

The smart cross-docking platform: Integration of the RFID in the business process

Hajar ABOULAID, Mohamed-Reda BRITEL, Abdelfattah SEDQUI, Abdelouahid LYAHYAOU

ABDELMALEK SAADI University

Research Laboratory LTI

ENSAT, Tangier, Morocco

hajargi@hotmail.com, mrbritel@hotmail.com, abdelfettah.sedqui@gmail.com, lyhyaoui@gmail.com

Abstract—

This paper presents the interest of adoption the new technology of information and communication, as the RFID, in the creation and the intelligent piloting of the platforms of cross docking. Through the modelling by BPMN of the upstream processes and the downstream of we identified weaknesses in this platform. By means of the tool TIBCO we feigned these processes after RFID integration. The objective is to quantify the impact on the costs and the deadlines of orders preparation in this platform and to create a model of a smart platforms of cross docking.

Keywords— Smart platform, cross-docking, RFID, modeling, BPMN, costs, deadlines.

I. INTRODUCTION

The technological boom that know the world at present, urges us to think about new modes of intelligent piloting, to reduce the human errors, increase the reliability of the operations and assure a better physical traceability of the flow, the information and the financiers.

To date it is necessary no lead to be geographically present in the same place to pilot the activities of a site, a plant or a platform.

Platforms constitute an intelligent solution to lower the final price of products, and thus have a market share.

The craftiness shows itself in the mastery of the upstream, and thus an intelligent planning of the operations by the massification of the flow.

The platforms of cross docking constitute a node between the suppliers, generally situated between a dozen and hundreds of Km next to the PCD, and the

distant customers around the world. The objective of the PCD is to reduce the global costs of the supply chain (SC) and to assure a competitiveness of the long-term product.

Our objective is the automation of the PCD piloting, with integration of the RFID technology in business process. We take the example of the process grouping of the orders which constitutes the value of transformation (VT) of products managed by the PCD. The integration of the RFID in such process allows to optimize the cycle time of orders treatment, to increase the reliability of the preparation operation and to gain the costs of the not quality further to the affectation errors of the grouping operation. In this paper, we try to demonstrate the RFID role in the creation of smart PCD, like an intelligent piloting of business process.

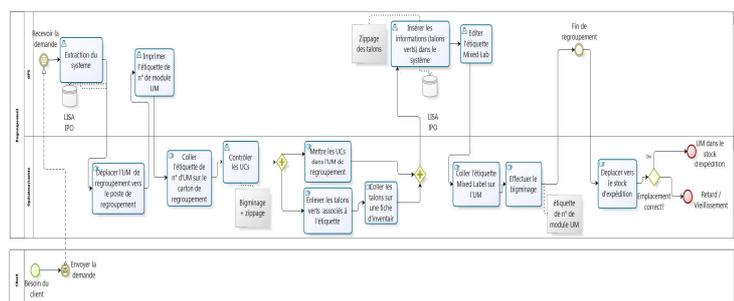
II. PROCESS GROUPING MODELLING BEFORE AND AFTER THE INTEGRATION OF THE RFID

The process grouping consists in:

- Sort out packagings according to every customer destination
- Expand massively packagings in handling units (UM).
- Recondition the UM
- Label the UM and store them in spans, in wait expedition.

Figure1 represent a detailed modelling of the grouping process by means of the tool BPMN.

Fig 1: Modelling of the process grouping before integration of the RFID (Scenario 1)



The figure 3 presents a comparison between every scenario cycle time:

Scenario 1: current State (Without RFID)

- Scenario 2: integration of the RFID.

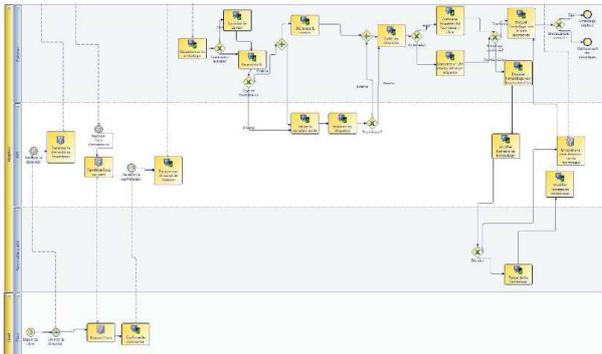
Through this modelling, we made following reports:

- A lack of traceability in the management of the parcel: the operator can make a mistake in the preparation of the good parcel and the affectation of the good customer destination.
- No elements to control the input and the output of the grouping process.
- The operation is manually made, what increases the rate of error.

The idea is to automate this process with a good control of the inputs, and outputs (reception process and expedition).

Figure 2, Present the result of modelling after the integration of the RFID (Scenario 2)

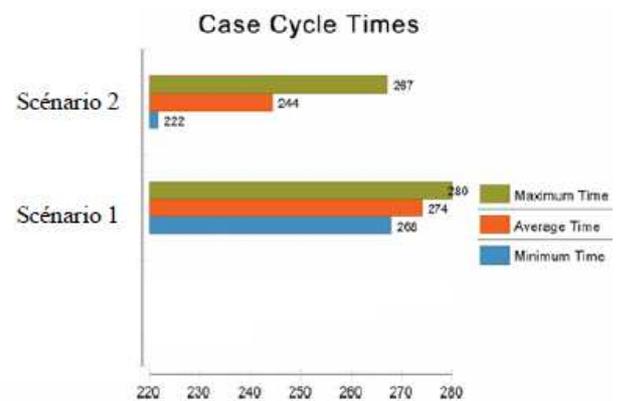
Fig 2: modelling of the process grouping after integration of the RFID



A. MODEL DISCUSSION (COST AND CYCLE TIMES)

Having modelled the process of grouping by integrating the features of the RFID we feigned the model by using the tool TIBCO and compared afterward the results of both scenarios (current state, and after integration of the RFID) in terms of cycle time of the process and the associated cost.

Fig 3: Cycle times comparison between scenario 1 & 2

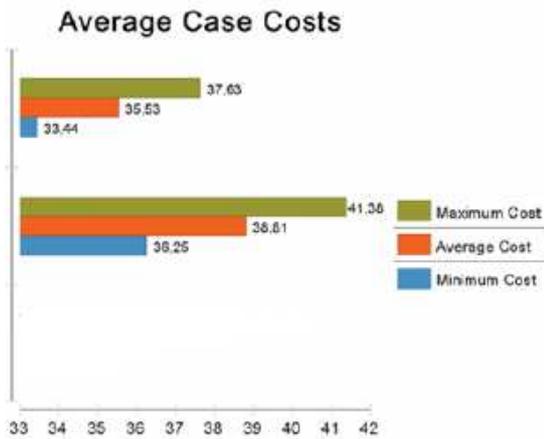


• Comparison of the cycle times

The comparison shows that the cycle time connected to the system RFID (scenario 2) is shorter compared with scenario 1, of which it does not exceed 244 min on average, as long as the time connected to the operation without integration of the RFID rises in 274min on average. Figure 4 presents the result.

B. Costs

Fig 4 : Costs comparison between scenario 1 & 2



- **Costs comparison**

The comparison of the costs shows that the integration of the RFID (scenario 2) allows to obtain more optimal cost with a 35.53-€ average value than that obtained without integration of the RFID with a 38.51-€ average.

As synthesis, the obtained results allowed to show that the most important optimization is the one concern the integration of the system RFID seen the improvements which he can assure at the level of the cycle time and the process cost. As an example, we quote the automation quantity received and grouped packaging control what decreases the time dedicated to the control, enhances inventory reliability and reduced the errors relative to operators,

On the other hand, the alerts allow to avoid the ageing in customers' orders zone preparation, received and grouped packaging what decreases the time dedicated to the control, enhances reliability the inventory and reduced the errors concerning the workforce.

III. Conclusion

We proved that the creation of smart PCD thanks to the integration of the new technologies as the RFID, has a positive impact on the reduction of the cycle time, and thus an automation more and more raised by the operation. As well a positive impact on the optimization of the processing costs of the customers' orders.

The birth of smart PCD, offers the opportunity to assure a better flows traffic (physical, information, financiers) between the various industrial ecosystem partners. And thus it is a new supply chain organization mode that gives birth of new smart platforms concept, capable to insure a global performance between the various economic partners

References

- [1] Andrew Spanyi "Operational Leadership, Strategic Management Collection. 2010 - Business & Economics
- [2] Gullede Jr, T.R., & Sommer, R.A. (2002). Business process management: public sector implications. Business
- [3] Supply Chain Council, October 2012
- [4] Bevis, K. (2004). Learning at work (automotive college). Manufacturing Engineer, 83(1), 30-33.
- [5] Jardini, B. Elkyal, M. Amri, M. (2015). The Complexity of Electronic Data Interchange Compliance for Supply Chain Automotive. Conference Proceedings, IEEE International Conference on Industrial Engineering and Engineering Management, 2015, Singapur
- [6] REDA, S. «Crossdocking: Can Supermarkets Catch Up? », www.stores.org., 5 p
- [7] SMALL, S.; McANDREWS, M. M. «Keeping Inventory Moving», Warehousing Management, vol. 5, no. 9, 1998, p. 34-35
- [8] Logistique et management Vol. 10 – N°2, 2002
- [9] ALLEN, R. M. «Quick Response: The Consumer's Handshake with Manufacturing at Union Tools», National Productivity Review, 1995, p. 27-38
- [10] Buzzell, Robert D; Ortmeyer, Gwen Sloan Management Review; Spring 1995; 36, 3; ABI/INFORM Global pg. 85

