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DEVELOPMENT OF SALES MODELS BY UML DIAGRAMS

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ABSTRACT

Our research work comes to supplement the previous researches that have represented business process modeling languages. The representation performed in this paper is focuses on the two most widely used graphical notations for Sales Processes: UML Use-Case Diagram (UML UD) and UML Activity Diagram (UML AD). The representation performed are: Develop a model of the sales process by providing Depository service during Sales Processes (keep the quantities of sold to the customer in the company's warehouses), and Create a model for the management of Depository warehouse with the possibility of withdrawal of quantities sold to the customer on parts until the end of the customer's balance of quantities in the Depository warehouse. The results of development UML UD and UML AD For Sales Process Modeling (SPM) presented in this paper.

Keywords— *UML, Model, Business Process, Sales Process, Activity Diagram, Use-Case Diagram..*

I. INTRODUCTION

The Unified Modeling Language (UML) is a standard language for writing software blueprints that premiered with version 1.1 in 1997. Three prominent object oriented programming professionals, Gray Booch, Ivar Jacobsen, and James Rumbaugh are the principle authors of UML. UML establishes a collection of graphical symbols as well as semantics to support and define these symbols. There are nine different kinds of diagrams in UML: class, object, use case, sequence, collaboration, state chart, activity, component, and deployment [5].

UML was developed and is being maintained by OMG. The current version - UML 2.4.1 was released in 2011. The main objective of UML is " to provide system architects, software engineers, and software developers with tools for analysis, design, and implementation of software-based systems as well as for modeling business and similar processes" [6].

In this paper we present UML Activity Diagram And UML Use-Case Diagram For Sales Process Modeling. The work presented in this paper is a development of a previous work which presented in the previous studies mentioned in the list of references which are : [3] and [4].

The representation performed are: develop a model of the sales process by providing Depository service during Sales Processes. And create a model for the management of warehouse Depository with the possibility of withdrawal of quantities sold to the customer on parts until the end of the customer's balance of quantities in the warehouse Depository.

II. RESEARCH METHODOLOGY

Our research has begun with display of available studies in the field of business process modeling. From these studies we have selected the ones that are most frequently used in practice, namely UML UD and UML AD. We have developed a series of models that are relevant for the developing of business process modeling languages. The developing has as starting point the previous researches that had as objective the developing of business process modeling languages and is based mostly on the study of the current normative documents of BPMN [2], and UML AD [1]. For the developing of UML UD and UML AD according to the models related to the adequacy of their graphical elements to represent the real business processes of an organization, we have used a case study. The purpose of the case study was to analyze the graphical symbols used by UML UD and UML AD for representing the Sales Process Modeling.

III. ACTIVITY DIAGRAM FOR SALES PROCESS MODELING

From a business perspective, UML AD provides a cost-effective way to rapidly model processes. From a user perspective, UML AD is easy to comprehend after an appropriate level of training. Companies that are looking for an inexpensive way to quickly capture and present information could reap great benefits by incorporating the UML to fulfill this need.[2]. Let us consider 'Place Customer Orders, which is a core Process modeled[3] as Fig.1.

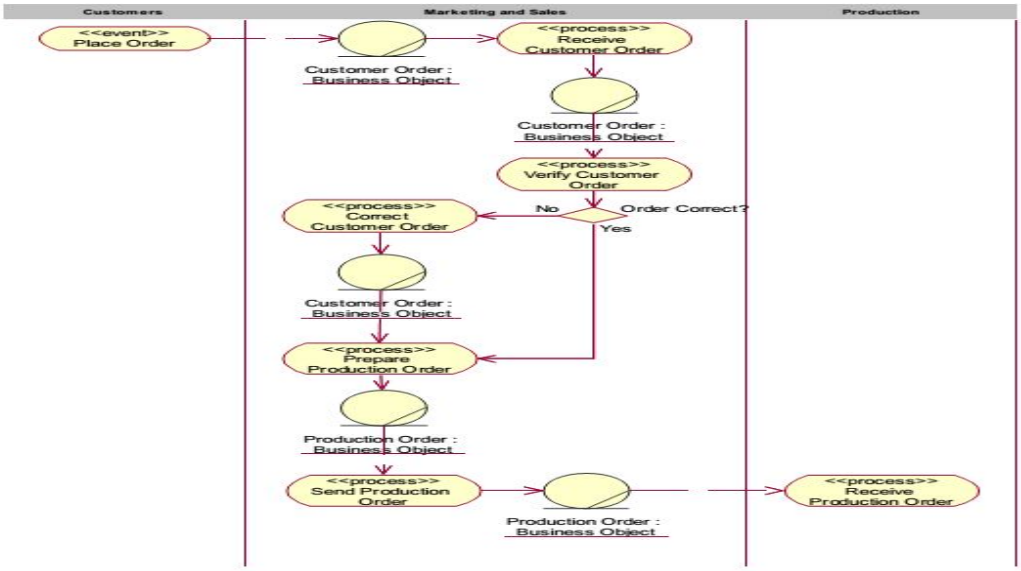

Fig. 1 Place customer order process workflow. [3]

Let's say that the process goal here is to 'Minimize processing time' and it contributes to an organization goal of 'maximizing customer satisfaction'.[3]. After reviewing the activity diagram in Fig. 1 , we worked to develop this work by adding an activity diagram that contains a group events represent depository service provided to the customer after the completion of the sales process as shown in Fig. 2, and this process begins after the last event of the sales process that described in Fig. 1.

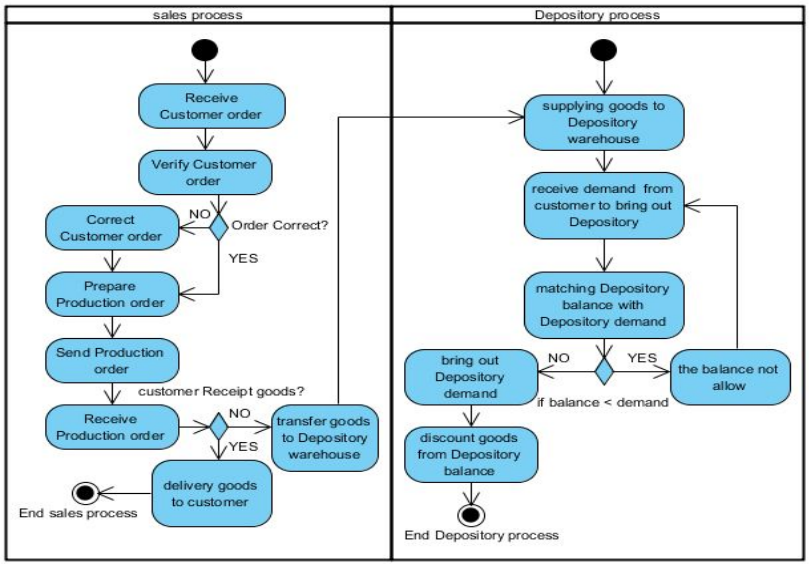

Fig. 2 Activity Diagram Analysis for Sales Process Modeling

In this case probably that the customer did not go to Stock in order to receive the goods, it is possible to come at a later time in order to receive the goods, here the customer goes to warehouse depository official to complete the procedures to withdraw entire or part of depository.

IV. USE-CASE DIAGRAM FOR SALES PROCESS MODELING

Use case modeling is very popular within the software engineering community and service requirements can be effectively analyzed through use case modeling [7]. A use case represents a coherent unit of functional behavior that is offered by a system to one or more actors. It defines the behavior of the system and its interactions with the involved actors. The behavior is triggered by an action performed by one of the actors.[8]. In this paper it has been viewed on the use case diagram in the previous study [3]. as shown here in Fig. 3 , that handles part of sales process, which are two subprocesses : 'Receive Customer Order' and 'Prepare Production Order'.

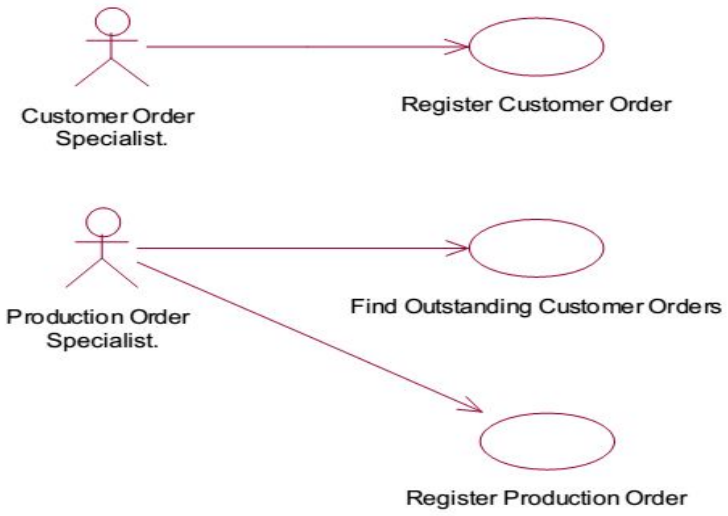

Fig. 3 Use Case Model to Support 'Place Customer Order' Process [3]

Noted the above use case diagram , we worked on the development of another use case diagram to represent the sales process which contains four actors in the sales process; 1- customer 2- sales specialist 3- warehouses official 4- cash specialist . Each one of the actors mentioned previously is specialized in several operations or activities as use cases detailed which are as follows: select product, request products, matching product and quantity, receipt goods, payment, write invoice , confirmation of payment, delivery goods, discount goods, receipt of payment as shown in Fig. 4.

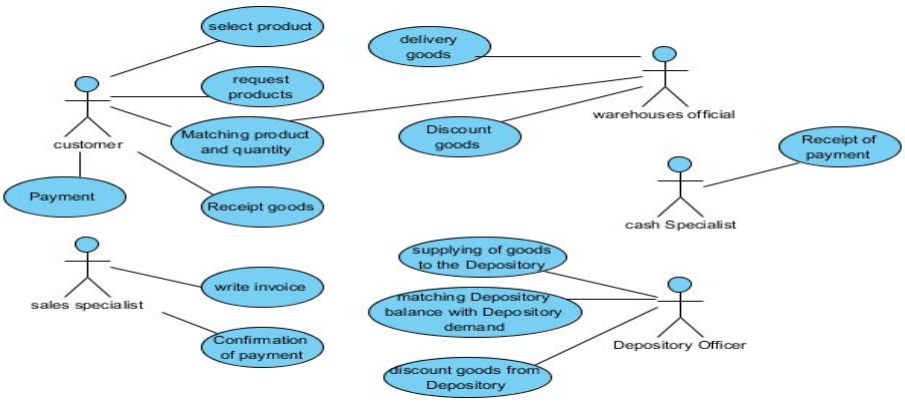

Fig. 4 Use Case Diagram Analysis of Sales Process

And added new that we worked in this research is to add a new service improves the performance of the sales process and in particular to increase the number of customers in the company through this service, called depository process . The depository process begins in if the customer does not withdraw his goods after the sale, so that goods sold move to depository warehouse and on the customer to deal with an official depository in order to withdraw the goods needed until depository balance is finished. It is perspective of use cases diagrams, this process consists of a single actor, which is called depository officer, which in turn operates several activities after-sales process namely: supplying of goods to the depository, matching depository balance with depository demand , discount goods from depository as shown in Fig. 4.

After considering use case diagram and activity diagram, we have this a preliminary class diagram and diagram Sequence as shown in Fig. 5 and Fig. 6 respectively, that demonstrates the interdependence between the classes, It has the following classes: Customers - Main-order - Order-detailed - Transaction-stock- MianDepository - Detail-depository - Items.

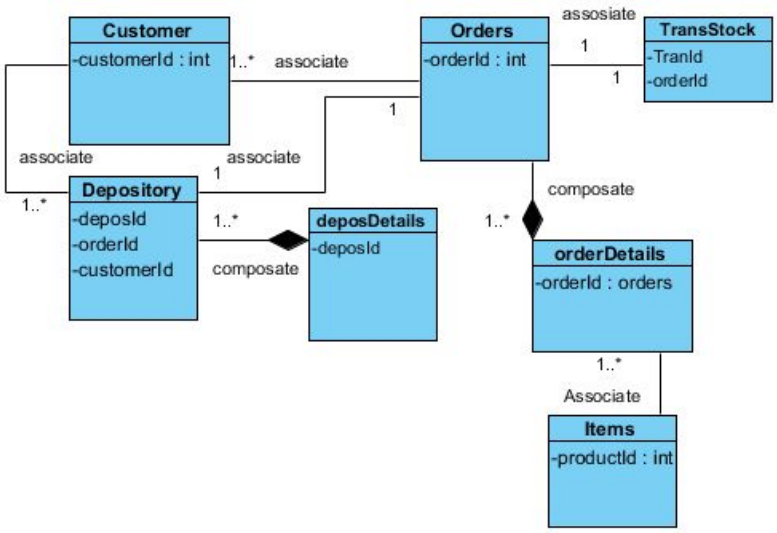

Fig. 5 class diagram depository process

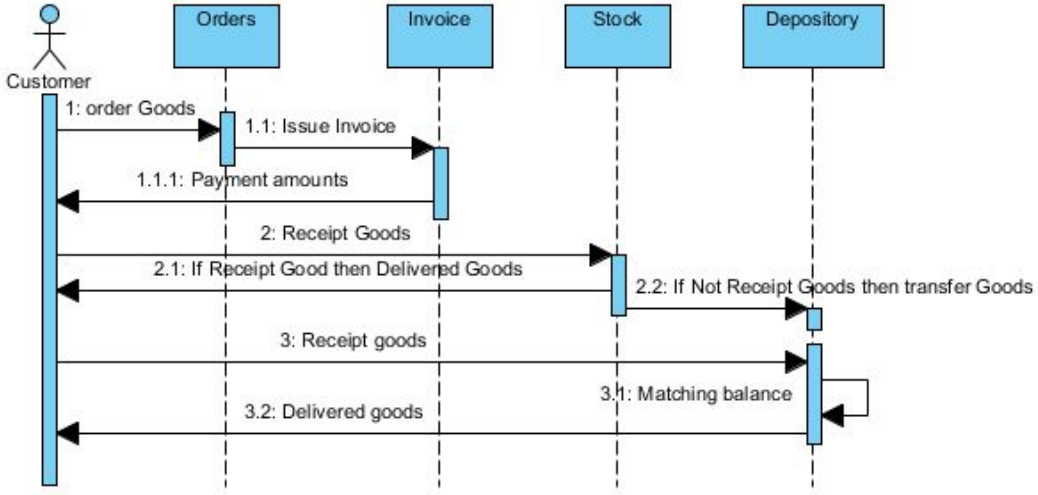

Fig. 6 sequence diagram depository process

Sequence diagrams are a kind of an interaction diagram that emphasize the time ordering of messages. A message is a specification of a communication between objects that conveys information with the expectation that activity will ensue[9].
The diagram that displayed in Fig. 6 illustrates the sequence implementation of deposit process. To illustrate the power of this technique, we show in Fig. 6 the sequence diagram describing interaction of the System Actor and its four types of classes (Orders, Invoice, Stock and Depository) in the realization of this use case.

V. RESULTS

Through this section of paper we presented test results has been proposed which are: Develop a model of the sales process by providing Depository service during Sales Processes , and create a model for the management of Depository warehouse with the possibility of withdrawal of quantities sold to the customer on parts until the end of the customer's balance of quantities in the Depository warehouse. this proposed shown in Fig.2 , Fig.4 , and the test results shown in Fig.7 Interface to test depository process that content of eight parts , each part representing event or set of events are shown in numbers apparent in Fig.7 that explains briefly as follows:

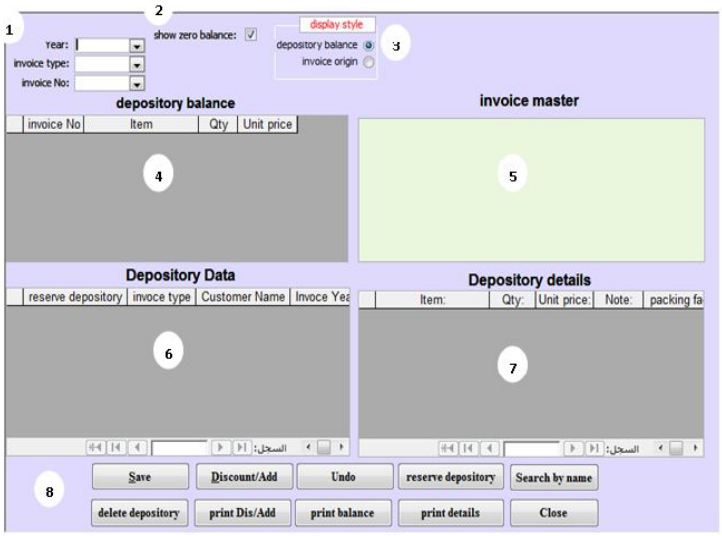

Fig. 7 Interface to test depository process

No.1 Actor Depository Officer Shown in Fig.4, who runs on the implementation of event transfer goods to depository warehouse shown in Fig. 2, through input the year, invoice type and invoice number to transfer it. No.2 show zero balance depository. No.3 display style (depository balance or invoice origin). No.4 viewing data by choice at No.3.

No.5 display the invoice master. No.6 display depository data.. No.7 display depository details.

No.8 set of buttons that work to implementation of the actions and events in Fig. 2, such as supplying goods to depository warehouse , bring out depository demand and discount goods from depository balance.

VI. CONCLUSION

The representation performed in this paper is focuses on the two most widely used graphical notations for Sales Processes Modeling, which is considered one of the most important topics in the modeling business processes using the Unified Modeling Language models. These models are : UML Use-Case Diagram (UML UD) and UML Activity Diagram (UML AD). The representation performed are: Develop a model of the sales process by providing Depository service during Sales Processes, and Create a model for the management of warehouse Depository with the possibility of withdrawal of quantities sold to the customer on parts until the end of the customer's balance of quantities in the warehouse Depository. The results of development UML UD and UML AD For Sales Process Modeling (SPM) presented in this paper are to facilitate the analysis phase of sales process and make processes clear from the perspective of analysts, employers and also users. On the other hand, the development presented in this paper will make the design

phase easier and explained as a future work to complete the design phase of the sales operations in other diagrams ,which is expected to increase the number of customers, especially customers who purchase large quantities of goods, that will benefit from the Depository service .

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