed by the flow objects describing all the case activities and different dealings with the important documents are also done. On the other hand, all the gateways, activities and events are connected as illustrated by the arrows. Moreover, two gateways are the part of figure 5 in which *"X"* defines the decision (XOR) and *"+"* for all the parallel processes (AND).
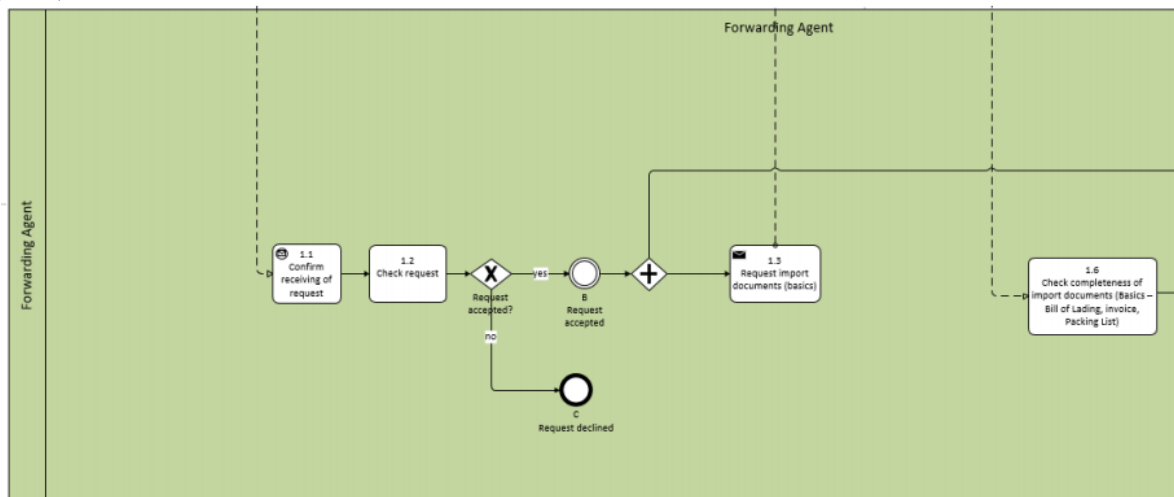

Figure 3: Logistics Operations in Cameroon

It has been analyzed that the forwarding agent is liable for all the processes along with the documentation process because of the different complexities present at the Douala seaport in Cameroon. The key focus has been made on the transit documents. On the other hand, all these processes are associated with other actors like customs agencies. The use of the BPMN model allows the development of different blockages along with this missing effectiveness, which shows this produces an adverse impact on the logistical processes at the Douala seaport. Figure 4 illustrates only one example from where cost and time are wasted (Schumann & Streit-Juotsa, 2014).
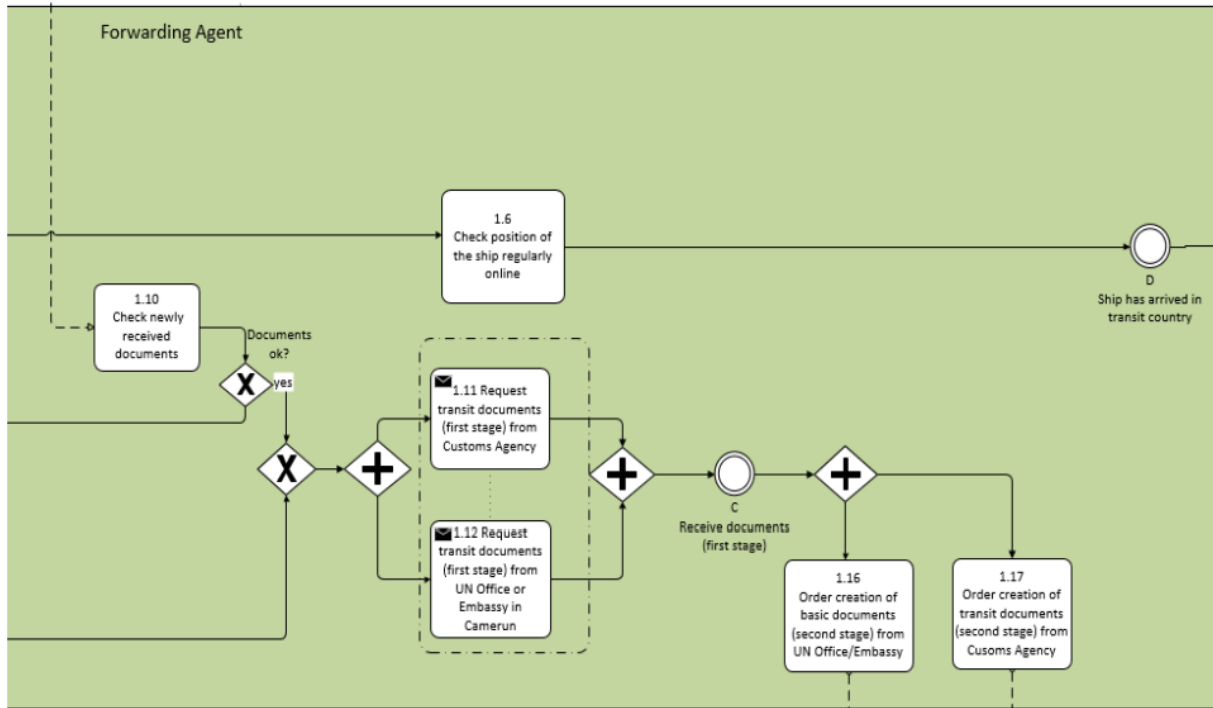
Figure 4: Logistics Process Model in Cameroon

Figure 5 defines the end of the process model where a clientacknowledges the reception of goods and provides feedback.
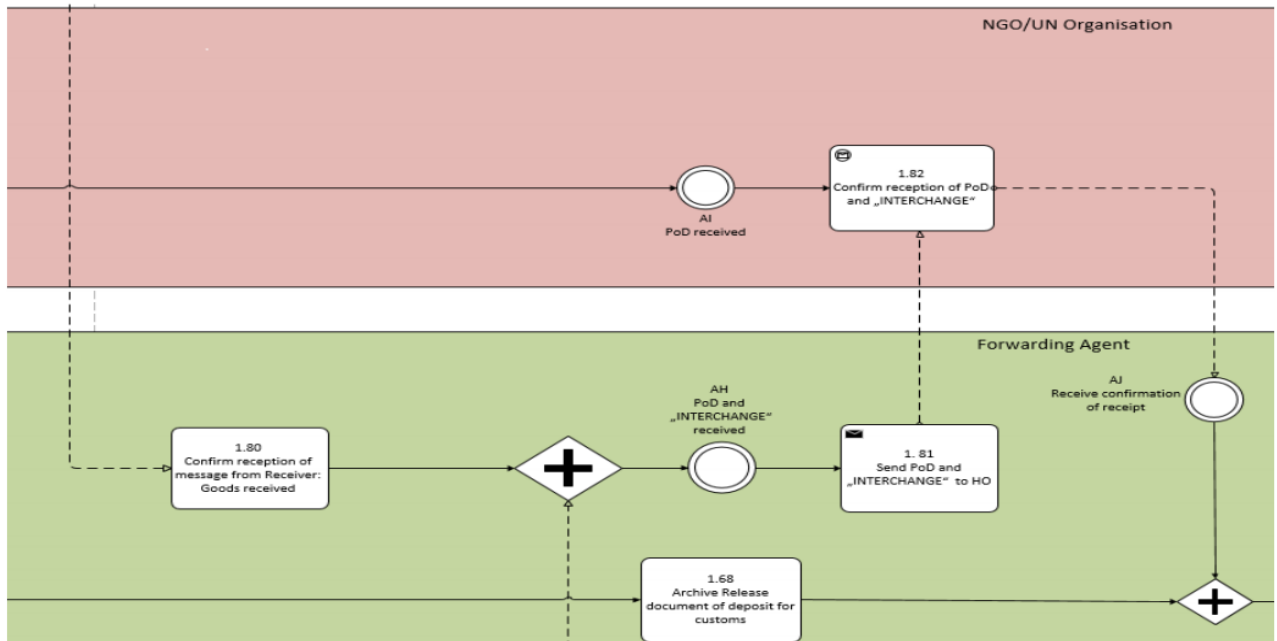

Figure 5: Cameroon Logistics Process Model

The combination of the statistics and model of logistics processes, various drawbacks in the logistics operation at Douala seaport in Cameroon has been compiled (see figure 6). Different contributing factors mainly include low education level, low infrastructure development and political instability. It has been evaluated that in Cameroon these factors are three times higher, producing different issues because of increasing delivery time and more than double costs are also determined (Kamgang et al., 2020).

	Cameroon Logistics Performance Index Rank 142	USA Logistics Performance Index Rank 9	Germany Logistics Performance Index Rank 1
Lead-time port and airport (days)	5	2	2
Lead-time land supply chain (days)	11	3	3
Sum lead-time port and land (days)	16	5	5
Costs* port and airport (US $)	1 817	769	892
Costs land supply chain (US $)	3 464	944	1 326
Sum costs port and land (US $)	5 281	1 713	2 218
*Costs: Typical charge for a 40-foot dry container or a semi-trailer, total freight including agent fees, port and other charges			

Figure 6: Comparison of Cost and Import Time Between Cameroon and Developed Countries

Furthermore, different photographs have been taken from the main seaports located in sub-Saharan Africa in which various blockages can be determined that hinders the logistics process (see Figures 7 and 8). These pictures illustrate the typical system present in their seaports. Figure 7shows that maritime vessels are held for five to ten days until they get the pass to travel through the seaport.

Figure 7: Maritime Vessel Waiting Area

Besides this, several issues associated with the capacity has been determined that produces a negative impact on the logistics operations. Figure 8shows the internal situation of the seaports located in Sub-Saharan Africa. Furthermore, different blockages are also present for the rail and road transport and due to these, goods are kept on the seaports more than the usual time. It has been analyzed that the core reasons underpinning the capacity issues are because appropriate measures are not present for warehousing and the handling process is not done as per the requirement (Raballand et al., 2012).

Figure 8: Capacity Issues at Seaport

Furthermore, in the study conducted by Plane (2021), it has been determined that the issues associated with political instability cannot be changed if different changes in logistics operations are induced. This means that different changes are required in policies by which difficult conditions present in the Douala seaport can be addressed and the logistics operations can be performed smoothly and timely.

5. Conclusion

This paper has identified the following issues at the Douala seaport in Cameroon, which are mainly poor infrastructure development, high custom charges, complicated bureaucracy, fewer qualified staff and bad governance, producing serious consequences on the logistics operations. It can be concluded that there is no such clarity and transparency present regarding the Cameroon logistics operations as compared to other developed countries. However, the model proposed in this paper can be significant by which the issues identified can be addressed in each step and a sustainable and effective logistics process can be obtained for Cameroon.

5.1 Recommendations

The following are the recommendations that could be applied accordingly in logistics operations in Cameroon:

- Several improvements should be introduced in the BPMN process model for the optimization of logistics operations in Cameroon.
- Different indicators for logistics management should be introduced to maintain the effectiveness and efficacy of the Cameroon logistics operations.
- The Cameroon government is required to introduce different benchmarks in their logistics processes for the associated actors. This will allow having effective corporation and communication among the associated parties.
- The Cameroon government is required to revise their supply chain policies to minimize the identified delays and the logistics operations can be performed at a low cost.
- A comparison should be made with the seaports working in the developed countries to enhance the overall efficiency of the Douala seaport.
- Different measures for investments should be induced within the existing infrastructure to introduce various improvisations.
- The issues associated with political instability should be addressed on priority to implement all the above-defined recommendations.

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