DEVELOPING THE COMPUTERIZATION CONCEPT OF THE COMMERCIAL AGENCY BY COMBINING ANALYTICAL PERSPECTIVES

Szymon Jeż, Walery Susłow

Technical University of Koszalin
The Faculty of Electronics and Computer Science
ul. Śniadeckich 2A, 75-453 Koszalin
e-mail: szymon@jez.net.pl, walery.suslow@ie.tu.koszalin.pl

Abstarct: *The article presents the case of study of the computerization concept of a typical commercial agency, worked out through the view model and viewpoints framework. Simultaneous use of standard (business, object, structural) and unconventional (reach picture, organizational chart) analytical perspectives in the process of developing the concept of an information system has increased, according to the authors, the chance to build the transparent, clear, useable system.*

Keywords: *Computerization, business modeling, systems modeling, conceptual modeling of information systems*

1. INTRODUCTION

The purpose of this document is to present the case study of the process of developing the concept of IT system for a typical commercial agency. That concept was developed within an analytic project by "combining" standard (business-oriented, object-oriented and structural) as well as some unconventional analytic perspectives in order to obtain sufficient level of the business problem comprehension by IT analysers and developers. This approach is close to the idea of recommended practice of view model as well as the concept of viewpoints framework – this includes frameworks in system engineering and software engineering. Those frameworks define consistent set of views to be used in the system analysis and/or in building the corporate architecture [1]. It should be stressed that authors of this paper do not try to create an information system model with "predominant" role of software (software-intensive systems), but rather look for idea to create a new system that shall "assist" functioning of already existing organization and verify logic organization of the system. These are issues on the verge of business process reorganisation, system planning and analytic design. They may result in making the decision to implement one of the existing systems of appropriate class or in decision to develop a new, original system as well as to abandon the business modernisation at all.

The approach to that problem only from the point of view of a single selected methodology significantly limits analyst's knowledge of the problem and may lead to conceptual mistakes of strategic nature. Combining the perspective should provide higher probability of generating clear and useful system, which, as a result, should reduce the risk of possible "costly" design modifications at later stages. The authors' intention is to present general overview of the situation, including description of a sample analytical project, concerning automation of a commercial agency. Then authors plan to present method of analytical works based on such mixed, combined approach.

The subject of modernisation in this paper is an "imaginary" commercial agency, which, according to the preliminary assumptions, is planned to be automated by implementation of an original IT system named Sellen. The idea of the typical, original IT system Sellen (the name is the abbreviation of words Sell Engine) consists in the change of the information flow between employees, from traditional way, i.e. orally, in writing, by phone or by e-mail to predominant flow through IT system. The information shall be stored in a daTablease and used to prepare reports. The system is intended to provide employees of each rank with tools assisting and facilitating their work. Internal

mechanisms of the system should organise and unify information (data) flow and enable management of the agency business processes.Based on the system concept described above, one may formulate more detailed assumptions of the project, which should:

- cover typical sales agency functions to the maximum extent,
- support development of the agency by recruitment and training of sales representatives;
- guarantee keeping the trade secret of the enterprise, by providing limited access to data for individual employees;
- provide system users with telecommuting option;
- tend to maximally focus the user on his/her job rather than on the system operation (e.g. by reduction of the time necessary to carry out most frequent operations to minimum), as research shows that sales representatives (SR) who contact customers more, also do and earn more.
- use a "production line" technique, where information is processed and converted into the product.

2. FIRST LOOK AT THE COMMERCIAL AGENCY

Authors suggest to take the first look at information flow mechanisms of the commercial agency from the point of view of unconventional diagram presented in Figure. 1, which in fact visualises Data Flow. The style of that diagram can be classified as information-graphics, i.e. presentation of the situation through text and pictures. Arrows shown in the diagram indicate to main data flow directions, while their inscriptions identify types of circulating documents or data sets. The advantage of the suggested approach is the fact that this point of view ideally assists the process of esTablelishing the dialog with the Employer, Sponsor, Shareholder and Customer, unlike in conventional form of contextual data flow chart. Thanks to realism with which the situation is presented, combined with the ability to specify the most important knowledge on objectified data in the context of the IT project, it is possible to discuss project-related issues even if the interlocutor of the analyst is not prepared appropriately (does not have proper competence). Knowledge on the problem shown in a given perspective can serve as inspiration for further analyses of the system functionality.

From the technical point of view, analytical tools are not usually capable of preparing such diagrams. Indeed, the Mind Map method may only be used as a supplement to that approach, i.e. used to note the conversation with the interlocutor (mind maps are often regarded as rich pictures, but they are mainly text-based and they require high formality of the structure). While CASE tools or business model editors are not provided with views allowing construction of such diagrams. Thus the optimum solution is to use special software for diagram or information-graphic generation, such as MS Visio, Dia or Gliffy. It is also advisable to esTablelish own collection of ready pictures, which may be replaced with photos, if necessary.

The technique described above is called in English Rich Picture, and it constitutes a part of the system engineering methodology [2]. It provides the mechanism of analysing complex issues or poorly defined problems by generating their detailed ("rich") representations. Rich pictures are usually not created using generally accepted syntax; they include symbols, sketches and "scribbles" and may also consist of numerous illustrations, so that information seems to be unnecessary. Completed diagram may be of value for all parties interested in the described problem, as it may give a better picture of many aspects of the situation. However, real value of that technique consists in the fact that to create the diagram, its author must analyse and understand the problem deeply enough to express it using a picture. The rich picture technique provides a schematic way to relate own experiences and views to a given problem situation by identifying and combining a number of terms, i.e. by generating a peculiar map of concepts. The process of generating rich pictures provides a forum for the analysis of a given situation.
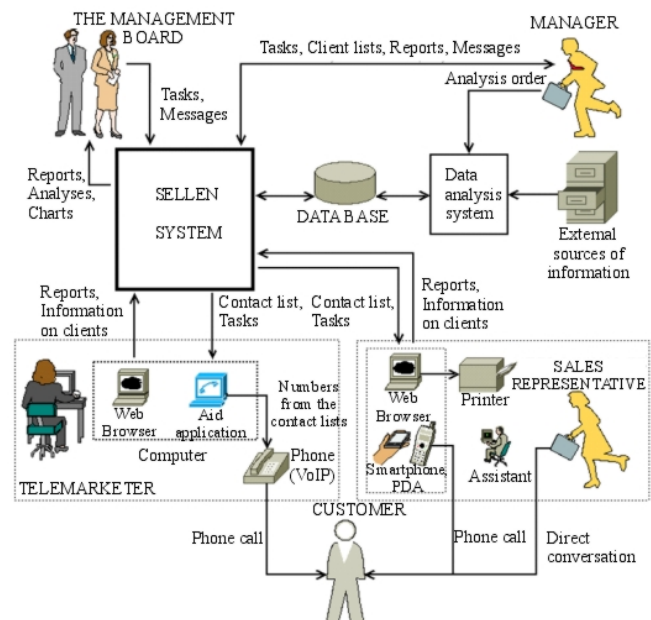

Figure. 1 Presentation of information flow in a commercial agency

3. USINESS PERSPECTIVE OF A COMMERCIAL AGENCY

In order to verify formulated vision of the planned system, it is useful to perform business analysis of a typical trade-and-service company, the main business activity of which makes it a commercial agency. It is important to know how the company earns money, to identify and describe positions in its structure as well as to prepare organisation chart of the company. Above actions should also include identification of business sub-systems existing within the company as well as their individual analysis as regards their functions. Key sub-systems should be examined in more detail, including development of appropriate model of the field (problem domain).

A business model is the term, which is defined in many ways. The most important feature of this model is the fact that it describes the way in which the organisation creates continuous stream of income, which in return generates profit. The business enterprise model matching the context of this paper is the brokerage model. In this business model, the company is called a broker. There is great demand on the modern market for services offered by brokers, which consist in matching buyers with sellers. One can say that brokers even create some markets: they match sellers with buyers and facilitate (carry out) transactions between then.

A broker usually charges fees or commissions for transactions successfully completed by him or her. Commissions are charged to the seller or the service provider who ordered the sale (sale ordering party), in accordance with specific arrangements with a given entity. In most cases, the company does not charge the end recipient (customer, consumer) with any fees.

The commercial agency actively seeks buyers and the agency is the party that initiates transactions. It is the opposite of the situation where the buyer actively seeks the seller and initiates the transaction. To esTablelish first contact with a customer, the agency most often uses telemarketing technique, i.e. an agency employee calls potential customer by phone in order to present the offer to him/her and to take an order from the customer or to arrange another contact call/meeting with him/her.

Lets assume that the agency modelled in this study operates mostly on B2C (business to customer) market and to much smaller extent on B2B (business to business) market. It's task is to bring the sale transaction (concerning mainly services rather than goods) to the conclusion. Goods are usually associated with a given service, e.g. as the equipment necessary for the service provider to provide the

service to the client or as a gift for a potential client to encourage him/her to buy the service.

Figure. 2 shows the context of orders, services and cash turnover between individual entities within the confines of the brokerage model. As a comparison, that drawing also includes a merchant model, where wholesalers and retailers of goods and services operate.

We assume that the company to be computerized shall not act as an agent of goods, services and payments between the end user and the service provider. It shall only present the offer to the customers and shall collect orders. The agency receives commission for completed (and also duly paid) orders. We also assume that the company shall not use proxies between it and the end, the manufacturer or the service provider. Summing up, the analysed Commercial Agency shall use the brokerage model and shall earn money by selling chiefly services on behalf of its business partners The agency shall actively function as a broker, contacting directly with the end user using telemarketing method.

The analytic perspective shown in the Figure. 2 does not belong to standard IT developer tools either. Nevertheless, it is worth to take it into account, as it provides basic data necessary for further detailed analysis of business processes taking place in the organisation to be computerized. Moreover, it simply helps the team of analysts and developers to understand the business and facilitates communication with the Ordering Party.
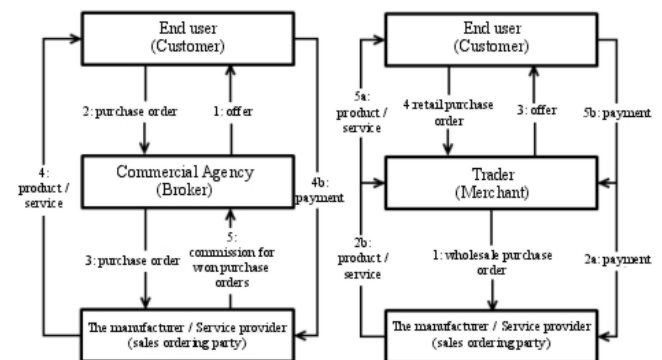

Figure. 2 On the left – the business model of the commercial agency (brokerage model), while on the right – the wholeselers/retailers (merchant) model (for comparison)

To better understand the company's business model, we developed the diagram of business cases of the Agency use (see Figure. 3), showing external perspective of the Commercial Agency. This diagram shows important aspects of the cooperation between business parties, i.e. it presents the Agency operation context. At this stage of modelling

process, the knowledge on the Agency itself is reduced to the „interface" form and thus detailed analysis of the Agency structure and functioning mechanisms is necessary prior to development of the software that shall assist its functioning.
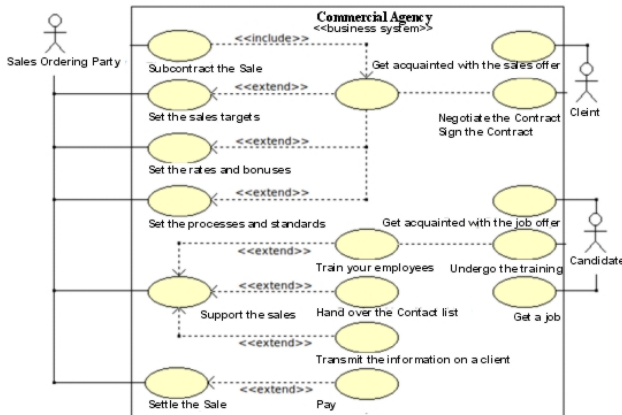

Figure. 3 The diagram of the business cases of the Commercial Agency use – the external perspective of the company

Having defined business cases of the Agency use, it is much easier to start designing system use cases and development of scenarios and dialogues. Business perspective of the use cases requires terminology characteristic for this sector (domain). This terminology may be "spread" to later stages of the analytic project. One may expect that this shall allow to reduce the number of misunderstandings resulting from widespread use of IT terminology, e.g. in user interfaces.

4. THE ANALYSIS OF THE COMMERCIAL AGENCY ORGANISATION STRUCTURE

Figure. 4 shows organisation units and positions of the Agency as well as reporting and cooperation relations between individual units and employees of the commercial agency. The executive units of the Agency are Trade Offices (TO). There are different subordination relationships between such trade offices (e.g. a head office – a subsidiary) and different specialties (e.g. telemarketing, TO TM). The presented organizational chart of the Agency shows graphic representation of the organizational structure of the Agency and thus it provides very important information on relationships between its functional units. There is currently no binding standard for generation of such charts. Reportedly, OMG organization plans to create standardized organizational structure representation format. When developing software supporting functioning of an organization, one should pay particular attention to

individual levels of individual job positions. The priority of this activity is the importance of the impact of a given functionality on achievement of the organization business targets. Indeed, for the analysed Agency, we should go down to the level of sales representatives and thoroughly examine their job, as the amount of commission earned by the Agency depends on their work. Therefore, to perform thorough analysis, we acquired additional information by creating brief descriptions of individual job positions in the company. That information is presented in structural form in Tablele 1. In our opinion, combining the graphic representation with structural description is an efficient way to get useful additional information on the analysed company.
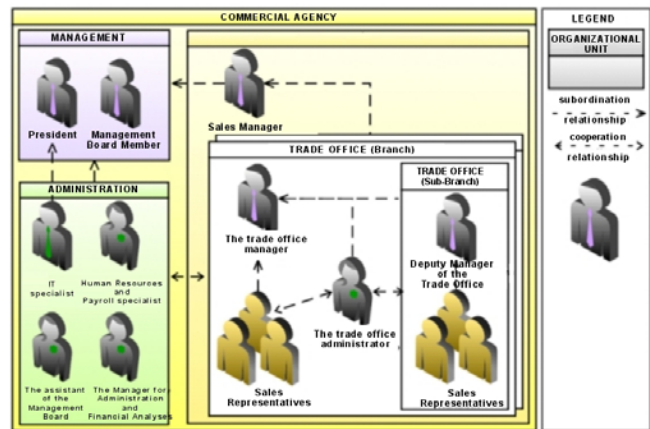

Figure. 4 Organizational chart of the commercial agency

As a result of the analysis of Commercial Agency activities regarded as the master business system, the following key business subsystems were identified: Sales, Recruitment, Training, Management of the company and Administration. Figure. 5 shows the structure of the company in modular way. The importance (weight) of individual sub-systems was presented symbolically as an information-graphics by means of area occupied by rectangles representing individual sub-systems. Having collated that division with the list of positions (see Tablele 1), we concluded that the most important sub-system in the business target context is Sales, as it is the department generating income. The remaining subsystems support the Sales sub-system.

Tablele. 1 List of job positions of the commercial agency

| Position	Description	Function
Sales representative (SR)	Rank-and-file employee of the company	Contacting potential customers, acc. to the list approved by trade office manager (TOM) in order to conclude contracts.
Depending on the way of contacting customers, there are two sales representative types in the agency: D2D SR (door-to-door sales representatives) and TM SR (telemarketing sales representatives).		
Trade Office Administrator (TOA)	The assistant of TOM	Preparation, verification and archiving the contract and performance of all formalities related with it.
The trade office manager (TOM)	He/she is the chief of the office	SR recruitment, training and management. Planning and organization of all the office activities and responsibility for the financial result of the office.
Sales Director (SD)	Direct superior of the TOM	Accomplishment of trade offices' sales targets, monitoring sales indices and appropriate reaction to changes of those parameters.
The President and Members of the Management Board	Indirect control over TOM's	Management of the Agency, taking strategic decisions, representing the company in the meetings.
Assistant of the Management Board (AMB)	Supports the management board activities	Management of the correspondence and phone calls
The Manager for Administration and Financial Analyses (MA&FA)	Business analysis	Cooperation with external companies, bookkeeping. Supervision over indirect sales managers as regards administration and financial issues. Preparing financial reports and forecasts.
Human Resources and Payroll specialist		Human resources issues
IT specialist	Administrator of the Agency computer network	Helpdesk, training of the personnel in the scope of IT. Supervision over data safety rules.
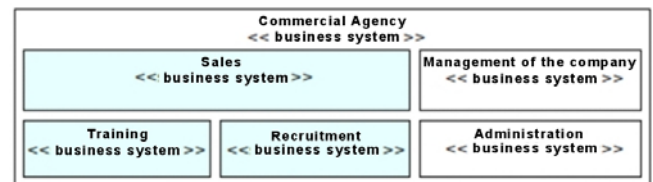
Figure. 5 Division of the Commercial Agency into business sub-systems.

5. FUNCTIONAL ANALYSIS OF THE SYSTEM

As part of the functional analysis of the "Commercial Agency" system, according to guidelines provided in the chapter "Modelling business systems" in [3], the authors identified actors and determined business cases of Agency use. Most of the actors correspond to job positions in the company structure. The exceptions that do not correspond to those positions include: DaTablease Administrator (DBA), Copywriter and Content Administrator. Those actors correspond to roles that may be assumed by the company employees executing particular tasks, remaining on their job positions. Additionally identified actors from outside of the company include: Client, Candidate, Business Partner and Sale Ordering Party. In order to develop more clear hierarchy of the actors, we introduced abstract actors used to describe common features and functions of actual actors, e.g.: Manager, Employee and Administration Employee. Figure. 6 shows hierarchically ordered structure of the system actors.
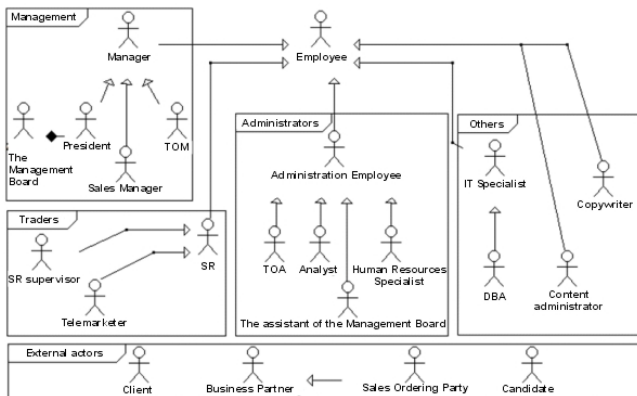
Figure. 6 Hierarchically ordered structure of the Commercial Agency business system actors

As the first case of the agency business use, authors identified and analysed the entire "Commercial Agency" business system. Results of the analysis were presented in Figure. 3 in form of the contextual data flow chart. The external perspective of the company presented there shows how external entities perceive the company.

Then all business sub-systems of the company were analysed one by one for their functionality. Their analysis was not limited to the external perspective only, but it also included internal business use cases. Results of the analysis of Sales and Recruitment sub-systems are shown in Figure. 7 and Figure. 8 respectively. Those sub-systems were chosen for presentation in the paper herein as their functioning engages largest number of employees and external partners. Moreover, the Sales sub-system directly generates company's profit.

We would like to emphasize that charts showing cases of Agency business sub-systems use were not built strictly according to authors' guidelines [3]. They do not only represent overview of the entire business sub-system as a black-box, but they include combination of typical external and internal use cases. The aim of that "innovation" was to evaluate the operations of the sub-system both from outside and inside even before the object-oriented modeling phase.
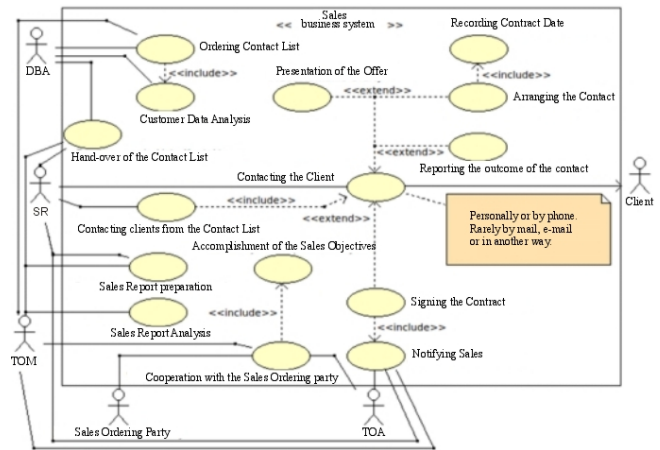

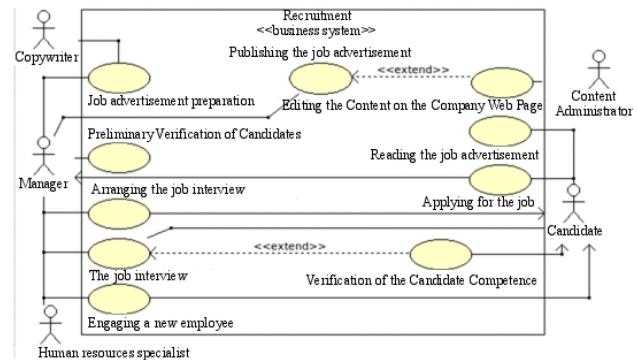**Figure. 7** The business cases of the Commercial Agency use – the Sales sub-system

Figure. 8 The business cases of the Commercial Agency use – the Recruitment sub-system

6. OBJECT-ORIENTED MODEL OF THE DOMAIN

After functional analysis, the picture of the company is clear and lucid enough to start the final phase of the analytic project – i.e. to the object-oriented modelling. To show the concept of the system (using the example of the Sales sub-system), authors used package and class perspective (see Figure. 9), which made possible the analysis of the structural elements of the business system and to show key components of system structure.
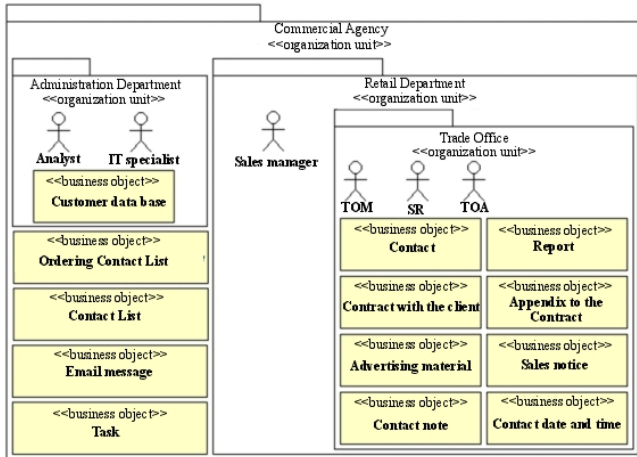
Figure. 9 The concept of the system using the example of the Sales business sub-system – the package perspective

Figure. 10 The concept of the system – The Sales business sub-system (in the classes perspective)

It seems to be reasonable to transfer the organisational structure of the Agency into the packaged structure of the analysed system as it allows to keep consistent nomenclature during analytic and design works and it permits to generate the code by iteration in form of consistent and completed sub-systems ready for implementation. Moreover, business objects presented in the package structure are referred to the most important documents maintained by an appropriate organisation unit and directly connected with winning new customers and the customer care. This approach (structural units   packages, documents   classes) may, at least, serve as the base point for the beginning of object-oriented analysis.

During modelling phase, authors tried to make the diagrams as simple as possible and to reduce the number of UML notation components to minimum in order to ensure maximum clarity of the structure for the Agency employees [3].

The SALES business sub-system in the class perspective (see Figure. 10) represents more detailed point of view, where the analyst can add important (in his/her opinion) instructions as regards the architecture of the application. Apart from document classes and actor classes, the model includes more complex event classes (e.g. The Sales Notice – it is a business object closely connected with the time/calendar and it a peculiar trigger of activity) as well as the process classes (e.g. A Task – is an object "widespread in time" with expanded life cycle), the aim of which is to make the project more dynamic. At later analysis and design stages, they may tend to be modified for higher implementation "comfort".
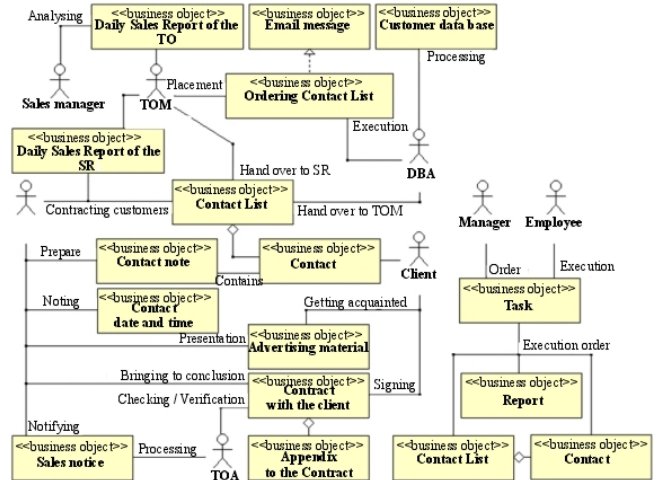
7. THE PROCESS-ORIENTED ANALYSIS OF THE COMMERCIAL AGENCY

The set of diagrams showing business processes in strict BPMN [4] notation may be a very useful tool for system dynamics verification. As regards the analyzed organization, we attached the following items to this paper: the map of main business processes of the Agency (see Figure. 11) and an except from main business processes taking place in the Commercial Agency (see Figure. 12).
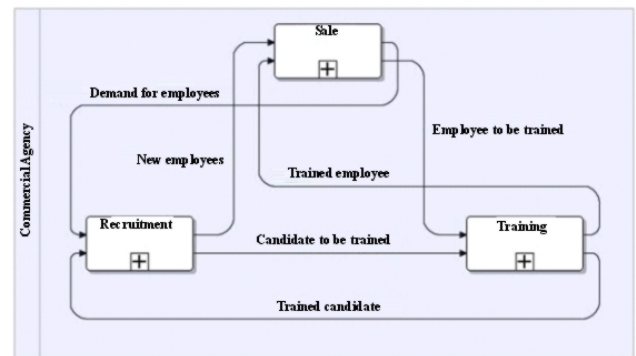

Figure. 11 Map of main business processes taking place in the Commercial Agency

The process-perspective charts give accurate picture of the organization dynamics (functioning) and thus they should contribute to better project of event classes and process classes. Another important feature of that graphic set is the fact that it provides efficient communication with the

Ordering Party (Customer) representatives at the advanced analysis stage. It is possible thanks to simplicity of BPML notation (at least in the ready charts mode) and because businessmen are very familiar with the process-oriented approach due to the nature of their everyday work.
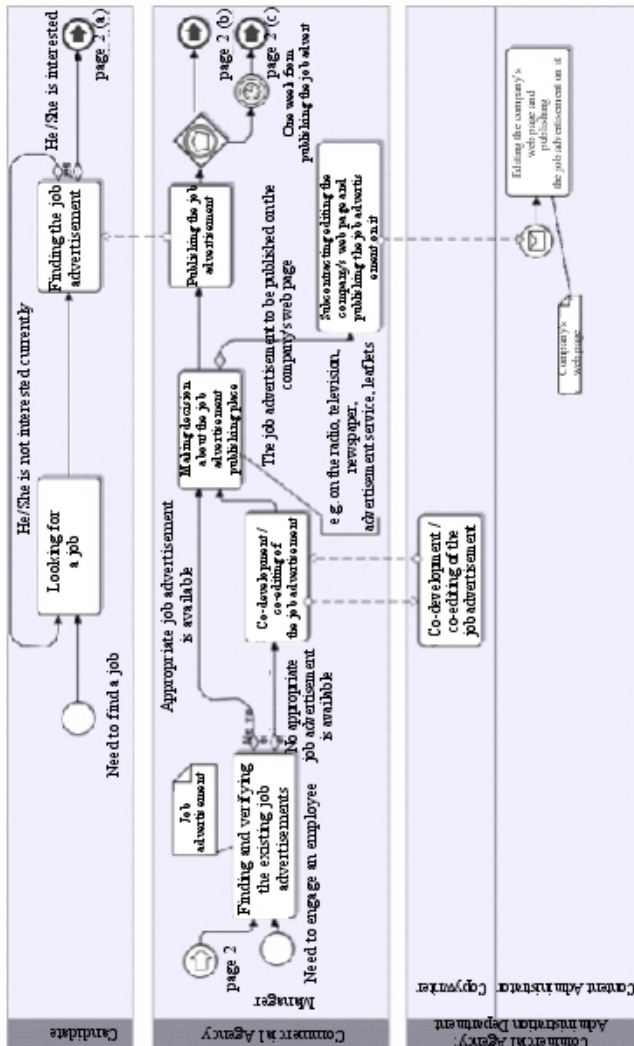

Figure. 12 Map of main business processes taking place in the Commercial Agency.

At a given stage of the analysis and design, it is necessary to present results of the analysis to the members of the management board and the company management to provide them with necessary data to make decisions as regards the most important needs of the organization in scope of software modules assisting business process of the company.

8. SUMMARY AND CONCLUSIONS

This paper provides the description of the process of developing the commercial agency computerization concept by combining traditional (business and object-oriented) analytical perspectives with unconventional analytical perspectives. In the authors' opinion, if the analyst does not follow "textbook" rules, he or she is provided with additional possibilities of esTablelishing efficient dialogue with the Customer representatives and, as a consequence, the analyst can expect to achieve higher quality of the analytic project.

Referring to current discussions taking place at the popular Polish internet community service of professional IT specialists GoldenLine (http://www.goldenline.pl/), authors definitely support the opinion that analytic projects are useful and that documentation generated as a result of such projects must be clear for all interested parties..

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