

Choosing ERP system for a retail enterprise

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Bachelor's thesis

December 2016

Technology, communication and transport

Degree Programme in Logistics Engineering

Author(s) Anfimova, Diana	Type of publication Bachelor's thesis Number of pages 43	Date December 2016 Language of publication: English Permission for web publication: x
Title of publication Choosing ERP system for a retail enterprise		
Degree programme Logistics Engineering		
Supervisor(s) Franssila, Tommi		
Assigned by GAP & Banana Republic Russia		
Description <p>This project was assigned by a retail company due to decision to change their management system and implement ERP package. The objective of research was to select Enterprise Resource Planning system, which is suitable for company and its purposes to solve existing problems.</p> <p>This research has a case study design as the combination of qualitative and quantitative methods with emphasis on qualitative side were used to get a result. Lean literature, online data, articles and company's data were used as sources of information and few interviews were conducted to gather the experience of other specialists who work in ERP field constantly. Though not all data can be considered completely reliable as few assumptions were made during research.</p> <p>To achieve the required result, assessment of the current state of the company was made to determine problems and create an outline for ERP system. Russian market of ERP vendors was researched, analyzed and few companies were selected who suit requirements better. Thereafter, in-depth study was made to explore them thoroughly and key factors were chosen to make comparison by. Each of them was weighted with values to underline their importance for decision-making.</p> <p>Eventually, final analysis matrix was drawn and a conclusion was made.</p>		
Keywords (subjects) ERP, ERP vendor, SAP		
Miscellaneous		

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Abbreviations & Symbols

3D – three-dimensional

€ – Euro

CIS – The Commonwealth of Independent States

DPD – Data Process Diagram

DSP – decision support tool

e.g. – for example

ERP – Enterprise Resource Planning

Etc. – et cetera

FOETSEL – Finance, Organization, Economic, Technical, Social, Ethical, Law model

HQ – GAP headquarters

IVSM – Independent Vendor Selection Management (SpecIT)

ISAHP – the International Symposium on the Analytic Hierarchy Process

IT – Information Technologies

LE – Logistics Employee (for use case)

MD – Microsoft Dynamics

PO – Purchasing Order

ROI – Return on Investment

SCM – Supply Chain Management

TMS – Transportation Management System

The USA, US – the United States of America

WMS – Warehouse Management System

1 Introduction

Nowadays the world is developing with an enormous speed and so is business. Famous and prospering franchises are invading markets, weaving their nets, starting with fast food such as McDonald's Corporation, ending with fashion retailers as Zara. While it seems effortless for companies to do what they have already done before in other countries, in real life they meet obstacles we do not imagine.

Each new area is a battlefield with its own rules and resources, with "native" founders and those, who managed to conquer this place beforehand. Laws and restrictions, national traditions, mentality of the people, politics and currency instability – those are just a few of many hidden hazards the company must deal with.

Talking about the retail clothing market in particular, one of the biggest challenges is to keep connection between all offices and warehouses of the franchise. Maintaining a stable flow of information is a necessity for daily work of each part of the whole company mechanism. The firm has to securely transact data, but also to make it understandable and workable with for each franchise department. This task includes considering language barriers, level of personnel training and last, but not least – software disparity.

The most popular answer to this need is Enterprise Resource Planning. ERP systems provide capability to create powerful and multi-dimensional networks which allow employees have the common ground and the same reporting system at least within the frames of the franchise area, also it forms new bonds between different departments inside the company.

If ERP system can solve so many problems, why is it so difficult to find the right one? The diversity of ERP vendors can be confusing and tricky: wide variety of abilities and features, price range, IT supportability – all of it is important. This thesis deals with research, analysis and selection of ERP vendor and covering some of the issues mentioned.

2 Research Methods

2.1 Research Objectives and Focus

This project is dedicated to a problem of choosing an ERP system for managing logistics operations and documentation flow in a retail company. To achieve this goal certain objectives were defined:

1. Evaluate requirements of company for the system
2. Assess ERP vendors market in Russia
3. Make comparison between suitable ERP-packages

When all these steps are done, the research problem is solved and the selected system can be offered to a company to implement.

The focus of the research is on the logistics department, its connections with internal branches of the company and its link with the headquarters. The reason for such decision was amount of influence each department have on this choice and, in reverse, effect of ERP system on productivity and facility. Therefore, problems of other areas are barely covered.

2.2 Methodology and data collection

This thesis has a case study design as it has a particular scope and an attainable target, provided by a specific company or person. Such research strategy usually imply a combination of quantitative and qualitative methods with a bias towards last mentioned.

Qualitative method includes collection, processing and analysis of available information. The sources should be checked carefully to be reliable, valid in the field of research and up-to-date.

During this particular study, main data sources were books, website articles and information provided by GAP Russia and GAP themselves. In addition, few inside interviews were done and meetings were hold to attain universal agreement regarding requirements and desirable qualities for future ERP system. This discussion was expressed in the factors evaluation (see 6.2 Values).

3 Theoretical Basis

3.1 ERP systems

According to Marianne Bradford (2012, p.14) ERP system is a tool to automate and integrate core business processes. Thereby departments and functions of the company are merged in a single system, all departments are working with a single database, and it is easier to share among themselves all sorts of information.

Typically, an ERP system includes various functional modules such as accounting and tax accounting, warehouse management, transportation, personnel records, customer relationship management. Different ERP software modules enable a single system to replace the outdated disparate information systems for logistics management, finance, inventory, projects. All information is stored in a single database, where it can be received at any time on request. Schematic diagram below represents main ERP application market during 2010-2015.



Figure 1. ERP Applications Market 2010-2015 (Pang, 2016)

It declares that ERP does not only improve the efficiency of the production activity of the enterprise, but also reduce the internal flow of information, thus reducing the cost of its revision. An important benefit of such implementation is a set of ERP functions, hereby are the most common and popular (Wallace & Kremzar, 2001, p.94-98):

- Maintenance and engineering specifications, defining the composition of manufactured products, as well as material resources and activities required for its production
- Sales and production plans
- Quantity of materials and components maintaining plan, the timing and volume of deliveries for the implementation of the production plan
- Inventory management and procurement: maintenance contracts, the implementation of centralized procurement, accounting and optimization of warehouse and shop stocks
- Operational financial management, including the preparation of a financial plan and monitoring its implementation, the financial and management accounting
- Project management, including planning steps and resources required to implement them

Ordinarily the retail market needs its own specification such as providing work with the supply chain, automating internal and external logistics, automating inventory control and merchandise management. Attention is paid to the CRM functionality for execution order management, customer management database, tracing the history of the relationship with customers, pricing management, assortment, forecasting demand and sales planning.

Physically such system may consist of two or three separate units: WMS (in the warehouse complex), TMS (in the transport and distribution centre) and the rest of the ERP system (in the central office). If the warehouse is combined with transport and distribution centre, the system is merged respectively.

The question of combining the business processes of the organization with processes already represented in the ERP system is of a big importance. There are three options: to "mould" the existing processes into the requirements of the ERP-system, to "break" ERP system into business processes of company or

to do something in between. In this case, the decision criteria is the impact of its own business processes at the company's competitive advantages. As a rule, retail business processes do not have a special uniqueness and "fine tuning" of business, so the scheme represented in ERP system simply increases the clarity and transparency of their operations and ordering. If the whole business of the company is based on a unique approach to trade and all business processes are aligned with it, taking into account their replacement with the proposed developers of ERP-system will lead to the loss of competitive advantage. In this case, it is necessary to reconfigure the software. As for the intermediate option, when working on a common scheme of the company implements its products through a unique touches in few areas. This situation leads to the need for partial reconfiguration of business processes implemented in ERP system, while retaining the main part thereof. Thus, it can achieve a double beneficial effect: the organization arranges core business processes and the software begins to support key to a company's business processes to ensure it a competitive advantage.

3.2 Methods of choosing ERP

Choosing which ERP to use is a complex decision that has significant economic consequences, thus it requires a multi-criterion approach (Alanbay, 2005). In order to determine which ERP system is the most suitable for the organization, all the selection criteria can be divided into several groups.

According to Bradford (2012, p.61-62), general criteria groups are:

- *Organization's needs.* This group of criteria linked to the current and future needs of the organization, its size, the working conditions and requirements of the market.
- *Applied technology.* This group includes criteria related to ERP system technology work and ways of implementation.
- *Functionality.* This group defines a set of criteria for the composition of ERP tasks and system modules required to meet the needs of the organization.
- *Support.* A set of criteria that defines the group conditions of technical information and service support for the ERP system of the supplier (vendor).

- *Cost of ownership.* This group includes all the criteria related to the acquisition and maintenance of ERP systems.

Due to Adam and Sammon (2004, p.94) there are few common scientific methods, which allow company management to analyze their resources and needs and make a choice of ERP vendor to suit requirements. The short-list of methodologies is herefore:

- SpecIT Independent Vendor Selection Management
- Kuiper's funnel method
- Dobrin's 3D decision support tool
- Clarkston-Potomac method

SpecIT Independent Vendor Selection Management is a comparison and selection automated mechanism. It collects data on the performance of existing programs, their core functionality, defines actual requirements, how they correlate with the current system, compares needed package with over 2,000 applications from database and suggests the appropriate choices for further improvement. ("SpecIT™ IVSM", 2016)

This method has a wide range of features and bonuses. IVSM can specify multidimensional requirements depending on country, company, departement, it allows to combine all of the specifications into one or separate them for feedback to needed department. Additionally, SpecIT is known for its accurate and realistic gap analysis tool, ability to benchmark possibilities against necessities and paperless tendering tool for managing and choosing of suppliers.

Kuiper's funnel method is a modified version of questionnaire for ERP vendor. Funnel method allows planning the question consequence in the way that their order would not influence honesty and realism of reply given by the supplier. It helps to keep specifications out of view until they are needed to finalize opinion and complete investigation on vendor capabilities so vendors do not bend answers to suit company's requirements.

The main reason the use of this method was denied – it does not have the numerical system of evaluation, calculation and comparison of results, it is a tool for assessment of ERP vendor abilities via provided value, process and

feature judgment, which is a satisfying method of research but not for a full analysis.

Nevertheless, Kuiper's table of common mistakes in choosing ERP system (see Table 2) was taken into account during carrying out the work. One of mistakes mentioned is choosing ERP vendors relying on their popularity and magnitude.

Table 1. Common mistakes in choosing ERP package (Adam & Sammon, 2004, p.94)

Common Mistake	Outcome
They limit their search to the most widely known vendors	As a result, they may overlook software that is more suitable for their needs
They do not formally define their requirements for the software	Companies that arbitrarily choose ERP systems risk disgruntling members of the project team and fostering a climate of conflict throughout the project
They demonstrate software before they define their requirements	Companies that make this mistake are more likely to be influenced by showy demos
They over-specify their requirements	Referred to as the "Candy Store" syndrome — if everyone in a company asks for every feature they want in a new ERP system, the cost, length, and complexity of the project increase
They become too involved in software analysis	Spending too much time studying requirements causes ERP selection to lose momentum; overextending an ERP project for any reason — particularly at the outset of the project — is risky; the longer the project takes, the more likely the employees and implementation team members are to lose their enthusiasm for the effort
They treat ERP selection as a matter of purchasing technology rather than as a major business decision	Companies that fail to see the strategic importance of selecting the appropriate ERP system risk choosing the most inappropriate system

Notwithstanding, all suppliers, which were chosen, are considered big players in their field but it was a conscious choice. It was not influenced by their image, only by software and support options they provide.

Dobrin's 3D decision support tool in some aspects resembles SpecIT IVSM as it is a computer-based evaluation program. DSP is usually implemented into existing system, collects data about internal/external company processes and applications needed for performing whereupon creates a map of working operations and recommends ways of improvement or new packages and/or applications to support system's productivity.

Clarkston-Potomac method was invented in Clarkston-Potomac Group Incorporation to evaluate and compare vendors in different fields, but is used mostly in software market. ("Implementation Consulting", 2016) The basic idea of this technique lies in combination of percentage and points evaluation of ERP suppliers based on questionnaire analysis and testing system but details of methodology are not known as Clarkston Consulting keeps it in private to retain upper hand on consulting market.

However, in this project the analysis is based on *FOETSEL model*, which originally belongs to marketing field, but was molded for research needs. Such analysis is more transparent and lack of difficult schemes makes it more compelling. The main idea of this approach is not only to give an assessment to each ERP vendor, but also to evaluate importance of key factors and multiply these numbers to get clearer picture. In other words, this analysis model allow to show priority allocation and to let it heavily influence the result.

FOETSEL model is a well-known tool for business field in the Netherlands. It assesses the potential marketing strategy on the feasibility of seven goals. These seven targets are represented by the following questions with regard to the marketing strategy:

- *F: Financial* – Are sufficient resources available to implement the plan?
- *O: Organizational* – How organizationally feasible is the plan?
- *E: Economic* – Does the plan fit in with the objectives of the organization?
- *T: Technologically* – Is the project technically feasible?
- *S: Social* – Can company adjust the plan within the social objectives of the organization?
- *E: Ethical* – Is the plan harmless for the environment?
- *L: Law* – Is the plan legally enforceable?

FOETSEL model is mostly used for estimating strategic options of product introduction to the new market area e.g. Grolsch beer concern used it for decision making about the European market and proved efficiency of this methodology. Choosing ERP vendor fits into the strategic planning category

and can be evaluated via similar points, though questions would vary vastly due to different field of research.

3.3 Implementation of ERP system

Implementation of ERP system is a complex multidimensional project, that requires a thorough analysis, a qualitative management and a profound business vision of company's future (Piterkin & Oladov, 2011, p. 84). It is not a one-move installment project as are frequently created for the application packages e.g. Microsoft Office, but an entire vast network project. It is better represented as a cycle project with constant checks and coming-backs, as it can be seen in table 3.

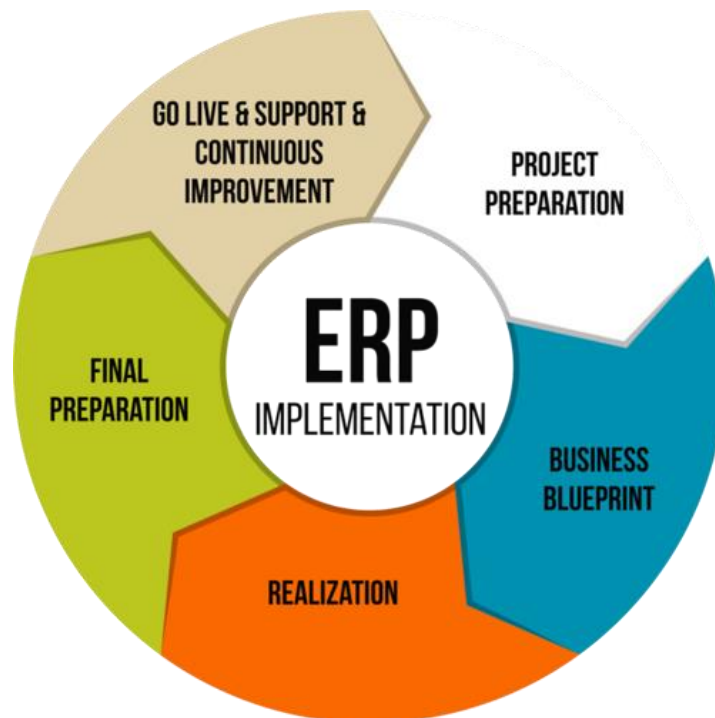


Figure 2. ERP Implementation ("ERP Implementation Services Pune", 2016)

A common mistake to consider ERP implementation an IT department task, as their part is only technical installment and partly data conversion. Such venture requires coordinated work of departments that are partaking in the future network and proper business planning from the company's management. The reason for this is the necessity of considering possible

future development of enterprise for designing ERP system correctly, leaving space where it would be needed e.g. for new modules or new department additions.

Thereby is the shortlist of the main stages ("Implementation of ERP", 2016):

- Analysis of current situation including business processes, data flow, personnel level and software
- Creating the technical blueprint of ERP system, combining analysis results and company's requirements
- Checking if existing hardware of company suits to the needs of new package
- Installment and basic settings, which includes installation, configuration, final inspection and preparation of the hardware to conduct subsequent works
- Adaptation of processes and documents in system to fit company needs
- Conversion exiting database into ERP (can be done manually or with special program)
- Personnel training
- Trial operation of the system and transfer it to the normal routine mode, when experts of the developer together with the customer's personnel conduct testing of the system, the results of which analyzes how the implementation went. At this stage, the system properly finalized

Although this thesis project is mainly focused on first three steps, it is the case study with further implementation of research results in real life, so all stages must be considered. Most of them are required for the fulfillment of analysis and for future recommendations. Some of these stages are transformed into key factors for final analysis, as they are vital for ERP workability.

There is a wide range of strategies of the ERP implementation process itself ("Внедрение ERP-систем (эталонный процесс)", 2016). It is important to understand differences and choose wisely, as it influences not only speed and cost of the process itself, but possible data losses and future workability of the entire ERP network within the company.

A *parallel adoption* implies running both the old (manual) and the new system, while output documents are compared. If they are consistent for a long time and have compatible types, a transition to the new system is made. This type of implementation is safe but is time-consuming, difficult to perform for employees and costs are significantly higher with respect to the other options.

One of the most well-known strategies is named *big bang*. This strategy is attractive, but not recommended, as it means an instant installment of the new ERP package and conversion of all the documentation into new database for an instant use. It is the challenging way to implement because it does not give company a proper testing time to indicate mistakes and flaws of new acquired system and its processes.

Pilot project is the most frequently used strategy. The pilot project is actually a big bang tactic applied to a limited number of business processes with the further growth of network. It covers a small area of activity and consequently this approach reduces the risk and is considered as the most reliable.

Unit by unit is an approach used sometimes in big corporations. It implies ERP implementation which is divided by departments or business processes. From economical point of view it is a wise decision, but constant processes and system development makes it difficult to perform. Also documentation is separated and creates an additional workload.

Last, but not least, though it is the most little-known. *Bottleneck methodology* involves a limited part of the production process. Using this campaign implementation, ERP plan is executed only for the bottleneck process or department and for the people working within. Accuracy is increased as all ERP implementation is concentrated in "narrow place". It has its advantages with regard to costs and time consumption e.g. training is needed only for people who work in this area, analysis of the effect only done for it, etc.

The implementation of the ERP system is carried out by special techniques developed by the software vendors. It is frequently performed either by the regional divisions of the company that owns the software or specially trained accredited IT-companies. Timing of the whole process can vary between different projects as it is depending on the flexibility of the ERP system, the

complexity of the company structure and business processes, type of implementation chosen and many other factors. To sum up, the implementation process is a complex project, which influences the success of further exploitation of the ERP software within organization.

4 GAP Russia

4.1 Company description

FIBA Group is a big holding company, which was founded in Turkey in 1987 by Hüsnü M. Özyeğin ("Fiba Group", 2016). International group is engaged in banking, insurance, leasing, factoring, asset management and private equity funds. In addition to the financial markets, the Group invests in aviation, retail, real estate, energy, shipbuilding, port management. Part of it, that was explored for this research, is FIBA Retail Group. It includes such franchise brands as Marks & Spencer, GAP and Banana Republic.

GAP Russia is a subsidiary company of GAP & Banana Republic (American franchise company), which provides retail and distribution services. GAP Inc. manages the global retail chain brands GAP, Banana Republic, Old Navy, Piperlime and Athleta, offering clothing, accessories and personal care products for men, women, children and infants.

The turnover in 2007 is 15.8 billion US dollars. GAP Inc. operates more than 3,100 stores in the United States, Canada, Britain, France, Japan and Ireland. In addition, GAP Inc. expands its global presence by opening stores GAP and Banana Republic in Asia, Eastern Europe and the Middle East within the framework of franchise contracts.

GAP Russia was founded in 2008. Headquarters of Russian branch are situated in Moscow. There are three offices and five main distribution centers widespread on the territory of the Russian Federation. Nowadays seventeen stores are opened, located mainly in large cities as Moscow, Saint Petersburg and Novosibirsk. This branch is operated by 269 employees ("Fiba Group", 2016).

Table 2. GAP Russia partnership structure ("FIBA Group", 2016)

Gap Retail	%29.6
Fiba Capital Investments	%33.2
Other	%37.2

GAP Russia is a developing retail branch founded 8 years ago, so the average age of staff is about 33 years old. Consequently, they have good skills in working with computer systems and enough experience in their respective fields. Most of them have higher education in their orientation area, which means they had courses connected with ERP or accounting programs, mostly with variety of 1C packages, as their alma mater are Russian universities. It means workers are easy to train and should not have any struggles with new system. Actually, it is a big problem for companies in Russia, as many people, who are working with documentation manually, cannot switch to the new working routine after implementation due to their advanced age and inability to understand modern computer technologies.

It was a management decision not to convert all business units to ERP profile due to costs and ease of some of the management processes without intervention. The main change of system dynamics is focused on Logistics, Purchasing, HR and Accounting & Finance departments. Due to that fact, an amount of employees was chosen for working with the future implemented ERP system. Table 4 shows how the number was divided by belonging to departments.

Geographically speaking, the most considerable block is going to be situated in the branch headquarters in Moscow. There are few main reasons for that: Logistics and Accounting & Finance departments are situated there, the central IT unit is based at the same place and all ERP vendors have offices in Moscow, which make them easily available and give company the ability to invite specialists or send their own for training purposes.

Table 3. Amount of future ERP users divided by departments

Department	Number of users
Logistics	15
Purchasing	34
Accounting & Finance	48
Human resources	28
Total	125

4.2 Current situation

GAP Russia has a network, consisting of three head offices and five distribution centers. Each office has assigned warehouses: Moscow office – three, Saint Petersburg – two and Novosibirsk has two warehouses. Offices are controlling and monitoring their territories' stock and needs.

Daily stock reports come to headquarters in Moscow via e-mail as an Excel file, are proceeded and then are sent to the other offices compiled daily report. Two branches answers back about their stocks and if they need anything, they draw requests. Head office's logistics department goes through this whole information, compares data on available stock and stock in America, shares information and requests with purchasing department.

While distribution centers exchange goods if needed, decisions on new orders are made. When purchasing department collects enough requests to assembly a fully packed shipment, they create an order and send it back to logistics department, where they start to proceed it.

When shipment is confirmed by the USA headquarters, logistics employees organize transportation from marine port to the main distribution center. Therefrom goods are picked to be transported to other warehouses. All these schemes are practically managed by logistics department. Communication is created via e-mail or messenger, the majoring part of files is Excel.

Having this review of ongoing activities, identification of system deficiencies can be done properly.

4.3 Detection of problems

To define problems in more structured way and figure out bottlenecks in data flow between GAP head office in the USA and main franchise office in Russia, Data Process Diagram was created. It shows the long way between stock daily data from USA branch to order creation.

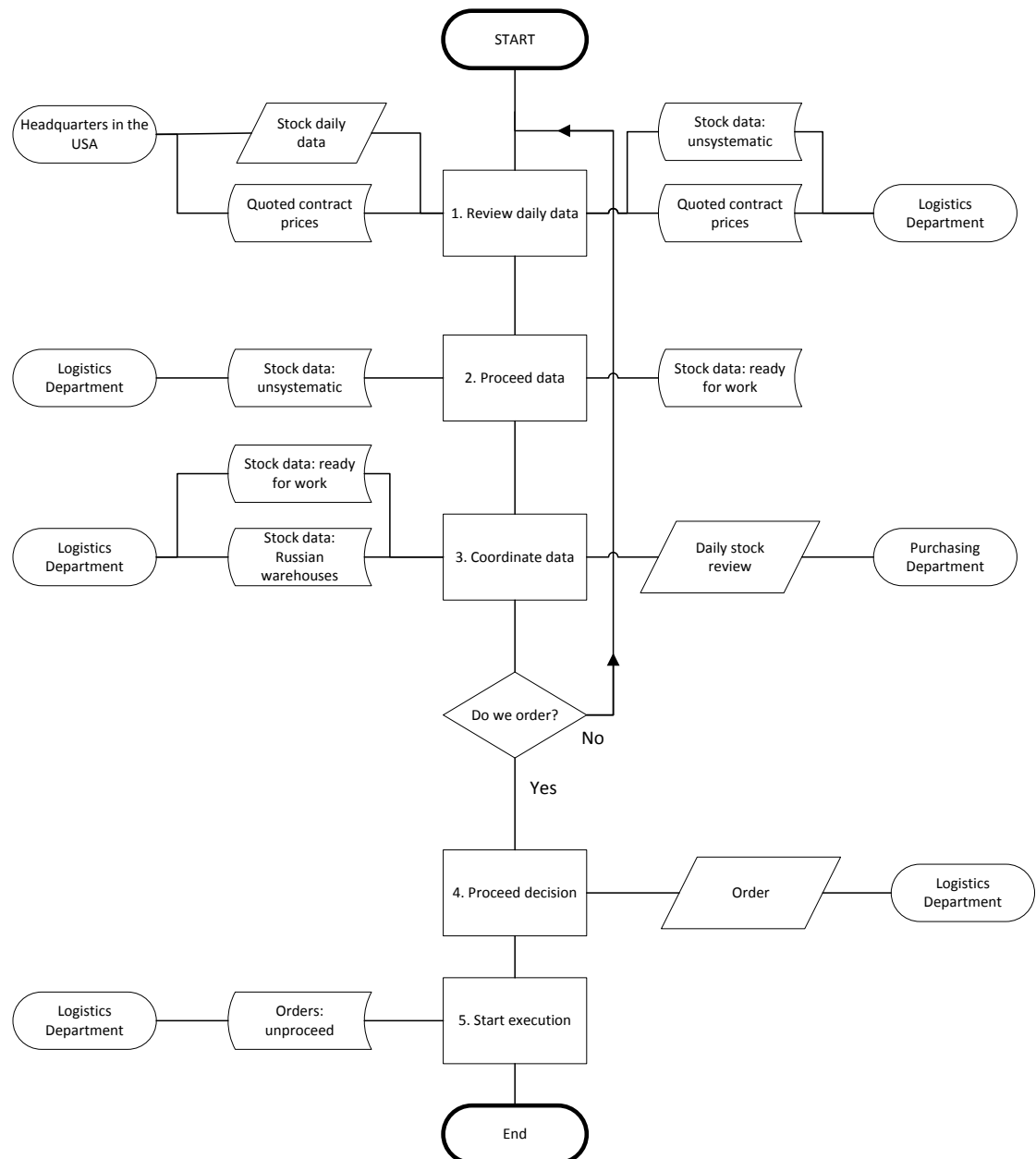


Figure 3. DPD of daily stock data in GAP Russia: Current situation

Apparently, in this scheme there is a vast amount of big and small flaws, even though this system is working successfully. Let us take a look on those with biggest possible influence.

Firstly, a bunch of useless actions is required as there is no database, which will unite departments inside Russian branch. It leads to repetitive e-mailing and significantly increases possibility of human errors on the way to final order request as each time there is need to insert data from one Excel sheet to another. Though this problem was temporary fixed with macros script to transfer information from one sheet to another automatically, it still can lag and mislead.

Secondly, at this moment stock data is a large amount of information, which needs to be proceeded every day manually. It compiles in one file and if mistake is made, which happens frequently, its detection takes working time that could be used for right purposes. Error is also dangerous in this case, as it influences the entire Russian branch and retail process itself. Sometimes it can lead to wrong order requests and cost the company time, money and reputation.

Thirdly, data flow is insecure, as though stocks themselves comes from the USA in script, but while departments and offices exchange information, it goes through unprotected channel. It increases risk of being easily hacked and influenced.

Fourthly, is that Russian branch does not have a proper network. If all offices and warehouses had the same management system, connected to the database, it would have influenced not only speed of works and protect from mistakes because of poor communication or re-entering texts, but also would allow to have better financial and goods flow control, which is essential for any retailing company.

The last important thing to mention is necessity to combine all this data for reporting and accounting, which can also be easily done with the ERP system. In addition, ERP can show KPI of this branch as united mechanism and establish stability.

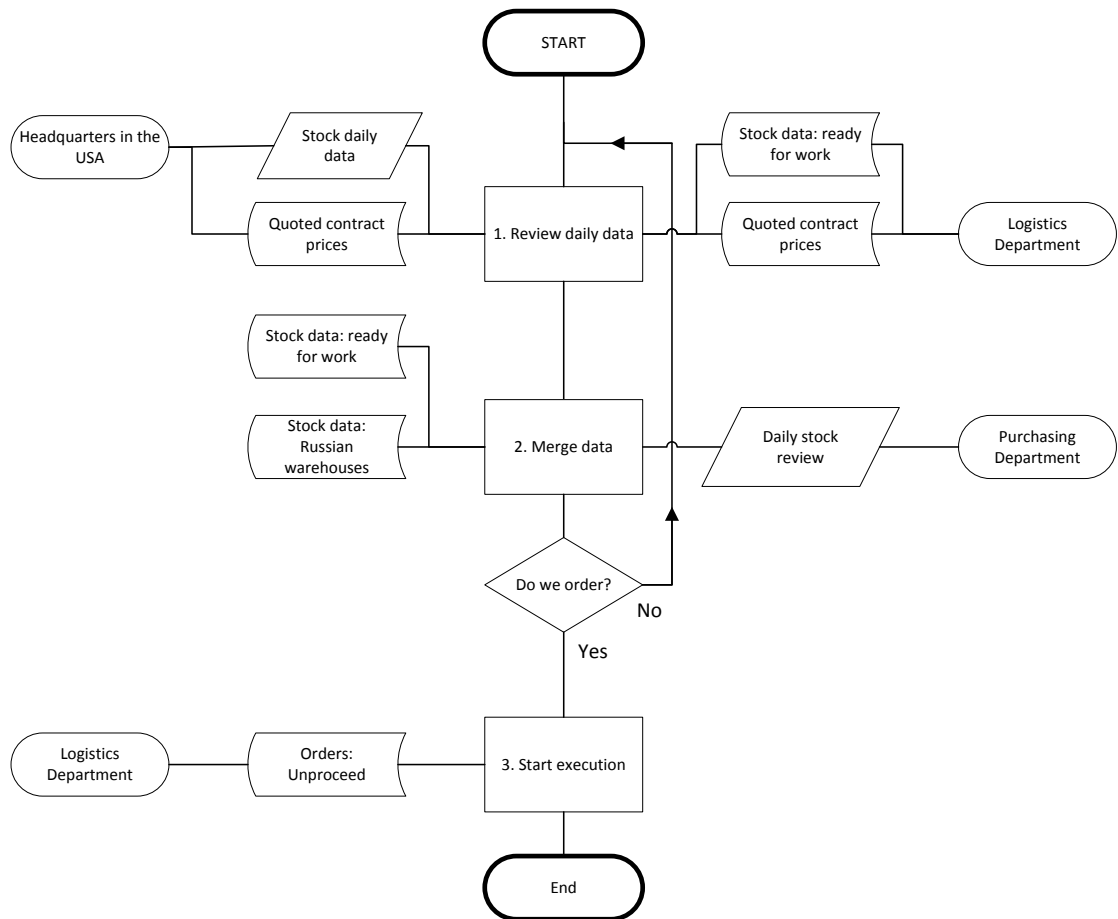


Figure 4. DPD of daily stock data in GAP Russia: Required

After figuring out flows and slips of existing scheme, new DPD was created to show what is required from database and how much influence it will have on order placement and lead time. Figure 3 shows scheme of one of the possibilities how the system will work. It helps to figure out structure of ERP package.

4.4 Company requirements

To start an ERP market research to choose the right vendor, company requirements must be defined based on previous gathered knowledge and company analysis. First of all, business processes of retail industry are needed to be determined for creating ERP system layout. It is important task to select processes appropriate; otherwise, it influences the whole vision of the system. Usually, the core business processes cannot be divided into departments as they involve few areas and are focused on adding value (Brown, 2008).

- Merchandising
- Marketing
- Supply Chain Management
- Store & channel operations
- Human resources
- Accounting and finance

As this research is logistics-centered, focus was on SCM and Store & Channel operations processes. GAP Russia has a short supply chain: as a retail franchise branch, it has only one supplier – GAP headquarters, situated in the USA. That means, that logistics operations are the same and well-developed. However, data flow is difficult to manage, as HQ and Moscow head office have different systems and amount of data is vast. Also data needs to be proceed by Logistics team first and only after that it can be sent to other offices and warehouses, which slows down the entire existing system.

Store & channel operations meet much more struggle. Though physical transportation and warehousing parts are fine and developed, due to there is no united database, all processes go through Moscow head office Logistics department and sometimes can end up as a mess. There is a TMS system to make all transitions smoother, still stock cannot be checked and controled properly via Excel sheets and a network connection. This system is inconvenient, easily dissarranged and creates the bottleneck, as cannot be changed by two people simultaneously.

To get a clearer picture of the company's needs, use case for one of SCM processes was created. Use case is a methodology used in system analysis to identify, clarify, and organize system requirements (Rouse, 2016). Basic flow is represented in both script and diagram, alternative flow is only in script.

Name: Create purchase order (PO)

Main actors: Logistic employee (LE), Purchasing employee (PE), Accounting manager (AM)

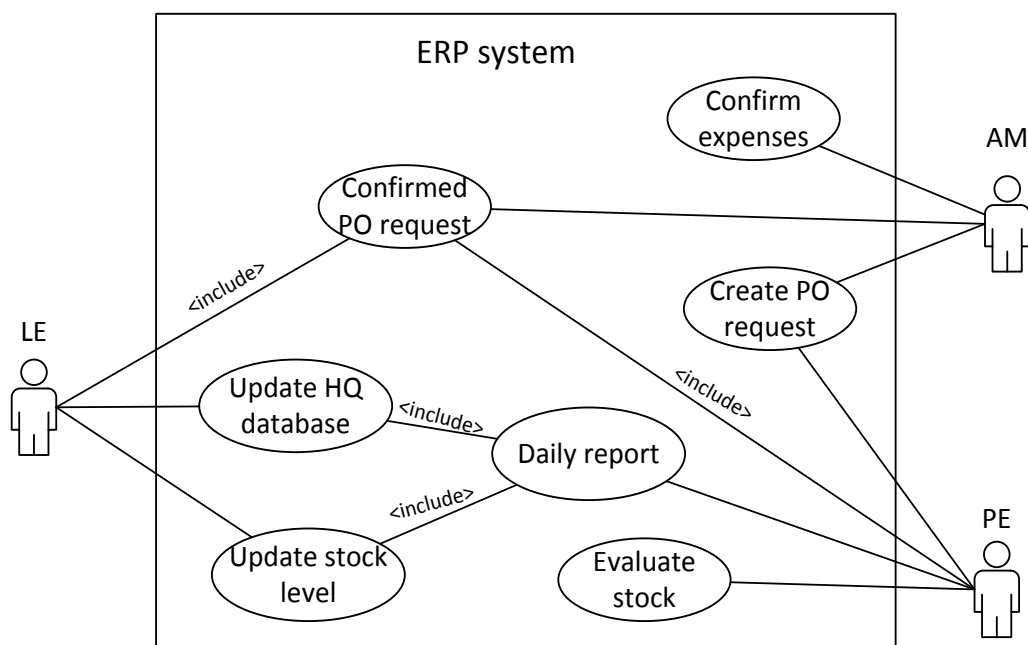
Past conditions: HQ and warehouse stock levels were checked

Trigger: receive daily report from HQ

Basic Flow (B1):

1. Logistics employee update HQ stock database
Logistics employee insert data in the ERP system manually or via converting program
2. Logistics employee update warehouse stock level
Logistics employee insert data, received from Russian warehouses
3. Purchasing employee evaluate stock
Purchasing employee makes a decision based on data compilation made by the ERP system
4. Purchasing employee creates purchasing order request
5. System notify Accounting Manager about request
6. Accounting Manager confirm purchasing order request
7. System notify Purchasing employee about confirmation
8. System notify Logistics employee about confirmation
End of process

Table 4. Use case: Create purchase order

**Alternative Flow (A1):**

1. PE does not create PO request

At basic flow step 3 PE decides that stock level is high enough and process ends

2. AM decline PO request

At basic flow step 5 AM does not have resources to settle the request and process ends

This example help us to gather deeper knowledge of company's needs for an ERP system. To make a final blueprint, more detailed scheme would be needed.

At this moment, the company's work is based on Microsoft Office platform. Consequently, all documentation and databases are kept in Excel format, scripted via macros instruments. This system must be preserved partially for those business units, which will not be converted to the new ERP package. It do not damage data flow as Marketing and Law departments has their own cases and databases that do not intersect with ERP-transferred units. Logistics employees are also using "Galaktika" transport management system and planning to eliminate it because ERP vendors provide their own solutions attached to the new system, so there is no need in extra work.

Accordingly to chosen fields of future implementation, corresponding interfaces are needed: SCM, Distribution, Accounting & Finance, HR and aforementioned TMS. All of them, except TMS tracking, are considered the standard ERP package, therefore minimal corrections are needed or not needed at all.

5 Case Research

5.1 Factors

After defining main problems and creating the outline of configuration for ERP package, key factors were discussed. Out of the many options, the list was selected, shown below with explanations of the reasons for this decision.

The *Financial* factor implies an assumable cost of implementation of ERP package and update for five years. Prices may vary a lot, as not only systems have different configuration, also two of them are developed by foreign companies. Because of the currency volatility, return on investment cannot be calculated properly.

The *Technological* factor incorporates concepts of an easiness of installing system for Russian GAP network and maintaining it. This factor aims to assess hardware, operating system and IT department level available and if it differs from the one needed for each of packages.

The *Organizational* factor represents the fulfillment of company needs, how does system suit to the requirements, existing business processes and created outline. It also shows flexibility of ERP vendors and possibility to bend package if demanded.

The *Law* factor indicates the relevance of created documentation for governmental services e.g. tax. It demonstrates if the system is requiring additional paperwork, which influence its usability radically.

The *Economical* factor displays possible profitability, which based on the assumption of the new order lead time. Since no test has been conducted, it was based on the Internet data and from experience of some of the users of these systems.

Last, but not least – the *Personnel* factor, which represents the easiness of usage for employees. Needless to say, the renovation of software requires trainings, but some ERP systems are more intuitive than the others. It influences amount of human errors done, the speed of implementation and transition to the normal operating mode.

5.2 ERP market in Russia

At the moment information technology market is one of the fastest growing industries in the Russian economy. The main trend of the Russian ERP market, as a year ago, is import substitution. Most market participants mentioned this process among the main tendencies of the last years.

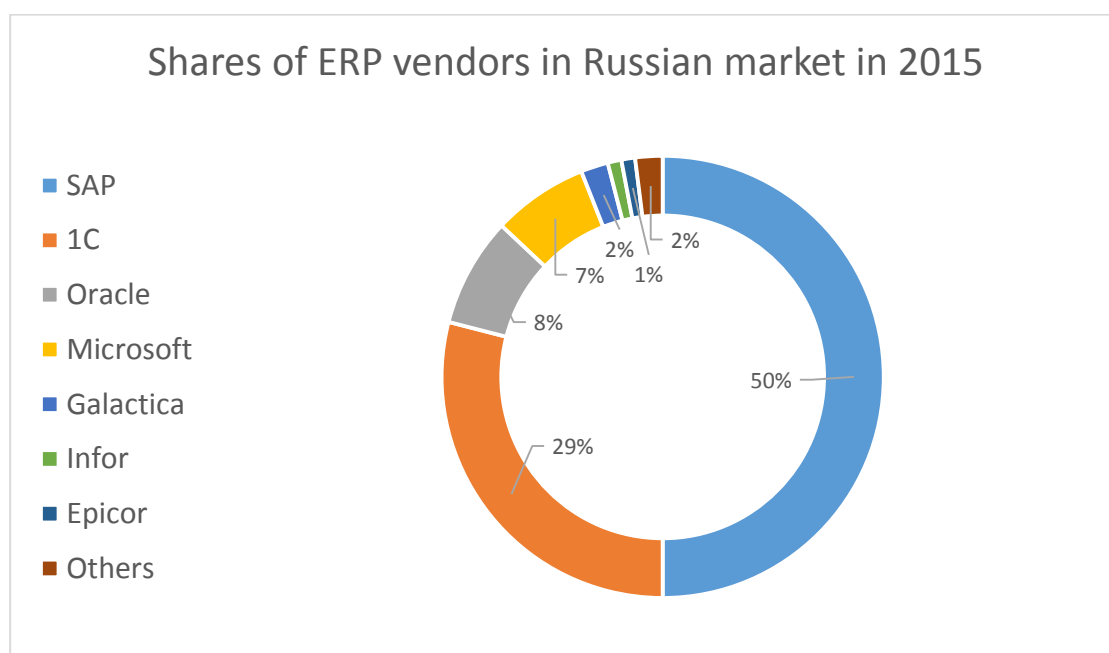
Russian industrial and retail companies are leading in the amount of ERP implementations. Mechanical engineering, food and chemical industries stand out among industrial. It is also a strong demand for enterprise resource planning in the construction sector and in financial services.

Central Federal District seriously stands out from the other regions in the number of ERP implementation and supporting projects. According to the

database TAdviser (2016), it is ahead of the second coming Northwestern Federal District more than two times. Volga, Siberian and Ural federal districts are the following. The smallest number of projects registered in the South, Far East, North Caucasus and Crimea districts.

Government initiatives strengthened the process of transition to homeland systems in state-owned companies. In particular, this applies to government regulations, approved in September 2016, about the priority of domestic goods and services for the procurement of companies with state participation. (Vitryanskiy, 2016)

Table 5. Shares of ERP vendors in the Russian market in 2015 (IDC Enterprise, 2016)



Due to IDC Enterprise (2016), shares of ERP vendors in Russian market in 2015 are distributed in the following way: SAP and Oracle still have their hold, but compared to previous years, they loose around 1-3% each year. On the contrary, 1C is growing with impressive speed, as does Microsoft, though Dynamics NAV had bad adaptation and was refused by many clients in the end. Smaller companies are still indefined compared to the main players. Percentage is represented in the table 3.

6 ERP vendors comparison

Whilst there is a large number of ERP systems on the market, the choice of a suitable system is limited to a relatively small circle of solutions. The main objective of this step is to find correct position of the company in the array of solutions from different ERP vendors.

As GAP Russia is a constantly growing company, which is united with Marks & Spencer franchise, it already has an imposing network. Consequently, the choice was made between ERP systems, which are oriented on medium-sized and big companies with more than 100 active users. Moreover, it was important that vendor has support centers at least in cities where offices are situated and had a basic package for retail industry with implementation positive feedback.

After cursory comparison of companies, those matching description were SAP, Microsoft Dynamics and 1C. In-depth study of these ERP suppliers was launched considering every key factor.

6.1 SAP

SAP is a leading provider of business applications in the world. This company entered Russian market 18 years ago and worked primarily with big companies e.g. energy giants like “Lukoil”, “Gasprom” and “Rosneft” (“Клиенты SAP”, 2016). At the moment, the company allocates two key packages for automation of business: “SAP Business One” and “SAP Business All-in-One.”

“SAP Business All-in-One” - a complete package of business applications for the large companies of up to 2,500 employees, which makes it applicable for GAP Russia. “SAP Business One” - business enclosure package for medium and small companies of up to 100 employees.

The composition of the ERP system modules from SAP covers all possible functional areas of modern enterprise: materials management, planning and execution of the production, sale and distribution, logistics, product lifecycle management, quality management, financial accounting, controlling (cost

accounting and profit), documentation and reporting. More complete set for retail market is shown in the diagram below.

Enterprise Management	Strategic Enterprise Management	Business Analytics	Business Intelligence & Decision Support	Accounting	Employee Relationship Management & Workforce Analytics	
Marketing & Customer Service	Marketing	Sales	Customer Service	Business Analytics		
Merchandising	Category Management	Merchandise & Assortment Management		Price & Promotion Management		
Supply Chain Planning	Supply Chain Analysis	Strategic Sourcing	Distribution Network Planning	Forecasting & Replenishment	Allocation	
Supply Chain Execution	Procurement	Inventory Management	Warehouse Management	Transportation		
Sales Channel Support	Store Business	Catalog Sales	e-Commerce	Interactive TV	M-Commerce	
Business Support	Financial Supply Chain Management	Fixed Asset Management	Technology and Enabling	Global Trade	Agency Business	Human Resources & Transaction Management

Figure 5. SAP: Retail Solution Map (Jimenez, 2003)

In addition to these two, “SAP Product Delivery” offers solutions for certain key processes: SAP SCM – for Supply Chain Management, SAP SRM – for Supplier Relationship Management, etc.

Main features of “SAP Product Delivery”: detailed study of solutions both by industry and by processes, stability, high performance and productivity, high cost of consulting services.

Financial factor: Traditionally, SAP implementation consultants and ERP packages are the most expensive on the market. Price (per user per annum) reaches around 1860€. SAP has low ROI mainly because it takes too long to implement and actual costs are much higher than expected.

Technical factor: SAP packages are compatible with many popular operation systems, including Windows. Nevertheless, it requires big memory capacity

and cannot be maintained by internal IT department only. Also, it is difficult to convert existing Microsoft Excel files into SAP format.

Organizational factor: Systems created by this vendor are generally well composed and usable. Special package for retail answer requirements, but it is not flexible and only minimal changes might be done if needed.

Law factor: SAP documentation is authorized to pass the tax inspection in frames of Russian law, but is not highly recommended. Other documentation blanks should be approved before usage in private order.

Economical factor: Due to interviews with people, who work in SAP daily, order lead time is reduced, but not immediately. On average, transition from installation of the system to its usage in routine regime takes about a year.

Personnel factor: This system is difficult to navigate without preparation, and even after human errors are still common and not easy to determine and correct.

6.2 1C

1C was founded in 1991 and specializes in the development, distribution, publishing and support of computer software for business and home use. (1C, 2016)

Of the company's own development, 1C are most known system “1C: Enterprise” program, as well as products for home computers and education. The system “1C: Enterprise” is widespread in Russia, Ukraine, Kazakhstan, Belarus and successfully applied by organizations in many countries of the world.

The key direction of company's development is business applications. 1C slowly but steadily moving up from systems for small and medium firms to products for large concerns. The movement is as leisure as purposeful and successful.

Currently, 1C is dominating in small business solutions segment and powerfully covering a good portion of middle-sized business. Now they are

developing new projects for large concerns and taking steps in all right directions.

The functionality of the system “1C: Manufacturing Enterprise Management” is represented on scheme below (Figure 4). It is, of course, less than the industrial card modules from the Oracle or SAP solutions, but it can compete with solutions of Microsoft Dynamics NAV.



Figure 6. 1C Enterprise 8: Interface (1C, 2016)

Financial factor: It is the least expensive package out of all. Price (per user per annum) is only 576€. Support costs are also pretty low and available everywhere in Russian Federation. ROI is pretty good, but depends on company size.

Technical factor: 1C is compatible with Windows and Linux as these two are the most widespread on the CIS territory. A light system does not require big memory capacity. It has a built-in file converter, which allow to transfer both Windows Office and SAP files and fits GAP Russia requirements on this matter

perfectly. IT departments can deal with almost all systems' errors on their own without consulting.

Organizational factor: Being long in the Russian market, this vendor figured out good industrial packages that suit almost everyone, retail is no exception. If some changes must be implemented, system is considered flexible, but not to everything.

Law factor: This system meets the requirements of the Russian legislation the best. It is not simply approved, but highly recommended and can reward users and partners with reduced taxes.

Economical factor: Order lead time for this ERP package is short and time reductions in all departments are usually noticeable. Users' comments about the impact of 1C on work and profitability are mostly positive.

Personnel factor: As Russian is a native language for this system, it can be considered quite intuitive. However, it still requires training and practice to manipulate it easily. During four-five months company usually use it in normal working style already. Human errors are not common as system usually notice strange inputs and make user check them.

6.3 Microsoft Dynamics

Microsoft Business Solutions promotion of their ERP systems captured a significant share of Russian market, which quite successfully holds to this day. The major causes for the active growth of the share of the product market is not observed, still there is a steady increase of clientele.

With ERP solutions from the global leader of software everything is easier, but not completely. Microsoft product line represents by only two ERP products. Microsoft Dynamics AX for large and medium-sized enterprises and Microsoft Dynamics NAV for small and medium enterprises. In addition, there are solutions for some industries e.g. Microsoft Dynamics AX for Retail, which suits GAP Russia purpose. However, it should be noted, that in comparison with amount of industrial solutions from SAP and Oracle, Microsoft is lagging behind.

Microsoft Dynamics AX in the market for over 20 years and is constantly evolving both in technology and in terms of functionality. Microsoft Axapta's unique scalability allows the system to "grow" with the company, but only conceived interface provides users with convenient operation. In 1998, the implementation of Microsoft Axapta began in Russia, and it is used today in more than 700 leading Russian enterprises of different industries.

Areas that are covered by the Microsoft Dynamics AX functionality represented in the figure below. Microsoft Dynamics NAV functionality is more limited.

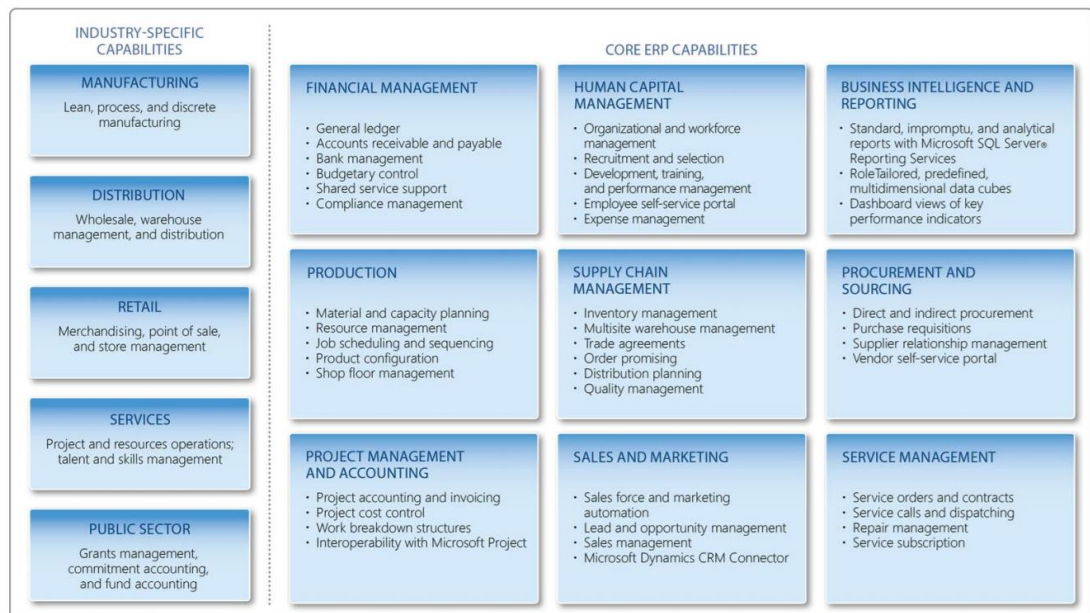


Figure 7. Microsoft Dynamics AX: Functionality (*Microsoft Dynamics AX 2012, 2014*)

Microsoft actively pushes its solutions in Russian market. Therefore, the number of implementations of each of the products is large enough. At the same time, the merits of Microsoft's decisions should be attributed with lower prices as compared with solutions from SAP and Oracle they lack functionality.

Financial factor: Price (per user per annum) is 1248€ ("Prices | Microsoft Dynamics 365", 2016). The system provides the best measure return on

investment among of the ERP systems. The analyst firm Nucleus Research (Polyskin, 2014) conducted a study, the results of which 75% of companies that implemented Microsoft Dynamics AX, were to recoup their investments in the period of less than two years.

Technical factor: As this ERP package is related to Microsoft, its compatibility with Windows and all Microsoft Office applications is incredible. Considering that all data of GAP Russia at this moment is in Excel files format, no convertation is needed – file manager inside MD AX is a useful and convenient tool. IT specialists deal with problems of system themselves mostly.

Organizational factor: Retail package answer basic need nicely. The system takes into account the constant changes in the business processes of the company, and its flexible architecture allows to change business processes in line with new market requirements in a timely and cost-effectively. In addition, the standard Microsoft Dynamics AX functionality can be extended by partnerships of industry solutions.

Law factor: The system is localized and meets the requirements of the Russian legislation, has certificates of the Ministry of Finance of the Russian Federation and recommendations of the Institute of Professional Accountants. Several times a year updates are released.

Economical factor: Order lead time in this system is considered short. Microsoft Dynamics AX also helps to reduce convert documentation time vastly.

Personnel factor: For users of standard Office it usually takes just a little training and practice. Based on experience, it is said that company can work with this package properly in two months after implementation. Human errors are rare if complicated macros scripts are not involved.

7 Basis for analysis

For clear and transparent decision-making, a comparison analysis (partially based on FOETSEL analysis, see 3.2) is held via the key factors and by awarding each of them with value.

To make the analysis realistic and suitable for determining the result of the whole research, key factors (see 5.1) were weighted with value from one (the least important) to four (the most important) depending on the influence they have.

The *organizational* factor got a score of 4 as it answers the main question of this whole research in making company more manageable and creating new, improved flow of documentation which will allow solving interdepartmental issues and significantly reducing time losses.

The *economic* factor is 3.5 due to importance of this point to the outcome of case. Each enterprise is firstly seeking the way to increase their profit, which consist of income and expenses.

The *law* relevance is 3.5 as well as it influences the reliability of documents, provided by ERP system and the speed of collecting documents for different governmental instances including tax service and Economic Crime Department, which allow to reduce waste of time.

The *financial* score got 3 because both the price of acquisition for necessary amount of ERP packages and maintenance for at least five years (according to the task from GAP Russia) must be considered.

The *personnel* factor got score of 2.5 due to significance of how easy program is for the average PC user and how much resources such as time, money and teaching staff is needed to put it to use.

The *technological* factor is 2 as to show if company's equipment is suitable for installment of ERP system and if level of IT department is good enough to proceed whole implementing process by themselves and to maintain system in future with minimal intervention of software company.

After awarding factors with values, the rating of 1 to 5 of each factor was created, which is explained in the table below.

Table 6. Factor value awarding matrix

	1	2	3	4	5
<i>Financial</i>	Not enough resources	Partly enough	Enough	Largely enough	Completely enough
<i>Technological</i>	Not suitable	Partly suitable	Sufficiently suitable	Largely suitable	Perfectly suitable
<i>Organizational</i>	Doesn't fit	Fit partly	Fit sufficiently	Fit largely	Fit perfectly
<i>Law</i>	Not feasible	Partly feasible	Sufficiently Feasible	Largely feasible	Perfectly feasible
<i>Economical</i>	Not profitable	Partly profitable	Sufficiently profitable	Largely profitable	Completely profitable
<i>Personnel</i>	Doesn't fit	Fit partly	Fit sufficiently	Fit largely	Fit perfectly

8 Analysis and results

Final analysis combines two evaluations. The importance of each key factor with its weight through calculations and comparison of products existing on the market. Numbers inserted in table are based on research data from chapter 6. The vendors are compared via features, numbers and users experience if known.

Financial: It was decided to evaluate this factor by prices per user per annum, as ROI cannot be used because implementation costs are unpredictable with such enormous projects. As SAP package costs 1860€, 1C is 576€ and Microsoft Dynamics - 1248€, they got 3, 5 and 4 points respectively.

Technical: SAP is one of the most inconvenient ERP systems from hardware point of view, especially compared with such light and adapted for operation systems and servers 1C and MD, especially considering that last one is from

the same company. The documentation convertibility of SAP is quite low and require special programs or manual input, so it got 2 points in this rating. 1C has inner converter, which is good enough, but sometimes allows some bugs, that earns the system well-deserved 4. MD accepts all Microsoft Office files, which is perfect for existing system and got 5.

Organizational: All vendors provide good packages for retail industry and develop constant updates. SAP got 4 because its architecture is difficult and not flexible, so even minimal changes are hard to be done. 1C got 5 due to flexibility and lightness of script language, so it can be changed and corrected even by internal company's IT department. MD is easily changeable, but updates are needed to be carried out by vendor team, and got 4

Law: SAP has the least acceptability law rate in Russia due to constant updates and problems with Russian language plugins and had 3 points. 1C and MD are both highly recommended by governmental structures and have special documentation form for taxation services so they both got 5.

Economical: This factor was evaluated based on users experience. As reduction of order lead time is almost the same for each of these ERP systems, the decision was made judging by time company needs to come back to normal work after the implementation. SAP has the longest transition period from installment to routine work, it got 3, 1C transition time is short – 5 and MD takes the middle point of 4.

Personnel: This criterion answers for ease of staff training to use ERP system. It shows if system is intuitive or is time and money consuming. SAP training usually takes a lot and as system is originally written in another language, it makes it even less manageable. SAP got 3 points. 1C is quite intuitive and has a very understandable interface, but still can be tricky and requires training properly, so got its 4. Microsoft Dynamics does require training too, still has a lot of similarities with Microsoft Office and got its 5 because it can be used easily by Microsoft product users, which includes almost everyone.

In the table key factors are marked with corresponding letters:

- F – financial
- T – technical

- O – organizational
- L – law
- E – economical
- P – personnel

Table 7. Final analysis matrix

	F (3)	T (2)	O (4)	L (3.5)	E (3.5)	P (2.5)	Result
SAP	3	2	4	3	3	3	47
1C	5	4	5	5	5	4	88
MD	4	5	4	5	4	5	82

As it can be seen, SAP is not the best solution for current situation. This is explainable, as GAP Russia is a medium-sized company and SAP costs, especially considering currency exchange rate, are enormous. Also implementation of such heavy and old-script programmed system takes a lot of time and cannot promise to be successful, which does not add points to this package.

Between 1C and Microsoft Dynamics difference is quite small, so both of them can be considered even if 1C had higher rate in matrix. Although, it is recommendable ERP vendor for work in Russian Federation and majority of employees already have experience of working in this ERP system.

9 Conclusion

9.1 Research results

During work process, all objectives stated in 2.1 were proceeded and main question was answered. Choice of ERP vendor was made and presented to the company for further usage with recommendations for possible implementation. 1C will not only increase productivity and make connection between departments more transparent, but also will allow stable data flow and reduce possibility of human-made mistakes. Although, implementation of

ERP is a difficult and risky process, but is it a necessity for future development and prosperity of GAP Russia.

Theme of selection ERP vendors is explored widely, but still has a lot of contradictions, new methods are being developed, so the author of this paper tried to combined the best points of existing methods with personal experience and attainments to get the best result possible.

9.2 Next steps

The main objective of the project was to give GAP Russia a comparative analysis of existing vendors in order to let the company implement ERP system. Based on the needs and requirements stated by the requester, the thesis research was completed.

Thereon next logical step is to create a technical blueprint of ERP system together with 1C specialists, which will allow checking if basic package for retail industry is enough or it requires any adjustments.

Subsequently, when so-called “fitting” is accomplished, IT department can check the hardware and make a final decision on its condition for ERP system installment. After the basic needs for the system's implementation are created, the system is installed and database conversion starts. During this phase, personnel training can be started, so the company's staff are prepared to use it when needed.

The next stage of implementation is the implementation process itself. The proper strategy has to be chosen for the step, as it influences costs, time consumption and effectiveness of the whole retailer branch. A pilot project is a recommended strategy because it fits company's needs and at the beginning can include only SCM and distribution processes that are influenced by the implementation the most. It gives time to make tests and check ERP package's capability to improve GAP Russia internal system. Other processes can be added later to finish the planned network.

9.3 Research critique

As a very particular scope was chosen and offered by company, the influence of ERP system on other then Logistics and Purchasing departments was not

taken into account and should be researched separately to confirm or deny the results of this study. The evaluation of price range for ERP packages was done roughly as data was a few years older and with currency volatility SAP and Microsoft Dynamics costs rised vastly. Time estimation also can vary from the one was assumed as it depends likewise on personnel level of ERP knowledge and may differ.

9.4 Reflection on the research

As I am very interested in ERP systems, the topic was exiting to learn about. It gave the opportunity to dive in depth and discover many intricate details you can never learn being a simple user of the system. Workload was big because the amount of information to read through, understand and analyze was unusually vast as previously such substantial projects were done in groups. Therefore, research itself was rewarding and my motivation was high.

The thesis work requires strategical, analytical and creative thinking, which must be combined to reach the objective. This project consisted of different stages. First included literature studies, data collection, conduction of interviews with users of aforementioned ERP systems and meetings with colleagues to figure out requirements. Second step was about proceeding gathered data into coherent information that can be used in thesis. Some of it was transformed into charts and tables to become more visual and clear. Third consisted of checking my deeds and schemes with company to make final changes before I started to write. Then the most difficult part came – writing itself. It reminded a bit of a puzzle: you have a lot of different pieces, it feels messy and complicated, but then in the end turns into beautiful picture with clear result.

In hindsight, I think I should have follow the initial plan I created, but I like the final result of my work as it was a result of inspiration and a lot of changes were done due to the fresh data I found on the way of research.

During project, I acquired not only new knowledge on the subject, but also new skills in analysis and improved my communication skills since I had to be a part of business meetings and to take active part in discussions we had. To sum up, my thesis work gave me the chance to increase my skill level and get

better impression of how big projects are created and executed in real life which I believe a tremendous luck and a very useful experience.

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Appendices

Appendix 1. DPD blocks explanation

