Development of a Reference Model for the "Purchase" Business Process as an Element of Modeling Basic Business Processes at FMCG Chain Retailing Companies

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Abstract. The article presents the development of a reference model for the "Purchase" business process as an element of modeling the basic business processes at FMCG chain retailing companies. In many ways, the rationale for the development of a business architecture model is related to the understanding of factors that push chain companies to search optimization solutions in terms of organizing their work. In these conditions, modeling basic business processes of the company is essential for the construction of architectural solutions of FMCG retail network companies. The models are based on a hierarchical principle that allows to consistently move to the next level of detail, as long as the model is not described in as much detail as necessary to solve specific problems of FMCG chain retailing companies. In accordance with the aim of the study, the basic business processes of FMCG-retail network companies are identified, a typical structure of the "Purchase" business process is presented, a contextual chart of the top level of detail and a subsidiary model of the "Purchase" business process are consistently developed (the IDEF0 notation is used in this study). On the basis of top-level models, models of subprocesses of business process A1 "Purchase" are developed: A1. 1 "Purchasing planning"; A1. 2 "Choice of Suppliers; A1. 3 "Conclusion of the Contract with Supplier"; A1. 4 "Operational management of Deliveries"; And 1.5 "Assessment of suppliers". The developed models can be used in construction of architectural solutions in FMCG chain retailing companies.

1. Introduction

In modern conditions of relative stability in the retail market economy, the external growth reserves of FMCG chain retailing companies are gradually exhausting themselves. In this situation, management of chain companies begins to pay special attention to the search for internal growth reserves. The majority of FMCG chain retailing companies, which for a long time functioned in the formats of 10-15 thousand square meters of leased area, today do not go beyond 8-10 thousand. For example, the area of the trading floor of the hypermarket "Lenta" for several years has decreased almost twice, and "Ashan" in addition to large formats began to actively develop "Ashan City " (up to 7-8 thousand square meters). The reduction of space affected those chain companies that have traditionally worked in the format of hyper-and supermarkets. At the end of 2017, the St. Petersburg grocer y chain "O'key" announced a new development strategy. Its goal is to increase business efficiency by creating compact hypermarkets. The non-food segment suffers the most in the hypermarket format: customers prefer shopping online. In June 2019, the "Magnit" retail chain began testing new ultra-small stores. The company opened the first facility of that kind in Krasnodar [1].

In these conditions, the role of commodity supply in the activities of chain companies is significantly increased, according to which the business process "Purchase" requires close attention of management. In many ways, the rationale for the development of a business architecture model is related to the understanding of factors that push chain companies to search optimization solutions in terms of organizing their work. In these conditions, modeling basic business processes of the company is essential for the construction of architectural solutions of FMCG retail network companies. Let us
consider the process of developing a reference model of the "Purchase" business process as an element of modeling the basic business processes of FMCG chain retailing companies.

2. Methods
This study is based on the method of graphical analysis of the process. In the course of the study, the ranking of the basic business processes was carried out, a qualitative analysis of the “Purchase” business process was performed. A visual analysis of the graphical process diagrams constructed using the IDEF0 process notation is performed.

3. Results and Discussion
3.1 Typical structure of the "Purchase" business process
Implementation of process management in chain companies is usually accompanied by the definition of key business processes and their subsequent description, analysis and optimization [1]. Numerous performers from different departments are involved in business processes, create a lot of documents, and most importantly there is a complex logic of interaction between the performers, which requires the display of the process format, convenient for perception and analysis.
In FMCG retail chain companies, as a rule, there are four basic business processes:
- A1 Purchase;
- A2 Logistics;
- A3 Marketing;
- A4 Sales.
Figure 1-Typical structure of the A1 "Purchase" business process

The typical structure of the A1 "Purchase" business process of FMCG chain retailing companies is presented in figure 1[11].
3.2 Development of contextual model for the A1 "Purchase" business process at the first level of detail

Currently, there are three ways to describe business processes: text, tabular and graphic.

The peculiarity of the description of business processes in the form of structured text is to follow a clear structure: first, it is recorded who and when performs the operation, and then in the sub-paragraph, the level below, describes the actions themselves, after which it is indicated to whom and in which case the result is transmitted. The main disadvantages of the textual way of describing business processes include the lack of a systematic approach, difficulties in using descriptions in the analysis, lack of clarity [8].

Using a tabular form adds "structure" to the business process description you create. The business process is described in the form of a table, where the rows describe the operations in the business process, each row contains not only the number and name of the operation, but also incoming and outgoing documents, time standards of execution, the contractor, the information systems used and the logic of further actions [8].

In recent years, many companies describe business processes in the format of graphical models. Different modeling notations can be used depending on the purpose of building the models. The purpose of this study is to build a reference model of the business process A1 "Purchase" FMCG chain retailing companies. This study uses the IDEF0 notation.

In accordance with the aim of the study, at the first stage it is necessary to develop a conceptual model of the business process "Purchase". The context diagram of the Procurement business process is shown in figure 2.

Figure 2-Context diagram of business process A1 "Purchase"

According to the data presented in the context diagram of the business process A1 "Purchase", each side of the rectangle has its purpose.

Thus, the upper side implies management, that is, various strategies, standards and other regulatory documentation, which is guided by the chain company in its activities. The bottom side of the rectangle implies various mechanisms and / or resources of the company engaged in direct economic activities. The left side of the rectangle graphically represents the inputs of the process (economic and information resources used to obtain the result). The right side of the rectangle represents the outputs or results of the business process [5].

The models are based on a hierarchical principle that allows to consistently move to the next level of detail, as long as the model is not described in as much detail as necessary to solve specific problems of FMCG chain retailing companies.
3.3 Development of a subsidiary business process model A1 "Purchase" at the first level of detail

Figure 3 shows a diagram of the A1 "Purchase" business process, revealing a typical structure of the business process for FMCG chain retailing companies.

As can be seen from the diagram, the A1 "Purchase" business process consists of five subprocesses [12]:
- A1.1 Purchase planning;
- A1. 2 "Selection of suppliers;
- A1. 3 "Conclusion of the contract with supplier";
- A1. 4 "Operational supply management";
- A 1.5 "Evaluation of suppliers".

Let us consider them in more detail.

3.4 Development of diagrams of subprocesses of business process A1 "Purchase" at the second level of detail

3.4.1 Development of diagram of subprocess A 1.1 "planning of purchases of goods". Figure 4 shows a diagram of subprocess A. 1. 1 "Purchase planning" for FMCG chain retailing companies.
As follows from the diagram presented subprocess A1.1 "Purchase planning" consists of four blocks:
- A1.1.1 "Preparation of commodity price forecasts for the period";
- A1.1.2 "Calculation of the needs of goods for the period";
- A1.1.3 "Formation of the schedule of deliveries of goods for the period";
- A1.1.4 "Preparation of the plan of obligations to suppliers of goods for the period".

At the first stage of the business process "Purchase" is the preparation of price forecasts for the period. For effective activity it is necessary to analyze the prices on all channels of distribution - at direct producers, distributors, competitors and so on as only understanding pricing of the producer, it is possible to estimate objectivity of the prices and to define strategy of negotiations with potential suppliers of goods [6].

For the leadership of the chain companies it is important to synchronize the assortments of chains. When building the range of categories are divided into price, brand and assortment (based on sales statistics). It is important and especially valuable that each product category receives a development strategy.

The backbone of the range in most chains are Federal brands. Firstly, global brands offer the best value for money, and secondly, have large promo budgets and advertising opportunities. The Federal block of assortment still has the lowest profitability, but also a high growth potential: having consolidated purchases, having agreed on partnership, chains are going to receive from Federal producers the best selling conditions and promo budgets [7].

The presence of local producers depends on the category and degree of development in the regional market. Retail chains see great potential for developing partnerships with local producers of goods made from local raw materials, taking into account the taste preferences of the region; meet modern trends of healthy food; unique, allowing to build up from competitors; analogues, able to compete with the Federal.

In order to effectively organize the procurement process, it is necessary to develop and agree with regular suppliers a delivery schedule. Delivery schedules require compliance with supply discipline, minimize inventory and, as a result, reduce the cost of procurement logistics.

3.4.2 Development of diagram of subprocess A1.2 "Supplier Selection". Figure 5 shows a child diagram of subprocess A.1.2 "Supplier Selection" for FMCG chain retailing companies.
Figure 5 is a chart of subprocess A1.2, "Selection of suppliers"

As can be seen from the diagram below, subprocess A1.2 "Selection of suppliers" consists of four blocks:
- A1.2.1 "Market Analysis of suppliers";
- A1.2.2 "Identification of possible conditions of work with suppliers";
- A1.2.3 "Assessment of reliability of suppliers";
- A1.2.4 "Competitive selection of suppliers".

At the first stage, a qualitative assessment of data on sales and existing suppliers of chain companies is carried out, possible interaction conditions are identified.

In order to assess the reliability of suppliers, existing and potential suppliers are audited according to the following criteria:
- Evaluation of input control of raw materials: verification of documentation, it is possible to visit the representatives of the chain company to the production, in order to verify the quality of raw materials used for production.
- Food safety of goods. Chain companies need to make sure that the supplier complies with hygiene standards, temperature regimes, production processes comply with standards, risks are assessed.
- Pest control, or pest control. The supplier must have signed contracts for the services of the exterminating pest and cleaning.
- Traceability. The chain company must have information about where the supplier purchases the raw materials, have access to all supporting documents and other information about the raw materials.
- Control of compliance with the requirements to the quality management system. The chain company must necessarily familiarize itself with the quality management system of potential suppliers. For example, whether the procedure for suspension of production in the event of a crisis situation is prescribed in the documentation.

In addition to these criteria, it is possible to check the suppliers in two directions: environmental and social [5]. In these cases, it is necessary to assess how economically and thriftily electricity, water and other resources are used, how efficiently waste is managed. Currently, an increasing number of chain companies are beginning to pay close attention to these issues.

Based on the results of the reliability assessment, the procedure of competitive selection of suppliers can be carried out.
There are two main ways to identify suppliers:

First option. The chain company independently searches for potential suppliers supplying the necessary goods in the following cases:
- If the goods are not presented in the company, but the need for them exists, or are presented, but an increase in the volume of goods supplied is required, including in connection with the opening of new retail facilities, or its replacement with other goods in connection with the detection of violations of the goods, or non-performance or improper performance by other Suppliers of obligations under the supply contract.
- The emergence of chain companies need to find potential suppliers. At the same time, the company selects suppliers either by searching in open sources and in the database of commercial proposals received by the company, or initiates electronic bidding (competition).

Second option. The supplier initiates cooperation with the Company by sending a commercial offer. As a rule, the engagement with suppliers starts on the chain portal. To participate in the selection, the manufacturer must register in the information system of the chain, get a link to his personal account, enter data on all manufactured goods and place a commercial offer. The commercial offer is verified, the goods of the manufacturer fall into the tender table and are ranked by the system [8]. The top lines show the products that have the best performance in terms of sales forecast, marginality, TPR-budget, compliance with quality criteria (based on Roskachestvo data), etc. The tender table is constantly updated. After the preliminary selection in the personal Cabinet, the manufacturer receives an invitation to a face-to-face meeting or participation in online bidding.

3.4.3 development of the child diagram of subprocess A 1.3 "Conclusion of the contract with the supplier of goods". Figure 6 shows a child diagram of subprocess A 1.3 "Conclusion of the contract with the supplier of goods" for FMCG chain retailing companies.

As follows from the diagram presented subprocess A1.3 "Conclusion of the contract with supplier" consists of three blocks:
- A1. 3. 1 "Preparation of the contract with the supplier";
- A1. 3. 2 "Legal audit of the contract with the supplier";
- A1. 3. 3 " Signing the contract with supplier";
Conditions of cooperation, assortment and promotion programs are thoroughly worked out with each manufacturer during the negotiation campaign.

Together with suppliers, a balanced assortment structure is built. The data on sales in different regions of the Russian Federation are taken as a basis, and then the range is fine-tuned for each chain depending on the region, format, positioning and consumer needs [4].
Some manufacturers may be subject to special conditions. For example, the chain points to the need to expand the distribution of popular goods, reduce the range of goods with a negative sales trend, increase promotion efficiency, and so on.

The introduction of the system of electronic data exchange with suppliers makes the legal audit of contracts absolutely transparent, as well as greatly facilitates the analysis of the results and the time for their preparation and signing.

3.4.4 Development of subprocess child diagram 1.4 "Operational supply management" Figure 7 shows the subprocess diagram A.1.4 "Operational supply management" for FMCG chain retailing companies.

![Diagram of subprocess A1.4 "Operational supply management" for FMCG chain retailing companies.](image)

Figure 7- Diagram of subprocess A1.4 "Operational management of goods deliveries"

As follows from the diagram presented subprocess A1.4 "Operational management of goods deliveries" consists of four blocks:

- A1.4.1 "Receipt of goods";
- A1.4.2 "Control over the fulfillment of the terms of the contract with the supplier";
- A1.4.3 "Claim work with suppliers";
- A1.4.4 "Return of goods to suppliers".

Distribution centers of chain retail trading companies are commodity warehouses responsible for the receipt of goods, and also perform a sorting role, which implies the concentration of goods, after which they should quickly be dispersed to retail outlets of the chain in small batches [2]. In relation to retail outlets, distribution centers perform the functions of the control unit: fill them with goods in accordance with the policy that is adopted in this trading chain.

The management of chain trading companies, concluding contracts with suppliers, prescribes in them volumes, terms and schedules of deliveries, and also the order of change of conditions (for example, the prices). However, contractual obligations are not always fulfilled in full, and situations of over-and under-deliveries, re-sorting and arbitrary price changes are quite common [3]. That is why it is the function of distribution centers to monitor all violations and solve problems in time, and this should be done at the time of arrival of the goods. Such processes include claims work with suppliers, as well as the return of goods of inadequate quality.

3.4.5 Development of a diagram of subprocess A1.5 "Evaluation of suppliers". Figure 8 shows a diagram of subprocess A.1.5 "Evaluation of suppliers of goods" for FMCG chain retailing companies.
As follows from the diagram presented subprocess A1. 5 "Evaluation of suppliers of goods" consists of three blocks:
- A1. 5. 1 "Analysis of the regularity of supply of goods by the supplier";
- A1. 5. 2 "Analysis of the quality of goods received from the supplier";
- A1. 5. 3 "Clarification of selection criteria for resource providers".

The analysis of regularity of deliveries of goods by suppliers is carried out on the basis of the schedule of deliveries and the directories of goods and suppliers updated at the current time.

In order to analyze the quality of goods received from suppliers, chain companies, in addition to current and planned control, carry out various activities. For example, the company "Ashan" in 2018, the company launched the project "Social audit" for suppliers of all product groups. On the basis of the report on the results of the audit of a potential partner, conclusions were issued on the possibility of cooperation. Subsequent assessments are carried out out the present time, according to the schedule or depend on the level of risk of the supplier and the type of goods. Thus, in 2018, more than 1,500 audits of suppliers, 117 thousand laboratory tests, 500 internal audits were conducted. To do this, the chain invites experts from independent audit companies [1].

Clarification of criteria for selection of suppliers of resources by tracking the results of procurement activities, system analysis and cleaning of the product matrix allows to prepare the optimal procurement strategy, as well as to introduce common approaches to procurement through clear regulation of procurement processes, preparation of regulatory documents for tender and negotiation processes. In addition to directly improving the effectiveness of the procurement process, most of these practices increase the predictability of the result and strengthen the control of purchases.

4. Conclusions

In the course of the study, the basic business processes of chain retail companies were identified, the typical structure of the business process "Purchase" was considered. At the first stage of the "Purchase" business process, special attention should be paid to the formation of price forecasts for the period, to analyze prices for all distribution channels, to develop and agree with regular suppliers a supply schedule. In order to assess the reliability of suppliers, it is necessary to constantly audit existing and potential suppliers according to certain criteria. With each manufacturer during the negotiation campaign should be deeply worked out the terms of cooperation, range and promotion programs. The analysis of the regularity of the supply of goods by suppliers is based on the delivery schedule and up to date on the current time of the reference products and suppliers, and clarify the criteria for the selection of resource providers by tracking the results of procurement activities, system analysis and cleansing commodity matrix allows to prepare optimal procurement strategy.
As a result of the study, a reference model of the top level of detail and a child model of the business process "Purchase" (in this study, the IDEF0 notation is used) are developed. On the basis of top-level models, models of subprocesses of business process A1 "Purchase" are developed: A1. 1 "Purchasing planning"; A1. 2 "Choice of Suppliers; A1. 3 "Conclusion of the Contract with Supplier"; A1. 4 "Operational management of Deliveries"; And 1.5 "Assessment of suppliers". The developed models can be used in construction of architectural solutions in FMCG chain retailing companies.

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