

# Microsoft Dynamics NAV Reference Model

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**Abstract:** The past decade has seen the rise of business process management as a general approach to improve business processes. Meantime, companies all over the world use enterprise resource planning systems to automate and enhance their business processes. The capabilities of enterprise resource planning systems can be described by best-practice reference models. Although the use of reference models brings many positive effects for business, they are still rarely used in practice. In the paper a reference model based on Microsoft Dynamics NAV is suggested. The reference model is designed using Business process modelling notation with additional objects, which help to describe the models in more detail way. In addition, paper demonstrates the business process redesign approach with the use of reference models.

## INTRODUCTION

The demand for business process management (BPM) is grounded in the pressure to align all aspects of an organization with the wants and needs of clients. It promotes business effectiveness and efficiency while striving for innovation, flexibility, and integration with technology. BPM attempts to improve processes continuously. Industry interest is strong in process standards, for example, widely accepted Business process modelling notation (BPMN), or business process reference models, such as ITIL (Information Technology Infrastructure Library), SCOR (Supply Chain Operations Reference model) or SAP R/3 reference model.

Companies are using enterprise resource planning (ERP) systems more and more extensively. ERP systems are essential part of the organization supporting most of the key functions as logistics, sales, and financial management. These systems are generic and the functionality they provide can serve a large variety of enterprises. The implementation of an ERP system involves a process of customising the generic package and aligning it with the specific needs of the enterprise (Soffer, Golany, & Dori, 2003).

It is very important to select an appropriate ERP system. The decision concerning the purchase of individual modules or their development can only be made on the basis of good knowledge of business needs, which have to be compared with the capabilities of an ERP system (Kovačič & Bosilj Vukšić, 2005). ERP system capabilities are best described by business process reference models. Reference models are generic conceptual models that formalise recommended practices for a certain domain (Rosemann & van der Aalst, 2007). They represent one or more pre-engineered and integrated organisational views (Enterprise Integration Inc., 2007).

The use of reference models has many positive effects for business (Kirchmer, 2009; Fettke & Loos, 2007). Despite that, they are still rarely used in practice. The reasons for this can be found in the accessibility or complexity of reference models as well as in implementation methodologies. One of the important management challenges of today's organisations lies in the development and reuse of reference models. For some ERP systems reference models have not been developed yet. Developing business models from scratch can be very time and cost consuming. Therefore it is reasonable to reuse existing reference models as a starting point to develop specific conceptual models (Becker, Beverungen, & Knackstedt, 2010).

The aim of this paper is to present Microsoft Dynamics NAV reference model and the business process redesign approach with the use of reference model.

The structure of the paper is as follows: the first section introduces the ERP system selection process. Section two generally describes reference models. Section three suggests the Dynamics NAV purchase reference model and the last section shows how to use reference models in business process renovation.

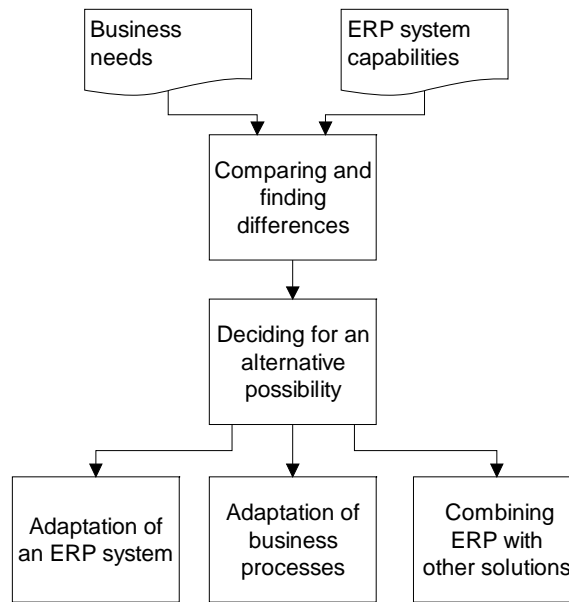
## 1 ERP SYSTEM SELECTION

An ERP system is a business management system that comprises integrated sets of comprehensive software that can be used, when successfully implemented, to manage and integrate all business processes and functions within an organisation. They usually include a set of mature business applications and tools for financial and cost accounting, sales and distribution, management of materials, human resources, production planning and computer integrated manufacturing, supply chain, and customer information (Kovačič & Bosilj Vukšić, 2005).

Nowadays many organisations support their processes by purchasing ERP systems. The rate of unsuccessful projects is significantly high. The main reason for this is the underestimation of the complexity of such a project that requires several organisational changes and the involvement of employees. The massive organisational changes involved in ERP implementation result

from the shift in business design from a fragmented, functional-based organisational structure to a process-based one (Davenport, 1998).

The ERP system selection process should be based on a comparison of business needs and the capabilities of an ERP system (Figure 1; Kovačić, Bosilj-Vukšić, 2005). Business needs are best described by organisation’s strategy and desired business processes.



**Figure 1: The alternatives for selecting and implementing an ERP system; Source: A. Kovačić & M. Indihar Štemberger, The Role of Business Process Modelling in ERP Implementation Projects, 2008**

Based on the comparison a company can choose between three alternatives (Štemberger & Kovačić, 2008):

- The first is to adapt an ERP system to their business processes. Most ERP systems allow a certain degree of customisations and parameterisation. This alternative can cause high additional costs along with problems in further maintenance and upgrade projects.
- The second alternative is the adaptation of business processes to an ERP system. Typically, the delivery of best practices applies more usefully to large organisations and especially where there is a required standard, or where the process is a commodity like accounting processes. This is because the procedure of capturing and reporting standardised or commodity content can be readily codified within the ERP software, and then replicated across multiple businesses with the same business requirements. The disadvantage of this alternative is that an organisation might lose the advantage of a unique and perhaps a better business practice.
- The third alternative is to combine the acquired ERP system, integrated best-of-breed systems and engineered adapted or built applications. This is the best possible alternative for the majority of cases.

The comparison therefore requires clear business needs on one side and recognised capabilities of ERP system on the other side. ERP system capabilities can be presented by ERP consultants, user manuals, training materials etc. The best way to formalise the capabilities of an ERP system is by business process reference models. They can be used to describe the features of different ERP packages. Based on such a description, it is possible to compare and select an appropriate ERP package for an enterprise.

## 2 REFERENCE MODELS

Process design is a key phase in the redesign of a business processes. The resulting blueprint is the basis for implementation and execution, as well as monitoring and controlling processes. Ensuring such modelling quality can be very time-consuming. The use of process templates significantly increases the efficiency and effectiveness of the process design phase. The process templates are generally called business process reference models (Kirchmer, 2009).

A reference model encompasses one or more pre-engineered and integrated organisational views. For example, one type of reference model might be a business process reference model, or a depiction of data flows (Enterprise Integration Inc., 2007). They

integrate the well-known concepts of business process reengineering, benchmarking, and process measurement into a cross-functional framework (Supply Chain Council, 2008).

A reference model is based on a small number of unifying concepts and may be used as a basis for education and explaining standards to non-specialists (AGIMO, 2007). In the science literature we can find several definitions of reference models. Rosemann (2003) defines reference models as generic conceptual models that formalise recommended practices for a certain domain. Fettke and Loos (2003) contended that a reference model represents a class of domains.

Reference models have the following characteristics (Fettke & Loos, 2007; Fettke & Loos, 2003; Kirchmer, 1999; Scheer, 1998):

- a representation of best practices (providing best practices for conducting business);
- universal applicability (representing a class of domains, not a particular enterprise); and
- reusability (they can be understood as blueprints for developing information systems, they can be structured for easy adaptability to company-specific situations).

Reference models play an increasingly important role in activities such as business engineering (Scheer, 2000), information systems development (Winter, 1994) customising of ERP systems (Rosemann & van der Aalst, 2007) and training and research (Thomas, 2006). In order to be able to use reference models, they must be adapted to the requirements of a specific enterprise. Reference models are also called universal models, generic models or model patterns.

Reference models represent the content of various domains. The most important types are the following (Kirchmer, 2009; Fettke & Loos, 2003):

- industry reference models (representing the best practices of a specific industry sector);
- software reference models (these could be traditional applications such as ERP systems, or a reference model representing the sub-process supported by service-oriented architecture (SOA));
- procedural reference models (e.g., a project management reference model); and
- company reference models (representing best practices within a company or a company group).

Certain types of software are designed and developed once, and then replicated many times (e.g. Microsoft Office). Certain software vendors (e.g. SAP, Oracle etc.) have applied this same concept at the enterprise level. They have designed and developed modular standard software solutions that enable business applications to be deployed across the enterprise. The idea is to implement the software with minimum modifications in order to avoid the associated costs and risks (Enterprise Integration Inc., 2007).

ERP-specific reference process models describe the main ERP processes on different levels of detail. Depending on the underlying methodology these models include details of the control flow, organisational units, input and output data and business objects. Further, it is usually possible to refer to the relevant part of the online documentation and, at the lowest level, even to the corresponding ERP transaction (Rosemann, 2000).

The use of reference models has different economic effects on the modelling process (Hilt, 2007; Fettke & Loos, 2007; Kirchmer, 2009):

- a decrease in costs (reference models can be reused so the development costs of the reference model can be saved);
- a decrease in modelling time (the knowledge contained in the reference model reduces learning and development time, allowing the identification of and a direct focus on critical processes);
- an increase in model quality (reference models are proven solutions and provide better model quality and an awareness of own deficiencies); and
- a decrease in modelling risk (the risk of failures during reference model usage can be reduced because reference models are already validated).

Possible disadvantage of using reference models is that an organisation might lose some advantage of its unique and perhaps better business practices. If reference model is widely used by the industry sector, then it hardly represents a source of a company competitive advantage.

### 3 REFERENCE MODEL DESIGN

The initial intent of reference model design was to create an easy to understand description of business processes contained in Dynamics NAV ERP. The reference model of the ERP solution Dynamics NAV has not yet been published by Microsoft. In this section I will therefore suggest a purchase reference model on two levels. The first level will present a general overview of purchase processes. The second, more detailed level explains purchase posting transactions. The design and development of the general reference model is based on ERP system educational materials on the purchase area (Microsoft Corporation, 2011), while the design of the purchase posting reference model is based on development and consulting experiences in ERP solution implementation projects.

### 3.1 Purchase Reference Model

The reference model (Figure 2) represents some ERP system Dynamics NAV purchase processes. It can be used by managers and business consultants to gain a general overview of certain ERP application area. Practical usage of the suggested reference model is expected at lower levels of detail. The high level structure of the reference model is as follows: purchase setup, purchase order management and requisition management.

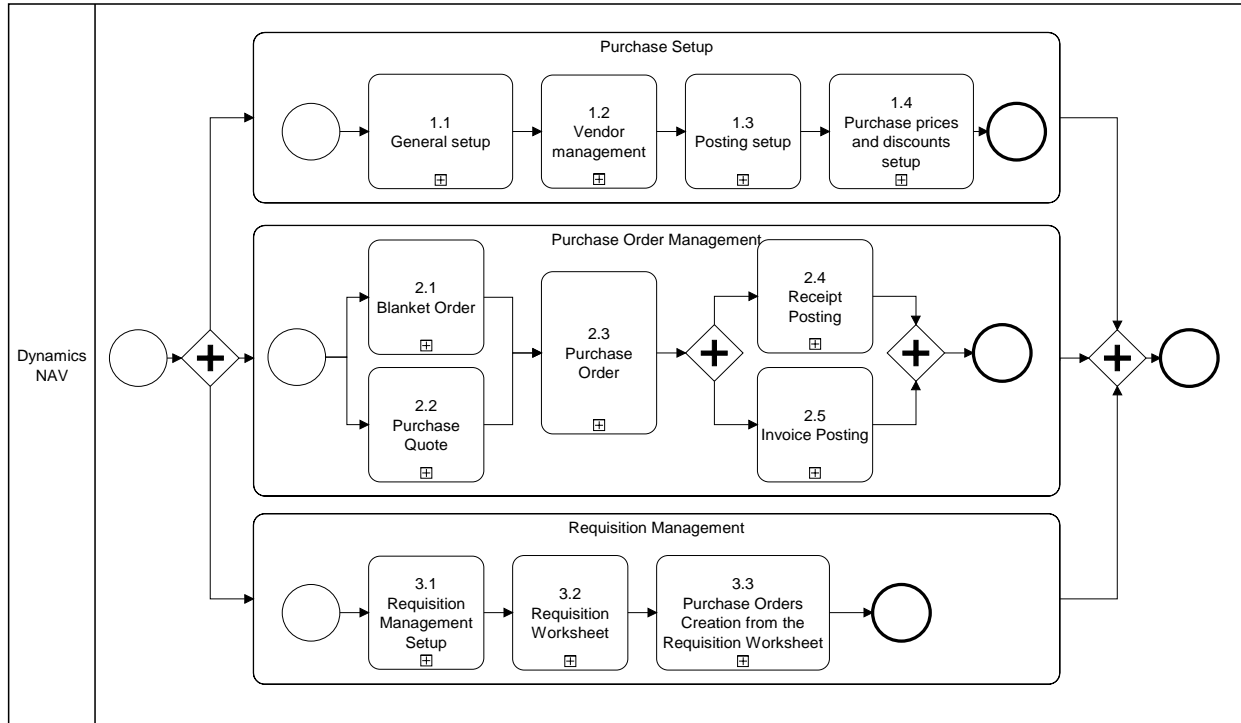


Figure 2: Purchase reference model (business view)

### 3.2 Purchase Posting Reference Model

Purchase posting reference model introduces a more technical view of ERP system dynamics NAV. In order to design such a reference model, we have upgraded the BPMN with additional Dynamics NAV objects (Table, Form, Report, Codeunit, etc.). Objects add additional information to the model. Reference model could be very useful for ERP system analysts and developers especially in the design and development phases of ERP system implementation. The reference model can therefore also represent the basis for technical documentation.

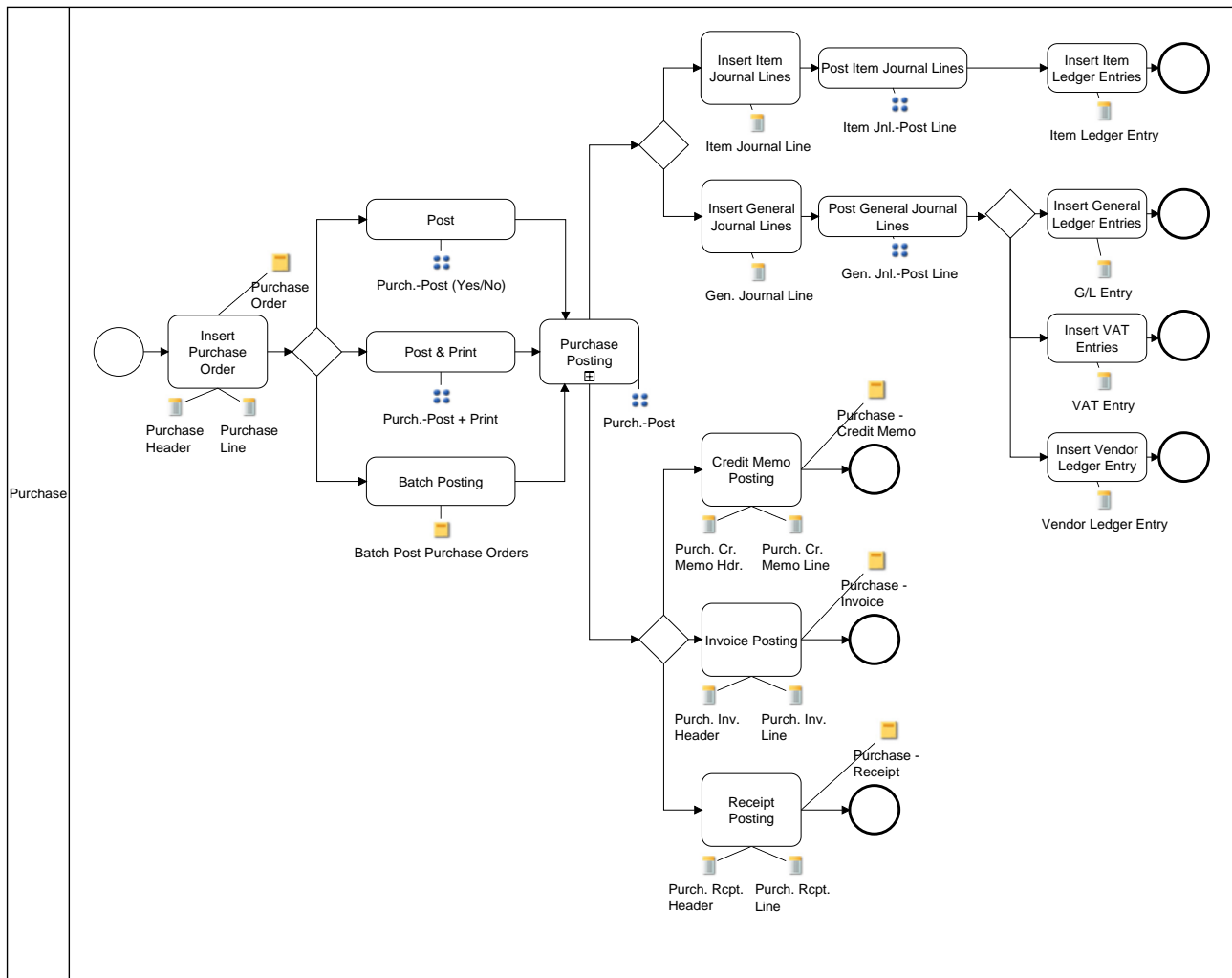


Figure 3: Purchase posting reference model (technical view)

## 4 THE USE OF REFERENCE MODEL

This section shows how to use reference models in a business process redesign process. First an existing requisition business process (Figure 4) in a trading company is presented. With the use of the purchase reference model presented in the previous section, the existing requisition process is redesigned and a new to-be process (Figure 5) is suggested, supported by ERP system Dynamics NAV.

### 4.1 Purchase Requisitions Process Modelling

The purchase requisitions process (Figure 4) explains events that can trigger the requisition of a specific product or service. These events can be:

- external, e.g. a paper list from a warehouse or a confirmation or invoice from a supplier;
- a released sales order in the case of a direct delivery where received goods are delivered directly to the customer;
- a confirmed requisition; or
- a requisition plan which has information regarding the optimal inventory level, requisition time periods etc.

Regardless of the source, currently in all cases the purchase order is manually entered into the system by purchasing clerks. The owner of the requisition plan is purchasing manager who manage plan in Microsoft Excel. The presented process involves a lot of manual work, especially with the entering of purchase orders and updating of the purchase plan.

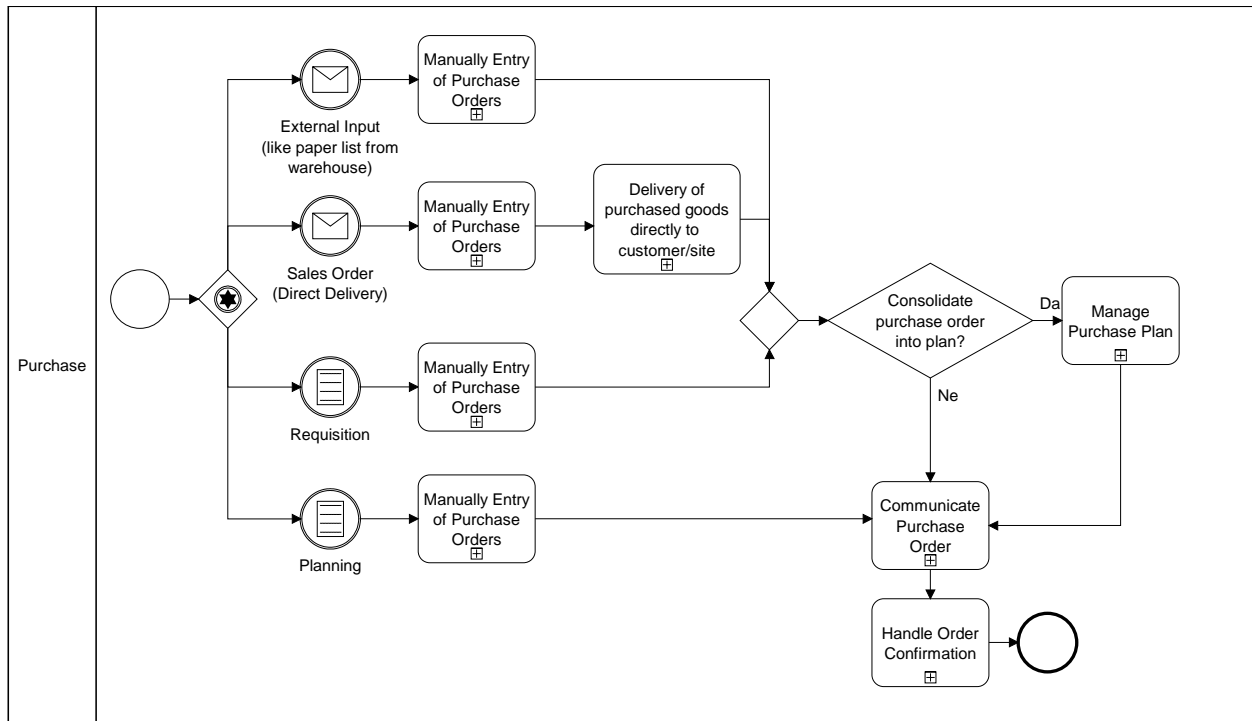


Figure 4: Purchase requisitions process (as-is)

#### 4.2 Purchase Requisitions Process Redesign

Process redesign is achieved based on a comparison between the purchase reference model of an ERP system Dynamics NAV (Figure 2) and the purchase requisitions process (Figure 4). The activities of the new to-be process (Figure 5) have a corresponding number of reference model sub-processes. This represents a link and explains which component of an ERP system supports the specific activity of the underlying company’s process. The result of the comparison shows the degree of fit and how many modifications would be needed on the ERP system side.

A reduction of manual work and many other advantages are achieved with the next process improvements:

- sales order lines, in the case of direct delivery, are now directly transferred to purchase orders (the purchasing clerk does not have to manually enter them again);
- the confirmed requisition is already entered in the system as a purchase quote (a blanket order is converted into a purchase order automatically); and
- a requisition plan based on predefined parameters suggests the necessary requisitions and also automatically creates purchase orders.

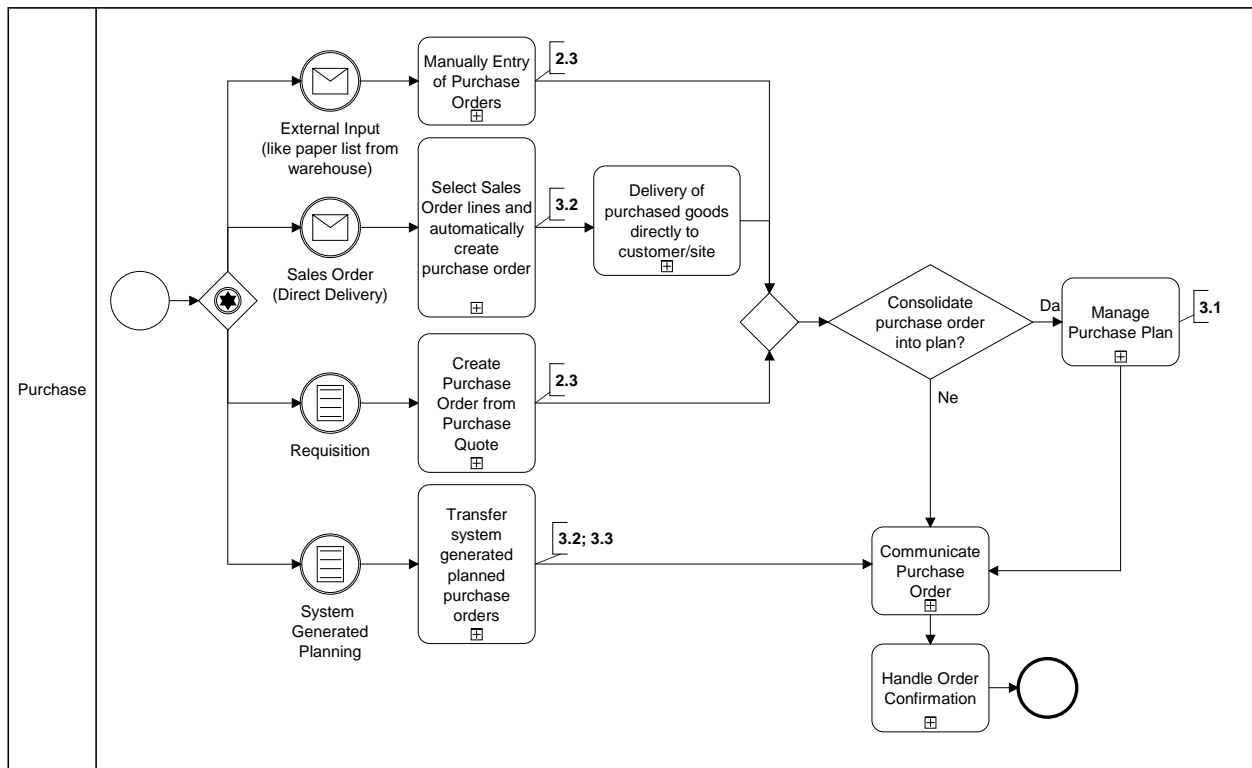


Figure 5: Purchase requisitions process (to-be)

## CONCLUSION

Conceptual models play an increasingly important role in all phases of the information systems life cycle. For instance, they are used for business engineering, information systems development and the customising of ERP systems. The design of such models is often cost- and time-consuming. The concept of reference modelling has been introduced to overcome these failures and improve the development of enterprise-specific models.

I started the paper with the presentation of alternative possibilities for the selection of an ERP system. In second part I introduced the reference model concept and then suggested the Dynamics NAV purchase reference model based on BPMN. In the last section I presented how to use reference models in business process redesign. First, an existing requisition business process in a trading company was presented. Based on the comparison between the suggested reference model and the as-is process I designed the to-be process and explained the process modifications.

There are many positive effects that reference models have on business. In the future we should devote more attention to this area, especially in practice.

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