

Business analysis methodology in telecommunication industry – the research based on the grounded theory

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Abstract: *The objective of this article is to present the grounded theory using in the qualitative research as a basis to build a business analysis methodology for the implementation of information systems in telecommunication enterprises in Czech Republic. In the preparation of the methodology I have used the current needs of telecommunications companies, which are characterized mainly by high dependence on information systems. Besides that, this industry is characterized by high flexibility and competition and compressing of the corporate strategy timeline. The grounded theory of business analysis defines the specifics of the telecommunications industry, focusing on the very specific description of the procedure for collecting the business requirements and following the business strategy.*

Key words: business analysis, business requirement, grounded theory, process management, project management, qualitative research, strategy.

1. Introduction

Telecommunication companies develop dynamically and quickly together with the technology growth. They are facing the pressure to be flexible enough and in connection with that also to be financially efficient. The enterprise strategy and strategic goals are very important to be set up in accordance with the support of information systems (because telecommunication services are highly dependent on the information systems and technology). After set up of new strategic goals there are usually some related project defined to achieve the goal which supports the enterprise strategy. There is close relation between strategic goals and information systems development in the way that those systems shall be implemented or changed to support the business goal achievement. Such implementation projects are assumed to be value added and we are facing the situation that the IT organization (IT = Information Technology) “operates as an investment center very often, less the case where it operates as a profit center or service center, and least the case where it operates as a cost center” (Aitken, 2001). It generally means that the implementation projects have to be designed successfully to support the organization’s strategic goals. In the case of implementation project **business requirements** which support the strategy of the organization shall be well defined. The elicitation and definition of all business requirements are usually taken as a part of the implementation project in **business analysis** phase. This project phase is very important for future success of information systems operation.

Business analysis can as a framework of techniques and steps which help to understand the current state of organizations. This general definition serves as a basis for the further research with the goal of **business analysis definition in telecommunications enterprises by the information systems implementation**. This topic is the subject of research in my doctoral thesis and the definition of methodology of business analysis in telecommunication sector is the main goal of my thesis.

Following there are several factors which shall be taken into account as the cornerstones for further research and business analysis methodology definition. Those factors influence the flexibility and speed of the enterprise development and serve as an input into the research covered in this article and also in my thesis. Those factors are mainly:

- **Not enough time and finance effort** spent in the business analysis on the beginning of the software project preparation (McConnel, 2006). There is an assumption taken into account, that the requirements for the information system functionalities do already exist in the organization and they are clear enough. For the purpose of information system implementation they should be only **summarized** in quite short time. But in practice, the methodology of collecting those requirements usually is missing.

- **The objective of the business analysis is not defined precisely enough** in the project and its split into particular objectives is not sufficient to ensure their efficiency. In the software project (McConnel, 2006) it is assumed, that the business analysis is native part of this project. That is why there is lack of attention paid to the business analysis goal set up in the particular project.
- **Lack of methodology basis** for business analysis completion using in practice. Usually there is a goal of the whole implementation project clearly defined and all attention is paid towards the project as a whole and the most efficient approach is not defined to collect all business requirements. Also the external vendors and business partners are participating on the project and they are bringing their own method. So the methodical approach to business analysis is broken.

2. The research objective

The current problems mentioned above have served as a basis for the research objective definition. The research question is related to methodology of business analysis used in the information systems implementation in telecommunication enterprises. The information systems implementation projects approach in telecommunication companies should allow the fastest and most efficient implementation of such a system, mainly because of the dynamic market changes and to short period of strategy validity. Because of many of the systems are implemented using the external subcontractors, the most competitive vendor selection is influencing the success of that project. The selection itself is not enough; also it is really important to transform the strategic goals of the organization and the ideas of the future information system supporting the strategic goals, into the as concrete assignment of the implementation project as possible. This transformation usually occurs also in the cooperation between vendor and the assigning authority. This cooperation should be managed methodically in a way of the most efficient run of such a transformation and achieving the result which is supporting the whole implementation project. Because of this transformation, my research was oriented to Czech telecommunication market and into the practical usage of the business analysis methodology. The main goal of this research **was to define the methodology of business analysis in information systems implementation in telecommunication enterprises** in Czech Republic. The goal was defined from two following perspectives:

1. **Methodology definition** in the big telecommunication organizations with above 250 employees (Pomucka pro urceni velikosti podniku, 2011). This idea was growing from the main requirement of such an enterprise, which is to ensure the efficient and quick implementation with the precise understanding to strategic goals of organization together with the achieving of business results. The goal of researched methodology shall be the acceleration and efficient consolidation of new or innovative information systems.
2. **Analysis of influencing factors** which can support the business analysis success. This comes from the fact, that the strategic goals are supported also by business processes and project management. These approaches also bring some critical success factors and risks influencing the business analysis project.

2.1 The reason to build a business analysis methodology for telecommunication industry

The topic of business analysis is important in the big enterprises from several reasons:

- The current situation in telecommunication industry which comes from many interconnected information systems. For example in the IT area in mobile operators there are hundreds of information systems providing automatic processes to ensure the products and services for end users (external as well as internal) and to other information systems. Those information systems are integrated into many system blocks and any change into them is necessary to solve not only in the concrete affected systems but also from the perspective of impact of this change into the other related systems. Any system upgrade means the analysis of all interfaces.
- The information systems are facing fast morale obsolescence coming from the quick development of the whole industry (the 1st generation mobile network was started in Czech Republic in 1991 and after 20 years we have the 4th generation network). Between both milestones the telecommunications passed rapid changes in the radio network and related information systems implementation together with the customer services changes.

3. Business analysis determination

Business analysis can be defined as a framework of some techniques and steps which help to understand the current state of organizations. “It usually includes the definition of organizational goals, how these goals connect to specific objectives, determining the sources of action that an organization has to undertake to achieve those goals and objectives, and defining how the various organizational units and stakeholders within and outside of that organization interact” (IIBA, 2009). There are several types of requirement which should be covered in case of information system implementation scoping (IIBA, 2009):

- **Business requirements** which are defined as high-level statements, goals objectives, or needed of the enterprise. They can be analyzed on strategic level of requirements analysis
- **Stakeholder Requirements** which are related to particular stakeholders or class of stakeholders (which can be defined as actors in the analysis problem area)
- **Solution requirements** which describe the characteristics of a planned solution that meet business requirements and stakeholder requirements – they could be related to tactical and operational perspective of business requirements. Solution requirements can be divided into:
 - **Functional requirements** which describe the behavior of the information systems and concepts in supporting information technology services delivery, their functionality and activities needed to be performed
 - **Non-functional requirements** which consist of conditions that describe the environmental conditions under which the information systems must remain effective, it is usually specified by relationships among business and information technology organizational units
 - **Transition requirements** which consist from capabilities that the information technology service delivery must fulfill in order to facilitate transition from current state of the enterprise to a desired future state under information systems.

Usually business analysis is performed in such a form before the specification of systems is written down. In this phase the users and stakeholders are involved much into the future information system building. The business analysis becomes more and more important tool supporting this early phase of information system specification nowadays. The research is based on the fact that the business analysis methodologies are described only on a general level and the specifics of an industry are missing. There is lack of general supporting methodologies to help to telecommunication companies to provide effective and efficient business analysis which accounts the pressure to flexibility and financial effectiveness. This was the main reason to start a research to find an appropriate methodology which can be adopted by concrete companies in practice. Besides the secondary research which was based on the literature study and confrontation, the primary research was provided as it is described in this article.

4. Research method identification

The main research method used for my research was based on the qualitative approach. The grounded theory was used. This method has been “inductively derived from the study of the phenomenon, which it is representing” (Strauss, Corbinova, 1999 p. 14). It is based on the collecting of data about the examined phenomenon and their analysis. The research direction is from the data to conclusion, hypotheses are not needed. The conclusion consists of the theoretical description of the researched data based on inductive analysis. The grounded theory was founded by two sociologists – Barney Glaser and Anselm Strauss. Based on the principles of the grounded theory the following sequence of steps was used to achieve the research objective (Strauss, Corbinova, 1999; Glaser, Strauss, 1967):

1. **Identification and the resource of research problem definition.** Following sources were used:
 - a. Recommended or assigned research problem
 - b. Professional literature
 - c. Personal or professional experience.

I have identified the research problem in the form of seeking for a suitable methodology for business analysis which can be used for information systems implementation (in telecommunication enterprises). I have used mainly my personal and professional experiences from the position of business analyst and project manager in telecommunication sector. The validation of the correctness

and completeness of defined research problem was done based on the recommended research problems and by the study of the related professional literature.

2. **The research objective set up** (in the form of statement identified the area of research). The research objective may be set up in the following formats:
 - a. Interactive question oriented onto the mutual affecting of data
 - b. Organizational question oriented to organizational mechanisms and their influence to the data
 - c. Biographic question coming from the assessment of data based on experiences.

After this sequence of steps the following research question was defined for further research: **How shall the methodology for business analysis in the inf. systems implementation in telecommunication enterprises look like?**

5. The primary research procedure

The primary research was used in order to answer the defined research question. The **interview** was chosen as the basic method. This method is used for data collection by questions – usually through the personal encounter, teleconference or audio conference (Collis, Hussey, 2009). For the purpose of my research the methodology of qualitative interview (Hendl 2012, p. 166 – 173) was used. The collected data were analyzed by mixed research using quantitative method as well as qualitative method. I prepared the open questions related to professional experience, perception and feelings of respondents (Hendl, 2012). The whole interview was recorded to dictaphone. The respondents were chosen accordingly to represent as wider as possible group of professionals, who have some relation to business analysis in telecommunications. The interviews were performed with the people having experiences from the mobile operators and from the other companies serving as vendors and information systems implementers in telecommunication sector. The respondents were positioned in following roles in their professional life (with the experiences from one or more related companies):

- Persons participating in business analysis in the role of
 - o Business analyst
 - o Project manager
 - o Solution architect
 - o Other project team member
 - o Business authority representative
- Persons acting for management approving the business analysis outputs
- Persons acting for information technology organizational unit and receiving the outputs of business analysis in order to define the future information systems
- Information systems auditors (ISACA, 2011)

The interview was provided with 18 persons. After this number the theoretical satiation was achieved. The same data were repeated in the interviews and the experiences of respondents were similar.

There were 763 propositions obtained and all of them were used for next steps of research. Through all propositions I have formulated 763 concepts using “**open coding**” and by assigning codes which labeled the main attributes of the concepts (Miles, Hubermann, 1994, Hendl, 2012). Codes were chosen in the way to be closely related to concepts they have been labeling.

The statistical analysis was used to support the mixed research (Hendl, 2012). The statistical sample was created from all 763 propositions and one concept was perceived as a statistical unit. The frequency of occurrence of each unit was analyzed. The purpose was to validate that each proposition is represented more than once in the statistical sample and numbers of these frequencies were identified. The frequency analysis was provided in several iterations. The reason was a need to redefine the categories several times to ensure their correct and well-proportioned definition. In that steps following activities were used:

- Category merge by identification of the same characteristics (for the categories with low frequency)
- New categories identification inside of existing category with high frequency (in the case it was not a subcategory)
- New analysis of existing categories

- Final check of correctness of all categories and concepts.

The final categories of concepts are listed below:

- MET – methodical approach to business analysis and methodical characteristics of telecommunication industry
- ZAV – implementation of information systems
- STR – enterprise strategy and strategic goals
- PRM – project management and its relationships to business analysis
- POZ – business requirements creation
- DEL – length of business analysis
- BUS – creation, updating and assessment of business case related to future information system
- POZO – the way of feasibility study
- CSF – critical success factors
- RIZ – risks
- PRO – relations between business analysis and process management
- ORG – organizational area
- DOC – documentation
- ROLE – roles
- USP – the evaluation of business analysis success
- TEL – telecommunication industry specification
- STAV – practical experiences of respondents
- PRB – problems in business analysis in practice
- KAT – categories and priorities of requirements

The results of quantitative analysis can be found in the Table 1:

Table 1: The quantitative analysis results

Source: The primary research (published in doctoral thesis)

Category	Absolute occurrence in statistical sample	Relative occurrence in statistical sample (%)
ROLE	73	9,57%
CSF	62	8,13%
ORG	63	8,26%
PRM	55	7,21%
MET	53	6,95%
STAV	48	6,29%
RIZ	49	6,42%
DEL	46	6,03%
STR	40	5,24%
DOC	34	4,46%
POZ	35	4,59%
POZO	30	3,93%
TEL	30	3,93%
PRB	25	3,28%
ZAV	25	3,28%
USP	24	3,15%
PRO	23	3,01%
BAS	17	2,23%
KAT	17	2,23%
BUS	14	1,83%
Total	763	100%

After quantitative analysis the **axial coding** was performed. The paradigmatic model was used (Strauss, Corbinova, 1999) using following terms:

- **Causal conditions** – set up of causes, which are causing the occurrence or formation of phenomenon. Usually one phenomenon is caused by more than one cause.
- **Phenomenon** – central idea of the research.
- **Context** – the aggregation of characteristics belonging to the phenomenon.
- **Intervening conditions** – representing the wider context of the phenomenon. Those are general conditions, which are influencing the strategy of behavior and phenomenon interactions.
- **Strategy of behavior and interaction** – performance of phenomenon, or reaction to some phenomenon in the defined context.
- **Consequences** – results of strategy of behavior and interaction.

The axial coding was performed to categories and they were assigned to the above defined terms. After that they were modeled into the causal model to find the appropriate structure of the future methodology and order of their steps.

The last step of coding – the **selective coding** was used in the following order:

1. **The frame of the methodology was prepared** – it was based on the central phenomenon definition (which was the category “methodology” representing the business analysis itself). For this phenomenon the basic characteristic were defined:
 - **Category content** representing the future content of the methodology of business analysis
 - **Association** of the central category with other categories (it means e.g. with project management, business process management...)
 - **Comprehensibility** of the category, represented by requirements for practical usage of business analysis methodology
 - **Purpose** of the category represented by the methodology adoption in the concrete company
 - **Experiences** in the category represented by concepts declaring the experiences of respondents.
2. The **causal characteristics** of the central category (see above) were put into relations with all other categories.
3. The finalization of identification the relationships among categories were provided. The **propositions** which define the generalized relationships among categories were defined (Hendl, 2012, p.244).

The final causal model using axial and selective coding is described in the Figure 1:

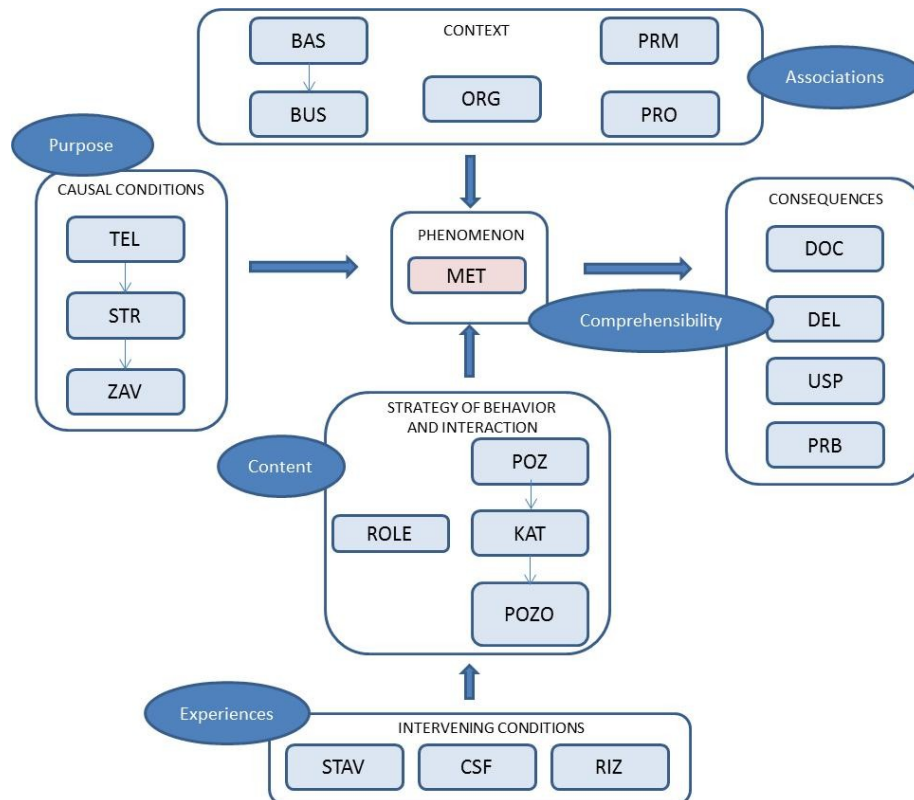


Figure 1: Causal paradigmatic model

Source: The primary research (published in doctoral thesis)

The process of business analysis has been identified using the propositions. The relationship among the process components identifies the order of all steps in the business analysis methodology. This process can be used in the grounding of the theory - that means grounding of business analysis. The content of grounded theory has been set up according to identified propositions as an output from the selective coding.

6. The grounding of business analysis

The methodology of business analysis used in information systems implementation in telecommunications can be grounded as a set of inputs, activities and outputs. The process is visible on the Figure 2:

The Figure 2 is representing the grounding of business analysis with following characteristics:

- The inputs into strategic business analysis are **Specific characteristics** of telecommunications which are collected by the primary research. The specifics differ from the general business analysis methodology (e.g. BABOK = Business Analysis Body of Knowledge methodology, IIBA, 2009). Their determination differentiates the grounded methodology from the general ones. After the Strategic business analysis activity providing there are outputs like Strategic goals. This kind of business analysis was raised from the research as very important for the appropriate information systems implementation projects selection.
- Next activity is to provide **Project business analysis** with the inputs from the **Information systems implementation method** as well as **Project management method**. The definition of two levels of business analysis (strategic and project level) expands the general business analysis and determines more precisely the closer view onto business analysis. There are relationships between business analysis and project management method defined based on the research.
- The Project business analysis is possible to split into sub activities:
 - **Business requirements collection** is consisting of other sub activity **Business requirements approval**. The approval methods is possible to use from the general methodologies (BABOK, IIBA, 2009), however the outputs from the research define the most often used ways of approvals and telecommunication specifics.

- **Business requirements analysis** which is possible to split into 4 other sub activities – **Categorization, Prioritization, Feasibility study and Evaluation of needed efforts**. All sub activities are collecting the conclusions from the primary research which is enhancing the general approaches to business requirements analysis, from the telecommunication point of view.
- During the business analysis activities it is necessary to take into account also the parallel activity **Verification of conformity of business requirements with strategic goals**. This activity runs continually during the whole business analysis, mainly the Project business analysis. This activity comes from the telecommunication characteristics related to enterprise strategy and from their alignment with the work on business requirements. The enterprise strategy in telecommunications is different from other sectors mainly from the length perspective – its validity is much shorter than generally. The flexibility is necessary because of the changing environment and conditions on telecommunications market.
- The **Critical success factors** and **Risks** are influencing all other activities. They need to be taken into account and also actively managed. Both effects rose from the general factors, which may influence information systems implementation in telecommunications. Determined effects are oriented into the research results and on telecommunications specifics as well as to definition phase of information systems implementation (business analysis).

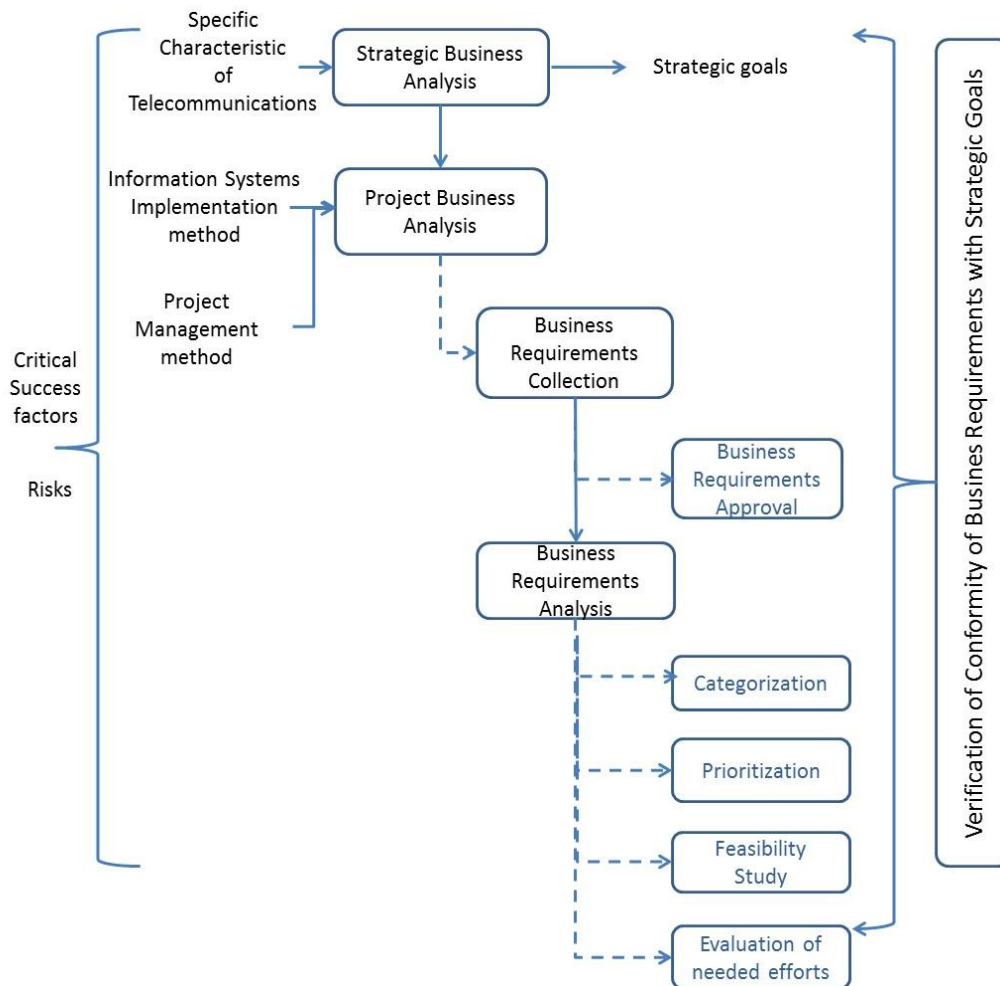


Figure 2: The business analysis process

Source: Own research

There are also other specifics of business analysis coming from the primary research. There is a determination of relationships between business analysis and **business process management** described in the doctoral thesis. Usually general business analysis methods are not describing the business process frameworks used in telecommunications in such detail as the research does. To embed the business analysis into practice the **organizational specifics of telecommunications** have been covered also by the research. The roles have been defined (the general role of business

analyst has been enhanced by other roles related to implementation projects). The roles are also put into relations with project management and business process management. The organizational perspective is important also from the aspects of working in the teams (the project teams shall be considered also from the perspective of social networking with the direct impact into the efficiency of business analysis – Mesicek, Svoboda, 2012) because of the complexity of the projects in telecommunications. The **practical experiences** of the respondents and **practical outputs of business analysis** have been also grounded into the theory. They can influence the course of business analysis, so grounding them can help to increase the success and efficiency of business analysis as a part of implementation projects.

The concrete grounded theory was a subject of detail description in my doctoral thesis prepared in Brno University of Technology, Faculty of Business and Management, Department of Informatics and it is going to be published soon.

7. Conclusion

The telecommunication sector is really dynamically growing. It brings many technologic innovations and the necessity to implement new information systems continuously. Through those systems it is possible to provide telecommunication services as well as to manage the organization internally. It means this sector is much dependent on the information systems. That is why it is necessary to look for efficient technology to be used and also efficiently implemented and managed. The implementation approach can be different in all companies; however all of them usually consume existing methods and approaches, which are adopted for their needs. The general methodologies are supporting such adoptions and in the same time they create a space for new concepts of methodologies.

The purpose of my research (in this article as well as in the wider format in my doctoral thesis) was to define the methodology of business analysis used in the implementation of information systems in telecommunication enterprises. This objective came from the formulated research problem in the form of doing a research leading towards efficient providing of business analysis and their adoption into the environment of telecommunication companies in Czech Republic. The purpose of information systems implementation shall be supporting of strategic goals achievement.

To fulfill the research objective the grounded theory was used as the main research method. Also other features of qualitative research were used as well as some help from the qualitative research methods. From the overall perspective the mixed research was used.

The grounded theory was chosen because it allows seeing the existing methods and activities from different perspectives and using different analysis and coding or collected data and grounding them into a new theory in the end. The steps used to ground the theory was described theoretically first and then used in the primary research. The output of such research is the grounded methodology of business analysis. Each methodical characteristic is put into the mutual relations according to the results from the coding. There were 18 respondents used for the primary research; all of them are working in the telecommunication industry. Their jobs are related to various roles which relate to information systems implementation and potentially to business analysis. The number of respondents meant the theoretical satiation by research data.

The grounding of business analysis was supported by secondary research published in the several research articles and in my doctoral thesis too (this kind of research is not included into this article). The characteristic of business analysis as a result of the research can be summarized by following points:

1. The introduction into the methodology which covers the specific characteristics of telecommunication industry and it determines the relationships with the enterprise strategy and with the whole process of information systems implementation.
2. Concrete content of business analysis which covers a method of business requirements collection, their categorization and prioritization, feasibility study and financial evaluation of the needed efforts. It covers also the identification of business analysis roles.
3. The definition of connection of business analysis from the strategic as well as project perspectives, the definition of the business case role, methodical fix of relations to project and business process management and the identification of other characteristics.

The grounded methodology was extended by the notes from the practice; so it is recommended to use those notes in the adoption of business analysis into concrete company. They are:

- Grounding of the experiences with business analysis
- Definition of potential critical success factors
- Definition of risks

Also the outputs of business analysis were grounded in the following way:

- Documentation related for run and outputs of business analysis
- Definition of the length of business analysis
- Identification of the possible ways how to assess the success of business analysis
- Identification of potential practical problems, which can occur

In the doctoral thesis the benefits for theory, practice and teaching are identified. I believe the grounded methodology is beneficial in all mentioned areas and will support the other researches and theories development which will help to improve the information systems implementation not only in telecommunication.

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