ECONOMIC RESEARCH CENTRE

Viktoras Veitas

SYSTEM THINKING BASED MUNICIPAL POLICY DESIGN FOR THE IMPROVEMENT OF LOCAL BUSINESS ENVIRONMENT

Šiauliai city case study

2007

• T. VRUBLEVSKIO ST. 4, LT-01100 VILNIUS •
• WWW.ERC.LT TEL. • +370 (5) 2615712 FAX • +370 (5) 2784163 •

ABSTRACT

The subject of this research study is the process of formulating business environment support policy on behalf of the city government. The work presents theoretical considerations and empirical research aimed at design and modelling of municipal policy framework for enhancing business environment in Šiauliai city. The research is based on the theoretical foundations of social systems design paradigm which joins general systems theory with cybernetics, social and management sciences, and is related to public management and strategic development domains.

The general goal of every government, including local government of the city, is the well being, or quality of life of its citizens. Local governments are supposed to pursue policies which secure and constantly enhance quality of life of their inhabitants. The quality of life, through is not completely identical, but is mostly related to the standard of living, which is in turn measured by income per capita measure. Recently, the ultimate goal of every municipality is the stimulation of economic activity in the city and improving the conditions for business. Various strategic documents prepared on European Union, national, ministerial and local levels list the means for improving business environment in an increasingly globalized local environment: seeking for international competitiveness, attracting foreign direct investment, supporting innovation, promoting high technology and educating labour force, just to name a few. Still, in the presence of general directions of actions, local governments have no framework for making day-to day decisions and selecting priorities in the local context of their operations. In other words, they do not have policy framework aimed at enhancing business environment customized to the local situation.

The goals of this research were to propose both theoretical and practical approaches to local governments' policy framework formulation. Within the scope of the research we have developed methodology suitable for designing municipal policies which is based on community's (particularly - interest groups') participation in formulating desired future of the business environment and delineating actions to reach that future. We have also proposed methodology for constructing formal conceptual models of current and desired business environment system for comprehending the underlying connections and dynamics of the system as well as for facilitating understanding between concerned interest groups. The methodology was tested in the real world situation of Šiauliai city business environment: we have collected the data about the system in the form of documents and interviews and, after

processing it through our methodology, proposed a municipal policy framework for the improvement of business environment in Šiauliai.

We believe that process model of design inquiry, developed in this research, may be successfully used in other settings (local governments, regions or even nations) as well as for other purposes related to social system design, not limited to the business environment. The case study of Šiauliai city business environment support policy formulation serves as example for further work in the field.

Published by Economic Research Centre

ISBN 978-9955-9838-3-5

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

ACKNOWLEDGMENTS

We would like to express gratitude to Dr. Artūras Grebliauskas for valuable comments and support during whole work and Dr. Linas Turauskas from ISM University of Management and Economics for recommendations regarding research methodology literature. Also we are grateful to Šiauliai city municipality for cooperation and making empirical part of the research possible.

1. INTRODUCTION

1.1. GOALS AND OBJECTIVES

This work presents theoretical considerations and empirical research aimed at design and modelling of municipal policy framework for enhancing business environment in Šiauliai city. The work is based on the knowledge within social systems domain, which in turn joins general systems theory with cybernetics, social and management sciences, and is also related to public management and strategic development fields.

Management concisely could be defined as judicious use of means to accomplish the end, or the goal. Traditionally, management is perceived as an aggregate of four functions - planning, organizing, directing and controlling. Drucker defines management through three tasks (or dimensions) enabling "the institution in its charge to function and [making] its contribution", which are: (1) "the specific purpose and mission of the institution, whether business enterprise, hospital, or university"; (2) "making work productive and the worker achieving"; and (3) "managing social impacts and social responsibilities" (Drucker 1985, p. 40). According to him, the public-service institutions - as he calls government agencies, armed services, schools and universities, research laboratories, health care institutions and others – are the "real growth sector of modern society" (Drucker 1985, p. 131). With respect to management dimensions, explained above, the only difference between public-service institutions and business enterprises is the area of their specific mission (Drucker 1985, p. 135), which is economic performance for business enterprises, but is diverse for public-service institutions. In this work our focus is on designing of the policy framework of public-service institution (city municipality) for enabling effective implementation of its public function (support for business environment), while attempting to forecast and manage social and economic impacts of the policy. We analyze and use knowledge in social system design domain as a technology to achieve management objectives of the Šiauliai city's government. Following Drucker's approach to management, design of the policy for the improvement of business conditions in the city is the managerial task and is approached as such in this work.

Systems design in the context of social systems is a future-creating disciplined inquiry. Social systems design as a relatively new intellectual technology (Banathy 1996, p. 45) which may change the way people, organizations and communities approach and seek realization of their visions about the future. The pace of change determines the need for continuous adjustment of social systems to emerging new realities. We view social system

design as a powerful intellectual technology suitable for boosting effectiveness of any social system, be it commercial organization, public institution, government or state economy. Usage of this technology allows system participants to understand self-organizing dynamics of their systems and utilize this knowledge in order to design their strategies and policies for influencing the system. For the proper and effective use of social systems design, all system participants should learn about this intellectual technology to participate in the process.

The ultimate goal of the work is to apply systems approach (or thinking) in solving sophisticated management, business' development and international competitiveness problems. We find that intellectual technology of social systems design, as it is described above, is well suited for our purposes from theoretical perspective. In the theoretical part of the research we attempt to compound social systems design domain with logical tools offered by "Theory of Constraints", a continuous improvement methodology, which in turn use algorithmic representation of interdependent entities and processes within a system. In empirical part we test our methodological approach on the real-world situation, namely, apply social systems design approach for solving complex strategic and management problems faced by Šiauliai city municipality. Therefore, the study combines two goals: theoretical and empirical.

From theoretical point, the goal of the work is to find a methodology suitable for designing municipal policies of a city government for the improvement of business environment in the city. This goal is based on the presumption that business environment may be analyzed as a system or, more specifically, a social system. The three objectives of the goal are: (1) to find a methodology for designing and modelling city business environment as a social system; (2) to find a methodology to understand system participant's - city government's - influence for the system. The third objective is directly related to management domain and is aimed at (3) developing an approach for designing policy framework of the municipality for managing improvement of business environment in the city. Thus the outcome of the theoretical part of the work is methodological approach towards designing municipal policies for improvement of city business environment or, in our terms, process model of design. The resulting process model of design is generic and may be applicable for analysis and design of municipal business support policies and systems for different cities although it is developed with consideration of Lithuania's and Šiauliai city's situation.

The second major part of the work is empirical research based on methodological approach developed in the theoretical part. The goal of empirical research is to use and test process model of design for developing business environment support policies and policy

framework for Šiauliai city municipality. The structure and progress of empirical research resembles the process model of design but is augmented with the context of real-world situation. Objectives of the empirical research are: (1) define the rationale for initiating design of municipal policies for the improvement of Šiauliai city business environment; (2) define dimensions of change and choose strategy for transcending the Šiauliai city business environment as a system; (3) develop a formal conceptual model of the current business environment of Šiauliai city as a socio-economic system; (4) describe a collective mental image of the desired future of Šiauliai city business environment as perceived by system participants; (5) design the desired future state of Šiauliai city business environment system; (6) develop a formal conceptual model of the desired future state of Šiauliai city business environment system as a socio-economic system; (7) suggest Šiauliai city policy framework for improvement of business environment in the city, i.e. achievement of the desired future state.

It should be noted that, despite objectives of empirical research closely resemble the steps of process model of design, they should be viewed differently from chronological perspective, because design of the social systems holds dynamic and cyclical nature and most of the steps will be revisited several times during the actual design process.

Scientific methods used in the study include theoretical analysis, logical abstraction, logical synthesis and empirical research. The paper falls into four large sections. First two sections (2. "Literature review" and 3. "Methodological approach") constitute to the theoretical part of the research. In the "Literature review" section we analyse theoretical approaches to competitiveness, business environment, government policy, systems approach and conceptual modelling and choose the respective approaches to be used in our research. In the "Methodological approach" section we formulate the process model of social systems design inquiry, based on choices done during literature review as well as delineate research method, design and data collection principles. The other two main sections of the work (4. "Empirical research" and 5. "Policy design") are concerned with empirical research of the Šiauliai business environment and application of chosen theoretical approaches. In the section "Empirical research" we describe the actual process of data collection and perform descriptive analysis of data. In section "Policy design" we apply process model of the design inquiry, developed in the theoretical part to the collected data for reaching the goal of the research – formulation of municipal policy for the improvement of business environment in Šiauliai. The results of the research are discussed in the section 6. "Conclusions".

1.2. NOTIONS, TERMS AND DEFINITIONS

In this work we have used certain notions and terms that may not have unanimous meanings in other than social systems design domain. Their actual meaning depend very much on the context of use. Our use of the notions to describe social system design processes and outcomes is based on reviewed literature and to some extent specific context of Šiauliai city business environment – the target system to design. Here we describe the meaning of most important notions and terms in the context of social system design and this work.

Social system is a purposeful system whose members are individuals and organizations who intentionally and collectively formulate objectives of the system and are engaged in continuous interaction towards realization of the formulated objectives (Ackoff & Emery 1972, p. 218). "Social systems are value-guided systems (Laszlo, 1972). Insofar as they are independent of biological need fulfilment and the reproductive needs of the species, social systems satisfy not body needs but values. But in what form they do so depends on the specific kind of values people happen to have." (Banathy 1996, p. 15). Another definition of social system is "A *social system* is a society that implements a closed *functional context* with respect to a common goal. A society is a structured set of agents that agree on a minimal set of acceptable behaviors" (Lind 2006).

Functional context: Functional context is a concrete and real-life situation which we describe in terms of social system (according to above mentioned definition). Functional context encompasses actual system participants, their individual and shared values and objectives as well as external forces influencing the behaviours of the system. According to Lind, functional context adds the teleological component to society and makes it a social system (Lind 2006).

Target system: Target system is a particular social system we want to design. In our case target system is the business environment of a city. For the purposes of this work we view city's business environment as a set of local businessmen, firms, associated structures, governmental and municipal organizations, educational institutions and municipality itself, interacting with each other and exogenous factors in order to pursue and facilitate entrepreneurial activity for economic growth and development of a given city.

Design: According to Simon, design is "the intellectual activity of changing existing situations into desired ones." (Simon 1969, p. 56). Design is a continuous process of solution finding, a process of creating things that do not exist yet (Banathy 1996, p. 17). Simon elaborated the distinction between science and design: science develops knowledge about what is; design uses knowledge to create what should be. Social system design is guided by

our visions and images of a better future (ibid, p. 32). The term **design inquiry** is used in order to emphasize the meaning of the design as a process of designing a system. Term **design outcome** is used to emphasize the results of the design process.

Model: In its general meaning, model is a "construct or description that represents or stands for something" (Banathy 1996, p. 51). Model is "a schematic description of a system, theory, or phenomenon that accounts for its known or inferred properties and may be used for further study of its characteristics" (MacDonald, Potter, & Jensen, 2003). In this work we use term model to refer to schematic, conceptual and formal representation of design. Product and process models are differentiated in this work. **Product model** is model of design outcome, while **process model** is the model of design inquiry.

System participants: Several associated terms are used to define system participants throughout this work: "system participants", "system actors", "synergetic system parts", "categories of actors". In this work system participants are agents which actively express purposes and values, act and exert power and influence target system. In the context of Šiauliai city business environment system, system participants are: members of city's community, local businessmen, firms, associated structures, government and municipal organizations, educational institutions, other actors.

Image: An image is "a mental conception held in common by members of a group and symbolic of a basic attitude and orientation". It is "a mental picture of something not actually present" (Encyclopedia Britannica Online). In this work image is a semantic representation of the system using language as a tool for representing reality. For example, image of the future system is a mental as well as language representation of the future system held by designers of the system. Images are outcomes of design steps not yet formally represented as models.

Policy: a definite course or method of action selected from among alternatives and in light of given conditions to guide and determine present and future decisions. Policy is a high-level overall plan embracing the general goals and acceptable procedures […] (Encyclopedia Britannica Online). The term **policy framework** is used to emphasize the generality of the course of action while term **policy impact** is used to denote effects of particular policy. Policy impacts are also referred to using the term **injection**, when using it in a context of model-building.

2. LITERATURE REVIEW

The whole literature review is broken down into three parts, each constituting to different domain of knowledge, related to this work. The three parts are (1) competitiveness and business environment; (2) systems perspective in solving social science problems; and (3) conceptual modelling. Given the extremely broad base of literature in these fields the literature review is as much as possible organized around the topic of this work: "system thinking based municipal policy design for the improvement of local business environment" and is concerned about local, or city socio-economic system.

2.1. COMPETITIVENESS, BUSINESS ENVIRONMENT AND GOVERNMENT POLICY

Our analysis will stand on the rather common sense premise that the goal and objective of any level of government, be it local, national or supranational, is the well being, or quality of life, of its citizens. For example, one of the directions of European Union policies is "improvement of living conditions and quality of life" (Phillips 2006, p. 5). While quality of life is rather broad and philosophical concept, we are more interested in standard of living, which, taking the approach of Phillips, is an integral "material" part of quality of life (Phillips 2006, p. 2, 5) and is related to economic and business aspect of social life. The most widely used and conventional measure of standard of living is income per capita (Levy 1988, p. 132; Tresch 2002, 132). The goals of this work, as explained above (page 11), are related to design of policies of city government and based on the presumption that business environment may be analyzed as a social system. Taking the system approach and having in mind socioeconomic perspective of urban life, we presume that the goal of the city government is to increase standards of living of the inhabitants of the city. As we will measure standards of livings by income per capita, the goal of the target system under analysis in this work is rising and sustainable income per capita in the city. We will use this premise as the major guiding principle for further research.

How can city government increase income per capita of city inhabitants? We have analyzed two approaches: traditional approach, emphasizing the concept and significance of competitiveness, and alternative standpoint, neglecting the importance of international competitiveness and emphasizing productivity. We conclude from our analysis that despite being outwardly opposite, both approaches have pretty similar implications to understanding of what are the drivers of income per capita growth.

Traditional approach, which is today widely accepted and utilized by many national and local governments, is advocated by Michael Porter, Harvard Business School Professor and leader of Institute of Strategy and Competitiveness (Harvard Business School) as well as Initiative for a Competitive Inner City (non-profit organization). Since Michael Porter's work "The Competitiveness Advantage of Nations" back in 1990, it is generally accepted as axiom that achieving international competitiveness is an ultimate objective of nation and company, seeking for growth and economic prosperity (Porter 1998c, p. 195). Porter's "theory begins from individual industries and competitors and builds up to the economy as a whole" (Porter 1998a, Preface xiii), thus extending the concept of competitiveness of a firm to competitiveness of nation, region or city. According to Kresl and Fry, "cities on a regional, national, and global basis are competing against one another to attract businesses, manufacturing enterprises, research and development facilities and head offices in an effort to provide well-paid jobs for local residents and in hopes of developing world-class clusters, whether these clusters be related to the auto industry, steel, textiles, energy, transportation, ICT, biotech or emerging fields linked to nanotechnology" (Kresl and Fry 2005, p. 16). Still it seems, that the most comprehensive model of competitiveness remains "diamond model", developed by Porter (Porter 1998a, p. 71-73). The model comprises four famous factors of competitiveness: (1) demand conditions, (2) factor conditions, (3) related and supporting industries and (4) firm strategy, structure and rivalry. The most important for us in the context of this work is Porter's positioning the government as "the final element necessary to complete the picture". According to him, government's role is to influence all four factors, thus shaping competitiveness (Porter 1998a, p. 73). "Government's proper role is to encourage or even push firms to raise their aspirations and move to a higher level of competitive prowess even thought this may be an unsettling and even unpleasant process" (Porter 1998a, p. 681). Porter states that the most effective government policies are "slow-acting" (i.e. creating favourable environment, advanced factors, encouraging rivalry, shaping priorities and influencing demand sophistication) and that traditional, "quick-and-easy" roles, (such as subsidies, protection and macroeconomic management) can even be counterproductive. The challenge for the governments is to resist short-term political pressures and to develop national (in our case – local) consensus for industrial and economic development (Porter 1998a, p. 681-682). This treatment is somewhat "sympathetic" and applicable to urban economies as predicated by Kresl and Fry (Kresl and Fry 2005, p. 32). They complement Porter's analysis of government policy by saying that "competitiveness is a feature of the nation and a firm, and the city should do little more than provide whatever the

firms need" (Kresl and Fry 2005, p. 33). Ni, in his study about urban competitiveness in China asserts, that urban competitiveness is a function of "hard" factors (incl. labour, capital, technology, environment, location, infrastructure and structural elements) and "soft" factors (incl. culture, management, openness and social structures) (Kresl and Fry 2005, p. 43).

Alternative approach is advocated by Paul Krugman, Professor of Economics and International Affairs at Woodrow Wilson School, Princeton University. He states, that "countries do not compete with each other the way corporations do" (Krugman 1994, p. 34) and that the "the major nations of the world are not to any significant degree in economic competition with each other" (Krugman 1994, p. 35). It should be pointed out, though, that Krugman derives his conclusions from the analysis of biggest economies of the world (United States, Japan and European Union) which he treats as rather closed economies and his findings may not be applicable to the economy of a city in a small economy (i.e. Šiauliai city in the context of Lithuanian economy). Nevertheless, the relevancy of his approach lies in emphasizing productivity rather than competitiveness. Krugman states, that "for an economy with very little international trade, "competitiveness" would turn out to be a very funny way to say "productivity"" (Krugman 1994, p. 32), and that "national living standards are overwhelmingly determined by domestic factors rather than some competition for world markets" (Krugman 1994, p. 32). Following, governments should focus not on competitiveness, but on productivity, which is in considerably more direct way associated to the standards of living. Krugman maintains that precarious bias of policy makers and government officials towards international competitiveness at all levels is mainly caused by "attractiveness of metaphors seeming comprehensibility", desired simplification of real problems, leading to accordingly simplified and easy perceived solutions and, last but not the least, political pressures (or rather temptations) to use attractive "competitive metaphor" (Krugman 1994, p. 39-40). Uncomfortably, "productivity […] is determined by a complex array of factors most of them unreachable by any likely government policy", so after accepting "productivity" rather than "competitiveness" problem, "you are unlikely to be optimistic about dramatic turnaround" (Krugman 1994, p. 40). We understand this view as an urge for governments of different levels to concentrate on complex and long-term policies for enhancing productivity giving away most of short-term "competitiveness" policies leading to somewhat artificial contra positioning of entities (for example cities) which are not really competitors in the true sense of the word.

While these two approaches appear opposite, we do not view them as such, because Porter's view of competitive advantage is based on the notion of productivity of the region

which is influenced by location advantages. According to him, "location affects competitive advantage through its influence on productivity and especially on productivity growth. Productivity is the value created per day of work and unit of capital and physical resource employed. Factor inputs themselves are abundant and readily accessed via globalization. Prosperity depends on the productivity with which factors are used and upgraded in a particular location" (Porter 1998b, p. 2). The central to understanding the concept is a link between competitiveness of the firms in the region and average productivity of the location. "The prosperity of a location depends […] on the productivity of what the firms choose to do there". Companies "contribute to the prosperity of a location based on productivity of the activities they perform there" (Porter 1998b, p. 3). What firms choose to do in particular location depends on the environment inbuilt in the location. "The sophistication of how companies compete in a location is strongly influenced by the quality of the business environment" (Porter 1998b, p. 3). Thus, government policy must be targeted at enhancing business environment in the region. Here Porter accepts the view (somewhat similar to that of Krugman's) that "capturing the nature of the business environment in a location is challenging, given the myriad of locational influences on productivity" and comprehends "diamond" model (see above, page 16) as a framework to understand effect of location on competition and, hence, on productivity (Porter 1998b, p.3).

"It is governments that are directly responsible for improving the well being of citizens in particular geographic areas" (Porter 1998b, p. 4). "Government, first and foremost, must strive to create an environment that supports rising productivity" (ibid, p. 4). The international aspect should not be forgotten here. "The increasing openness of international economic interaction has increased the stakes for the private and public sector leaders of all urban economies" (Kresl and Fry 2005, p. 23). Thus local governments should understand and exploit the place of local economies in the globalized world in order to find niche for their development. The business environment should be favourable for local as well as international actors. We can distinguish two competitiveness and productivity policy directions: we call them active, or targeted, and passive, or horizontal, policies.

Active policies are targeted to specific companies, industries or clusters according to the adopted strategy of the city. This policy is often assumed when urban or regional economies undergo transition or restructuring. This is particularly related to our target system, as Kresl and Fry state, that "the cities in countries that have emerged from their earlier condition have all sought to find some niche for themselves in the global economy" (Kresl and Fry 2005, p. 183), having in mind cities in Central Europe and former USSR countries.

They give ample of examples of cities that have undergone restructuring of their economies. "Toronto focused on developing its role as the corporate headquarters and the financial services centre of Canada. Montreal […] has focused on information-communication, multi-media and electronic commerce. Pittsburg moved from steel to electronic instrumentation and medical technology. Chicago has shifted from basic steel to high technology in that industry. […] These cities have discovered, to use a line from recent movie 'if you build it, they will come'" (Kresl and Fry 2005, p. 184-185). The above discussion implies that cities need targeted strategy based on economic planning, encompassing desired functions of the area, niches, clusters and strong urban identity. Cities should also encourage local start-ups which is probably a part of horizontal dimension of the strategy, but nevertheless crucial for its success (Kresl and Fry 2005, p. 187-188).

Horizontal policies are based on the attitude that "government, first and foremost, must strive to create an environment that supports rising productivity. Artificial distinctions between social and economic policy must fall away, because the two are inextricably tied in defining the environment for productive competition" (Porter 1998b, p. 5). Though horizontal policies are much harder to define and impossible to relate directly to productivity growth in certain industry sector, they are perceived as key aspect of government policy, because "competitiveness is a feature of the nation and a firm, and the city should do little more than provide whatever the firms need" (Kresl and Fry 2005, p. 33). Enhancing business environment is perceived as key horizontal policy aimed at productivity growth in the area. Additionally, according to Porter, "productivity and productivity growth is highest where there is a cluster, not isolated firms and industries" (Porter 1998b, p. 3). Directly related to our work is the approach that "policies implemented without consideration of how they influence the entire system of determinants are as likely to undermine national [or regional] advantage as enhance it" (Porter 1998a, p. 73) which calls for systematic design of such policies.

Next step in our analysis was to identify theoretical factors or aspects of business environment, which should be taken into consideration when designing policies for enhancing target systems (city's) business environment. We have used three sources. Michael Porter in his article "The Adam Smith Address: location, clusters and the "new" microeconomics of competition" highlighted aspects of his "diamond" model and cluster theory which are most related to business environment in particular location and appropriate government policies (Porter 1998b, p. 3). Those aspects are selected and provided (in Table 1) below. World Economic Forum, not-for-profit independent international organization, pursues Global Competitiveness Network research program, which publishes annual Global Competitiveness

Report. While the ultimate objective of the report is to produce rankings of the countries according to their competitiveness, the methodology used for calculating the index amplifies aspects of firm management and business environment, thus providing information needed for our study. Selected aspects of business environment from Global Competitiveness Report 2006-2007 (Word Economic Forum 2006, p. 48-49) are provided (in Table 2) below. The third source is report of Organization for Economic Co-operation and Development (OECD) "Micro-policies for growth and productivity". Objective of the report is to "identify the critical areas of the business environment for each driver of growth and to identify effective micro-policies for each of these critical areas in order to develop a more coherent growth strategy for the micro level of the economy" (Organization for Economic Co-operation and Development 2005, p. 3). OECD develops its own methodology, because "the field of micro-policies is new and no agreed methodology exists. The policy insights provided are a first attempt to produce a coherent micro-level growth strategy" (Organization for Economic Co-operation and Development 2005, p. 11). Results of the extensive study based on survey are "policy priorities and micro-policies for enhancing growth and productivity", which are enumerated (in Table 3) below.

Table 1. Selected aspects of business environment according to Porter

1	**Factor conditions**
1.1	Physical infrastructure
1.2	Information
1.3	Legal system
1.4	University research institutes
1.5	High quality education and training
2	**Firm strategy and rivalry**
2.1	Rules, incentives and norms governing the type and intensity of local rivalry
2.2	Investment climate
2.1.1	Macroeconomic and political stability
2.1.2	Tax system
2.1.3	Labor market policies affecting the incentives for workforce development
2.1.4	Intellectual property rules and their enforcement
2.3	Competition policies
2.3.1	Antitrust policy
2.3.2	Government ownership and licencing rules
2.3.3	Policy toward trade
2.3.4	Policy toward foreign investment
3	**Demand conditions**
3.1	Setting challenging but flexible quality, safety and environmental standards
3.2	Use of government procurement to stimulate product improvement or innovation
3.3	Policies governing buyer information and recource to products and services of poor quality
3.4	Policies that encourage early adoption of new products and services
4	**Related and supporting industries**
4.1	Local pressure or absence of suppliers of materials, components, machinery and services
4.2	Existance of related industries
4.3	Available factors of production
5	**Cluster policy**
5.1	Export promotion
5.2	Attraction of foreign direct investment
5.3	Science and technology policy
5.4	Technical and vocational training
5.5	Related (institutional) infrastructure
5.6	Early development of local markets for new products
5.7	Coordination between neighbouring countries (or cities)

Source: Porter 1998b, p. 3,5.

Table 2. Selected aspects of business environment according to Global Competitiveness Report

Pillar	Section	Aspect of business environment
1 Institutions	1.1 Public institutions	1.1.1 Diversion of public funds
		1.1.2 Public trust of politicians
		1.1.3 Favoritism in decisions of government oficials
		1.1.4 Burden of government regulation
	1.2 Private institions	1.2.1 Ethical behaviour of firms
		1.2.2 Protection of minority shareholders' interests
		1.2.3 Stranght of auditing and accounting standards
2 Infrastructure		2.1 Overall infrastructure quality
		2.2 Railroad infrastructure development
		2.3 Quality of air transport infrastructure
		2.4 Quality of electricity supply
		2.5 Telephone lines (hard data)
3 Higher education and training	3.1 Quantity of education	3.1.1 Secondary enrolment ratio (hard data)
		3.1.2 Tertiary enrolment ratio (hard data)
	3.2 Quality of education	3.2.1 Qualilty of educational system
		3.2.2 Qualilty of math and science education
		3.2.3 Qualilty of management schools
	3.3 On-the-job training	3.3.1 Local availability of specialized research and training services
		3.3.2 Extent of staff training
4 Market efficiency	4.1 Good markets	4.1.1 Extent and effect on taxation
		4.1.2 Number pf procedures required to start a business (hard data)
		4.1.3 Time required to start business (hard data)
		4.1.4 Foreign ownership restrictions
	4.2 Labor markets	4.2.1 Hiring and firing practices
		4.2.2 Cooperation in labor-employer relations
		4.2.3 Reliance on professional management
		4.2.4 Pay and productivity
		4.2.5 Brain drain
	4.3 Financial markets	4.3.1 Financial market sophistication
		4.3.2 Ease of access to loans
		4.3.3 Venture capital availability
		4.3.4 Soundness of banks
5 Technological readiness		5.1 Technological readiness
		5.2 Firm level technology absorbtion
		5.3 Internet users
		5.4 Personal computers
6 Business sophistication	6.1 Networks and supporting industries	6.1.1 Local supplier quantity
		6.1.2 Local supplier quality
	6.2 Firms' operations and strategy	6.2.1 Production process sophistication
		6.2.2 Extent of marketing
		6.2.3 Control of international distribution
		6.2.4 Willingness to delegate authority
		6.2.5 Nature of competitive advantage
		6.2.6 Value-chain presence
7 Innovation		7.1 Quality of scientific research institutions
		7.2 Company spending on research and development
		7.3 University/industry research collaboration
		7.4 Government procurement of advanced technology products
		7.5 Availability of scientists and engineers
		7.6 Utility patents (hard data)
		7.7 Capacity for innovation

Source: Word Economic Forum 2006, p. 48-49.

Table 3. Policy priorities and micro-policies for enhancing growth and productivity according to Organization of Economic Co-operation and Development

Policy priority	Policy category	Micro-policy
1 Fostering firm creation and entrepreneurship	1.1 Increasing access to venture capital	1.1.1 Using public equity funds to leverage private financing and targeting financing gaps
		1.1.2 Easing quantitative restrictions on institutional investors
		1.1.3 Developing competent venture investors and managers
	1.2 Ensuring efficient bankruptcy regimes	1.2.1 Reducing the time during which creditors have claims on assets
		1.2.2 Introducing tougher regimes for bankrupt parties whose conduct has been irresponsible
		1.2.3 Removing the state's right to recover unpaid taxes ahead of other creditors
	1.3 Providing entrepreneurial education	1.3.1 Teaching entrepreneurial skills and attitudes in early education
		1.3.2 Integrating entrepreneurial education in university curriculum
2 Seizing the benefits of information and communications technology (ICT)	2.1 Enhancing ICT skills at all levels of education	2.1.1 Defining a national strategy for integrating ICT in schools
		2.1.2 Helping schools buy computers and get online
		2.1.3 Providing ICT training for teachers
		2.1.4 Developing educational software and online content
		2.1.5 Working with the private sector to develop long-term strategies for developing the ICT workforce
	2.2 Stimulating competition in communication markets	2.2.1 Accelerating the process of unbundling local loops
		2.2.2 Increasing competition across different communications platforms
	2.3 Implementing e-government	2.3.1 Increasing online government services
		2.3.2 Creating common government portals and standardised Web pages
		2.3.3 Ensuring online security and privacy
	2.4 Developing digital content	2.4.1 Clarifying intellectual property regimes for online content
		2.4.2 Clarifying ownership and pricing rules for digital content based on public sector information
3 Exploiting and diffusing science and technology	3.1 Enhancing the quality of public research	3.1.1 Creating centres of excellence for research
		3.1.2 Involving industry in the design and financing of the centres
		3.1.3 Developing competitive mechanisms to identify research areas
	3.2 Promoting industry-science links	3.2.1 Fostering spin-offs and licensing agreements from public research with flexible IPR infrastructure
		3.2.2 Promoting public-private partnerships with well-defined objectives and clear funding arrangements
	3.3 Fostering collaborative networks and clusters	3.3.1 Integrating a cluster approach when designing support programmes, e.g. at the regional level
		3.3.2 Focusing more on getting the right people together than on providing subsidies
	3.4 Stimulating demand for new products, processes and services	3.4.1 Public procurement of new products and services
		3.4.2 Creating awareness and public acceptance of new technologies
		3.4.3 Fostering acceptance among the social partners of the long-term benefits of new technologies
4 Enhancing human capital and realising its potential	4.1 Increasing educational attainment	4.1.1 Providing cost-effective support to tertiary education
		4.1.2 Stimulating competition among educational institutions
		4.1.3 Linking higher education to the conduct of government-financed research and development (R&D)
	4.2 Providing incentives for continuous training	4.2.1 Negotiating tripartite agreements to share the costs and responsibility for enterprise training
		4.2.2 Offsetting costs and time constraints of individual investments in training
		4.2.3 Developing schemes to assist small firms to provide more worker training
	4.3 Fostering knowledge-based management and organisation in enterprises	4.3.1 Promoting flexible work approaches through labour market policies
		4.3.2 Adopting knowledge-based management approaches in the public sector
		4.3.3 Upgrading managerial skills in small firms

Source: Organization for Economic Co-operation and Development 2005, p. 8.

For the objectives of further research we have combined business environment aspects and micro-policies in order to construct a theoretical framework for analyzing and designing target business environment system.

After combining the three approaches we came to six basic categories of factors influencing business environment. The six categories are: (1) fostering firm creation and entrepreneurship; (2) seizing the benefits of information and communications technology (ICT); (3) exploiting and diffusing science and technology; (4) enhancing human capital and realizing its potential; (5) infrastructure and (6) business sophistication. The elaborate list of factors influencing business environment which were derived from analysis of sources presented above is provided in Annex A "Factors of business environment".

2.2. SYSTEMS APPROACH TO SOLVING ILL-DEFINED PROBLEMS

We can categorize all problems to "simple, compound, complex and metaproblems" (Banathy 1996, p. 27). The four types of problems could be defined in two-dimensional matrix where dimensions are number and calculability of variables. We have simple problems when dealing with specified number of calculable variables; compound problems when dealing with unspecified number of calculable variables; complex problems – specified number of incalculable variables and meta-problems – unspecified number of incalculable variables.

Table 4. Classification of problems

		Number of variables	
		Specified	**Unspecified**
Calculability of variables	**Incalculable**	Complex problems	Metaproblems
	Calculable	Simple problems	Compound problems

Source: based on Banathy 1996, p. 27

Banathy maintains that "the design of social systems deals with both complex and metaproblems" because social systems are "unbounded" (Banathy 1996, p. 28-29). In turn, Ackoff, Magidson and Addison call organizational problems faced by management the "systemic problems" (Ackoff, Magidson, Addison 2006, p. 138) or a "mess" that should be formulated and proposes to think about planning as a "mess management" (Ackoff 1981, p.

52). According to Walker and Cox, "managerial decisions are ill-structured and do not lend themselves to quantitative methods". They point, that from the perspective of problem solving process, problems are structured, structurable and unstructured (Walker II and Cox III 2006, p. 138).

With the reference to above we deduce that in search for methodology for formulating business environment support policy, we are faced with challenges of solving unstructured meta-problems (or complex problems at the very best). Before trying to understand and solve such problems we have to structure (or model) them. Such statement is based on our rather philosophical premise that human mind is not capable to understand reality in its entirety, so we pick one aspect of reality (we often call it "dimension") and attempt to depict it, structure and understand how it works – in other words, to build a model. When the model is built, we deal with reality (or our meta-problem) though it (Dilts, Grinder, Bandler, DeLozier 1980, p. 3). Furthermore, in order to model we need a teleological component, or a purpose: we have to pick the "dimension" of reality that is most related to our needs and goals, because we have no analytical and cognitive tools to contemporaneously conceptualize every, or even several "dimensions" of a complex system also known as reality.

"A set of two or more independent problems constitutes a system" (Ackoff 1981, p. 52). In order to deal with a system, we need tools from the domain of systems thinking (or system approach). System approaches to organizational and social systems may be mapped on a dichotomy where one extreme is solving problems of the current system and the other is complete redesign of the system. The dichotomy can also be illustrated by contra-positioning incremental change with "inventing tomorrow today". No one of analyzed approaches to system change matches any of these dichotomies, including Banathy's social system design, Ackoff's idealized design, Goldratt's theory of constraints and Sterman's business dynamics (Banathy 1996, Ackoff 1981, Ackoff 2006, Dettmer 1997, Dettmer 2003, Sterman 2000). Yet all of these approaches or theories have their own position in the dichotomy. Goldratt's theory of constraints and Sterman's business dynamics are closer to problem solution, while Ackoff's idealized design is closer to complete redesign. Banathy's social system design comprehends both worlds, yet ideologically tend to support complete redesign of the system, predicating that "there is growing awareness that most of our systems are out of sync with the new realities of the current era" and "those who understand this and are willing to face these realities call for the rethinking and redesign of our systems" (Banathy 1996, p. 42).

For our research we have chosen Banathy's social system design approach because in our view it corresponds best to our target system (business environment) and comprehends

identification of the purposes of the social system, or the teleological component. Also, most of the approaches are targeted to business companies as organizational systems, while Banathy's social system design is targeted to design of socio-economic system. Nevertheless, we also use insights of other scholars in formulating process model of design inquiry (see 3.2 "Design of the social system" below).

2.3. CONCEPTUAL MODELLING

The first theoretical goal of the research "to find a methodology for designing and modelling city business environment as a social system" (see page 11) requires us the tool for formal representation of the model.

We contradistinguish two different types of modelling: (1) models based on econometric estimation of system of functions and (2) conceptual models based on logical representation of cause and effect relationships.

Most of the models dealing with regional or urban economic development are quantitative and based on econometric estimation of dependent and independent variables. Econometric models simulate a phenomenon under analysis (for example regional economic system) based on a set of pre-defined parameters, eliminating the need of experimenting with the actual system (Bležević & Jelušić 2006, p. 1190). Yet econometric models are inadequate for our research because of few reasons. First, they attempt to answer question "what can we achieve" (e.g. level of income per capita) instead of "how can we achieve it", which is central question for us. Second, they are quantitative in their nature thus requiring and resulting in quantitative data which is in many cases not available. Third, econometric models have no teleological component, which is of great importance for us in this research – we cannot model purposes of the individuals and society using these models. Thus it is obvious that econometric modelling is not suitable for us.

Within the second type of modelling (conceptual modelling), we have analyzed two approaches, proposed by System dynamics and Theory of constraints.

The Systems Dynamics Society (www.systemdynamics.org) defines this approach as "a methodology for studying and managing complex feedback systems, such as one finds in business and other social systems". Feedback refers to the closed chain (or loop) of causes and effects when "causes" and "effects" influence each other. Initially, system dynamics field was developed by Jay W. Forrester, Germeshausen Professor Emeritus of Massachusets Institute of Technology in 1956 (Raisinghani 2004, p. 130) and "is grounded in the theory of nonlinear dynamics and feedback control developed in mathematics, physics, and

engineering". These tools are applied both to the behaviour of humans as well as physical and technical systems (Sterman 2000, p. 5). Using System dynamics tools, modellers construct conceptual representation of the system, formalize it to system of formulas and then simulate the behaviour of the system changing certain quantitative parameters. Simulation is done with the help of specialized computer software packages. Thus, modelling in System dynamics has two goals: (1) to represent conceptual model of the system and (2) quantitatively reveal dynamic implications of system parameter changes using the model (Sterman 2000, p. 102).

Another conceptual modelling approach is called "Theory of constraints thinking processes". This approach was developed by Elyahu M. Goldratt and is the simple logic method based on causality aiming to "impress structure on most structurable problems and on many unstructured problems" (Walker II and Cox III 2006, p. 138). The approach is used mostly for business organizations and process improvements. According to Dettmer, Theory of constraints is a paradigm, a pattern or model that includes its concepts, guiding principles, prescriptions as well as tools and applications (Dettmer 1997, p. 21). Goldratt developed collection of basic tools (thinking processes) "that allow managers to answer the three most important questions when confronted with an apparently intractable problem: (1) "what to change?" (2) "to what to change?" and (3) "how to implement change?". The collection of tools are comprised of five distinct logic trees and the "rules of logic" that govern their construction (Walker II and Cox III 2006, p. 139). The tools allow constructing several logic trees, representing views of different groups of the organization, are guided by simple and formally expressed logic rules (thus comprehensible not only for experts) and require comparably little time and resources to be used. This approach does not account for quantitative evaluation of parameter changes (as System dynamics) but rather concentrates on explicit formal depiction of causality relationships, ways to shape them in order to reach goal as well as models, easy presentable for non-experts. These attributes of theory of constraint's thinking processes, as conceptual modelling approach, make it most useful for the goals of our research. Yet we do not completely rule out other approaches which may be used for quantitative estimation of system's dynamics, which is not required for reaching objectives of this research.

Summarizing the results of literature review performed, our theoretical approach to the way we will be seeking objectives of this work is based on three "pillars": (1) theoretical definition of business environment; (2) approaching ill-defined problems using systems perspective and (3) methodology for conceptual representation of the process and the results. We have defined business environment in terms of factors affecting it, using different

international sources. For approaching ill-defined problems of business environment development we have chosen to rely on Banathy's paradigm of social system design. Finally, for conceptual representation of business environment system we will use Theory's of constraints thinking processes. Using these "pillars", in the next section, we build methodology suitable for designing municipal policies of a city government.

3. METHODOLOGICAL APPROACH

3.1. DEFINITION OF THE SOCIAL SYSTEM

Banathy presents big variance of approaches for designing social systems which is logical given the scope and diversity of human activity systems as well as different goals and intentions of those approaching them. He describes four domains of design inquiry: design philosophy, design theory, design methodology, and functional context of design. "The functional context - the society in general and systems of all kinds in particular - is the primary source that places demands on design inquiry" (Banathy 1996, p. 94). Thus, there is no "one" or "the best" methodology in design. In fact, we have to design the design inquiry (or methodological approach) prior to engaging into design and modelling of the target system based on the functional context of this system.

A number of systems and design scholars offered variety of views about design (Banathy 1996, p. 11). Here we list few of the views which in our opinion suits best for the functional context of the system we want to design:

Design is the use of scientific principles, technical information, and imagination in the definition of a system to perform specific functions with maximum economy and efficiency (Archer);

A purposeful activity, design is directed toward the goal of fulfilling human needs (M. Asimov);

Design simulates what we want to make before we make it, as many times as may be necessary to feel confident in result (Booker).

We synthesize our view to social system design in the context of target system (business environment of the city) from these definitions: Social system design is a creation of purposeful systems in which creative design can guide evolution and self organization and direct social and societal development; purpose of the system depends on the values of system participants; in order to design the future system we must determine the values of its participants.

Using Banathy's concept of social system design and Lydeka's thoughts about economic systems we attempt to define a social system for the purpose of design of city's business environment. The definition is depicted in the next paragraph.

Social systems, or in other words human activity systems, are purposeful systems, whose members are purposeful individuals (or institutions, that is, lower-level systems) who

intentionally and collectively formulate objectives. Social systems are value-guided systems that satisfy values of the people (and institutions) that form the system. Social systems are very complex ever evolving organisms whose evolution is guided by interaction of organizing and self-organizing forces (Banathy 1996, Lydeka 2001).

From the group of systems and design researches who made significant contributions to the development of social systems design we select four, namely Banathy, Ackoff, Checkland, and Nadler, who developed comprehensive process models of systems design (Banathy 1996, p. 58). We used these models to construct the specific process model for the design of business environment system of the city.

The resulting process model of design inquiry for target system is primarily based on Banathy's "Social Systems Design" model and complemented with parts of Ackoff's "The design of idealized systems" model. The process model is particularly depicted in the following section.

3.2. DESIGN OF THE SOCIAL SYSTEM

The process model of design inquiry is depicted in steps. Each step is described in terms of what should be done in respective stage of design and how this will be done. Therefore each section, where is appropriate, includes explanations of tools that will be used to perform the step.

3.2.1. RATIONALE FOR ENGAGING IN DESIGN

There may be lots of reasons why system change is initiated. We have to understand, formulate and explicitly state our goals of initiating system change prior to engaging into design in order to orient our efforts and structure the design process. Without having objectives of design inquiry we would not be able to select proper methodological approaches and process models, not talking about design of the target system itself.

Another way of looking at the necessity of answering the question "why we need to engage in design?" is distinguishing between natural and social (or human activity) systems. "Natural and engineered systems cannot be other than what they are. Human activity systems, on the other hand, are manifested through the perceptions of human beings who are free to attribute a variety of meanings to what they perceive" (Checkland 1981, p. 14). So, social system is not something that exists and we depict it, but something we create or want to create. Our objectives and goals form the system because we attempt to change it in the

desired direction. There is no "one right answer" even to specific system design question which depend on the values, objectives and views of the engaged people.

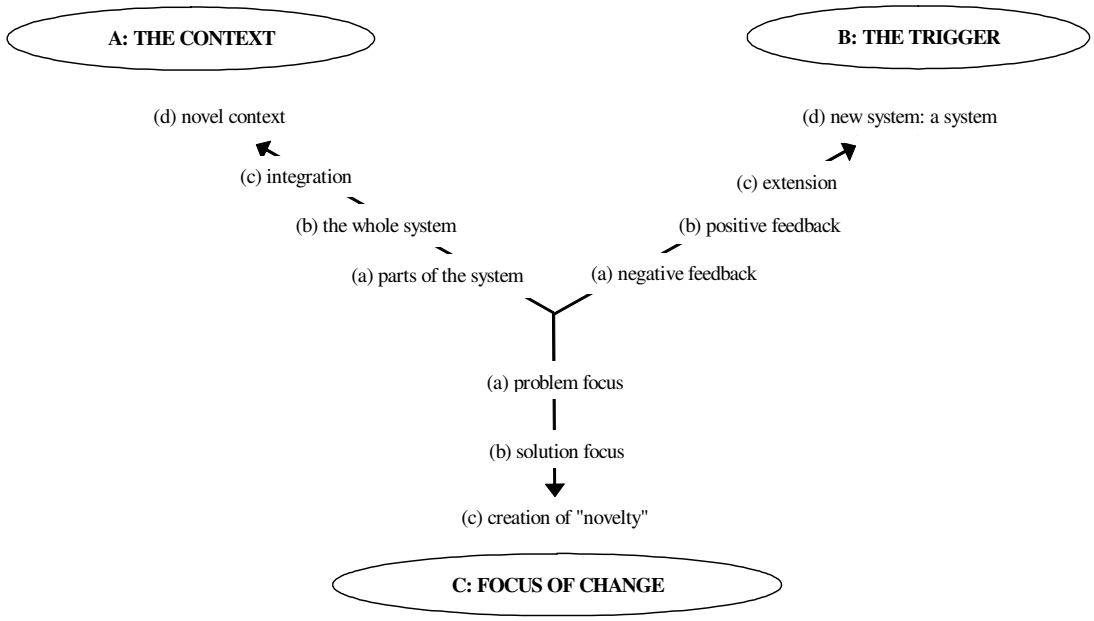
3.2.2. TRANSCENDING THE EXISTING SYSTEM

The ancient wisdom says that in order to create something new we have to destroy the old. While this extreme is not always the case, it is always true that we have at least to change the old way of doing things in order to progress. It is incredibly difficult to move the established system from its current state (except the case of total and obvious crisis), because of inherent inertia of the system participants and the system itself. Perhaps this is why Banathy calls transcending "probably the most troublesome aspect of systems design" (Banathy 1996, p. 122).

3.2.2.1. DEFINING DIMENSIONS OF CHANGE

We can use three-dimensional model for understanding why people initiate change. "The three dimensions of the model are (A) the context of change, (B) the trigger of change, and (C) the focus of change inquiry" (Banathy 1996, p.113).

Figure 1. Change dimensions



Source: Adapted from Banathy 1996, p. 114.

Each dimension has multiple options as depicted (in Figure 1) above. "Given the three dimensions, and options within those dimensions, one can construct a set of "reasoned configurations" that can be considered to be the "genesis" of change" (Banathy 1996, p. 114) in the form of A([a]|[b]|[c]|[d]),B([a]|[b]|[c]|[d]),C([a]|[b]|[c]).

Further, Banathy differentiates four major types of change: improvement, redesign of the existing system, systems design and integration with other systems, and creation of a new system in a new environment (Banathy 1996, p. 116). These four types constitute to continuum of choices between two extremes: improving existing system and creating a completely new one. In the system dynamics perspective, these two extremes may be expressed in terms of breaking negative feedback loops (improvement) and creating a system of positive feedback loops (new system) (Sterman 2000, p. 12). Actual system design inquiry always lies somewhere in between of these extremes.

3.2.2.2. CHOOSING STRATEGY FOR TRANSCENDING

Social system design by definition can never be isolated from the context of surrounding environment and the current state of affairs. Main types of activities associated with design (as well as other scientific inquiry) are analysis and synthesis. But in case of design as creative activity, synthesis supersedes analysis, while both are used concurrently during the inquiry. As Banathy puts it, "designers seek solutions by synthesis, scientists by analysis. Accordingly, designers evolve and develop methodologies that do not depend on the completion of analysis before synthesis begins" (Banathy 1996, p. 56). Still, the strategy of transcending the system and design process itself differs depending on relative importance of analysis and synthesis.

"We can differentiate two major strategies - types "A" and "B" - for initiating design." (Banathy 1996, p. 117). Type "A" strategy suggests situational analysis of the current state of the system prior to transcending, while type "B" strategy advocates transcending the system focusing on solutions rather than current situation. The choice of the strategy depends on the many things: nature of the target system, goal of initiating change, context of surrounding environment (functional context) and people who initiate design. In city's business environment design inquiry we will use type "A" strategy and perform thorough analysis of the system prior to transcending system and proposing any changes. In our situation we may not know whether system needs complete redesign or only improvement steps until we perform analysis of the current situation. Based on results of analysis, approaches of type "B" strategy may be employed for further transcending and design of the system.

3.2.3. SYSTEM INSIGHT INTO THE CURRENT STATE OF AFFAIRS

According to Ackoff, design commences with an understanding and assessment of what is now and is a process of "formulating a mess" (Ackoff 1981, p. 52). The process of formulating a mess encounters system analysis of the current state of affairs, a detailed study

of constraints to development, and creation of projections and scenarios to answer the question: “What would happen if we would not change anything?”.

On the grounds of Ackoff’s approach, we will use analytical tools from the collection of “Theory of constraints’ thought processes”, developed by Elyahu M. Goldratt (Smith 2000, p. 34) and further elaborated by various systems and management scholars. For the analysis of current state of the system we will use a tool, called “Current Reality Tree”. “A Current Reality Tree (CRT) is a logical structure designed to depict the state of reality as it currently exists in a given system. It reflects the most probable chain of cause and effect, given a specific, fixed set of circumstances. The CRT seeks cause-and-effect connections between visible indications of a system’s connection and the originating causes that produce them. It is *functional* rather that *organizational*, blind to arbitrary internal or external system boundaries.” (Dettmer 1997, p. 64).

Detailed explication of current reality tree tool is provided in Annexes, page 116, together with other Theory of constraint’s thinking tools used. Current reality tree tool provides us with a tool for very precise and formal conceptual representation of a system. Despite that, the goal of this step in overall design inquiry process is not to build exact representation of the current state of the system, but to get an insight into the current affairs in order to be able to make informative decisions when performing the central activity – design of desired system (see section 3.2.5 “Design for transformation”).

3.2.4. ENVISIONING THE FIRST IMAGE OF THE SYSTEM

The “creation of a new system is grounded in the designers’ vision, ideas and aspirations of what the future system should be” (Banathy 1996, p. 61). During this process we will articulate the vision and core ideas of the desired future of Šiauliai city business environment. This will be the first image of the system.

3.2.4.1. LEARNING ABOUT NEW REALITIES

The need to design new systems or redesign old ones is always related to changes in environment. “Drucker (1989) calls the emerged changes the "new realities". It is of primary importance that we individually and collectively understand what these new realities are, grasp their implications for the design of our lives and the design of our systems” (Banathy 1996, p. 43).

Referencing Banathy (Banathy 1996, p. 127) and making proper adjustments ourselves, we will do learning about new realities step in three stages:

(1) Identify various components of societal change related to the system we want to design. These dimensions may be sociocultural, sociotechnical, economic, technological, organizational, scientific and possibly other;

(2) Identify societal changes in each dimension demanding change or redesign of the target system;

(3) Organize findings in a two column ("old realities" and "new realities") table.

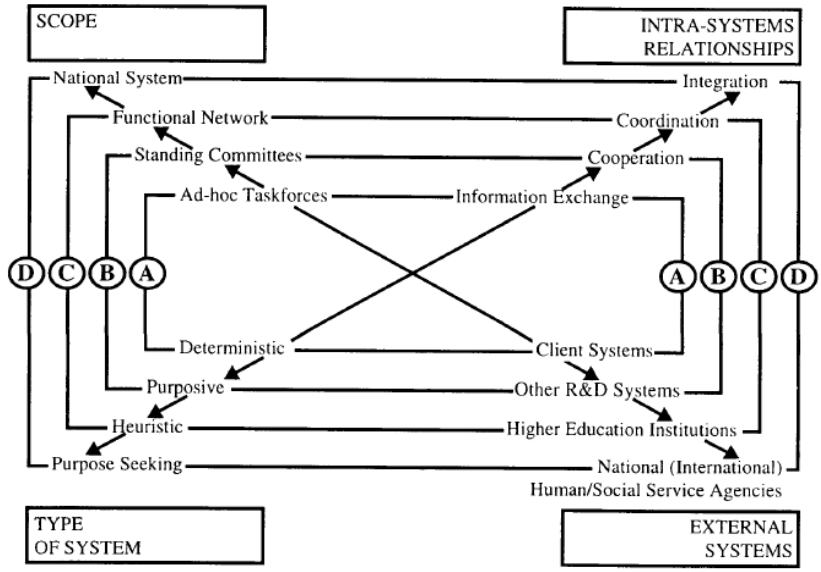
Learning about new realities exercise will give us understanding about larger context of societal and economic changes that affect Šiauliai city business environment system and direct our design inquiry efforts accordingly.

3.2.4.2. MAKE BOUNDARY JUDGMENTS

Boundaries of the design inquiry draw a line that set aside the design inquiry space of the system that we want to design from its environment (to which the system will have to adjust or try to influence). The line differentiates parts of reality that we want to design from the parts that we do not want to design.

(In Figure 2) below an example of four dimensions, according to which system boundaries are defined is presented. Depending on functional context of the system and design inquiry, designers may choose different dimensions and definitely choose different options for each dimension. For making boundary judgment about Šiauliai city business environment system we will mostly use analytical tools and creativity, also data from questioning system's participants. We do not intend to explicitly model or state the boundaries of the Šiauliai business environment, yet we admit the importance of understanding and keeping them in mind when pursuing the design of the future system.

Figure 2. Boundaries of design inquiry



Source: "Figure 4.5. A framework for exploring design options", adapted from Banathy 1996, p. 130.

3.2.4.3. CREATING THE FIRST IMAGE OF THE SYSTEM

The image of city business environment system will be created based on example proposed by Banathy (and organized into a two column table, depicting the existing state of the system and desired state of the future system, according to several dimensions or "markers", as he calls them). Dimensions, as well as their characteristics would be acquired from outcomes of previous two stages of the process – learning about "new realities" and making boundary judgments.

Figure 3. Example of the first image of the system (Integrated R&D system)

The existing state	The future state
The overall scope is defined by the sphere of influence of individual agencies.	The overall scope of the future state is the larger society, the nation, and beyond.
The main functional is to provide service by responding to the needs of state and local educational agencies within their geographic region.	The main function is the coordinated development of models and processes that the eductional communities of the nation can use to design their own learning and human development systems.
The key organizing principle is to respond to local needs that fall into the traditional means and methods of addressing specific problems.	The key organizing principle is to assume leadership and be at the cutting edge of theory formulation and methods development of disciplined inquiry.
Relationship with peer systems is limited to information exchange and occasional/limited and short-range cooperation.	Relationship with peer systems is full-fledged partnership and long-range integration of operations and services.
Relationships with other systems is occasional/self-serving cooperation.	Relationship with other systems aims at building alliances with local/national agencies that advance human development.
Internal focus is the prudent administration of specific projects and programs.	Internal focus is on developing organizational capacity and staff capability for organizational learning and educational design.
Type of system: deterministic, moving toward purposive.	Type of system: heuristic, moving toward purpose-seeking.

Source: Adapted from Banathy 1996, p. 133.

"The findings generated in the course of the design strategy, become the essential knowledge base that is used in the course of the entire design process", depicted in the next step 3.2.5 "Design for transformation". "This 'essential knowledge' emerges from the environment and integration of the vision that was formulated, the core values that the designers collectively articulated, and the core ideas that emerge from the boundary judgments made as the inquiry options were selected" (Banathy 1996, p. 132).

3.2.5. DESIGN FOR TRANSFORMATION

This stage covers the central activity in the chosen process model and will be concerned with actual design of the future system of business environment of the city (in our case - city of Šiauliai). The design for transformation is performed in three interrelated and logically successive steps: development of core definition of the system based on its purposes, building a system of functions leading to achievement of the purposes and designing the enabling systems, providing required resources and coordination to the make the system of functions work. Transformation here is a key concept, because the goal of every design is to change the reality into desired state, that is, transform existing system or current state of affairs into designed system.

3.2.5.1. DEFINING THE SYSTEM

Every system is guided by its purposes. According to Banathy, we can talk about two major categories of purposes: purposes that are "generic" to all social systems and purposes that are "specific" to city business environment (Banathy 1996, p. 135). Ackoff suggests that every system should attend to three purposes: the purpose of its parts, its own purposes, and the purposes of the system in which it is embedded" (Ackoff 1981).

Following the proposed approach to defining the system we will describe general purposes of the system in three levels:

1) Purposes of all synergetic system parts (or categories of actors) which should be balanced to achieve stable system. In order to define these purposes, categories of system actors will be defined using information, obtained from step 3.2.4.2 "Make boundary judgments" of the design process model, and the main purposes of each category will be determined;

2) Purposes of Šiauliai city business environment system will be depicted and defined.

3) And finally, we will depict purposes of the larger embedding system or systems which could be: Lithuanian economic policy and development patterns, physical infrastructure, international business relations, requirements of foreign direct investors, etc, as

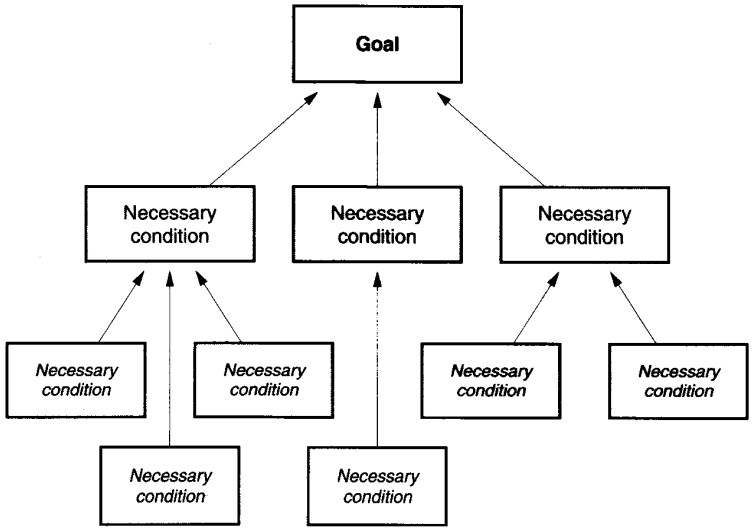
much as they are related to our target system. Identification of embedding systems will be associated to systems boundary judgments made previously.

Definition of specific purposes should be pursued with the appropriate specifications of the purposes in mind. Specifications interpret systems image, the mission, and the purposes as those questions are asked: "Who are the clients of the system? What services should we offer them? What characteristics should those services have? When, where and how should we provide those services? Who should own the system? How should the ownership be distributed? What rights and responsibilities should owners have? What rights and responsibilities should clients and stakeholders have? How should a system relate to other systems in the environment?" (Banathy 1996, p. 76).

After having defining general, specific purposes and specifications of the system, using described approaches, we will follow Nadler and Hibino approach leading to the formulation of hierarchical system of purposes. "The thrust is to seek ever broader (higher level) purposes" (Banathy 1996, p. 137). Therefore, at the top level of hierarchical system of purposes we will formulate the broad mission of the system.

For organization and formal representation of the hierarchical system of purposes we will use the tool proposed by Dettmer, which he calls "The Strategic Intermediate Objectives Map" (Dettmer 2003, p. 63). We will use Dettmer's proposition, that "one of the characteristics of complex systems is that their goals inevitably have several preconditions that must be satisfied if the goal is to be achieved" (Dettmer 2003, p. 60) as organizing principle of the hierarchical system of purposes. Graphical representation of "The Strategic Intermediate Objectives Map" is provided (in Figure 4) below.

Figure 4. The Strategic Intermediate Objectives Map



Source: Adapted from Dettmer 2003, p. 63

Detailed explanation of the tool is given in Annex E "Theory of Constraint's thinking tools", "Strategic Intermediate Objectives Map" below.

3.2.5.2. BUILDING A SYSTEM OF FUNCTIONS

Answers to the question "what are the specific functions that must be carried out?" lead to making "the most central, the most essential design decisions" and results in a conceptual model of a system which is the goal of the whole design inquiry process. This conceptual model of the system is "systematic arrangement of "verbs", and nothing else but verbs" (Banathy 1996, p. 138) ordered for answering the question: What should a system "do" to achieve its goals and act according to its mission?

For understanding the central role of designing system of functions in whole design inquiry, we cannot say better that Banathy: "In most organizational work, once the mission and purposes are stated, people move on to establish the structure of the organization. In systems design there is an iron law: Form follows function. We cannot design a social system without first specifying the functions that have to be carried out." (Banathy 1996, p. 76)

System of functions will be depicted in hierarchical way using the methodology similar to the one used for the construction of hierarchical system of purposes (Figure 4. The Strategic Intermediate Objectives Map). The system of functions will be constructed in three steps: identification of functions, evaluation of individual functions and evaluation of the system of functions. Using information from the previous steps of the design inquiry process, mostly the core definition, mission, system of purposes and specifications, we will perform the three steps by answering series of questions for each step:

3.2.6. MODELLING THE SOLUTION AND PRESENTING THE MODEL

"The outcome of design is a presentation, a description of the future system and its systematic environment" (Banahty 1996, p. 141). The purpose of this step in the process is twofold. The first purpose is to aggregate all steps of design into one overall image of the new system. Another purpose is the development of presentation or conceptual model of the design outcomes for use in communicating the design to policymakers, facilitating decision process, as well as documenting the underlying ideas and assumptions for future reference.

For modelling and presenting solutions we will use another theory of constraint's thinking process called "future reality tree". "The Future Reality Tree (FRT) is a sufficiency-based logic structure designed to reveal how changes to the status quo would affect reality […]. It's an expression of a reality that does not yet exist. The Future Reality Tree visually

unfolds the cause-and-effect relationship between changes we make to existing systems and their resulting outcomes. It's a simulation model of the future." (Dettmer, 1997, p. 180).

Detailed explication of the Future reality tree tool is provided in Annex E "Theory of Constraint's thinking tools", "Constructing A Strategic Future Reality Tree" below.

The conceptual formal model of the system in a form of future reality tree, developed as a result of whole design inquiry process, may be used for constructing and checking policy impacts (or "injections" as Dettmer calls them), yet we do not intend to perform this task in this research. Due to the cyclical dynamics of the design inquiry process it is inevitable that certain steps of design process will be continuously revisited until final model with chosen policy impacts will be developed.

3.2.7. CREATING THE TRANSFORMATION

In this stage of the process we will have three models developed: (1) system insight into current state of the system (represented by the Current reality tree); (2) hierarchy of system's purposes (represented by the Strategic intermediate objectives map); and (3) the desired future state of the system (represented by the Future reality tree). While knowledge and understanding gained during development of these models would definitely be very beneficial in managing the system towards the desired state, these models are not the policy in themselves. Having answered the questions "Where we are?" and "What we want?" we have to answer the question "How to get there?", that is, develop a strategy for transforming the system from current to desired state.

3.2.7.1. ANALYZING MISMATCHES

The goal of analyzing mismatches is to "determine the nature and the scope of deviation, or "gap", between the system's current condition and performance, and that, which is required to achieve the goal and critical success factors" (Dettmer 2003, p. 46). Using straight logic, the actions required for influencing the system into desired direction can be retrieved by analyzing differences between Current reality tree and Future reality tree. While it may be largely true, in social system design the process in not that straightforward. Determining the nature of the "gap" between future and reality involves understanding the causes of "gap", or undesirable effects, as Dettmer calls them. Furthermore, we are not very much interested in constraints specific to the current reality, but should focus on potential constraints that will be faced when seeking for the desired future.

Again, it is never too much noting about cyclical nature of the design process which is especially apparent in this stage. Future reality tree is designed and modelled based on

purposes of the system (Strategic intermediate objectives map) and having in mind current conditions (Current reality tree). The future that we design and seek depends on the current resources of the system and the will of system's participants to provide those resources. Consequently, we may find it necessary to amend the Future reality tree while analyzing the mismatches and further planning for transformation. This again illustrates that no one step of the design process model is finalized and may be revisited at any time until the whole design process is finished.

3.2.7.2. FORMULATING THE POLICY FRAMEWORK

After determining the nature and the scope of the "gap" between current reality and desired state, the next step designers have to take, is to answer the question: "How can the gap be closed?" and develop strategies and actions for initiating change. As Dettmer predicates, "the changes usually take a form of policies, actions, programs, or projects". He refers to any such changes as "injections", meaning something new that must be injected "into current situation to make change happen" (Dettmer 2003, p. 160). The entirety of all injections, required to achieve the desired reality, in our case the desired business environment in Šiauliai city, forms the policy framework of Šiauliai city municipality for improvement of local business environment, which is precisely the goal of this work.

Formulation of policy framework is a creative exercise based on the list of injections generated during the whole design process and explicitly modelled in the Strategic intermediate objectives map and Future reality tree of the target system – Šiauliai city business environment. Obvious, but still important to note, prerequisite characteristic of all the injections is the competence of city municipality to pursue the injections and implementation of the policy on its own behalf. The other point, worth stressing, is the nature of the policy framework itself, which by definition is "a course or method of action" (not the action itself) and implies the set of principles to be used in forming specific policy impacts for sustained period in time.

3.3. RESEARCH METHODOLOGY

In order to use the process model of design inquiry in the particular setting, data about the real world is needed. This sub-section deals with designing the data collection and analysis processes for the subsequent policy formulation.

3.3.1. INTRODUCTION

The research methodology part of this study, unlike some other parts, is not organized in a logically successive way, where discussion about different approaches and theoretical paradigms lead to conclusions in the end. Rather, we state our conclusions in the beginning and then explain how we have reached them. Purposes, objectives and questions of the study are formulated already having in mind chosen research tradition and design, consistent to Creswell's view that "in writing the problem, the purpose, and the questions, researchers have an opportunity for encoding with terms that signal to the reader the specific tradition being used" (Creswell 1998, p. 93).

3.3.1.1. RESEARCH METHOD DEFINED

Our research of Šiauliai business environment is a case study. It could also be viewed as the starting point of action research spiral in formulating Šiauliai municipality's business environment policy framework. Our aim is to start developing theory in action which could be used in other cities or regions. Despite our research have certain aspects of grounded theory, we do not see any inconsistency in designing it as a case study. Obviously, unit of analysis of the study is Šiauliai city business environment. Thus, the study is single-case. It is an embedded analysis of the business environment subsystem in the context of whole Šiauliai city socio-economic system. The research falls into both explanatory and descriptive categories of research design and combine intrinsic (understanding business environment of the city) and instrumental (modelling the system) aspects.

3.3.1.2. NOTES ON GENERALIZABILITY

Generalizability of qualitative studies in general and single-site case study, which is the research design of this study, in particular is a controversial problem and an ongoing debate in the social science community. According to Gomm, Hammersley and Foster, three main views are apparent in the debate. "Some argue that what is involved in is a kind of inference or generalization that is quite different in character from statistical analysis, being 'logical', 'theoretical' or 'analytical' in character". "Others suggest that there are ways in which case studies can be used to make what are in effect the same kind of generalizations as those which survey researchers produce. Still others argue that case studies need not make any claims about the generalizability of their findings, that what is crucial is the use others make of them" in a way of 'naturalistic generalization' and "'transfer' of findings from one setting to another on the basis of 'fit'" (Gomm, Hammersley, Foster 2000, p. 5).

Elaborating on the debate and relating concepts of generalizability and external validity, Schofield states that "it is clear that numerous characteristics that typify the qualitative approach are not consistent with achieving external validity as it is generally conceptualized" (Schofield 2000, p. 2). Accordingly, in this study we view the concept of generalizability, rather than methodological conformity of qualitative research to "classical view of external validity" (Schofield 2000, p. 6), as the axis of the debate. With respect to generalizability, external validity or simply usefulness of the study is related to the question "How could performed study in its entirety be used in other similar settings?", rather than to usual questions "How can study results be replicated in other settings?" or "Can they be extended to the larger population?".

Therefore, our case study of Šiauliai city business environment and formulation of city government's policy towards enhancing it, embodies theory of action defining "how the researcher expects an intervention, event, or process to take a case from one situation to the next. In effect this theory of action will define the issues to be examined during the analysis, thereby providing linkages among the research question(s), propositions and analytical criteria" (Berg 2007, p. 294).

3.3.2. PURPOSE, OBJECTIVES AND RESEARCH QUESTIONS

We define the goals of the empirical part of this research in terms of purpose, objectives and research questions. Despite such definitions may overlap, we presume that together they fully reflect the nature of our research.

3.3.2.1. PURPOSE

The purpose of this case study is to develop the Šiauliai city government policy framework for the improvement of current business environment situation in the city. In terms of this work, case study is „seen as a distinct research paradigm", which is more than just a method „as involving quite different assumptions about how the social world can and should be studied from those other underlying assumptions" (Gomm, Hammersley and Foster 2000, p. 5). For the purposes of this research, case study is defined as formulation of a particular city government's policy, in the particular area of city government's competence.

3.3.2.2. GOALS AND OBJECTIVES

The primary goal of the empirical research of Šiauliai city business environment is to test the methodological approach developed in the theoretical part of the study (see section 3 Methodological approach above), that is: apply social systems design approach for solving

strategic and management problems of enhancing urban business environment, faced by Šiauliai city municipality. Hence, the goal of the empirical part of the study essentially is to test the theory. Gomm, Hammersley and Foster regard case study as "valuable at all stages of inquiry, but particularly in testing theories" (Gomm, Hammersley and Foster 2000, p. 10). Berg implies that "case study methods are found in the literature associated with theory building rather that theory testing [...] but some sources suggest the utility of case study strategies in theory testing and or in combining both theory development and testing" (Berg 2007, p. 284). This in turn implies that results of the case study research, performed in the empirical part of the work, may be beneficial for the refinement of the methodological approach which would advance the generalizability of the results of the study while it is not an explicit objective of the research.

We have separated the goal of the empirical research into three objectives: (1) define the current situation of Šiauliai city business environment from the data collected; (2) identify desired and feasible Šiauliai city business environment, envisioned by participating actors; and (3) formulate Šiauliai municipality's policy framework based on results of previous two stages. While we will attempt to keep our case study research as straightforward as possible (as recommended by Creswell (Creswell 1998, p. 21)), all three objectives require somewhat differing approaches with respect to data collection and analysis which are described in detail further.

3.3.2.3. RESEARCH QUESTIONS

"Defining research questions is probably the most important step to be taken in a research study" (Yin 1994, p. 7). When formulating research questions, Creswell recommends "that a researcher reduce his or her entire study to a single, overarching question and several subquestions" (Creswell 1998, p. 99). He proposes that author should present "a small number of subquestions that follow the central question" in two sets: as issue questions and topical questions (Creswell 1998, p. 101). Alternatively, Yin states, that a "basic organization scheme for the types of [research] questions is the familiar series: "who", "what", where", "how" and "why" (Yin 1994, p. 5). Furthermore, both authors suggest that research questions should be closely related and adjusted to the tradition of inquiry (Creswell 1998, p. 100) or to research strategy (Yin 1994, p. 5). According to Yin, depending on whether the questions are "who", "what", where", "how" or "why", the researcher should select combination of research strategy and design type (i.e. descriptive case study or exploratory experiment) (Yin 1994, p. 5). If the research strategy is predisposed, researchers should "create the form of study

questions best matching the strategy […] inclined to pursue in the first place" (Yin 1994, p. 8).

Table 5. Research questions

Category of questions		Questions
Central question	1	What direction of actions or policy should be pursued by Šiauliai city government in order to continuously enhance business environment in the city?
Issue subquestions	1	What are the categories of actors (or institutions) whose interrelationships shape business environment in the city?
	2	What are the actions or positions of the actors which influence business environment in the city?
	3	What are the cause and effect relationships between the actions or positions of the actors related to factors shaping business environment in the city?
	4	How could Šiauliai city government act in order to influence relationships between actors in order to improve overall situation?
Topical subquestions	1	What is the current state of Šiauliai city business environment according to the defined six categories of factors influencing it?
	2	What are the deep underlying reasons leding to the current state of business environment according to six categories?
	3	What are the desired state of the business environment of Šiauliai city by the categories?
	4	What are the feasible (or practically reachable) state of the business environment of Šiauliai city by the categories?
	5	How could the situation in each category be improved?
	6	How could Šiauliai city government influence or directly improve each category of factors, influencing business environment?

Research questions (in Table 5) consist of central question of the research, indicating the final expected result of the case study, issue subquestions, which address "major concerns and perplexities to be resolved" (Creswell 1998, p. 101) and topical questions, which "cover anticipated needs for information" (ibid, p. 101).

It could be noticed, that almost every topical question is related to categories of factors which influence business environment and follow from the literature review on the subject (see page 24 above and Annex A "Factors of business environment"). Consequently, the categories of factors derived in the theoretical part will serve as categories of information for use in data collection and content analysis parts of this study.

While the most of the research issue and topical questions are "what" type questions, all of them could be contracted in two "why" and "how": (1) "Why the situation of Šiauliai city business environment is at current state?" and (2) "How could it be improved?". Referring to Yin's speculation about applicability of different types of research questions to type of designs, we propose that the best type of answering to these "what", "why" and "how" questions is a combination of explanatory and descriptive types in our case study.

3.3.3. RESEARCH METHOD AND DESIGN

We have used a concept of „five research traditions in qualitative research" as a guiding principle when developing research design for our study. According to Creswell, five research traditions are (1) biography, (2) phenomenology, (3) grounded theory, (4) ethnography and (5) case study (Creswell 1998, p. 65). Alternatively, Yin lists five "major research strategies in the social sciences: experiments, surveys, archival analysis, histories and case studies" (Yin 1994, p. 4).

Case study is the research tradition that is almost fully corresponds to the nature and objectives of our study. (Table 6) below describes dimensions of our study with respect to appropriate type of qualitative research which is case study in most dimensions. The dimensions used for analysis of our research are borrowed from Creswell, who uses them for comparing all five research traditions of qualitative research mentioned earlier (Creswell 1998, p. 65).

Table 6. Dimensions of the study and research tradition

Dimension	Description	Matching research tradition*
1 Focus	Developing an in-depth analysis of a single case	Case study
2 Discipline origin	Urban studies, other social sciences: management	Case study
3 Data collection	Multiple sources: documents, prior interviews, internet pages, interviews.	Case study
4 Data analysis	Data coding, analysis, interpretation	Case study, grounded theory
5 Narrative form	In depth study of a case resulting in a model of business environment system.	Case study, grounded theory

* According to Creswell 1998, p. 65, Yin 1994, p. 103

Obviously, case study is the most appropriate method of research (or research tradition) to be used in our study. Despite some aspects of the study, namely data analysis and narrative form, are somewhat related to the grounded theory (building a formal model of a case – business environment system of Šiauliai city), we appeal to Creswell's predication that „there is no standard format for case studies" (Creswell 1998, p. 186) and recommendation for the students to „stay within one tradition, becoming comfortable with it, learning it, and keeping a study concise and straightforward" (Creswell 1998, p. 21) and choose to follow case study research tradition in the empirical part of our study.

Case study definition by Yin strongly support our choice: "Researcher Robert K. Yin defines case study research method as an empirical inquiry that investigates a contemporary

phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used“ (Soy 2006, p. 1).

Case study involves number of dimensions that can be approached differently thus shaping the overall structure of research. Among the dimensions (or choices) are single–site vs. multi-sites; holistic vs. embedded; exploratory, explanatory and descriptive; intrinsic, instrumental and collective. Our research may be positioned in all these dimensions which are explained in the following paragraphs.

As it is already clear from goals and objectives of research (see 3.3.2 “Purpose, objectives and research questions”), unit of analysis in our study is business environment of Šiauliai city. This will be a single-site case study. The reasons for such design are twofold. First, the goals of the research require deep analysis of the phenomenon, which implies single site instead of multiple sites case study. Many researchers warn that more than one case dilutes the analysis, and the fever cases are investigated, the more information can be collected about each of them (Creswell 1998, p. 63, Gomm, Hammersley, Foster 2000, p. 2). Second, we have unique opportunity for doing the research because we have good access to the site due to prior consulting projects with Šiauliai city government.

Creswell explains, that “whether the case is single or multiple, the researcher decides whether to study the entire case, a holistic design, or multiple subunits within the case (the embedded design)”. Embedded analysis is the analysis of a specific aspect of a case. (Creswell 1994, p. 63, 187). In our case of Šiauliai city, the specific aspect is business environment. It is important to apprehend that the whole complex urban socio-economic system will be analyzed only from the perspective of business environment and ability of local government to influence it. The discernment of this aspect from the whole system is closely related to defining boundaries of the system under analysis (see 3.2.4.2 “Make boundary judgments” above).

Yin aggregates the single-site vs. multi-sites and holistic vs. embedded dimensions of case study into 2 X 2 matrix resulting in “four major types of designs” (Yin 1994, p. 18). Following this approach, our research occupies single-site (i.e. Šiauliai city) / embedded design (business environment) part of the matrix. Creswell implies that Yin’s concept of a matrix is helpful but is of general level (Creswell 1994, p. 187), which we feel could be even more fine-defined using other dimensions.

Berg consolidates other researchers maintaining that “there are several appropriate designs of case study […]: exploratory, explanatory, and descriptive” (Berg 2007, p. 292).

Our research falls into both explanatory and descriptive categories of research design. Descriptive approach implies "the formation and identification of a viable theoretical orientation before enunciating research questions" (ibid, p. 293). "Explanatory case studies are useful when conducting causal studies. Particularly in complex studies of organizations or communities, one might desire to employ multivariate cases to examine a plurality of influences. This might be accomplished using a pattern-matching technique suggested by Yin and Moore (1988). Pattern-matching is a situation in which several pieces of information from the same case may be related to some theoretical proposition" (ibid, p. 292). Accordingly, we have delineated theoretical orientation in literature review and methodological approach parts. Resulting theoretical orientation was used for defining, what information should be gathered and how it should be analyzed in order to describe the phenomena and identify causal relationships and influences among related influence groups. (In Table 5 "Research questions") above we have defined research questions which, as described in the following discussion, are mostly "what", "why" and "how" which may be best answered by explanatory and descriptive designs.

Besides of discussed we should admit, that our research also has some attributes of exploratory case study, though we did not intentionally emphasized it when doing research design nor it is comparable in importance with descriptive and explanatory aspects. According to Berg "when conducting exploratory case studies, fieldwork and data collection may be undertaken before defining a research question" (Berg 2007, p. 292). While we defined research questions prior to conducting field research, we used secondary data prior to formulating the questions and we expect to alter them during the research based on information we receive. Yet most importantly, exploratory "type of study may be seen as a prelude to a large scientific study" (ibid, p. 292). We expect results of our study to be used in other similar studies both in other sites, analyzing other embedded systems or even in other types of designs, which is related to generalizability (see 3.3.1.2 "Notes on generalizability" above) and limitations of the study.

Depending on researchers' purposes of studying cases, case studies "can be classified into three different types: intrinsic, instrumental and collective" (Berg 2007, p. 291). In this respect, the purposes of our study combine both intrinsic and instrumental dimensions as we aim to understand the business environment of Šiauliai city (intrinsic) and then create a theoretical explanation, or model of the system (instrumental). Again, as Berg concludes, „there is no solid line between instrumental and intrinsic studies" because researchers often have multiple interests (ibid, p. 292). „Finally, in a case study such as an ‚intrinsic' case

study, the writer might define the boundaries of the case, specifying how the case is bounded in time and place. If an ‚instrumental' case study is desired, then the researcher might specify and define generally the issue being examined in the case" (Creswell 1998, p. 97) which is exactly what we are doing in our research.

Concluding the positioning of our research in all above mentioned dimensions we propose to view them in two categories. First two dimensions are „hard", that is, they have clear boundaries between and represent Yin's „2 X 2„ matrix. Here we have clearly defined our case study as single-site and embedded design. The other two dimensions are „soft": our research seems to have features of all of them (exploratory, explanatory descriptive; intrinsic, instrumental). "Soft" dimensions of the study depend on the researcher's choice. Thus, we design our case study research based on "hard" dimensions while we extend it into the "soft" dimensions depending on the chosen boundaries, depth and breadth of the study.

3.3.4. METHOD FOR DATA COLLECTION

The basic question about data collection methods is always whether study is quantitative or qualitative. "The distinction between quantitative and qualitative data in social research is essentially the distinction between numerical and nonnumerical data" (Babbie 2004, p. 26). Though in principle we can collect and analyze both numerical and non-numerical data in our case study, we choose qualitative research as corresponding to the nature of research questions of the study (Creswell 1998, p. 17).

Additionally, there is strong rationale to engage in qualitative study because: (1) research questions mostly start with "what" and „how"; (2) the topic needs to be explored and presented in detail; (3) we study individuals, organizations and interest groups in their natural setting; (4) our role in research is an „active learner's" role (Creswell 1998, p. 17-18).

Yin recommends six sources of evidence, as he calls it, for conduction of qualitative case studies: documents, archival records, interviews, direct observation, participant-observation and physical artefacts (Yin 1994, p. 78; Creswell 1998, p. 63). „No single source has complete advantage over the others. The various sources are highly complementary, and the good case therefore want to use as many sources as possible" (Yin 1998, p. 80). In our research we combine two sources of evidence: documents (secondary data) and interviews (primary data). Strengths and weaknesses of the two sources are enumerated (in Table 7) below. The choice of sources was based on various reasons, including nature of research questions, requiring grasping and understanding interest groups and their interaction in forming business environment in the city, scope and time frame of research project as well as

purely practical considerations: prior consulting experience in Šiauliai city, resulting with good rapport with business community and city government officials.

Table 7. Strengths and weaknesses of selected sources of evidence

Source of evidence	Strenghts	Weaknesses
Documentation	* stable - can be reviewed repeatedly * unobtrusive - not created as a result of the case study * exact - contains exact manes, references, and details of an event broad coverage - long span of time, many events, and meny settings	* retrievability - can be low * biased selectivity, if collection is incomplete * reporting bias - reflects (unknown) bias of the author * access - may be deliberately blocked
Interviews	* targeted - focuses directly on case study topic * insightful - provides perceived causal inferences	* bias due to poorly constructed questions * response bias * innacuracies due to poor recall * reflexivity - interviewee gives what interviewer wants to hear

Source: Adapted from Yin 1994, p. 80;

Creswell proposes, that when dealing with obtaining enough information to present an in-depth picture of the case study, in planning a case study individuals may develop a data collection matrix "in which they specify the amount of information they are likely to collect about the case" (Creswell 1998, p. 64). In our research, data collection matrix results from relation of research questions (Table 5 above) and categories of factors of business environment (Annex A below). The aim of our data collection method is to obtain evidence about how each of the six categories of business environment factors relates to issue and topical research question. For example, in "Enhancing human capital and realizing its potential" information category (or business environment factor) we would like to learn, what are the interest groups and institutions in the field, what are their positions and actions, what is the current state of related matters (e.g. professional education system), what are the reasons for the current state, does current state satisfies system participants, what is the desired state of the business environment with respect to this factor, haw could situation be improved and, finally, how could Šiauliai city government stimulate the improvement.

3.3.4.1. DOCUMENTS

We plan to analyze the following documents as a secondary data: (1) strategic planning documents, feasibility studies, internal and external reports, presentations and other work performed as a part of Šiauliai city government function as well as other system participants; (2) reports of surveys and other field research performed in Šiauliai city in areas and time interval relevant to our study; (3) publicly available information about business

environment matters in Šiauliai city (according to data collection matrix), including internet sources, newspaper articles, publications.

3.3.4.2. INTERVIEWS

One of the most important sources of case study information is the interview (Yin 1994, p. 84), as well as in some other forms of qualitative inquiry, such as grounded theory (Creswell 1998, p. 122).

Interviewing might be viewed "as a series of steps in a procedure" (Creswell 1998, p. 123), which for a circle rather than just sequential steps and consists of 7 steps (locating site/individual; gaining access and rapport; purposeful sampling; collecting data; recording information; resolving field issues; storing data) (ibid, p. 110). Our design of interview strategy is based on these concepts.

Sampling (interviewee identification)

There are a number of sampling types to be employed when selecting a sample for doing qualitative research, including probability sampling strategies, convenience, purposive, snowball and quota sampling (Berg 2007, p. 41-45). Based on the nature of our research we choose to use purposive sampling, advocated by Creswell, who sees purposeful sampling as an integral part of his "data collection circle". "This is not a probability sampling so that statistical inferences can be made; rather, it is sampling so that one can best study problem under examination" (Creswell 1998, p. 110-111). Furthermore, he urges researchers to choose the specific type of purposeful sampling from array of 16 possibilities (ibid, p. 111). Based on provided features of purposeful sampling types we choose stratified purposeful sampling as the best type for our research, in order to "illustrate groups and facilitate comparisons" (ibid, p. 119).

Important principle of sampling and data collection relevant to our design of research is the concept of saturation, or retrieving "information that continues to add until no more can be found" (Creswell 1998, p. 56) or until we "saturate" our data collection matrix. Thus, identification of interviewees was a continuous process: we did purposeful sampling based on secondary data and preliminary interviews with key individuals, then carried on to data collection and were prepared to alter the list of interviewers depending on its results. Consequently, exact sample of interviewees was not known until the end of research.

Type of interview

"The interview may take several forms" (Yin 1994, p. 84). He separates three forms of interview: of open-ended nature, focused and survey – type. Open-ended interview collects

not only facts about phenomena, but also opinions and positions of respondents (or 'informants', as Yin calls them). "Such persons not only provide the case study investigator with insights into a matter but also can suggest sources of corroboratory evidence and initiate the access to such sources" (ibid, p. 85). In this type of interview we pose open-ended questions in order to facilitate respondents to express their opinions and insights about the matters about which we, as researchers, may not be aware. In the focused interview, the interview takes a short period of time (an hour, for example). "In such cases, the interviews may still remain open-ended and assume a conversational manner, but you are more likely to be following a certain set of questions derived from the case study proposal" (ibid, p. 85). The third type of interview "entails more structured questions, along the lines of formal survey" (ibid, p. 85).

In or cease study research we would like to use both open-ended and focused interviewing types. Open-ended interviewing of key persons related to our studied phenomenon is necessary for purposeful sampling procedure, that is, identification of interviewees for further data collection. The primary data collection activity will be focused to, or structured according, to our data collection matrix. Yet, we would also want to leave some flavour of open-ended nature in these interviews in order to allow interviewees to freely express their opinions. Thus we intend to pursue interviewing in two phases: open-ended (first phase) and focused (second phase).

Collecting, recording and storing data

Creswell lists another three types of interviews which, in our view, are closely related to adopted data collection technique or procedures: telephone interview, focus group interview and one-on-one interview (Creswell 1998, p. 124). In data collection stage of research we planed to employ solely one-on-one interviews, implying individual approach to respondents both in the first and second phase. Yet we did not rule out telephone interview and focus groups interview in the data analysis and model building stages of the study, where we may want to clarify or identify specific issues and formulate Šiauliai city government's business environment policy framework.

Technically we planed to do two stages of interviewing considerably differently. First stage was done by ourselves in a form of unstructured interviews. We performed several one-on-one open-ended interviews with key persons identified on the basis of our experience with Šiauliai city government as well as recommended by the key persons themselves. The topics of the open-ended interview were: 1) presentation of the research; 2) the need for focused

municipal business environment support policy; 3) interest groups shaping business environment in the city and their strength; 4) key persons within each interest group which could provide required information. The result of the first phase was a long-list of potential interviewees which we analyzed and produced a "final" sample considering research objectives and data collection matrix. We use word "final" in brackets, because the sample changed in the process according to sampling procedures explained above.

We planned to perform the second interviewing phase with the help of professional marketing and public opinion research company, which fully administered and carried out focused interviews according to the developed interview strategy, or interview guide. Interviews have been performed in one-on-one basis by more that one interviewee, thus considerably reducing the overall data collection time. All interviews were tape recorded and transcribed into text. Furthermore, the research company did preliminary coding of the interview texts into categories according to theoretically derived data collection matrix. Coding was be performed using textbase manager software and allowed us to flexibly alter the categorization of interview data during the analysis and model building phases.

It should be noted that interview data is confidential and may not be published or disclosed in any other way. Confidentiality is required because interviews disclose opinions of different members of city communities and their respective positions. Subsequently, publication of interviews as well as names of the respondents is regarded as incorrect with respect to respondents. The confidentiality of interview data and names of respondents is an obligation of researchers that was be stated to the respondents prior to the interview (see Annex B "Letter to Potential Respondents" below).

Data collection principles

Berg differentiates case studies of organizations and communities. We are particularly interested in his writing about community case studies as it is largely related to our research of business environment in Šiauliai. „The logical place to begin considering community groups is in published sources". Data sources may include "examination of census data, local histories, newspaper accounts of group activities and events, any official records of various organizations related to the group or community, or so on." (Berg 2007, p. 299). Yet the main insight for us is definition of the community. "Case studies of communities can be defined as the systematic gathering of enough information about a particular community to provide the investigator with understanding and awareness of what things go on in that community; why and how these things occur; who among the community members take part in these activities

and behaviours, and what social forces may bind together members of this community" (ibid, p. 297). Thus, in order to understand the communities we have to know and understand its principal members, or interests groups. "Interest groups are another way you might divide up the inhabitants of community" (ibid, p. 299). We understand the current situation and dynamics of the system by understanding the roles and interplay of the inherent interest groups. Thus, we have added another dimension to our data collection inquiry: the dimension of interest groups.

3.3.5. ANALYTIC STRATEGY

There are numbers of ways to analyze collected qualitative data in the case studies, which are called "general analytic strategies" by Yin, "general data analysis strategies" by Creswell and simply "content analysis" by Berg (Yin 1994, p. 102, Creswell 1998, p. 141, Berg 2007, p. 303). While all authors advocate somewhat different analytic techniques for analyzing case study evidence, we can emphasize two dominant principles: (1) "every investigation should start with a general analytic strategy - yielding priorities for what to analyze and why" (Yin 1994, p. 102), and (2) data analysis generally maybe differentiated into set of activities, for example data managing; reading and memoing; describing; categorizing (Creswell 1998, p. 148) or coding operation and data interpretation process (Berg 2007, p. 304). Our general position which we formed towards data analysis is that it is necessary to define analytic strategy in advance, but there is no "boxed" strategy – we should formulate our own analytic strategy using various techniques described in the literature and corresponding to the goals of our research.

Our general analytic strategy is based on the process model of design inquiry (see Table 8 below, also 3.2 "Design of the social system" above for details) and "collaborative social research approaches" as a "positivistic approach" to content analysis (Berg 2007, p. 305, 307).

Table 8. Process model of design inquiry

Number *	Stage of the process model
3.3.2	Transcending the existing system
3.2.2.1	Define dimensions of change
3.3.2.2	Choose strategy for transcending
3.2.3	System insight into current state of affairs
3.2.4	Envisioning the first image of the system
3.2.4.1	Learning about new realities
3.2.4.2	Make boundary judgements
3.2.4.3	Creating the first image of the system
3.2.5	Design for transformation
3.2.5.1	Defining the system (purposes)
3.2.5.2	Building a system of functions
3.2.5.3	Designing the enabling systems
3.2.6	Modelling the solution and presenting the model
3.2.7	Creating for transformation
3.2.7.1	Analyzing mismatches
3.2.7.2	Formulating the policy framework

* Number in the table corresponds to paragraph number in the text.

Few important things should be noted here. First, we would like to explain how our process model of design inquiry fits into Berg's collaborative social research approach. "Researchers operating in this research mode work with their subjects in a given setting in order to accomplish some sort of change or action [...]. The analysis of data gathered in such collaborative studies is accomplished with the participation of the subjects who are seen by the researcher as stakeholders in the situation in need of change or action. Data are collected and then reflexively considered both as feedback to craft action and as information to understand a situation, resolve a problem, or to satisfy some sort of field experiment" (Berg 2007, p. 305). This is exactly what we are attempting to achieve following social systems design approach and our process model of design. Also, we find the techniques of open coding, coding frames, analytic coding, and category development relevant to our data analysis strategy despite that they are more often attributed to grounded theory research (Berg 2007, p. 311).

Second, our research has many common features with action research in terms of goals and overall context of the study. "Action research is a collaborative approach to research that provides people with the means to take systematic action in an effort to resolve specific problems. This approach endorses consensual, democratic, and participatory strategies to encourage people to examine reflectively their problems or particular issues affecting them or their community. Furthermore, it encourages people to formulate accounts and explanations of their situation and to develop plans that may resolve these problems" (Berg 2007, p. 224). Technical/scientific/collaborative mode of action research, as Berg calls

it, has the primary goal "to test a particular intervention based on a prespecified theoretical framework" (ibid, p. 231). "Action research is a method of research in which creating a positive societal change is the predominant force driving the investigator and the research" (ibid, p. 224). From this perspective our attempt to create a Šiauliai city government policy framework for enhancing business environment in the city perfectly fits to the definition of action research. Yet, from the perspective of research design and scope, action research, as we understand it, implies a much more in-depth and time consuming exercise than was ever intended for this study. "Kemmis and McTaggart (1988) […] describe the action research process as a spiral of activity: plan, act, observe, and reflect" (Berg 2007, p. 225), furthermore, "the strengths of an action research strategy are a focus upon change, the recognition that time needs to be devoted to reconnaissance, monitoring and evaluation and the involvement of employees (practitioners) throughout the process" (Saunders, Lewis, Thornhill 2003, p. 94). According to the authors, action research is an infinite (or at least undefined in time) spiral of planning, implementing, monitoring, evaluating, revising the plan and then amending planned steps. The extent of such action research not nearly fits into the scope of our research. Yet, according to the authors, the action research spiral begins with initial idea and criteria for change intervention, fact finding and analysis and planning for intervention (Saunders, Lewis, Thornhill 2003, p. 95). Thus, from this perspective, our research should be viewed as the beginning step of the action research spiral.

Third, in our analysis we will be relying on theoretical propositions, which is one of the two of possible general analytic strategies. Our original objectives and design of the case study were based on the propositions, which reflected a set of research questions, reviews of the literature, and new insights. The propositions also have shaped the data collection plan and therefore have given priorities to the relevant analytic strategies (Yin 1994, p. 103, 104).

Table 9. Analytic strategy defined

No.	Analytic strategy
1	Theoretical propositions (process model of research, data collection matrix and research questions) are developed resulting in cathegorical labels.
2	Data are collected and made into text (inluding secondary sources and interviews)
3	Materials are sorted by categories, identifying similar phrases, patterns, relationships, and commonalities and disparities.
4	Additionall codes and cathegorical labels are analytically developed and augmented to theoretical propositions (if required)
5	Sorted materials are examined to isolate meaningfull patterns and processes going through developed process model of design inquiry.
6	Additional data are collected selectivelly depending on the need

* Based on Berg's standard set of analytic activities (Berg 2007, p. 306) adjusted to the needs of our research.

The final note is that although we base our analytic strategy on tools and strategies proposed by various research scholars, we are have to use those tools creatively in achieving our goals of research. Creativity is the key word here. The goal of research is to design a policy framework. “Design creates novelty. Thus, creativity is central in design. Novelty cannot be produced by analysis of what is known or by associating aspects within the same frame of reference” (Banathy 1997, p. 212-213). Our task is to present our findings as well as methods and processes of achieving them in a most possible comprehensive and honest way in order to make them useful for others.

4. EMPIRICAL RESEARCH

In previous section we have developed the methodological approach for collecting the data about city's business environment. In the following section we use the methodology to collect data about Šiauliai city business environment for further analysis.

4.1. DOCUMENTARY DATA

All documentary data used in empirical research of the study was collected and used with the permission of Šiauliai city government administration, except public data which was collected from public sources. List of the documents used in the research is provided (in Table 10) below. References to documentary data related to business environment in Šiauliai were collected from Šiauliai city government officials during interviews for the goals of purposeful sampling.

Table 10. Documentary (secondary) data used in research

No.	Name of the document	Source
1	Šiauliai city strategic development plan for 2007-2016. Šiauliai city government administration, Economic Research Centre, 2006.	Economic Research Centre's archives
2	Development of Šiauliai Industrial Park. Feasibility Study. Economic Research Centre, 2005.	Economic Research Centre's archives
3	Survey of business executives of Šiauliai city and region. Survey Report. UAB "RAIT", 2005.	Economic Research Centre's archives
4	Development of small and medium business in Šiauliai. Presentation by Šiauliai city municipality Economics Department, 2005.	Economic Research Centre's archives
5	Opportunities of Šiauliai city development. Survey of Šiauliai city inhabitants and experts. Presentation. UAB "RAIT, 2005.	Economic Research Centre's archives
6	Economic Environment.Prepared for City's Master Plan, work in progress.	Šiauliai Municipality Administration, Education Department
7	Support for small business. Report to the Šiauliai city mayor. 2007	Šiauliai Municipality Administration, Education Department
8	Review of Šiauliai city economic environment. Šiauliai City Municipality (information prepared for official internet site), September 2006.	Šiauliai Municipality Administration, Education Department
9	Environment for Investments.Šiauliai City Municipality, 2006.	/investicijos/index.php
10	Small and Medium Business.Šiauliai City Municipality, 2006.	http://www.siauliai.lt /ekonomika/smulkus_ir_vidutinis_verslas.php
11	Provisions for the professional orientation systems model. Vytautas Burokas, Ministry of Education and Science, 2007	Šiauliai Municipality Administration, Education Department
12	Cooperation between business and municipality. Working groups for preparation of Šiauliai city strategic development plan for 2007-2016. Discussion notes. 2005.	Economic Research Centre's archives

4.2. SAMPLING

Most of the data was expected to be collected from direct interviews of representatives of institutions or individuals important to business environment formation in Šiauliai city.

According to purposive sampling procedure, explained above (3.3.4.2 “Interviews” / “Sampling (interviewee identification)”, we have interviewed 6 individuals (see Table 11 below) whom we had contacts with from our previous consulting experience in Šiauliai city and who are closely related to formation of city‘s business environment.

Table 11. Purposive sampling interviews

Institution	Number of persons
Šiauliai city municipality administration, officeholders' level	3
Šiauliai city municipality, political level	1
Business associations, top level	1
Šiauliai university, middle level	1
Total	**6**

The main goal of purposive sampling interviews was to create a list of respondents for interviewing. Our target was 20 to 30 respondents from the biggest possible variety of institutions that are related to business environment formation in Šiauliai city. Purposive sampling interviews were designed as unstructured and open-ended conversations in order to identify those individuals which are informed, respected in the community and would be useful for us. Secondary goal was to receive documentary data for the empirical research, as well as to present and verify our data collection method. Resulting from the purposive sampling interviews, we have identified 44 names of potential interviewees which we call “the long list”. Based on our approach to research as community case study (see 3.3.4.2 “Interviews” / “Data collection principles”) we have identified six major interest groups whose interaction shape the business environment in the Šiauliai city. After identifying potential respondents and classifying them into interest groups, or categories, we have reviewed the list carefully and removed from it those potential respondents whose knowledge and experience may duplicate during interviewing (see Table 12 below).

Table 12. Results of purposive sampling procedure

No.	Interest group	Number of respondents	
		Long list	Short list
1	Šiauliai city municipality (both officeholders' and political level)	11	6
2	Business associations (big and medium businesses)	6	5
3	Tertiary and professional education system	11	6
4	Labour market	3	4
5	Banks and financial institutions	0	3
6	Individual business enterprises	5	2
7	Representatives of small businesses	1	2
8	Business support institutions	7	3
	Total	**44**	**31**

Short list of the 31 interviewees was used to pursue actual interviews according to our research methodology. Interviews were carried out and administered under the contract with market research and analysis group RAIT, following collectively developed interview guide (see 4.3 "Interview guide" below). It should be noted that administration of interviewing and our communication with RAIT was arranged in such a way that we were able to control the process, follow the incremental results and alter the nature of interviewing (questions, structure of the interview, approach to the interviewees) accordingly. As defined earlier in this paper (see 3.3.4.2 "Interviews" / "Sampling (interviewee identification)" above), our data collection follows the saturation approach which implies open ended sample of interviewees which size depends of the results of the actual interviews. In case interviews with respondents from the short list would not generate sufficient information to saturate all information categories, we were prepared to extend the list of respondents accordingly.

4.3. INTERVIEW GUIDE

Before starting the interviewing process, we have developed interview guide based on our theoretical considerations about business environment and research questions. The interview guide was developed in collaboration with market analysis and research company RAIT, which administered the interviews.

"The interview guide serves as a framework for the main body of a semi-structured interview, and is based on the key questions that the study is addressing" (Arksey and Knight 1999, p. 97). The goal of interviewing was to fill the data collection matrix (see 3.3.4 "Method for data collection" above), which joined research questions (see Table 5 "Research questions" above) and theoretically derived categories of information (see Annex A "Factors of business environment" below). Thus, after filling data collection matrix, we have obtained

answers to the topical questions in each information category (for example: "What is the current state of firm creation and entrepreneurship in Šiauliai?"; „What are the underlying reasons for that?", What is the desired state of firm creation and entrepreneurship?"; „What could be realistically achieved in this field?"; „How could firm creation and entrepreneurship be improved in Šiauliai?"; „How could Šiauliai city government contribute to the improvement?").

Main requirements for interview process were the following: (1) respondents should be informed about research and what we are doing in order to be able to provide their insights; (2) we need to structure the interviews in the way that would permit both open-ended questions for gathering new ideas as well as closed-ended questions for following the data collection matrix.

Our short list of respondents consisted of major municipality officials, politicians and businessmen and we have decided that realistic time of single interview is approximately 45 minutes. This put a considerable burden of what we were be able to ask during the interview. We realized that we would not be able to cover all information categories in the time of single interview. Because of this time frame it was decided to ask individual respondent only questions about two information categories. By distributing all information categories among respondents (every respondent was attributed two categories), considering their experiences and backgrounds, we have been able to fill whole data collection matrix. Results of information category attribution to respondents are shown (in Table 13) below.

Table 13. Attribution of information categories

No.	Interest group	Number of respondents	Frequency of information categories analyzed						Total
			1	2	3	4	5	6	
1	Šiauliai city municipality (both officeholders' and political level)	6	3	1	3	2	1	2	12
2	Business associations (big and medium businesses)	5	0	1	2	5	1	1	10
3	Tertiary and professional education system	6	0	0	4	5	1	2	12
4	Labour market	4	3	1	0	4	0	0	8
5	Banks and financial institutions	3	3	0	0	0	0	3	6
6	Individual business enterprises	2	0	1	1	0	2	0	4
7	Representatives of small businesses	2	0	2	0	0	2	0	4
8	Business support institutions	3	3	0	3	0	0	0	6
	Total	**31**	**12**	**6**	**13**	**16**	**7**	**8**	**62**

See also Annex C "Interview results" below for the full list of respondents and attributed information categories.

List of information categories for reference is provided (in Table 14) below.

Table 14. List of information categories

No.	Information category
1	Fostering firm creation and entrepreneurship
2	Seizing the benefits of information and communications technology (ICT)
3	Exploiting and diffusing science and technology
4	Enhancing human capital and realizing its potential
5	Infrastructure
6	Business sophistication

4.4. DATA COLLECTION

As explained above, the major part of data collection – interviewing - was performed by public opinion research company RAIT. Despite administration of interviews was outsourced to the third party, we closely monitored and controlled the process with the opportunity to intervene if necessary. Thus we have secured the option to change interview guide in the middle of the interview if it was regarded appropriate and beneficial.

RAIT interviewers were provided with: (1) short list of respondents with their contacts and comments about each respondents position, background as well as referee; (2) table of information categories, subcategories and questions (see Annex A); (3) research questions (see Table 5); (4) List of respondents with attributed information categories; (5) Letter to potential respondents informing about objectives of research (see Annex B). Interviews were recorded on tape and transcribed to text. Additionally, interviewers were asked to write their insights and notes about reactions of interviewees that could not be expressed in words and recorded to tape (for example, changes of the attitudes, reaction to voice recorder, etc.).

After 13 respondents were interviewed, we have discussed the interview results and noticed that answers are rather formal, respondents show incomprehension and fluster; interviewers found it difficult to keep interview within boundaries of information categories. With consideration to that, we have changed interviewing strategy: we decided to submit written questions to the interviewees during interviews (corresponding to attributed categories of information) and allow them to answer those questions which they are most knowledgeable about. The task of the interviewer became to follow the research questions in the each category of information. In such a way we succeeded to encourage open talking of the respondents while keeping them within information categories.

The data collection process, including arrangements of meetings, interviewing and transcription of voice recordings to text took place from March 1 till April 10, 2007. Data collection process to some extent chronologically overlapped with succeeding data analysis

process because of iterative nature of research as well as pressing time frames. Yet in this paper, data analysis process and results are separated to the following section.

4.5. DATA ANALYSIS

4.5.1. DESCRIPTION OF DATA

From the initial sample of 31, 26 (84%) respondents were actually interviewed, while 2 (6%) respondents refused to be interviewed. 3 individuals (10%) agreed to be interviewed, but interviewers were not able to arrange meetings with them during interviewing time and those individuals were not interviewed (see Table 15).

Table 15. Responsiveness of respondents

Interviewed respondents	26	84%
Interviews not arranged during interviewing period	3	10%
Refused to be interviewed	2	6%
Total number of respondents	**31**	**100%**

Thus, we were not able to interview 5 respondents from sample of 31 which constitutes to 84% response rate. Resulting responsiveness of interviewees by interest groups is presented (in Table 16) below. Despite the fact that two interest groups were considerably less responsive that the average of the sample (group 2 – business associations and group 5 – banks and financial institutions), we have decided not to interview additional respondents because we still were able to cover all information categories and preliminary data analysis indicated that categories were sufficiently saturated.

Table 16. Responsiveness by interest groups

No.	Interest group	Initial sample	Responsiveness			Interviewed / sample, %*
			Interviewed	Delayed meetings	Refused interviewing	
1	Šiauliai city municipality (both officeholders' and political level)	6	5	0	1	83%
2	Business associations (big and medium businesses)	5	3	2	0	60%
3	Tertiary and professional education system	6	6	0	0	100%
4	Labour market	4	4	0	0	100%
5	Banks and financial institutions	3	1	1	1	33%
6	Individual business enterprises	2	2	0	0	100%
7	Representatives of small businesses	2	2	0	0	100%
8	Other	3	3	0	0	100%
	Total	**31**	**26**	**3**	**2**	**84%**

* The last column of the table (Interviewed / sample, %) represents responsiveness of the respondents by interest groups.

As mentioned earlier, each respondent has been interviewed according to two information categories. Matrix of interest groups vs. information categories is depicted (in Table 17) below. Interest groups best represented in the sample are tertiary and professional education system (23%), Šiauliai city municipality (19%) and labour market (15%). Least represented groups were banks and financial institutions (4%), individual business enterprises (8%) and representatives of small business (8%). Relative frequencies of information categories questioned are somewhat less dispersed with most frequent 4th category "Enhancing human capital and realizing its potential" (27%) and least frequent 6th category "Business sophistication" (8%).

Table 17. Frequencies of information categories

No.	Interest group	Interviewees		Frequency of information categories analyzed						Total
		Number	%	1	2	3	4	5	6	
1	Šiauliai city municipality (both officeholders' and political level)	5	19%	2	1	3	2	1	1	10
2	Business associations (big and medium businesses)	3	12%	0	1	2	3	0	0	6
3	Tertiary and professional education system	6	23%	0	0	4	5	1	2	12
4	Labour market	4	15%	3	1	0	4	0	0	8
5	Banks and financial institutions	1	4%	1	0	0	0	0	1	2
6	Individual business enterprises	2	8%	0	1	1	0	2	0	4
7	Representatives of small businesses	2	8%	0	2	0	0	2	0	4
8	Business support institutions	3	12%	3	0	3	0	0	0	6
	Total	**26**	**100%**	**9**	**6**	**13**	**14**	**6**	**4**	**52**
	%			**17%**	**12%**	**25%**	**27%**	**12%**	**8%**	**100%**

Frequencies of information categories show initially intended themes of interviews, yet actual thematic patterns of interviews are better represented by analysis of code frequencies, elaborated below.

4.5.2. TEXT ANALYSIS

Text analysis was performed with the help of textbase management software MAXqda2 (www.maxqda.com). This software supports large number of categories and code sets which allows researchers to code text to several different dimensions and analyze resulting relations of codes. For the scope of this research we have used evaluation version of the software.

The whole text base was coded in five dimensions (see Table 18 below). Each dimension has its own code system. Following is the short description of the five dimensions.

Dimensions are based on results of literature review and methodological approach depicted above.

Table 18. Coding dimensions

No.	Dimension	Stage	Objective of dimension	Code system
1	Text source	Identified during research design	Is used to distinguish sources of different opinions	1. Documents (12 texts) 2. Interviews (26 texts)
2	Interest groups	Identified during purposive sampling and complemented during coding	Is used for attaching different views to acting interest groups	1. Community 2. Business associations 3. Šiauliai city municipality 4. Tertiary and professional education system 5. Labour market 6. Banks and financial institutions 7. Individial business enterprises 8. Small business 9. Business support institutions
3	Information categories	Theoretically derived during literature analysis and used during first coding of data	Factors affecting business environment are used for in-depth analysis of the system	1. Entrepreneurship 2. Information and comunication technologies 3. Science and technology 4. Human capital 5. Infrastructure 6. Business sophistication
4	Topical research questions	Identified during research design and used in first coding of data	Used for in-depth analysis of causes, effects, present and intended dynamics of the system.	1. Current situation 2. Causes of situation 3. Ideal state 4. Feasible state 5. How to reach? 6. Role of city government
5	Design	Based on process model of design, results of first coding. Used in final coding of data	Used for pursuing steps of the procxess model of social system design devceloped in literature analysis part of the work	1. Boundaries 1.1. Control 1.2. Influence 1.3. External 2. Units 2.1. Interest groups 2.2. Business enviroenment system 2.3. Embedding systems 3. Analysis 3.1. Goals 3.2. Decisions 3.3. Causes 4. Evaluation 4.1. Positive 4.2. Negative 5. Situation 5.1. Current 5.2. Potential 5.3. Tendencies

First dimension is “text source” which simply indicates the origin of the text. Following our data collection method (see section 3.3.4 above) we have collected data from

two sources – documents (or secondary data) and interviews (or primary data). Documentary data consist of 12 documents (see Table 10 above) and interview data consists of 26 transcribed interviews (see Annex C "Interview results" below).

Second dimension is "interest groups". Eight interest groups were identified during purposive sampling procedure (see 4.2 "Sampling" above) and one interest group was added during coding procedure (interest group "community"). This interest group represents inhabitants of Šiauliai city which do not belong to the other groups but are still related to business environment system analyzed (e.g. workers, experts, inhabitants). Every text (both documents and interviews) has been assigned to appropriate interest group depending on authorship of the document and position of interviewee. Attribution of text to interest groups is depicted in Annex C "Interview results" (for interviews) and Table 38 (for documentary data) below.

Third dimension represents theoretically derived factors of business environment (see 2.1 "Competitiveness, business environment and government policy" above and Annex A below). Portions of the text that were notionally and semantically related to certain factors were coded to appropriate categories.

Fourth dimension was also theoretically identified during research design stage and represents topical research subquestions (see Table 5 "Research questions" above). Portions of the text were assigned to the code system of this dimension similarly to the third dimension.

Fifth dimension differs from the previous four because it was constructed after coding of text to first four dimensions was finished (we call it initial coding). The code system of this dimension was constructed based on the process model of design inquiry (see section 3.2 "Design of the social system" and Table 8 "Process model of design inquiry" above) and taking into account initial coding results.

The goals of the whole coding procedure and rather complex set of different coding dimensions was to streamline analysis of the text and supply data for design process itself. Combining the codes from different dimensions made possible to extract key messages and patterns of the textual data. For example: by combining code "2. Business associations" from "interest groups" dimension, code "3. Science and technology" from "information categories" dimension and "5. Situation/ 5.1. Current" from "Design" dimension we were able to grasp the opinion of business associations about current situation of science and technology related matters in Šiauliai city.

(In Table 19 and Table 20) below we describe some aspects of the data we were using for pursuing our goals of research - designing municipal policy for enhancing business environment. Tables and following discussion illustrate relationships between codes and their implications for analysis of data.

Table 19. Code frequencies (information categories vs. interest groups)

Information categories / interest groups	1. Entrepreneurship	2. Information and comunication technologies	3. Science and technology	4. Human capital	5. Infrastructure	6. Business sophistication	Total
1. Community	3	1	2	3	0	0	9
associations	1	10	16	40	1	1	69
3. Siauliai city municipality	110	21	55	100	76	76	438
4. Tertiary and professional education system	8	0	46	96	7	7	164
5. Labour market	23	8	9	157	0	0	197
6. Banks and financial institutions	16	0	1	7	6	6	36
7. Individial business enterprises	26	16	8	19	14	14	97
8. Small business	14	0	1	8	3	3	29
9. Business support institutions	34	1	25	37	4	4	105
Total	**235**	**57**	**163**	**467**	**111**	**111**	**1,144**
Documents	83	10	14	95	65	65	332
Interviews	152	47	149	372	46	46	812
Total	**235**	**57**	**163**	**467**	**111**	**111**	**1,144**

Technically code frequencies, provided (in Table 19) above, contain the information about how often each code and sub-code was assigned to text segments within a particular text, and for all texts in the textbase (including documentary and interview data). By interpreting this data we can judge about relative concern of interest groups towards specific business environment factor. Thus, the last row of the table shows that human capital is the single most important factor (for almost all interest groups). The second most important factor appears to be entrepreneurship. Then follow infrastructure, business sophistication and information and communication technologies. In general, interest groups perceive information and communication technologies as least important for business environment formation in Šiauliai city. The last column (of Table 19 above) illustrates the relative weighs of the interest groups in the subset of codes. Most of codes originated from Šiauliai city municipality (we should note, that largest portion of these codes were extracted from documentary data,

through it cannot be seen from the table). 29% of the codes were related to documentary (official data) while 71% were extracted from interview texts.

Table 20. Code relationships

	1. Entrepreneurship	2. Information and comunication technologies	3. Science and technology	4. Human capital	5. Infrastructure	6. Business sophistication	Total
Boundaries	**222**	**64**	**137**	**446**	**99**	**34**	**1,002**
Control	118	35	65	133	44	13	408
Influence	82	17	67	277	37	20	500
External	22	12	5	36	18	1	94
Units of analysis	**228**	**62**	**135**	**446**	**95**	**31**	**997**
Interest groups	83	19	71	221	16	17	427
Business environment system	118	32	61	190	39	13	453
Embedding systems	27	11	3	35	40	1	117
Analysis	**160**	**44**	**111**	**338**	**65**	**26**	**744**
Decisions	92	31	56	163	33	14	389
Goals	23	3	20	64	24	7	141
Causes	45	10	35	111	8	5	214
Evaluation	**156**	**21**	**59**	**205**	**59**	**11**	**511**
Positive	83	9	23	77	32	6	230
Negative	73	12	36	128	27	5	281
Situation	**175**	**30**	**66**	**248**	**64**	**14**	**597**
Current	123	22	58	186	36	10	435
Potential	35	4	4	24	22	2	91
Tendencies	17	4	4	38	6	2	71
Total	**941**	**221**	**508**	**1,683**	**382**	**116**	**3,851**

Code relationships, provided (in Table 20) above, show how many text segments any two codes are attached to. The number at the intersection of horizontally and vertically arranged codes is the number of text segments coded with both codes. For example, we may see (from Table 20) that participants of business environment tend to emphasize current situation in favour of potential situation, i.e. tendencies, which we can interpret as lack of vision towards desired future.

It should be explained here that we did not perform quantification of the textual data based on code frequencies and did not do any related analysis. We rather concentrate on notional characteristics of the text: we use coded text for extracting different views of interest groups to certain factors of business environment, current situation, goals, visions and causes; using these patterns we then attempt to explain dynamics of the Šiauliai city business environment and design its desired future state. Importance of the conflicting views of interest

groups was not analyzed in this research yet it may be addressed during later stages of the action research (see 3.3.1.1 “Research method defined” above). Code frequency and relation tables above are provided only for illustration and data description purposes.

5. POLICY DESIGN

In this section we apply the process model of design inquiry, developed in section 3.2 "Design of the social system" to the data collected and coded in the previous section to come up with actual design and model of desired future of Šiauliai city business environment and municipal policy framework for its enhancement.

5.1. RATIONALE FOR ENGAGING IN DESIGN

One of the three strategic priorities of Šiauliai city is "economic competitiveness of the city" (Šiauliai city government administration 2006, p. 12). The five goals of this priority are (1) promote development of high added value industry and business; (2) create favourable environment for innovations in business; (3) develop human capital, increase its capacities with consideration of labour market developments; (4) develop logistics system and expand transport services; (5) enhance tourism sector of Šiauliai city (ibid, p. 48-49). Šiauliai city government administration officials acknowledge that attainment of these goals is closely related to overall business environment in the city and that improvement in this area is inevitable for reaching them. Yet business environment is perceived as somewhat indeterminate concept without explicit understanding what are the integral parts of it and how it could be improved. Together we engage in design of business environment policy framework of Šiauliai city in order to define its content and boundaries and to delineate directions for its improvement. Based on our theoretical analysis we presume that the goal of business environment system is achieving rising and sustainable income per capita in the city (see 2.1 „Competitiveness, business environment and government policy" on page 15 above).

5.2. CHANGE DIMENSIONS AND STRATEGY

We define reasons of initiating change in the three-dimensional model depicted in 3.2.2.1 "Defining dimensions of change" above. Change dimensions for designing Šiauliai city municipality's business environment policy are A(c), B(b), C(b) (see Figure 5 below):

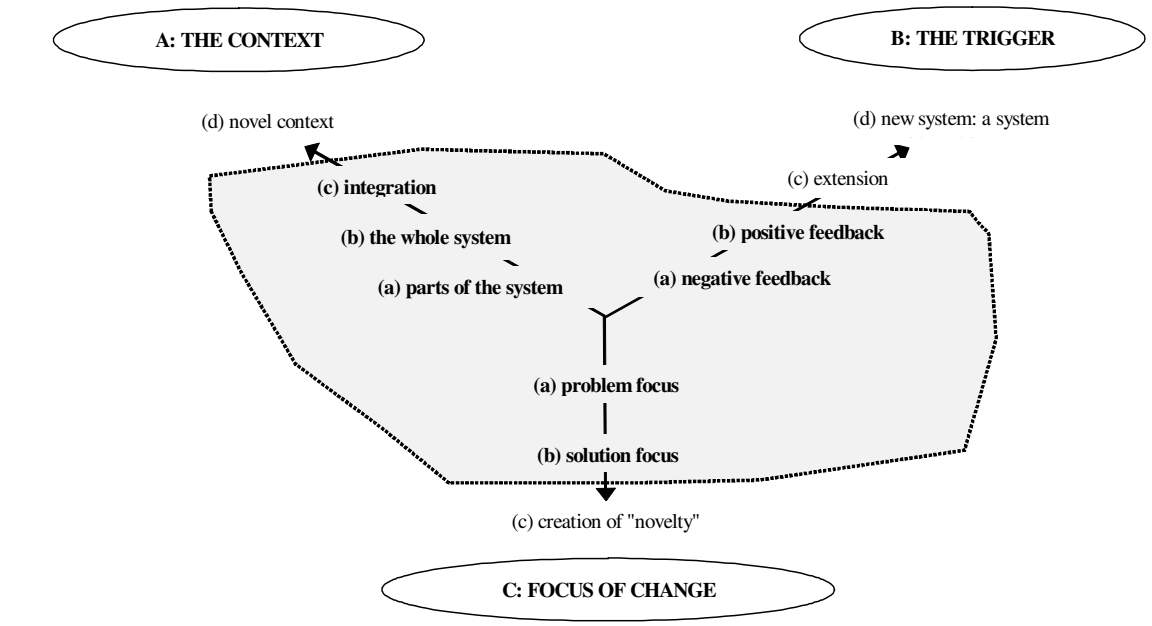
A. The context: (c) integration – the design calls for integration of educational system, labour market, innovation system and local governance.

B. The trigger: (b) positive feedback – the analysis of the current system and design of new one call for finding and eliminating negative feedback loops in the system and designing new positive feedback loops.

C. Focus of change: (b) solution focus – we focus on creating business environment solving current and potential problems of the system.

The definition of change dimensions demonstrates our intent to change existing system without creating completely new one. Design inquiry will be pursued according to strategy "A" (see 3.2.2.2 "Choosing strategy for transcending" above), that is, we will perform situational analysis prior to design.

Figure 5. Change dimensions defined



(In Figure 5) above we illustrate the definition of change dimensions of our target system – Šiauliai city business environment. Shaded area represents the scope of the inquiry. Note that in order to concentrate on solutions we will analyze problems (dimension "C") and in order to design positive feedbacks we will depict negative ones (dimension "B").

5.3. CURRENT STATE OF BUSINESS ENVIRONMENT IN ŠIAULIAI

We used collected empirical data for depicting current situation of Šiauliai city business environment. In order to explain current situation we concentrate on statements about current problems in the system. By extracting all segments of the textbase ("text source" dimension: documents AND interviews) which are coded with both „Situation/Current" AND „Valuation/Negative" codes ("design" dimension) we obtain 168 statements about current problems perceived by different interest groups (for all retrieved segments see Annex D "Data analysis tables", Table 39 to Table 44 "Segments of text coded with „Situation/Current" AND „Valuation/Negative" (#1) below).

Analysis of empirical data was performed with the intent to construct a model of current situation of Šiauliai city business environment. Therefore, for subsequent steps of

analysis we follow our chosen modelling technique (see Annex E "Theory of Constraint's thinking tools", "Building A Current Reality Tree (CRT)" below).

Number of retrieved segments was far too large for analysis; besides, many of the statements recurred several times. In order to make data analyzable we contracted all the statements which duplicated notionally or semantically. The guiding principle for this procedure was the goal of situational analysis. We define the goal of analysis of current situation in terms of two questions:

(1) Why people in Šiauliai earn less than in Lithuania on average?

(2) Why GDP per capita in Šiauliai is only 75% of Lithuania's average?

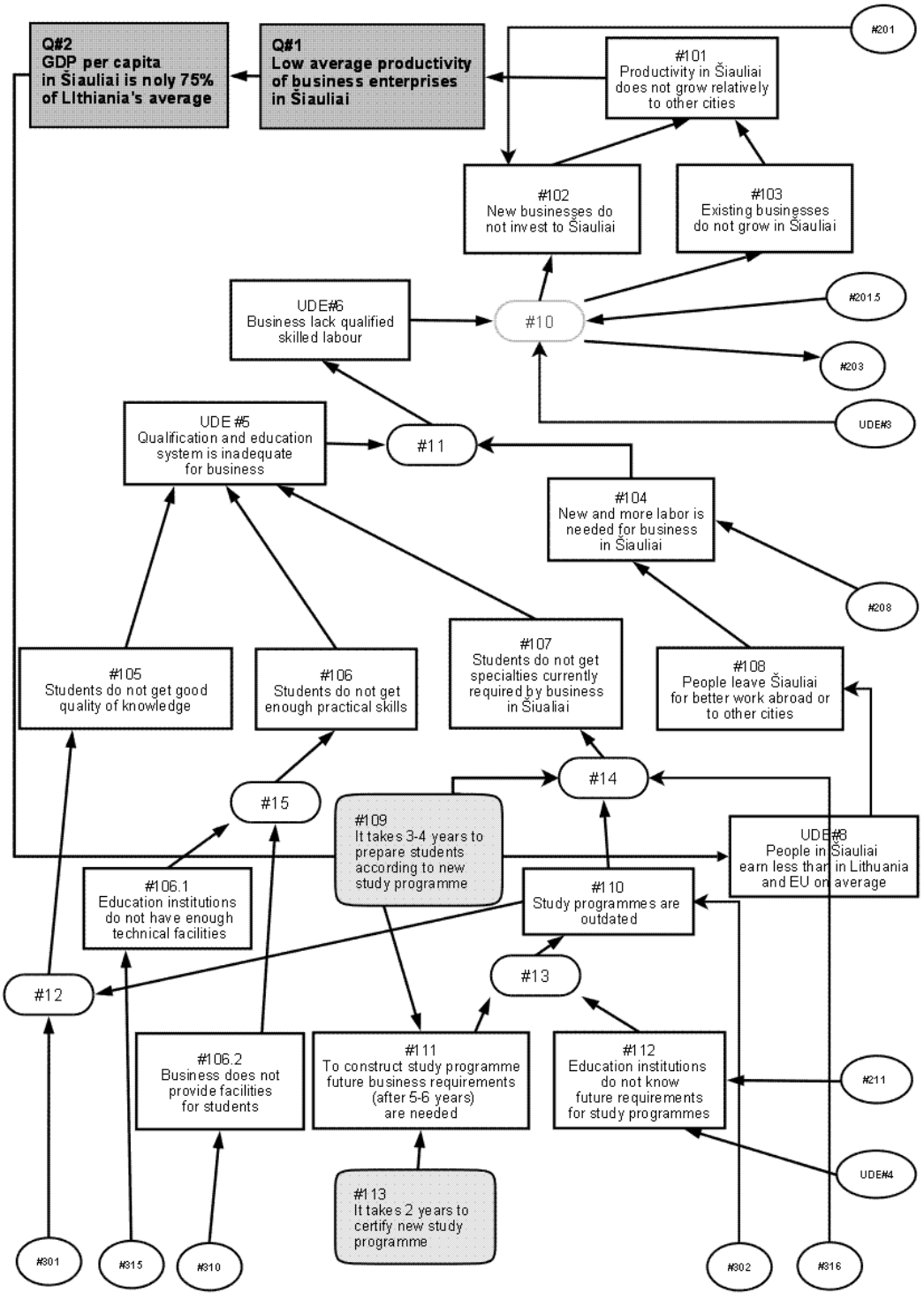
By following this principle of contracting the data we result in 26 summarized statements about problems of current situation of business environment in Šiauliai (Table 21 below). We call these statements undesirable effects and list them in the order of priority or significance. We begin constructing model of the current situation with first seven undesirable effects and but later use both other summarized statements as well as initial retrieved segments.

Table 21. List of undesirable effects for CRT construction

1	Low avarage productivity of business enterprises
2	Business lack qualified and skilled labour
3	There is no prepared land for physical investments
4	Lack of coordination between all interest groups
5	Qualification and education system is inadequate for business
6	Too many bureaucratic obstacles for business
7	Innefective labour market
8	Šiauliai city has no strategic directions for development
9	Lack of leisure activities for inhabitants
10	It is difficult to start business in Šiauliai
11	City does not exploit its natural advantages (airport, transport center)
12	Innefective business support system
13	Insufficient level of information and telecomunication technologies
14	Low salaries
15	Innefective qualification and education system
16	It is not safe in the city due to unnocupied youth
17	There are no attractive workplaces
18	Investments do not come to city
19	Unclear business support system - businessmen do not know where to go
20	Young people (students) see better prospects abroad than in Šiauliai
21	Support for innovations is declarative more than real
22	Salaries of university teachers are very low
23	Business enterprises are treated unequally
24	There is no clear business support policy
25	There is no policy for attracting investments
26	People leave Šiauliai for better work

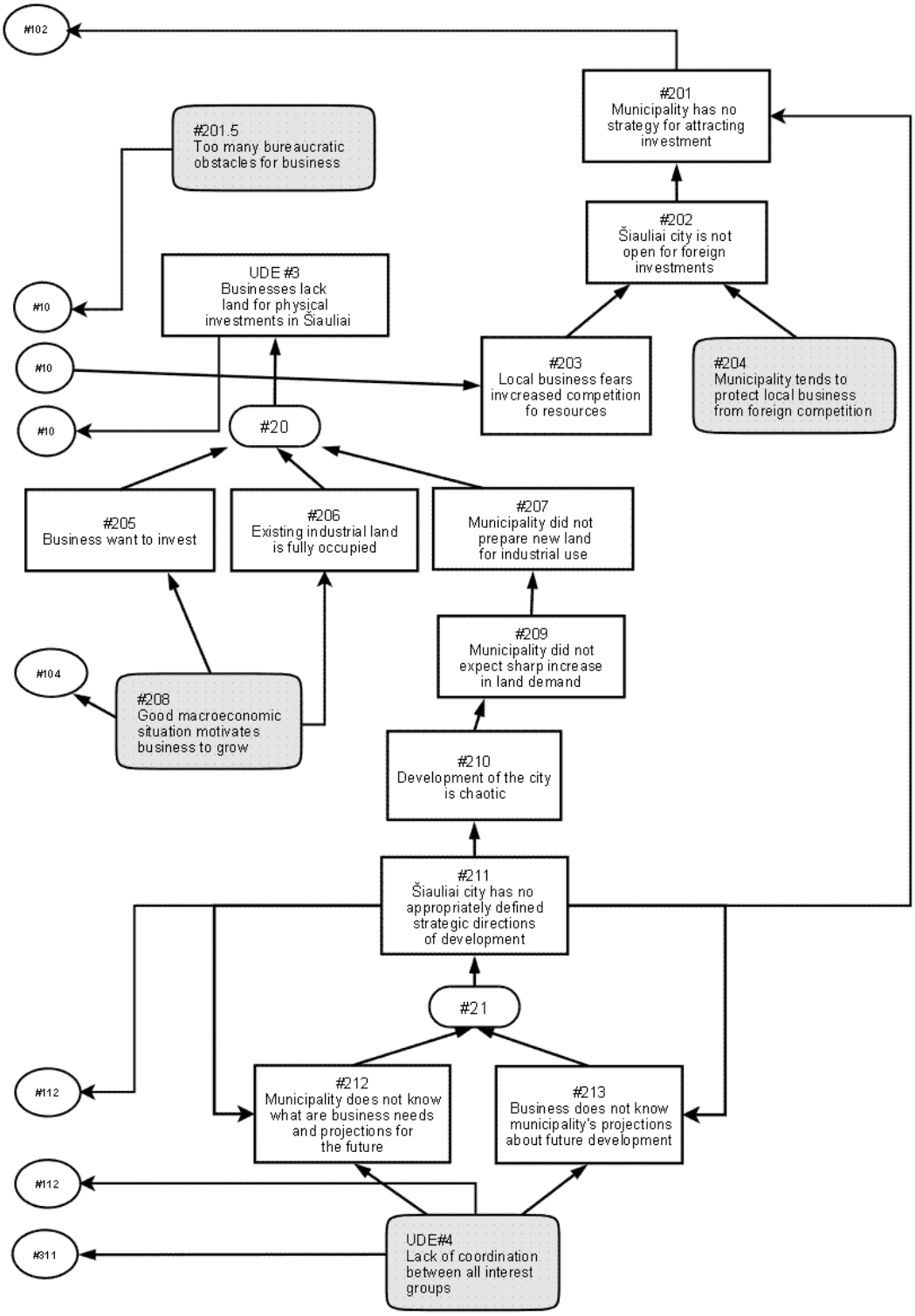
(In Figure 6, Figure 7 and Figure 8) below we picture the current state of business environment in Šiauliai modelled following the procedure explained in Annex E "Theory of Constraint's thinking tools", 0 "Building A Current Reality Tree (CRT)" below. The tree depicts cause and effect relationships leading to answer to the goal of analysis. The entities representing questions, formulated as the goal of analysis, are depicted as dark-shaded rectangles with bold text. Root causes (which, according to definition, begin cause and effect chain) are depicted as bright-shaded and round cornered rectangles.

Figure 6. Current Reality Tree of Šiauliai business environment (page #1)



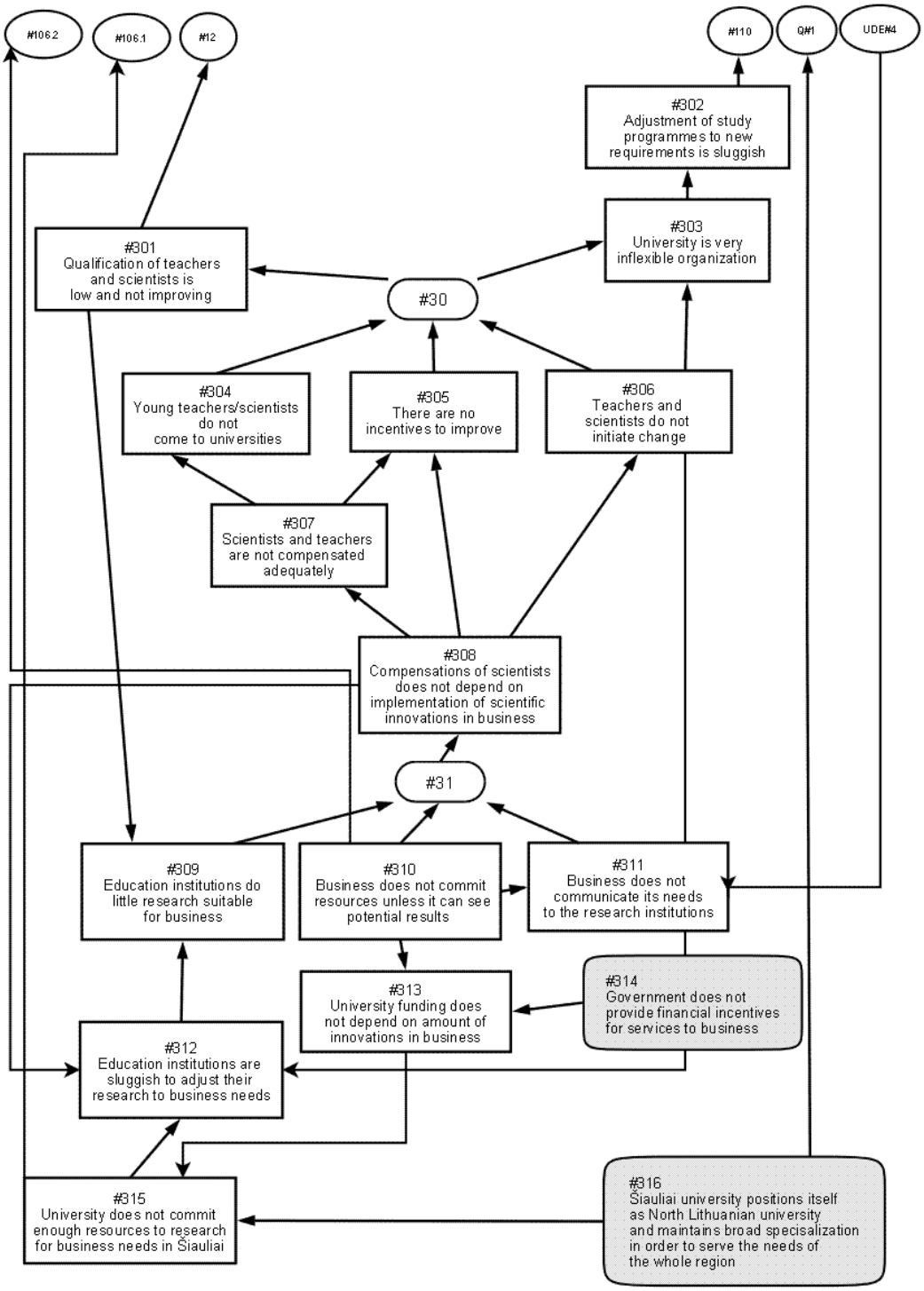
Note: According to CRT notation system, ellipses mean joint dependency relationships (i.e. eliminating on of the causes leads to break of relationship). Yet ellipse #10 (distinguished in bright colour) is used only for clarity of the diagram and does not constitute to "AND" logical statement;
Note: Ovals represent connections of entities on another page (with respective numbers).

Figure 7. Current Reality Tree of Šiauliai business environment (page #2)



Note: Ovals represent connections of entities on another page (with respective numbers).

Figure 8. Current Reality Tree of Šiauliai business environment (page #3)



Note: Ovals represent connections of entities on another page (with respective numbers).

Root causes and goals of analysis are summarized (in Table 22) below, explaining relative significance of them in the current situation as well as possible influence of Šiauliai city government over the issue in terms of sphere of influence or span of control.

Table 22. Root causes depicted

Notation in CRT	Description	Significance	Boundary
Q#1	Low average productivity of business enterprises in Šiauliai	Goal of analysis: main undesirable effects	
Q#2	GDP per capital in Šiauliai is only 75% of Lithuania's average		
#109	It takes 3-4 years to prepare students according to new study programme	"Facts of life" - negative	Outside sphere of control
#113	It takes 2 years to certify new study programme		
#314	Government does not provide financial incentives for services to business	External circumstances	
#208	Good macroeconomic situation motivates business to grow	"Facts of life" - positive	
#201.5	Too many bureaucratic obstacles for business	Root cause	Span of control
#204	Municipality tends to favor local business from foreign competitors		
#316	Siauliai university positions itself as North Lithuanian university and maintains broad specialization in order to serve the needs of the whole region		Sphere of inflence
UDE#4	Lack of coordination between all interest groups	Core problem	

It appears from the analysis that the core problem is lack of coordination between all interest groups. Other root causes that are possible to attack are related to bureaucratic obstacles, reservations of municipality about benefit of foreign direct investment in Šiauliai as well as policy issues of education institutions present in Šiauliai. This analysis provides good picture of current situation with business environment in the city, yet does not provide solutions, which will be addressed in the following stages of the process model of design.

5.4. FIRST IMAGE OF ŠIAULIAI BUSINESS ENVIRONMENT

For envisioning first image of Šiauliai business environment we have used data extracted from our textbase in the same manner as previously. However for this task we have used seven combinations of codes to extract data instead of one (see Table 23 below). By using the procedure we have obtained information about positive and negative aspects of current, potential situations and existing developments of the system. The seventh code combination extracted information about external influences to the business environment system and state of embedding systems.

Table 23. Code combinations for envisioning the first image

No.	Code combinations	Interpretation
1	Situation/Current AND Valuation/Negative	Existing negative aspects of Šiauliai business environment (also used for CRT construction)
2	Situation/Current AND Valuation/Positive	Currently existing positive aspects of the business environment
3	Situation/Tendencies AND Valuation/Negative	Currently ongoing negative developments and tendencies
4	Situation/Tendencies AND Valuation/Positive	Currently ongoing positive developments and tendencies
5	Situation/Potential AND Valuation/Negative	Potentially possible negative and undesired state of Šiauliai business environment
6	Situation/Potential AND Valuation/Positive	Potentially possible and desired state of business environment
7	Boundaries/External	External developments which affecting the system and cannot be influenced by municipality

5.4.1. NEW REALITIES

Identifying new realities is required to understand the changes in the environment calling for the design itself. We have identified old and new realities according to eight markers (see Table 24 below). The markers, or components of change, represent six factors of business environment which we identified during theoretical analysis and used as information categories in data collection matrix (see Annex A "Factors of business environment" below). Two additional markers are "local governance", explaining deep changes in the nature of governing and "business support system", depicting associated institutional development.

(Table 24 shows that) the changing realities affecting Šiauliai business environment are: productivity and competitiveness of business companies is shifting from dependence on cheap labour to high technology and skilled labour; demand for quality information and communication services and content is increasing; business needs high technology and research as a matter of survival in enlarged EU market; highly skilled employees are needed to work with high technology, yet existing labour market does not provide appropriate labour force (in terms of qualification and specialization) and business finds it difficult to provide high remuneration due to existing low technology; pressure for business to grow and sophisticate its technology increase the need for prepared industrial land in the city; municipality is taking appropriate steps to increase land supply, yet current lack of the land hinders development and foreign direct investment for few years; higher technology and increased competition both in product and resource markets distinguish growing companies with professional management and increasingly troubled ones with low quality of

management; municipality officials realized the need for aligning developments of business environment according to long term strategic plans of the city and directions of development satisfying all interest groups of the city; all interest groups should be visible and contribute to the transparent decisions of the municipality; already created and functioning business support institutions should be better coordinated and create business support network with tuned goals and action plans.

Table 24. Old and new realities of Šiauliai business environment

No.	Marker	Old realities	New realities
1	Fostering firm creation and entrepreneurship	Productivity and competitiveness is based on low cost resources, primary low cost labor, advanced management is secondary importance	Productivity and competitiveness is based on high technologies and skilled labor force. Advanced management is required.
2	Seizing the benefits of information and communications technology (ICT)	The main tasks are increasing computer usage level, learning basic computer skills and connecting to the internet (quantitative level)	Demand for quality services is increasing. The main task is to induce institutions and companies to create content and services in digital space
3	Exploiting and diffusing science and technology	Business does not need high technology because reliance on cheap labor. Science institutions are surviving from limited government funding.	Business needs high technology and advanced research because of competitive pressure to increase productivity. Science realizes the need to partially finance themselves from public-private partnerships with business
4	Enhancing human capital and realizing its potential	Education institutions adapt to market conditions, institutional system of proffessional education and labor market are establishing themselves. Low cost labor is flooding from Šiauliai to other cities because of industry crisis. Remuneration is low due to dominating low qualification.	Labour market feels competitive pressure from other Lithuanian cities and EU markets. Labor demand better work conditions and higher remuneration; business demand higher qualification. Inbalances between required and existing qualifications and specializations in the labour market are increasing.
5	Infrastructure	Šiauliai cannot utilize natural advantages as city with intersection of three transportation means because of lack of funds and pure condition of infrastructure. City have no prepared industrial land.	Šiauliai is establishing itself as large logistics center in Lithuanian and EU level with advanced airport, railway and automobile road infrastructure. City prepares industrial land for business development.
6	Business sophistication	Entrepreneurs lack financial and accounting knowledge, risk management and general management skills. Entrepreneurs learn managementfrom their own experience but do not share their practices.	Entrepreneurs increasingly use professional management, adequately prepared by education institutions. Business with poor management is not surviving.
7	Local governance	Local government solves problems on ad-hoc basis, without long term strategic directions of city industrial development. Interests of strong lobying groups are best heard in municipality. Community, business and municipality do not trust each other.	Municipality needs to consider interests of all interest groups, and make transparent decisions for formulating well balanced long term development policy. Community, business, municipality and aducation institutions should work together for following the strategic plan.
8	Business support system	Focus on institutional develoment.	Institutions are created and developed. Focus on coordinating activities of all institutions.

5.4.2. FIRST IMAGE OF THE SYSTEM

The image of the system carries the information about the directions of required developments and changes based on current situations and new realities of system environment. The first image of Šiauliai business environment is organized in three column

table (see Table 25 and Table 26) around the same eight markers (used for depicting old and new realities). The image provides description of current and desired state of the system with respect to each marker.

Table 25. First image of the system (#1)

No.	Marker	Current state	Desired future state
1	Fostering firm creation and entrepreneurship	Dominating business is low technology. Avarage productivity of Šiauliai business enterprises is low. Business is still relies on low cost labor thought it is becoming increasingly difficult due to lack of such labor force.	Business shifts to using high technology and skilled labor. New high technology companies are created (including foreign direct investment) and existing compenies are modernized or withdrawn. Entrepreneurs take risks of using new production methods and technologies Bancrupcy becomes mechanism of progress.
2	Seizing the benefits of information and communications technology (ICT)	While information and telecomunication infrastructure is considered good, companies and institutions delay creating advanced services and content in the digital space because of concerns about security and unrealized benefits.	Municipality, business support institutions and companies use and constantly sophisticate advanced information technologies (including benefits of e-government) to establish mutual high quality communication channels reaching increased communication/coordination with redused costs.
3	Exploiting and diffusing science and technology	Science institutions and business companies find it difficult to cooperate because of insufficient incentives and lack of finances to change (science), unwillingness to invest to joint research (business) as well as inbalance between demand and supply of current research facilities.	Appropriate research and excellence centers featuring new technologies and advanced research are created based on the needs of business and long term stretegic development directions of the city. Duffusing science and technology is based on public-private partnership principles and employs new communication channels offered by advanced information technologies.
4	Enhancing human capital and realizing its potential	No competition in labor market from labor side yet intense competition from employers side. Existing labour force is scarce and unskilled. Business needs labour with higher qualification yet finds it difficult to pay competitive wages. Labor requires higher remuneration yet education institutions fails to supply adequate qualifications and skills. Labour tends to emigrate.	Labour market is competitive and balanced (competition exists both among employees and employers). Education institutions cooperate with business for educating and preparing skilled and adequate labour force. Education institutions follow long term strategic directions of the city in preparing study programmes. Education institutions and business share advanced technological facilities and other resources. Municipality and business support institutions monitors and solves inefficiences of the system.

Table 26. First image of the system (continued - #2)

No.	Marker	Current state	Desired future state
5	Infrastructure	Infrastructure is inadequate for business needs. There is no prepared land in the city for industrial purposes which stopped growth of the business. City is underexploiting its potential to become logistics center with intersection of three transportation means. Municipality identifies need for infrastructure when it is already hinders development.	Municipality formulates future infrastructural develoment of the city collaborating with business and community. Adequate infrastructure is created in advance based on strategic plan and fosters desired development of the industry. Existing georgaphical position of the city and all transportation means are fully utilized to establish Šiauliai as large logistics center.
6	Business sophistication	Advanced and professional management practices are rare and limited to large enterprises. Enterpreneurs generally lack management skills and knowledge yae find it difucult to acquire them due to overinvolvement in routine tasks (especially in small business ventures) and lack of resources (including time). Best business practices are not spreaded among business community.	Business increasingly use professional management, small business posess advanced management skills and increasingly uses delegation of functions. Education and professional qualification institutions support the growing management skills by providing adequate courses, spread best business practices locally as well as internationally. Municipality supports and promotes business and community initiatives.
7	Local governance	Municipality has no broad strategic directions of development and have no basis for routine decisions. Unequal power of interest groups create inbalance of representation of different interests and pushes municipality to protect narrow interests.	Municipality considers interests of all interest groups, decisions are transparent and public. City has balanced long term strategic directions of development which are basis for decisions. Community, business, municipality and aducation institutions work together for following the strategic plan and solving the problems.
8	Business support system	Existing business support institutions plan and perform their activites independently. Despite the the well developed infrastructure and existing information business does not reach it due to lack of proper communication channels and chaotic activity of the system.	Business support institutions with the coordination of municipality form solid support network with concerted strategic plans and actions. Services and actions of the network are based on business needs and strategic directions of city development. Advanced and cheap information channels using information technologies are employed.

(Table 25 and Table 26 show that) the desired aspects of future business environment system call for rise of usage of advanced technology and related investment in infrastructure (including attracting foreign direct investment); skilled labour; advanced communication channels based on information technologies; research and excellence centres based on collaboration of business and science institutions; competitive labour market with appropriate dialogue between parties and adequate professional qualification facilities; adequate infrastructure needed for business growth; balancing interests of all interest groups in the city

when taking decisions about future development; long term strategic directions of city development; coordination of activities of all business support institutions for reaching common goals of the city.

5.5. DESIGN FOR TRANSFORMATION

Design for transformation of Šiauliai business environment is based on analysis of current state and first image of the system, depicted above. Design of transformation itself falls into two interdependent steps: system definition (which includes defining system of functions) and policy formation.

5.5.1. ŠIAULIAI CITY BUSINESS ENVIRONMENT DEFINITION

Following steps of the process model of design (see 3.2.5.1 „Defining the system" above) we have identified and depicted: (1) purposes of each interest group related to the business environment, (2) purposes of Šiauliai business environment as a system and (3) purposes of embedding, or outside systems. For identification of the respective goals we again queried the textbase of collected data and retrieved statements coded with four combinations of codes depicted (in Table 27) below.

Table 27. Code combinations for defining the system

No.	Code combination	Interpretation	Number of retrieved statements
1	Analysis/Goals AND Units/Interest groups	Purposes of synergetic parts (interest groups of the system)	45
2	Analysis/Goals AND Units/Business environment system	Purposes of business environment system as on unit	67
3	Analysis/Goals AND Units/Embedding system	Purposes of embedding or outside systems (not falling into the boundaries of analyzed system)	15
4	Analysis/Decisions AND Units/Interest groups	Decisions of interest groups related to solving respective problems of business environment	106
	Total		**233**

Total number of retrieved segments using the codes was 233 (see Table 27 above). The fourth code carried the most information and was included into analysis of system participants' goals despite the code name does not strictly fit the objectives of analysis.

The purposes in all three categories were arranged by markers developed during envisioning the first image of Šiauliai business environment system (see above). Resulting system of purposes is depicted in tables below. Purposes of each interest group arranged by markers are provided (in Table 28 and Table 29) below, while purposes of Šiauliai business

system and embedding systems are depicted (in Table 30) below. It should be noted that tables include only information retrieved from textbase of collected data and were not complemented from any other sources, thus blank cells in the tables indicate missing data or that interest groups have no purpose in respective area.

Table 28. Purposes of interest groups (as Šiauliai business system participants) (#1)

Marker	Interest group: Šiauliai city municipality	Business associations	Tertiary and professional education system	Labour market	Banks and financial institutions	Individual business enterprises	Representatives of small businesses
Fostering firm creation and entrepreneurship	Stimulate growth and investment which in turn increases value added and tax income of municipality; attract foreign direct investment	Simple and quick start of business, less bureaucratic procedures related to investment and growth	More demand for education services, higher income from education and qialification services (from business)	Better working places, higher remuneration; employers committing resources to employee qualification	Innovative products, attractive projects and rising crediting market	Rising demand for quality products; rising purchasing power of inhabitants	Equal opportunities for all business ventures without direct protectionism
Seizing the benefits of information and communications technology (ICT)	Decreased costs and paperwork; Benefits of ICT not fully realized	More and better quality information, decreased costs and paperwork; priorities of city development in ICT	Better communication channels, higher quality information exchange	Better document management, less paparwork, and costs; better access to labour (especially vouth)	Better marketing of the city, information exchange	Information databases, dissemination of public research results; decreased bureaucratic procedures and associated costs	
Exploiting and diffusing science and technology	Rise of higher value-added business; increased quality of public research	Decreased costs of finding suitable research institutions for business, streamlined process of business-science communication; creation of targeted excellence centres available for business use	Demand for scientific research fo large business compenies; improvements in intelectual property rights system;	Better remuneration of scientists; decreased emigration of scientrits	Innovative products, new technology, attractive investment projects, including high technology projects	Systematic (versus ad-hoc) cooperation between business and science institutions; joint laboratories and research centers; involvement of scientists in business projects;	
Enhancing human capital and realizing its potential	Higher skills of municipality's officials, increased quality of current municipality's functions.	Good quality and appropriate specialization labor; better management education, courses, foreign lectures; higher business investment to HR; effective emloyee search capabilities	Better quality information (research) about future requirements, prospects of labiour market, specialities needed; stimulating engineering education and science; Stimulate tripartite agreements between universities, employers and employees;	Better quality information and research about prospects and future needs of labour market; students acquire practical skills; higher remuneration after graduating; business involvement in the study process; more active participation of business in shaping labour market; remunaration compatible to EU level		Enhancement of emplouee skills and requalification of adults; attraction of more and better labour force to Šiauliai (immigration is possibility);	Higher qualifications and skills of municipality officials

* The table depicts only information from textbase of collected data. Blank cells indicate absence of corresponding retrieved statements.

Table 29. Purposes of interest groups (as Šiauliai business system participants) (continued - #2)

Marker	Interest group: Šiauliai city municipality	Business associations	Tertiary and professional education system	Labour market	Banks and financial institutions	Individual business enterprises	Representatives of small businesses
Infrastructure	Preparation of needed infrastructure in advance; prepare airport for usage for logistics; establish Šiauliai as logistics center;				Completion of Industrial park (land prepared for investment) as soon as possible.	Business should not finance preparation of planing documents needed for land usage (municipality should cover the costs);	Municipality should do their work well
Business sophistication	Help business to do business planning; Strenghten business process engineering skills, organize visits	Enhance management education. Invite lecturers from abroad. Organize more information seminars, etc.	Solvbe intelectual property rights problems, creaet appropriate system	Spread good management practices among business (including peronell management practices)			Municipality officials need better qualification
Local governance	Long term strategic approach to city development (in terms of development directions and priorities); better skills of officials; streamlined bureaucratic procedures; high quality of existing functions; Integratation and strategic coordination of business support institutions.	Stimulation of discussions between social partners; consistency in decisions	Good analysis of current situation and developments; improved collaboration with science institutions	More and better informational seminars	Integrated yet real approach; strategy about development priorities of the city is neededimproved collaboration with banks, joint projects for business and develpmnet financing	Less intervention to business matters; decreased dominance of large buisness; coordination of joint marketing of small companies; more people in local government who understand specific sector and have its vision.	No direct intervention to busness matters; Better skills of municipality officials; better opportunities for representing various interests in local government, no discrimination between interests;

* The table depicts only information from textbase of collected data. Blank cells indicate absence of corresponding retrieved statements.

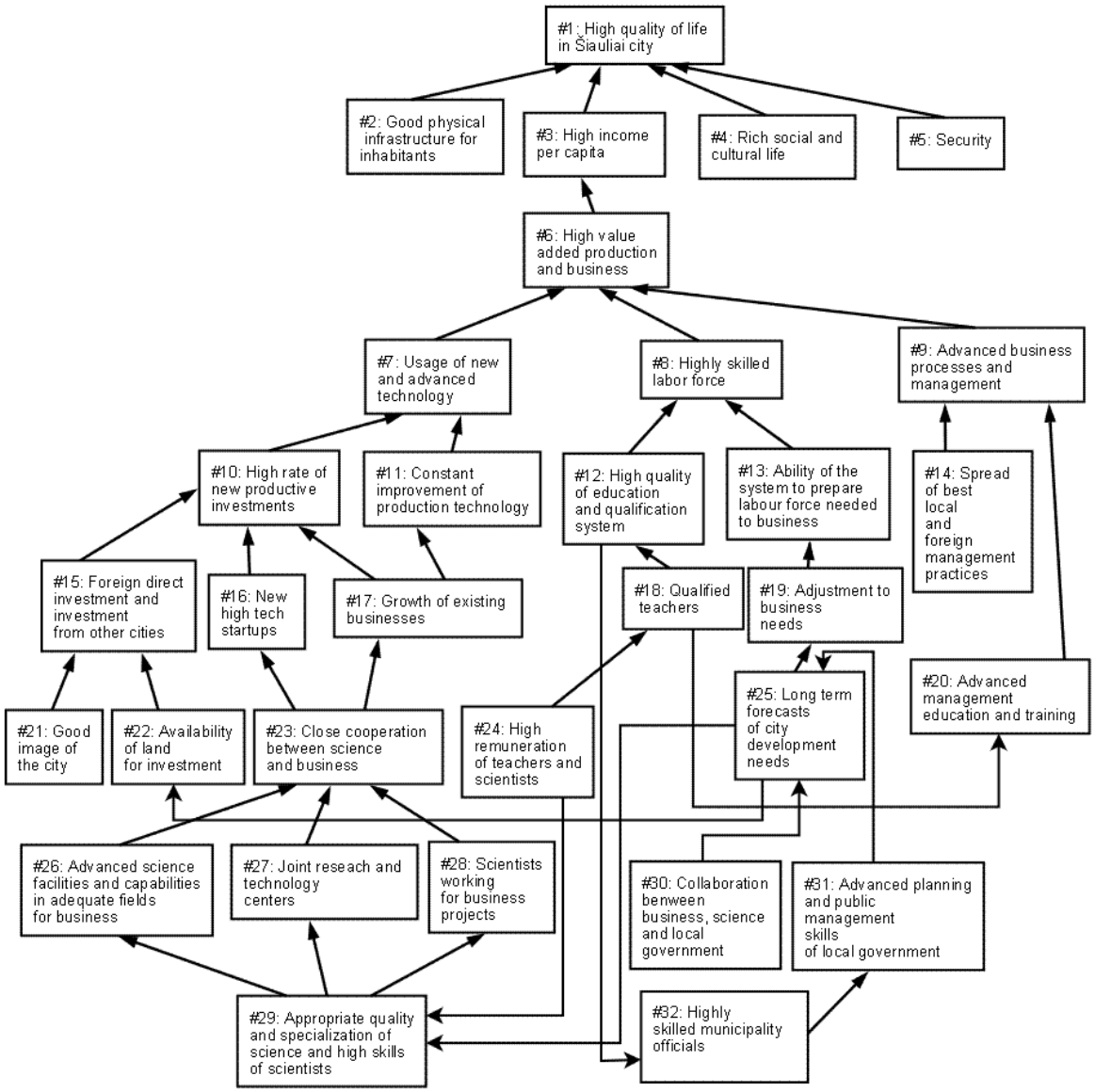
Table 30. Purposes of Šiauliai business system and embedding / outside systems

Markers	Goals of	
	Business environment system	Embeddding systems
Fostering firm creation and entrepreneurship	Stimulate and attract investment to Šiauliai city (including foreign direct investment)	City should become attractive to tourists
Seizing the benefits of information and communications technology (ICT)	Advantages of information technologies should be used while balancing risks; consistent and coordinated development of ICT should be ensured.	EU and national authorities support ICT development, financial support may be obtained on project basis
Exploiting and diffusing science and technology	City economy should move to higher value added products through introducing high technologies and collaborating with science	EU politically and financially strongly supports colaboration between science and business.
Enhancing human capital and realizing its potential	Labour should possess and constantly advance adequate qualifications and skills needed for business	Tertiary institutions' system reform is a necessity and probably a matter of time yet still nothing is done into that direction
Infrastructure	The city should become a place where it is good to live; Šiauliai should become logistics center of North Lithuania and integrate into European logistics network	The ideal situation for Šiauliai is the coexistance of all means of infrastructure (air, railway and motorway)
Business sophistication	Best management practices and buisness processes should be used in order to generate higher value added in the economy	
Local governance	Municipality should become the axis of development, become part of the process. Local government should stimulate long term planning of city development and fostering of social partnership	
Business support system	Business support system should work in concert solving the inefficiencies of the market	

* The table depicts only information from textbase of collected data. Blank cells indicate absence of corresponding retrieved statements.

The information from tables above was used to construct the formal representation of hierarchical system of purposes of Šiauliai business system (see Figure 9 below). The system of purposes was graphically depicted as the Strategic intermediate objectives map according to methodology described in 3.2.5.1" Defining the system" (see Figure 4 above). It should be noted that while lists of purposes of interest groups, business environment and embedding systems were the basis for construction of system of purposes, results form other stages of analysis were also used.

Figure 9. Strategic intermediate objectives map of Šiauliai business environment



5.5.2. MODELLING THE DESIRED FUTURE

Before proceeding with the central stage of the design process model it is worth to summarize intermediate results of the analysis performed above. Until now we have completed number of steps guiding us logically to rather complete and detailed vision of desired future of the system. We have the following information at our disposal which will be used for modelling the desired future state of the system:

(1) Change dimensions of the design inquiry (Figure 5 on page 70);

(2) Model of current state of Šiauliai environment (Figure 6, Figure 7 and Figure 8 on pages 73-75);

(3) Root causes (undesirable effects) of the current state (Table 22 on page 76);

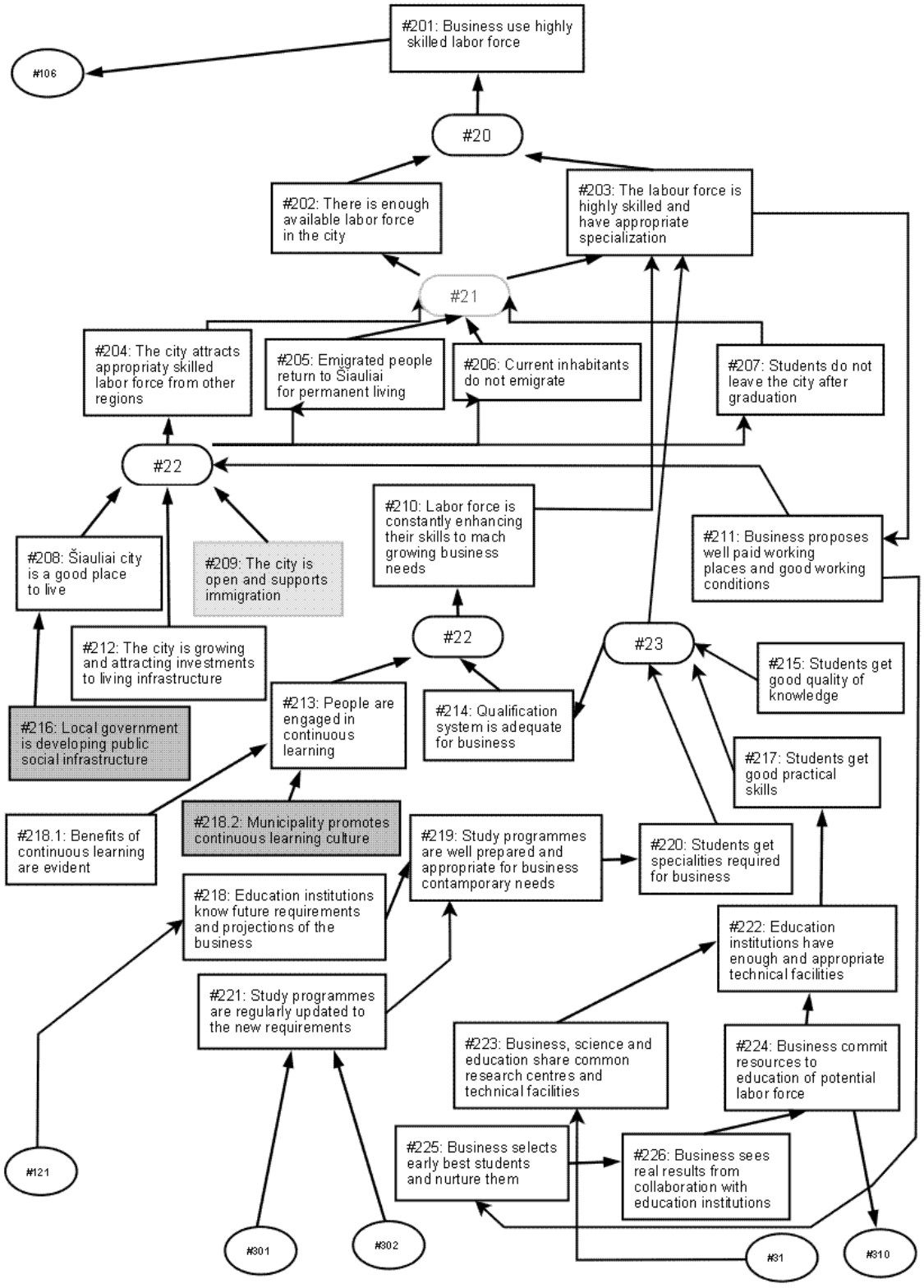
(4) First image of the system in terms of definitions of current state and desired state of Šiauliai business environment according to eight "markers" (Table 25 and Table 26 on pages 80 to 81);

(5) Complete definition of the system in terms of hierarchical system of purposes, combining purposes of all interest groups within the system and purposes of the system itself (Figure 9 on page 87);

(6) All the listed information represents derivatives from underlying data retrieved from the textbase of collected data. The underlying information was also used for designing and modelling the desired future state of the business environment system.

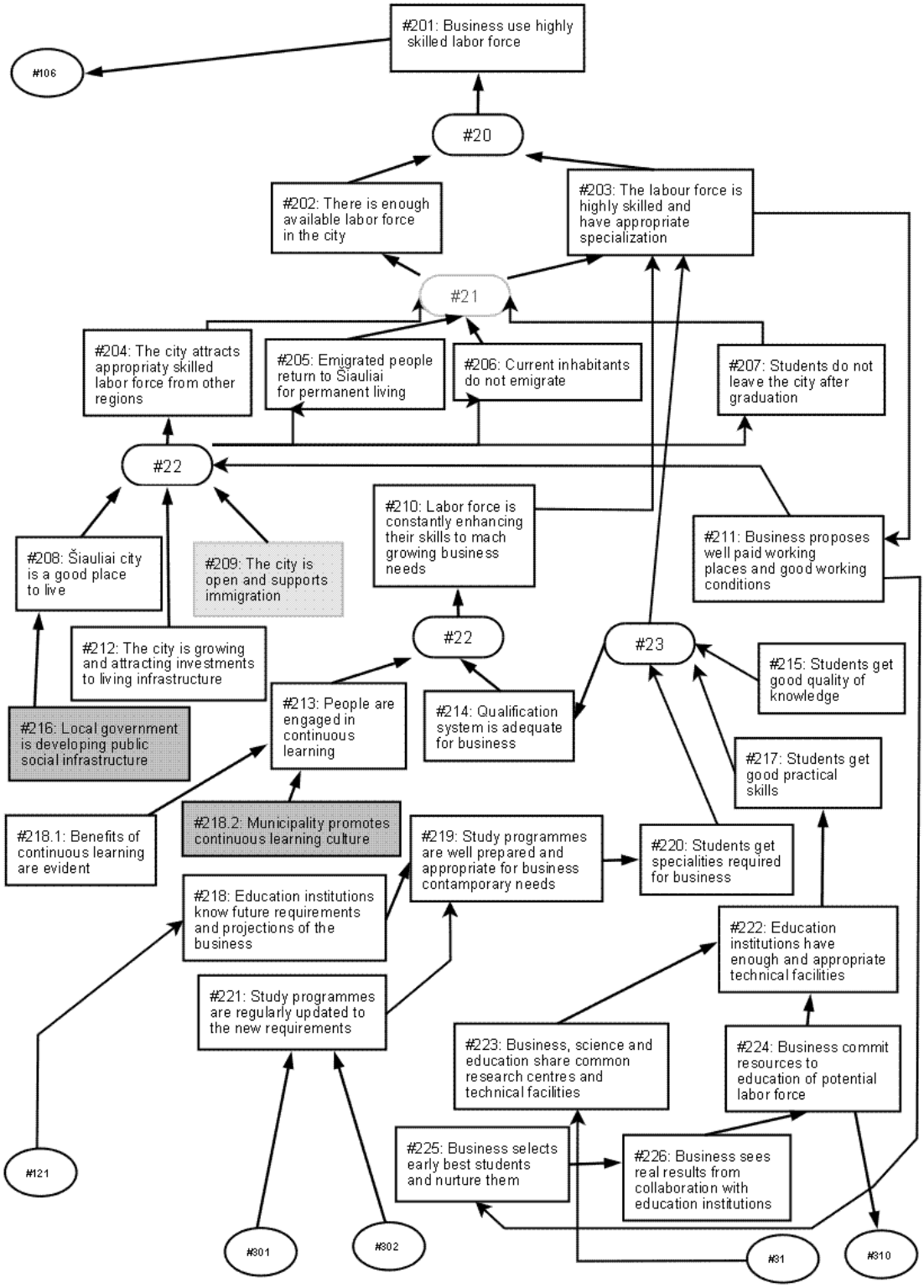
We have integrated all listed above information to produce the model of desired future state of the system in the form of Strategic Future Reality Tree of Šiauliai city business environment (see Figure 10, Figure 11 and Figure 12 on pages 89 to 91). The model was constructed following the procedure described in Annex E "Theory of Constraint's thinking tools", "Constructing A Strategic Future Reality Tree" below. Basically, the procedure encompassed augmenting the system of purposes (strategic intermediate objective map) with detailed injections, actions, desired and undesired effects taken from all the other sources of information listed above and resulted in full picture of desired future.

Figure 10. Strategic Future Reality Tree of Šiauliai business environment (page #1)



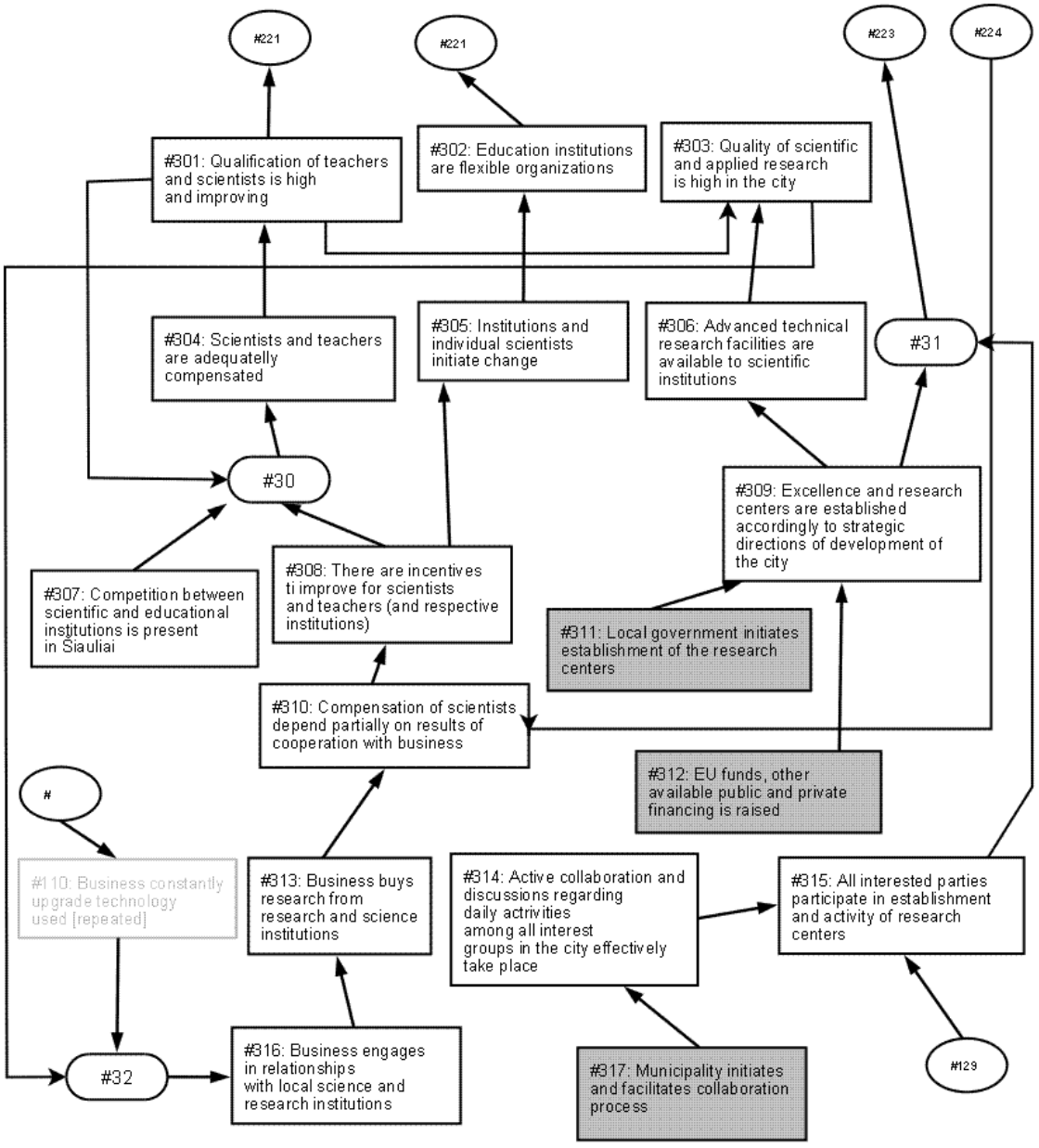
Note: Ovals represent connections of entities on another page (with respective numbers).

Figure 11. Strategic Future Reality Tree of Šiauliai business environment (page #2)



Note: Ovals represent connections of entities on another page (with respective numbers).

Figure 12. Strategic Future Reality Tree of Šiauliai business environment (page #3)



Note: Ovals represent connections of entities on another page (with respective numbers).

5.5.3. ŠIAULIAI CITY BUSINESS ENVIRONMENT SUPPORT POLICY

Finally we came to the actual formulation of the Šiauliai city government policy framework for the improvement of the business environment in the city. In order to do that we reviewed the three models constructed previously – model of current situation, system of purposes and the model of desired future situation – and extracted entities which correspond to the functions or actions of municipality that lead to desired outcomes. The result is the list of city government‘s functions (or in case of Current reality tree – undesirable actions/effects) (see Table 31 below). The table represents simple list of entities used in the respective

models; numbers indicated in the table corresponds to the numbers in the corresponding figures.

Note that stepping through the process model of design inquiry, we do not blindly follow the theoretically determined sequence of steps but rather adapt the process to the requirements of research. Thus we have first modelled the desired future state of the business environment system and then extracted system of functions despite theoretical process model suggested reverse sequence of these steps.

Table 31. List of city government's functions

No. of entity	Function / Entity	Source
#201.5	Too many bureaucratic obstacles for business	Current Reality Tree
#204	Municipality tends to protect local business from foreign competition	
#208	Good macroeconomic situation motivates business to grow	
UDE#4	Lack of coordination between all interest groups	
#314	Government does not provide financial incentives for services to business	
#14	Spread of best local and foreign management practices	Strategic Intermediate Objectives Map
#19	Adjustment to business needs	
#5	Security	
#112	Municipality promotes FDI with high technology	Strategic Future Reality Tree
#116	Local government prepares industrial land in advance	
#119	Government officials act timely and according to the strategic plan	
#122	Government uses best public management practies and techniques	
#123	The opportunities and prospects of the city are appropriately marketed	
#125	Local government officials are highly skilled	
#126	Adequate municipal procedures and processes are created and used	
#129	All interest groups of city community are equally and fairly represented	
#130	Municipality properly initiates and facilitates the collaboration of interest groups	
#131	Municipality's operations are very efficient	
#209	The city is open and supports immigration	
#216	Local government is developing public social infrastructure	
#218.2	Municipality promotes continuous learning culture	
#224	Business commit resources to education of potential labor force	
#307	Competition between scientific and educational institutions is present in Šiauliai	
#311	Local government initiates establishment of the research centers	
#312	EU funds, other available public and private financing is raised	
#313	Business buys research from research and science institutions	
#317	Municipality initiates and facilitates collaboration process	

Technically, the policy framework is the same list of required and desired city government's functions, rearranged and formulated appropriately. Policy framework for improvement of Šiauliai city business environment, suggested by the research accomplished in this study is presented (in Table 32) below.

Table 32. Municipal policy framework for enhancing business environment in Šiauliai

Goal: High standards of living
Goal: High value added business and production
1: Business and investment
Promotion of investment with high technology (including FDI)
Marketing of the city and its opportunities for local and foreign investors
Early and appropriate preparation of industrial land ready for investment
Local government initiates establishment of the research centers according to strategic development directions of the city
Diminishing of bureaucratic obstacles primarily by using opportunities of ICT
No direct support to business enterprises is provided at any circumstances
2: Efficient public management
Municipality uses best public management practices and techniques
Municipality invests into implementation of best management practices and creation of adequate procedures and processes within the organization
Officials are constantly improving their qualification in public management
Local government involves all interest groups into strategic planning and decision process, bases its actions decisions on proposals of city community
Municipality initiates joint public - private partnership projects and exploits opportunities of EU structural fund financing
Municipality follows and complies to strategic development directions of the city
3: Partnership with community
Communication and colaboration of all interest groups (business, science and labour) is facilitated in order to reach balanced decisions for city development
Municipality initiates and facilitates discussions and joint meetings of interest groups
Municipality ensures that all major interest groups were equally and fairly represented when making decisions about development of the city
Municipality initiates and facilitates discussions between social partners about future strategic development directions of the city; documents the outcomes and implements respective decisions
4: Life, education and work
Municipality supports immigration to the city
Municipality promotes and supports continuous learning culture in the city
Competition between education and science institutions is promoted
Business relationships between companies, science and education institutions is supported and promoted

The goals of the business environment support policy are high standards of living and high value added business and production, dominant in the city. The policy framework itself is logically subdivided into four priorities: (1) business and investment, (2) efficient public management, (3) partnership with community and (4) life, education and work.

The axis of the policy framework is the understanding that local government can not and should not formulate policies or take strategic decisions for the whole city. The power to choose directions of development and respective policies lies in the hands of city community consisting of various interest groups. Municipality officials should serve the community searching for common interests and balanced solutions. Thus, third priority "partnership with community" is central in the policy framework and closely related to the other three priorities.

5.6. LIMITATIONS

The presented research of municipal policy formation for the improvement of Šiauliai city business environment involves an intersection of several very broad topics including theoretical definition of local governments' goals, paths to higher quality of life, standards of living and higher income per capita, definition of business environment, systems thinking and analytic tools to aid that thinking, social system design paradigm, to name a few. Working with these broad topics and having in mind limited scope of this work imposed natural limits on the research.

First, our theoretical analysis predicates that goal of any local government is to increase standards of living of inhabitants of the city, which could be achieved by pursuing policies falling into two categories – (1) active or targeted policies aimed at identification and pursuing of strategic direction of development (e.g. priority industries) and (2) horizontal policies, aiming at improvement of whole economic or social environment disregarding any value based strategic directions of development (see 2.1 "Competitiveness, business environment and government policy" above). This research deals with the second category of policy – business environment support and improvement policy. Yet in the context of whole aggregate of existing and desired municipal policies, the two categories are naturally intertwined and not easy segregated. In our work we attempted to analyze only horizontal aspect of business environment policy but some aspects of targeted policy (related to directions of city development) were still affected.

Second limitation of this kind concerns research method selected and its context. This research is a case study of policy framework formulation for improving business environment in Šiauliai city (see 3.3.1.1 „Research method defined" above). Yet we acknowledge that policy formulation is a prolonged and iterative process rather than one-time exercise. Obviously we were not able to launch and successfully accomplish action research within given time and space requirements of the study. Nevertheless, the results of this case study research should be treated as starting point of action research.

The data for research was collected from documentary sources and single round of interviews. Given the broad object of research – business environment – and method of interviewing, it is plausible to assume that interviewed individuals did not fully reveal their positions, concerns and interests about the matter, not to mention sensitive topics regarding critique of government or other institutions. The research would be much more complete if we had an opportunity to discuss the initial results with the interest groups and brainstorm the

solutions to the identified problems together with the participants of the system. Yet again, this calls for action research which extends outside the scope of this study.

Action research would require implementation of the policy framework and related solutions, monitoring the implementation, evaluation of results and revising the policy appropriately. Again, policy framework formulated in this research should be treated as the start of the whole process and should not be regarded as complete or finished product.

All of above limitations presuppose the main limitation of this research. The design of the future, according to social system design paradigm, is a participative process and cannot be performed in isolation or from the standpoint of only one system participant. By definition, the process requires contribution of all participants and revelation of their conflicting positions towards business environment problems. While in our research we integrated the positions of all interest groups by pursuing interviews, the design process itself was performed solely by us (authors of the research) without any participation of systems' participants. Thus the result of the research – municipal policy framework for the improvement of Šiauliai business environment – may be naturally biased towards our positions and ideological beliefs. In case of participatory design process, which is recommended, yet was not possible due to the scope and time restrictions of this research, such bias would be eliminated.

Generalizability in the traditional sense of this term of the results of this research is limited not because of the characteristics of research process but rather due to research method itself. Generalizability of single-site qualitative case study is a controversial problem and an ongoing debate in a social science community (see 3.3.1.2 "Notes on generalizability" above). The results of this research are twofold: (1) the methodology for designing and modelling social system and (2) the policy framework for improving Šiauliai city business environment. The first result is readily and fully generalizable, as it may be used for policy formation in any other city or even area. The second result is not generalizable, as it is attached to the context of Šiauliai city, yet is usable as example for similar studies. These limitations are inherent characteristics of research method as mentioned above and should not be treated as shortcomings of this research.

6. CONCLUSIONS AND IMPLICATIONS

During the work we have reached all the goals and objectives raised in the beginning of the research (see 5.1 “Goals and objectives” above). We have successfully applied systems thinking approach to solving sophisticated public management problem: formulation of policy framework for enhancing business environment in the given region, which influences business development, international competitiveness of the city and living standards of its citizens. The developed methodology was applied in the real-word situation: formulation of policy framework for the improvement of business environment in Šiauliai city.

From the theoretical point, we developed a methodology suitable for designing municipal policies on behalf of the city government and: (1) found a methodology for designing and modelling city business environment as a social system; (2) found a methodology to understand system participant’s - city government’s - influence for the system; and (3) developed an approach for designing policy framework of the municipality for managing improvement of business environment in the city. Basing on the assumption that business environment is a social system, we proposed that it can be designed using the Banathy‘s social system design paradigm and modelled using logical tools from Theory of Constraints (TOC) thinking processes collection. The social system design paradigm advocates democratic and participatory way of formulating the municipal policy by equally respecting all interest groups in the community. The methodology allows to consider all involved interests and match them for reaching the common goal of the system, benefiting all interest groups. The models of the current and desired future state of the system empower the researcher or policy maker to easily understand each system participant‘s influence on the system, thereby, obviously, influence of municipality which is one of the participants in business environment system. The social system design paradigm as well as TOC thinking processes together encompass a number of methodological approaches and tools for designing social system. Thus the largest and probably most important part of the research is “Methodological approach”, where we have proposed the detailed sequence of steps needed to formulate policy framework (process model of system design inquiry) as well as research methodology for data collection and analysis. The work performed in the theoretical part mapped the rest of the research which was concerned about testing the developed methodology in the real world situation.

In the empirical part of the research we have successfully tested the methodological approach. In the „Empirical research“ section we have delineated the data collection process as well as described collected data. „Policy design“ is probably the second most important section of the work, where we applied theoretically developed process model of the design inquiry to the collected data and came up with the suggested municipal policy framework for enhancing business environment in Šiauliai. In the empirical part of the research we have reached the following objectives: (1) defined rationale for initiating design of municipal policies for improvement of Šiauliai city business environment; (2) defined dimensions of change and chose strategy for transcending the Šiauliai city business environment as a system; (3) developed a formal conceptual model of the current business environment of Šiauliai city as a socio-economic system; (4) described a collective mental image of the desired future of Šiauliai city business environment as perceived by system participants; (5) designed the desired future state of Šiauliai city business environment system; (6) developed a formal conceptual model of the desired future state of Šiauliai city business environment system as a socio-economic system; and finally (7) suggested Šiauliai city policy framework for improvement of business environment in the city, i.e. achievement of desired future state of the system.

The field of governance in terms of national, regional and municipal governments is traditionally held a public administration field, which is considered distinct from management domain. The basic difference between the two concepts is that public administration focuses upon following the hierarchy of rules (laws, procedures, purchasing rules, etc.) while management advocates flexibility and adaptation, which require unconventional decision-making, surprise and secrecy in order to enhance innovation (Lane 1994, p. 144, 146). The rising need for flexibility and creative adaptation while unfading requirement for openness and transparency necessitate governments at any level to turn to public management (ibid, p. 139). In this context local communities and their governments need to understand that rising economic activity, international competitiveness, prosperity and high standards of living require more than following the pre-defined rules and strategies. It requires active creation of the future which is the essence of social the system design paradigm followed in this research. This research proposes the methodology for envisioning the future for large community and mapping the steps to achieving it from the perspective of the initiator of the design process.

Policy, as well as strategy, formulation is not a one-time exercise: it is a process. Local governments wishing to engage in active formation of the future of their economies and

communities should engage in continuous and everlasting spiral (loop) of policy formation: initiating the change – fact finding and analysis – planning action steps (policy) – implementing – monitoring – evaluating – revising the policy and initiating change if necessary.

LIST OF BIBLIOGRAPHIC SOURCES

(1) Ackoff, R.L., Magidson, J., Addison, H.J. (2006). *Idealized Design*. New Jersey: Wharton School Publishing.

(2) Ackoff, R. L. & Emery, F. G. (1972). *On Purposeful Systems*. Chicago: Aldine-Atherton;

(3) Ackoff, R. L. (1981). *Creating the Corporate Future*. New York: Wiley;

(4) Arksey, H., Knight, P. (1999) *Interviewing for Social Scientists: An Introductory Resource With Examples*. London, Thousand Oaks, New Dehli: Sage Publications;

(5) Babbie, E. (2004). *The Practice of Social Research*. Belmont: Wadsworth;

(6) Banathy, B.H. (1996). *Designing Social Systems in a changing world (Contemporary systems thinking)*. New York: Plenum Press.

(7) Banathy, B.A. (1991). *Systems Design of Education*. Englewood Cliffs: Educational Technology Publications;

(8) Berg, B.L. (2007). *Qualitative research methods for the social sciences*. Boston: Allyn & Bacon.

(9) Bležević, B., Jelušić, A. (2006, Vol. 35). Modelling regional economic development. *Kybernetes*, p. 1190-1202.

(10) Checkland, P. (1981). *Systems Thinking, Systems Practice*. New York: Wiley.

(11) Checkland, P. & Sholes, J. (1990). *Soft Systems Methodology*. New York: Wiley.

(12) Creswell, J.W. (1998). *Qualitative inquiry and research design: choosing among five traditions*. Thousand Oaks, London, New Dehli: Sage Publications.

(13) Dettmer, W.H. (1997). *Goldratt's theory of constraints: a systems approach to continuous improvement*. Milwaukee: ASQC Quality Press.

(14) Dettmer, W.H. (2003). *Strategic Navigation: a systems approach to business strategy*. Milwaukee: Quality Press.

(15) Dilts, Grinder, Bandler, DeLozier (1980). *The Study of the Structure of Subjective Experience*. Cupertino: Meta Publications.

(16) Drucker, P. F. (1985). *Management: tasks, responsibilities, practices*. New York: Harper & Row, Publishers.

(17) Gomm, R., Hammersley, M., Foster, P. (2000). *Case Study Method*. Thousand Oaks, London, New Dehli: Sage Publications.

(18) Kresl, P.K. & Fry, E.H. (2005). *The Urban Response to Internationalization*. Cheltenham: Edward Elgal Publishing, Inc.

(19) Krugman, P. (1994 March/April). *Competitiveness: A Dangerous Obsession*. Foreign Affairs, p. 28-44.

(20) Lane, J.E. (1994 December). Will Public Management drive out public administration. *Asian Journal of Public Administration*, p. 139-151.

(21) Lydeka, Z. (2001). *Becoming market economy: theoretical discussion*. Kaunas: VDU publishing. [Lydeka, Z. (2001). *Rinkos ekonomikos tapsmas: teoriniai svarstymai)*. Kaunas: VDU leidykla].

(22) Lind, J. (2006). *General Concepts of Agents and Multiagent Systems*. Acessed on: 11-04-2006 at the address http://www.agentlab.de/general_concepts.html;

(23) Levy, F. (1988). Incomes, Families, and Living Standards. In Litan R.E., Lawrence R.Z., Schultze, C.L., Brooking Institution (Eds). *American Living Standards: Threats and Challenges*. (pp. 108-153). Harrisonburg, Virginia: R.R. Donnelley and Sons, Co.

(24) MacDonald, B. Potter, J. M. M., Jensen, K. O. (2003 April). Long-Term Business Modelling Using System Dynamics. *BT Technology Journal*, p. 158-169.

(25) Organization for Economic Co-operation and Development. (2005). Micro-policies for growth and productivity: final report. Accessed on 01-16-2007 at the address http://www.oecd.org/dataoecd/40/58/34941809.pdf.

(26) Phillips, D. (2006). *Quality of Life: Concept, Policy and Practice*. Abingdon, Oxon: Routledge.

(27) Porter, M.E. (1998a). *The Competitive Advantage of Nations*. Houndmills, Basingstoke, Hampshire: Palgrave. (Original work published 1990).

(28) Porter, M.E. (1998b, January). The Adam Smith Address: locaton, clusters and the "new" microeconomics of competition. *Business Economics*, p. 7-13.

(29) Porter, M.E. (1998c). *On Competition*. Boston, MA: Harvard Business School Publishing;

(30) Raisinghani, M. (2004). *Business intelligence in the digital economy: opportunities, limitations, and risks*. Hershey: Idea Group Publishing.

(31) Saunders, M., Lewis, P., Thornhill, A. (2003). *Research Methods for Business Students*. Essex: Pearson Education Limited.

(32) Scholefd, J.W. (2000). Increasing generalizability of qualitative research. In Gomm, Hammersley, Foster (Eds.), *Case Study Method* (p. 69-97). Thousand Oaks, London, New Dehli: Sage Publications.

(33) Šiauliai city government administration. (2006). *Šiauliai City Strategic Development Plan for 2007-2016.* Šiauliai: Šiauliai city government administration.

(34) Simon, H. (1969). *The Science of the Artificial.* Cambridge: MIT Press;

(35) Smith, D. (2000). *The Measurement Nightmare: How the Theory of Constraints Can Resolve Conflicting Strategies, Policies, and Measures*. London: St. Lucie Press.

(36) Soy, S.K. (2006). *The Case Study as a Research Method*. Unpublished paper, University of Texas at Austin. Accessed on: 01-21-2007 at the address http://www.gslis.utexas.edu/~ssoy/usesusers/l391d1b.htm;

(37) Sterman, J. (2000). *Business dynamics: systems thinking and modeling for a complex world*. Boston; London: Irwin/McGraw-Hill.

(38) Tresch, R.W. (2002). *Public Finance: A Normative Theory*. San Diego, London: Academic Press.

(39) Walker II, E.D., Cox III, James F. (2006, Vol.1). Addressing ill-structured problems using Goldrtatt's thinking processes: A white collar example. *Management Decision*, p. 137-154.

(40) World Economic Forum. (2006). Global Competitiveness Report 2006-2007. *Chapter 1.1. The Global Competitiveness Index: Identifying the Key Elements of Sustainable Growth*. Accessed on: 01-17-2007 at the address http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/gcr_2006/chapter_1_1.pdf.

(41) Yin, R.K. (1994). *Case study research*. Thousand Oaks, London, New Dehli: Sage Publications.

ECONOMIC RESEARCH CENTRE

Viktoras Veitas

SYSTEM THINKING BASED MUNICIPAL POLICY DESIGN FOR THE IMPROVEMENT OF LOCAL BUSINESS ENVIRONMENT

Šiauliai city case study

2007

• T. VRUBLEVSKIO ST. 4, LT-01100 VILNIUS •
• WWW.ERC.LT TEL. • +370 (5) 2615712 FAX • +370 (5) 2784163 •

ANNEXES

A. FACTORS OF BUSINESS ENVIRONMENT

Table 33. Categories of factors of business environment (#1)

Category of factors	Sub-category	Micro-policy or factor of business environment	Source
1 Fostering firm creation and entrepreneurship	1.1 Financial markets efficiency	1.1.1 Using public equity funds to leverage private financing and targeting financing gaps	OECD
		1.1.2 Developing competent venture investors and managers	OECD
		1.1.3 Ease of access to loans	Global Competitiveness Report
		1.1.4 Venture capital availability	Global Competitiveness Report
	1.2 Providing entrepreneurial education	1.2.1 Teaching entrepreneurial skills and attitudes in early education	OECD
		1.2.2 Integrating entrepreneurial education in university curriculum	OECD
	1.3 Goods market efficiency	1.3.1 Number pf procedures required to start a business (hard data)	Global Competitiveness Report
		1.3.2 Time required to start business (hard data)	Global Competitiveness Report
		1.3.3 Policy toward foreign investment	Porter
2 Seizing the benefits of information and communications technology (ICT)	2.1 Enhancing ICT skills at all levels of education	2.1.1 Defining a national strategy for integrating ICT in schools	OECD
		2.1.2 Helping schools buy computers and get online	OECD
		2.1.3 Providing ICT training for teachers	OECD
		2.1.4 Developing educational software and online content	OECD
		2.1.5 Working with the private sector to develop long-term strategies for developing the ICT workforce	OECD
	2.2 Stimulating competition in communication markets	2.2.1 Accelerating the process of unbundling local loops	OECD
	2.3 Implementing e-government	2.3.1 Increasing online government services	OECD
		2.3.2 Creating common government portals and standardised Web pages	OECD
		2.3.3 Ensuring online security and privacy	OECD
	2.4 Developing digital content	2.4.1 Clarifying intellectual property regimes for online content	OECD
		2.4.2 Clarifying ownership and pricing rules for digital content based on public sector information	OECD
3 Exploiting and diffusing science and technology	3.1 Enhancing the quality of public research	3.1.1 Creating centres of excellence for research	OECD
		3.1.2 Involving industry in the design and financing of the centres	OECD
		3.1.3 Developing competitive mechanisms to identify research areas	OECD
		3.1.4 Local availability of specialized research and training services	Global Competitiveness Report
		3.1.5 Quality of scientific research institutions	Global Competitiveness Report

Table 34. Categories of factors of business environment (continued - #2)

Category of factors	Sub-category		Micro-policy or factor of business environment	Source
3 Exploiting and diffusing science and technology (cont.)	3.2	Promoting industry-science links	3.2.1 Fostering spin-offs and licensing agreements from public research with flexible IPR infrastructure	OECD
			3.2.2 Promoting public-private partnerships with well-defined objectives and clear funding arrangements	OECD
			3.2.3 Company spending on research and development	Global Competitiveness Report
			3.2.4 University/industry research collaboration	Global Competitiveness Report
			3.2.5 Availability of scientists and engineers	Global Competitiveness Report
	3.3	Fostering collaborative networks and clusters	3.3.1 Integrating a cluster approach when designing support programmes, e.g. at the regional level	OECD
			3.3.2 Focusing more on getting the right people together than on providing subsidies	OECD
			3.3.3 Coordination between neighbouring countries (or cities)	Porter
			3.3.4 Related (institutional) infrastructure	Porter
			3.3.5 Attraction of foreign direct investment	Porter
			3.3.6 Export promotion	Porter
	3.4	Stimulating demand for new products, processes and services	3.4.1 Public procurement of new products and services	OECD
			3.4.2 Creating awareness and public acceptance of new technologies	OECD
			3.4.3 Fostering acceptance among the social partners of the long-term benefits of new technologies	OECD
			3.4.4 Policies governing buyer information and recource to products and services of poor quality	Porter
			3.4.5 Policies that encourage early adoption of new products and services	Porter
			3.4.6 Government procurement of advanced technology products	Global Competitiveness Report
4 Enhancing human capital and realizing its potential	4.1	Increasing educational attainment	4.1.1 Providing cost-effective support to tertiary education	OECD
			4.1.2 Stimulating competition among educational institutions	OECD
			4.1.3 Linking higher education to the conduct of government-financed research and development (R&D)	OECD
			4.1.4 Qualilty of math and science education	Global Competitiveness Report
			4.1.5 Qualilty of management schools	Global Competitiveness Report
	4.2	Providing incentives for continuous training	4.2.1 Negotiating tripartite agreements to share the costs and responsibility for enterprise training	OECD
			4.2.2 Offsetting costs and time constraints of individual investments in training	OECD
			4.2.3 Developing schemes to assist small firms to provide more worker training	OECD
			3.3.2 Extent of staff training	Global Competitiveness Report
	4.3	Fostering knowledge-based management and organisation in enterprises	4.3.1 Promoting flexible work approaches through labour market policies	OECD
			4.3.2 Adopting knowledge-based management approaches in the public sector	OECD
			4.3.3 Upgrading managerial skills in small firms	OECD

Table 35. Categories of factors of business environment (continued - #3)

	Category of factors	Sub-category	Micro-policy or factor of business environment	Source
4	Enhancing human capital and realizing its potential (cont.)	4.4 Labor market efficiency	4.2.1 Hiring and firing practices	Global Competitiveness Report
			4.2.2 Cooperation in labor-employer relations	Global Competitiveness Report
			4.2.3 Reliance on professional management	Global Competitiveness Report
			4.2.4 Pay and productivity	Global Competitiveness Report
			4.2.5 Brain drain	Global Competitiveness Report
			4.2.6 Labor market policies affecting the incentives for workforce development	Porter
5	Infrastructure		5.1 Overall infrastructure quality	Global Competitiveness Report
			5.2 Railroad infrastructure development	Global Competitiveness Report
			5.3 Quality of air transport infrastructure	Global Competitiveness Report
			5.4 Quality of electricity supply	Global Competitiveness Report
			5.5 Telephone lines (hard data)	Global Competitiveness Report
6	Business sophistication		6.1 Production process sophistication	Global Competitiveness Report
			6.2 Extent of marketing	Global Competitiveness Report
			6.3 Control of international distribution	Global Competitiveness Report
			6.4 Willingness to delegate authority	Global Competitiveness Report
			6.5 Acess to business best practices	OECD

B. LETTER TO POTENTIAL RESPONDENTS

Economic Research Centre is implementing a scientific investigative study "City business environment support policy formulation and modelling" from July 2006 to April 2007. The study is fully leaded and financed by Economic Research Centre. The goal of the study is to find or create methodology suitable for designing municipal city's business environment support policy. The study is based on the premise that city's business environment may be analyzed as a social system using appropriate system analysis tools.

After analyzing existing researches and studies related to the formation of business environment and city competitiveness, Economic Research Centre identified major business environment development factors and developed a methodology for conceptual modelling of business environment as socio-economic system.

One of the stages of the study is to test the methodology business environment support policy formation in the real setting. Economic Research Centre, partially appealing to formerly implemented joint projects with Šiauliai City Municipality (Strategic Development Plan for 2007-2016, Feasibility Study for Development of Šiauliai Industrial Park), is pursuing to test the methodology in Šiauliai city. In collaboration with Šiauliai City Municipality's Administration, Economic Research Center is executing an interviewing of institutions and individuals related to Šiauliai city business environment. We plan to interview Šiauliai city municipality administration's officials, members of the Šiauliai city Council, members of business associations, employees of education institutions, banks, labour market related and other organizations. Interviewing is administered and implemented by market analysis and research group „RAIT". Data gathered during interviews will be analyzed and as a result, using the methodology described, considering positions of Šiauliai municipality officials and identified business environment developments, business environment support policy and its steps for Šiauliai city will be developed.

Economic Research Centre is kindly asking you to take participation in interview and research so contributing to formation of Šiauliai city business environment. Your participation is fully voluntary and you can withdraw from the interview at any time. Your person will not be associated with any of your answers of positions during and after the research and will be known only to persons engaged in research.

The report of scientific investigation study will be written in English language. The results of the study are the possession of Economic Research centre but they will be publicized and available freely. After conducting the study, Economic Research Centre will submit the final report to Šiauliai city municipality's administration and will grant the administration to use the results of the study at its discretion. Economic Research Centre will inform all respondents of the interviews about results of the study and will offer a possibility to obtain and use them.

Thank you,

Viktoras Veitas
Partner
Economic Research Centre

C. INTERVIEW RESULTS

Table 36. List of respondents and their interview results (#1)

Respondent	Interest group	Attributed information categories				Result of interviewing
		No.	Category	No.	Category	
Interviewee#1	Šiauliai city municipality	5	Infrastructure	1	Fostering firm creation and entrepreneurship	Interviewed
Interviewee#2	Šiauliai city municipality	1	Fostering firm creation and entrepreneurship	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#3	Šiauliai city municipality	2	Seizing the benefits of information and communications technology (ICT)	3	Exploiting and diffusing science and technology	Interviewed
Interviewee#4	Šiauliai city municipality	6	Business sophistication	3	Exploiting and diffusing science and technology	Interviewed
Interviewee#5	Šiauliai city municipality	1	Fostering firm creation and entrepreneurship	6	Business sophistication	Denied to be interviewed
Interviewee#6	Šiauliai city municipality	4	Enhancing human capital and realizing its potential	3	Exploiting and diffusing science and technology	Interviewed
Interviewee#7	Business associations	3	Exploiting and diffusing science and technology	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#8	Business associations	4	Enhancing human capital and realizing its potential	6	Business sophistication	Did not manage to arrange interviewing time
Interviewee#9	Business associations	4	Enhancing human capital and realizing its potential	3	Exploiting and diffusing science and technology	Interviewed
Interviewee#10	Business associations	5	Infrastructure	4	Enhancing human capital and realizing its potential	Did not manage to arrange interviewing time
Interviewee#11	Business associations	2	Seizing the benefits of information and communications technology (ICT)	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#12	Tertiary and professional education system	3	Exploiting and diffusing science and technology	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#13	Tertiary and professional education system	3	Exploiting and diffusing science and technology	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#14	Tertiary and professional education system	3	Exploiting and diffusing science and technology	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#15	Tertiary and professional education system	3	Exploiting and diffusing science and technology	5	Infrastructure	Interviewed
Interviewee#16	Tertiary and professional education system	4	Enhancing human capital and realizing its potential	6	Business sophistication	Interviewed
Interviewee#17	Tertiary and professional education system	4	Enhancing human capital and realizing its potential	6	Business sophistication	Interviewed
Interviewee#18	Labour market	1	Fostering firm creation and entrepreneurship	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#19	Labour market	4	Enhancing human capital and realizing its potential	2	Seizing the benefits of information and communications technology (ICT)	Interviewed

Table 37. List of respondents and their interview results (continued - #2)

Respondent	Interest group	Attributed information categories				Result of interviewing
		No.	Category	No.	Category	
Interviewee#20	Labour market	1	Fostering firm creation and entrepreneurship	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#21	Labour market	1	Fostering firm creation and entrepreneurship	4	Enhancing human capital and realizing its potential	Interviewed
Interviewee#22	Business support institutions	1	Fostering firm creation and entrepreneurship	3	Exploiting and diffusing science and technology	Interviewed
Interviewee#23	Business support institutions	1	Fostering firm creation and entrepreneurship	3	Exploiting and diffusing science and technology	Interviewed
Interviewee#24	Business support institutions	1	Fostering firm creation and entrepreneurship	3	Exploiting and diffusing science and technology	Interviewed
Interviewee#25	Individual business enterprises	3	Exploiting and diffusing science and technology	5	Infrastructure	Interviewed
Interviewee#26	Individual business enterprises	2	Seizing the benefits of information and communications technology (ICT)	5	Infrastructure	Interviewed
Interviewee#27	Banks and financial institutions	1	Fostering firm creation and entrepreneurship	6	Business sophistication	Interviewed
Interviewee#28	Banks and financial institutions	1	Fostering firm creation and entrepreneurship	6	Business sophistication	Did not manage to arrange interviewing time
Interviewee#29	Banks and financial institutions	1	Fostering firm creation and entrepreneurship	6	Business sophistication	Denied to be interviewed
Interviewee#30	Representatives of small businesses	2	Seizing the benefits of information and communications technology (ICT)	5	Infrastructure	Interviewed
Interviewee#31	Representatives of small businesses	2	Seizing the benefits of information and communications technology (ICT)	5	Infrastructure	Interviewed

D. DATA ANALYSIS TABLES

Table 38. Attribution of documentary data to interest groups

No.	Name of the document	Interest group
1	Šiauliai city strategic development plan for 2007-2016. Šiauliai city government administration, Economic Research Centre, 2006.	Šiauliai city municipality
2	Development of Šiauliai Industrial Park. Feasibility Study. Economic Research Centre, 2005.	Šiauliai city municipality
3	Survey of business executives of Šiauliai city and region. Survey Report. UAB "RAIT", 2005.	Individual business enterprises
4	Development of small and medium business in Šiauliai. Presentation by Šiauliai city municipality Economics Department, 2005.	Šiauliai city municipality
5	Opportunities of Šiauliai city development. Survey of Šiauliai city inhabitants and experts. Presentation. UAB "RAIT, 2005.	Community
6	Economic Environment.Prepared for City's Master Plan, work in progress.	Šiauliai city municipality
7	Support for small business. Report to the Šiauliai city mayor. 2007	Šiauliai city municipality
8	Review of Šiauliai city economic environment. Šiauliai City Municipality (information prepared for official internet site), September 2006.	Šiauliai city municipality
9	Environment for Investments.Šiauliai City Municipality, 2006.	Šiauliai city municipality
10	Small and Medium Business.Šiauliai City Municipality, 2006.	Šiauliai city municipality
11	Provisions for the professional orientation systems model. Vytautas Burokas, Ministry of Education and Science, 2007	Labour market
12	Cooperation between business and municipality. Working groups for preparation of Šiauliai city strategic development plan for 2007-2016. Discussion notes. 2005.	Individual business enterprises

Table 39. Segments of text coded with „Situation/Current“ AND „Valuation/Negative“ (#1)

Interest group	No.	Retrieved segments
Community	1	Inhabitans find it difficult to find job
	2	Black (illegal) labour market is enlarging
Business associations	3	E-government function of municipality lags behind
	4	Intelectual rights protection system is extremely complicated
	5	Municipality does not pay enough attention to intellectual rights matters
	6	Unemployment rate is too low. There is no competitionm in the labour market.
	7	Services of employee recruitment do not satisfy business
	8	Extensive brain drain. Most qualified people leave.
	9	Municipality holds that employee qualification matters are not in its function
	10	There is no good quality continual education system and business cannot buy the service
	11	New processes and technologies are bought only by largest enterprises. Small enterprises are not capable for that.
Banks and financial institutions	12	Šiauliai city has no strategic directions. The existing potential is underexploited.
	13	Small businesses lack coordination and strategic approach to their activities. Owners of small companies do everything and have no time
	14	It is unprofitable to credit small companies because preparatory work is complex, required return is high, small credit amounts, no
Labour market	15	More than half youths registered in labour axchange have no proffesional education.
	16	Training related with establishment of new business are not popular
	17	Employers require practical skills when employing, but are disinteresed to employ students for practice
	18	Most students study only to get paper and after graduating work not according to their speciality.
	19	The quality of studies in university is low (due to too many study programmes)
	20	Colleges are more attractive that universities because they require less years of studies
	21	Deep inconsistanec between university programmes and requirements of labour market exist
	22	University gives a lot of knowledge but does not give good quality knowledge
	23	University has too low requirements for students. The system works according to "Pay money - get diploma" principle
	24	Employers are interested only about diploma, they do not care about anything else.
	25	University cares about image more than actual quality of studies
	26	Students are not interested in labour market. They are interested in studies.
	27	Students do not see municipality doing something related to students or pupils
	28	Young people have no prospects in Šiauliai. Older peopler do not give away their positions.
	29	It is not safe in Šiauliai

Table 40. Segments of text coded with „Situation/Current“ AND „Valuation/Negative“ (continued - #2)

Interest group	No.	Retrieved segments
Labour market	30	Inhabitants leave to work abroad becauise it is easier to earn money there. Both people who want temporary and permanent jobs leave.
	31	Universities are not flexible in doing organizational changes because all faculties fight for themselves and their teachers. protect their
	32	Many people are dropped out from labour market. They lack information and skills to present themselves.
	33	It is more complicated for older people to get employed
	34	Šiauliai city is not able to supply with good (wel paid) working places so many people leave
	35	Business lacks qialified and skilled labour force
Individial business enterprises	36	There are no unemployed in Šiauliai - only those who do not want to work
	37	Road infrastructure in the city is poor due to the lack of funds
	38	It is difficult to find large plots prepared industrial land suitable for building industrial buildings
	39	Service sector is underdeveloped in Šiauliai - lack of supermarkets, hotels, leisure activities, sport clubs
	40	Labour force is unskilled and expensive
	41	Business is sceptical about Šiauliai local government potential to attract investors who are related to future development of the city
	42	Labour shortage hinders development: business enterprises doubt weather they will be able to find labour in case of enlargement
	43	There is no uniform approach within municipality about long term teritoric develomnet of city
	44	There is no policy to atract investment to the city
	45	Šiauliai city have no database of free land or land that is planned to be free for investment
	46	There are no well-balanced support policies for SMEs. SME fund does not fulfill its functions.
	47	Scientists are not motivated for implementation of scientific innovations in business, thay are motivated for writing papars. Scientists do not care much about whether result will be implemented in practice.
	48	It takes very long time to prepare detailed plans for doing investments. Yet municipality cannot do much because these things are
	49	Municipality lacks power toinfluence business environment from with taxes
	50	Municipality lacks understanding of situation. Everything is done too late.
	51	People leave to work abroad both according and not according to their speciality
	52	Municipality has no policy in the field of information and telecvomunication technologies
	53	Municipality does not support business initiuatives (for example when establising and marketing public internet access points)
	54	Lack of information: businessmen do not know where to go for support.
	55	There are no qualified and proactive employees. No institution is nurturing skills of employees. Most should be done by business uitself
	56	Demand and requirement for innovations are only declared but in reality contrary: too little innovations are implemented

Table 41. Segments of text coded with „Situation/Current“ AND „Valuation/Negative“ (continued - #3)

Interest group	No.	Retrieved segments
Business support institutions	57	Scientists are not motivated to implement their innovations in practice
	58	Students are have lost hope and think that tey have better prospects abroad
	59	The biggest problem is in the governmental level regarding state tax system.
	60	New businessmen face large bureaucracy, tax inspection is controlling rather than consulting
	61	New businessmen need financial support
	62	New businessmen need informational seminars, discussions and information. In principle there is lot of information but it is not accessible. Probably it is because bad communication channels and lack of interest
	63	New businesspeople lack financial and accounting knowledge, they lack expierence, risnk management skills, i.e general management
	64	Sciuence is oriented towards creation of theoretical models, stuidents lack logical thinking
	65	There is enough number of students and older people but they are not skilled specialists
	66	Šiauliai looks very bad according to foreign investment indicators
	67	Young people, just after graduating from universities, do net get good salaries, but they want to earn more
	68	Students are studying with the thoughts to leave abroad for the job
	69	Pelple from rural areas do not go to Šiauliai for work because it is better for them to receive unemployment benefits
	70	Conditions for starting new business are good but there is no people to work
	71	Banks to not lend money for new technologies and innovatrions, state support system does not work well
	72	Competitive advantage is grounded with cheap labor force
	73	Universities prepare people for positions in large enterprises but do not prepare entrepreneurs
	74	Šiauliai does not have entreprises that could self-sufficiently create new technologies. There are no research, product development.
	75	Irrelevant speciality students are prepared, their preparation quality is inadequate, expensive specialties receive inadequate funding. Underinvestment to young people. Senate of university does not efficiently distribute money.
	76	There are enough institutions. The deficiency is lack of interdependent systematic work. There is no interconnection between them.
	77	Municipality represents isolated interests of lobbying groups but not community interest
	78	Universities do not give entrepreneurship skills to the young people
	79	Foreign investments are of higher risk
Tertiary and professional education system	80	Education institutions need to compete with both local and foreign schools.
	81	Scientists and teachers earn very little
	82	Business is not that rich to organize scientific research. The goal is to earn money now.
	83	It is difficult for universities to allot funding between scientific activities and teaching activities. Money are allotted but do not reach people
	84	Business does not finance research because it does not see results. In order to see results, business should have appropriate education/qualification. Research is funded only by government.
	85	risks.

Table 42. Segments of text coded with „Situation/Current“ AND „Valuation/Negative“ (continued - #4)

Interest group	No.	Retrieved segments
Tertiary and professional education system	86	There are institutions, but there are no incentives (for cooperation of science and business)
	87	Municipality does not communicate enough with university (and community in general) about city development, investments
	88	There is no incentives to seek knowledge. Students are reluctant to study.
	89	Scope and spread of public research (studies) is on average level. Many things are perceived intuitively, without analysis
	90	Proffesionals are prepared according to current situation. Nobody looks several years into the future.
	91	Specific directions should be developed, it is not good to prepare all kinds of specialties.
	92	Foreign goods are flooding to Šiauliai, local enterprises are closing down becouse their activities do not pay off.
	93	Foreign capital is invisible in Šiauliai
	94	There is no spread of best business practice. There were no seminars, etc.
	95	There is no publicity when taking strategic decisions (in municipality)
	96	Community does not participate in decision making
	97	There is no city scope partnership between business and government, existing partnership is only in the level of narrow interests.
	98	Employers do not consider employee needs, do not provide opportunities for growth
	99	Employees are not loyal to their employers
Small business	100	There is no strategy for attracting investments
	101	Awarding privileges to businesses that compete is market distortion
	102	Government produce inequal conditions for business entities, therefore they feel wrongly treated
	103	Investment is impeded by land laws and inferior work of municipality
	104	Government (municipality) is sceptical about businessmen
	105	City government does not employ people with highest qualification, yet thay are reluctant to ask outside advice from community and
	106	Lack of leisure activitries, sports events
	107	Qualified and skilled people left to Vilnius and Kaunas. Less qualified - abroad.
	108	Returining to Šiualiai is considered non-prestigiuous
Šiauliai city municipality	109	GDP per capital in Šiualiai is only 75.6% of Lithuania's average
	110	Šiauliai is lacking acording to material and foreign investments which are several times lower than in other cities. City is not attractive for
	111	Labour deficit is becoming hindrance for business development
	112	Underdeveloped leisure, hotel business sphere
	113	In 2004 FDI in Šiauliai was 7.5 times lower than Lituania's average
	114	Material investments (to buildings and machinery) are needed
	115	Massive youth emmigration is taking place
	116	structure

Table 43. Segments of text coded with „Situation/Current“ AND „Valuation/Negative“ (continued - #5)

Interest group	No.	Retrieved segments
Šiauliai city municipality	117	Part of inhabitants of the city, who lost their former competences, are not able or willing to retrain themselves and obtain new skills, which
	118	Major impediments for business: risk of bancrupcy during the starting phase
	119	Credit system is oriented towards consumption and not towards investment (too short credit periods, small credit amounts, etc.)
	120	Municipality's SME fund is only following its regulations. SME fund does not influence support policy.
	121	City growth is based on local investments which do not exploit all possibilities
	122	According to FDI Šiauliai is lagging behind almost every city (even some region centers)
	123	Negative balance of migration
	124	Employers find it difficult to find skilled employees
	125	Emploees find it difficult to find job (especially for unqualified, special groups)
	126	Šiauliai develoment is impeded by: low labor productivity
	127	Šiauliai develoment is impeded by: lack of free skilled labor force
	128	Šiauliai develoment is impeded by: inadeqiate for industry quality of education institutions
	129	Šiauliai develoment is impeded by: undeveloped physical infrastructure for industry growth
	130	Šiauliai develoment is impeded by: insufficiently active municipality policy for attracting foreign direct investment
	131	Šiauliai develoment is impeded by: lack of free land with required infrastructure
	132	Šiauliai develoment is impeded by: chaotic development of the city, irrational territoric positioning of industrial objects in the city
	133	Šiauliai has less highly skilled workers than other Lithuanian cites (respectively more low-skilled workers)
	134	Most (almost 80%) of unemployed people are not ready for labour market (have no proffesion, lost skills, hardly orients in labour market
	135	Unemployed people registered in labour market are regarded very negatively by businessmen
	136	Most of problems currently appear regarding practical preparation of students/pupils, which require certain decisions, e.g. technical basis in education institutions, collaboration forms with employers in order to use their technical basis for practice, etc.
	137	Education institutions do not pay attention to needs of industry when preparing specialists and highly skilled workers
	138	Most of businessmen train employees themselves, because education institutions do not prepare required people
	139	City lacks leisure places and sport clubs
	140	needs
	141	Scope of activity of Šiauliai airport are very little
	142	Some specific niches in labour market are underexploited
	143	It is not esay to achieve that young specialist after their PhD studies cointinue their career in Šiauliai
	144	It shows that inhabitants still do not see many advantages in using internet (lack of services)
	145	Šiauliai city attractiveness for investment, especially for foreign investors, comparing to other cities, is low
	146	One of the largest problem among unemployed is poor preparation for labour market
	147	Comparing to other largest Lithuanian cities, average brutto salaries in Šiauliai are the lowest
	148	Prepared land with required infrastructure in the city is considered one of the biggest hindrance of investment flows to Šiauliai
	149	Companies almost do not pursue activities related to incoming tourinsm

Table 44. Segments of text coded with „Situation/Current“ AND „Valuation/Negative“ (continued - #6)

Interest group	No.	Retrieved segments
Šiauliai city municipality	150	Hotel services are almost most underdeveloped services in the city
	151	Among the main problems, faced by new and existing entrepreneurs are bureaucracy, lack of finances and insufficient economic, legal
	152	Entrepreneurs' problems: unstable and constantly changing tax base
	153	Entrepreneurs' problems: complex and unfavourable crediting system for starting business
	154	Entrepreneurs' problems: lack of knowledge and danger of competition in enlarged EU market
	155	University thinks that it collaborates [with municilapity], but it is not true. Collaboration is taking place only in paper.
	156	Municipality does not communicate a lot with business support institutions, does not know what is going on.
	157	Science and industry are too much apart
	158	Business needs railway
	159	Probolems of airport as transport centre are more political than economic
	160	Municipality supports business with the help of ad-hoc funds which is totally ineffective
	161	Municipality supports business wthout any selection, system
	162	Regarding nurturing of entrepreneurship, municipality cannot intervene to what schools do. Municipality does not know what shools do
	163	Bureaucratic procedures for starting business are very complex
	164	Municipality should have separate processes for those who want to establish new business. But these processes do not depend on local government. These things are regulated by the law. For example preparation of detailed plan takes about half a year.
	165	Municipality cannot disctriminate local investment versus foreign direct investment
	166	Almost all taxes (and tax incentives) are in the hands of central government
	167	Municipality has no structure for promoting investment
	168	Municipality does not know what form of support would be best for business. Every enterprice has its own demands. Joint research effort should be pursued to get new ideas of what municipality could do.

E. THEORY OF CONSTRAINT'S THINKING TOOLS

BUILDING A CURRENT REALITY TREE (CRT)

This annex is based on William Dettmer's book „Goldratt's Theory of Constraints: A Systems Approach to Continuous Improvement", Chapter 3 "Building A Current Reality Tree" (Dettmer 1997, p. 62-119). The book may serve as excellent handbook for using logic tools. This annex encompasses procedures for building CRT used in the research. For in-depth discussion and description of the tool it is strongly advisable to consult the book.

"A Current Reality Tree (CRT) is a logical structure designed to depict the state of reality as it currently exists in a given system. It reflects the most probable chain of cause and effect, given a specific, fixed set of circumstances. The CRT seeks cause and effect connections between visible indications of a system's condition and the originating causes that produce them." (Dettmer 1997, p. 64).

Dettmer breaks down the process of building a CRT into ten iterative phases or steps (see Table 45 below). CRT (as well as all other TOC thinking tools) was designed to be used as stand-alone tools without links to any system design paradigm. Yet we use CRT only as modelling sub-technique in our process model of design inquiry and do not use several phases listed in Table 45 below, because they are included elsewhere in our model or not required at all.

Table 45. Steps of building CRT

No.	Step
1	Identifying your span of control and sphere of influence
2	Creating a list of undesirable effects (UDEs)
3	Begining the Current Reality Tree
4	Connecting the first two UDEs
5	Connecting other UDEs
6	Building the cause-and-effect chain downward
7	Redesignating UDEs
8	Identifying root causes and core problem
9	Looking for missing connections
10	Deciding which root causes to attack

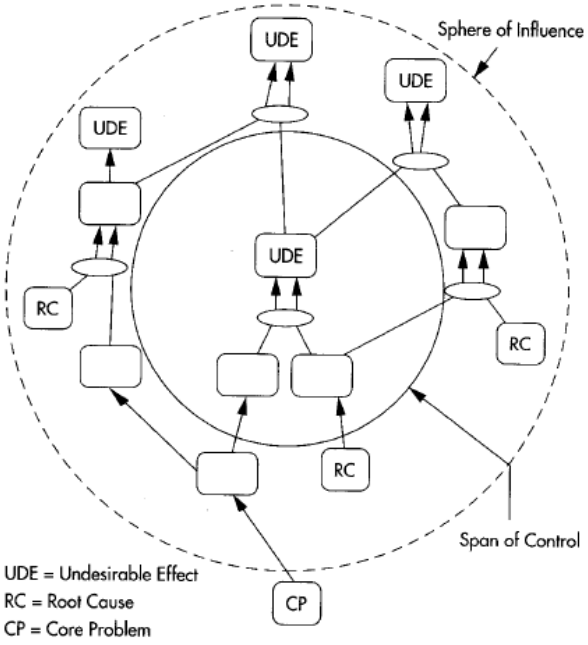
Source: Dettmer 1997, p. 89-98

Identifying span of control and sphere of influence

Parts of complex systems have varying degrees of control over that environment. Dettmer divides the system into three "spheres" according to this attribute. In some areas the subject has a high degree of control over parts or functions of that environment, thus these areas are said to lie within subject's *span of control*. Within span of control subject can

change virtually everything. Just outside span of control lies *sphere of influence* where subject can influence things to varying degrees but does not enjoy direct control. Beyond sphere of influence subject has neither control nor influence (see Figure 13 below) (Dettmer 1997, p. 68-69).

Figure 13. Span of control, sphere of influence, and the CRT



Source: Dettmer 1997, p. 69.

We call subject the entity which is engaged in the design, or "owner" of the model. In our case subject is Šiauliai city government administration. It is relatively easy to identify span of control as it is simply parts or functions that belong to the subject. It is much more difficult to identify sphere of influence because it depends on goals of the subject and it's direction for action (Dettmer 1997, p. 89). There are many things subject can influence or at least put an attempt to it. Identifying span of control and sphere of influence at this stage is a mental exercise of picturing how far subject's influence may extend (ibid).

Creating a list of undesirable effects (UDEs)

"Nearly all of what we see in a system that we don't like is not problems, but indicators. They are the resultant effects of underlying causes" (Dettmer 1997, p. 13) and called *undesirable effects (UDEs).* The underlying causes are called *core problems*. Identifying and eliminating them not only eliminates all the undesirable effects that issue from it, but also prevents them from returning (ibid, p. 13). Thus, the goal of CRT is to identify and eliminate core problems in the system.

Building of CRT starts with most visible or apparent *any* undesirable effects. According to Dettmer, building of CRT should be started with no more than five UDEs generated as statements around problem, which is intended to be resolved with CRT (Dettmer 1997, p. 89). We call this statements *goal of analysis*.

In order for indication of problem to be used in CRT building, it should satisfy *entity existence* rule. It is one of eight of *categories of legitimate reservation*, as Dettmer calls them and demands statement to be complete, structured and valid (Dettmer 1997, p. 36-38).

Connecting the UDEs

After major undesirable effects are properly formulated and explicitly listed, building of CRT is started by deciding which of listed UDE *lead* to another listed UDE (note that leading does not mean causing, because it may not include all causality connections). If intervening steps between to related UDEs are missing, they should be identified (or picked from the list) and inserted into the CRT. The action should be recurred until all original UDEs are connected to other entities (Dettmer 1997, p. 90-92).

At this step it is appropriate to start using visual tools for constructing CRT. Dettmer proposes to use large piece of paper for background and a lot of very small, adhesive-backed notes (such 3M's Post-it notes) for entities. The CRT is constructed by sticking the notes with written UDEs and connecting them with arrows sketched by pencil on the paper background (Dettmer 1997, p. 90). Alternatively, we have used diagram creation computer software Dia (http://live.gnome.org/Dia) for the similar purposes.

Building the cause-and-effect chain downwards

Sometimes it is possible to construct full CRT with procedures described above, yet in most cases they end in one or more groupings or clusters of UDEs without connections to each other. The modeller needs to build the cause and effect logic downwards until all the branches are connected. This is where creativity comes into play as at this point list of formulated UDEs is usually exhausted. Alternatively the modeller may engage in additional data collection and problem formulation. This step of building CRT is finished when all branches are connected to each other.

Redesignating UDEs

Previous steps produced the "unclean" CRT. In order for it to become "clean" and usable for successive steps, Dettmer proposes to redesignate UDEs, that is: check entities for

qualifying as UDEs, review and tighten logic, remove all unnecessary entities, scrutinize the tree (Dettmer 1997, p. 94-96). At this stage we also numbered all entities in the tree.

Identifying root causes and core problem

In building a Current Reality Tree, the modeller works his way from UDEs back through the chain of cause and effect to root causes. "The root cause is the beginning of cause-effect relationship" (Dettmer 1997, p. 73). In other words, root cause is the true problem, not indications of it, as undesirable effects are by definition (see above). Root causes are entities in the CRT which have arrows coming out, but none coming in. Core problem is the root cause which account for 70 or more percent of UDEs (Dettmer 1997, p. 96-97).

Deciding which root cause(s) to attack

Obviously, if a subject could eliminate or solve root problem, it would solve 70 percent or more undesirable effects and this would of course be the preferred course of action. Yet in deciding which root causes to attack the appropriate attention should be paid to boundaries of span of control and sphere of influence, delineated in the first step of building a CRT. It may be the case that core problem lies outside sphere of influence. Root causes which are inside the span of control or sphere on influence and account for most of UDEs, should be attacked first.

STRATEGIC INTERMEDIATE OBJECTIVES MAP

This annex is based on William Dettmer's book „Strategic Navigation: A Systems Approach to Business Strategy", Chapter 5 "Defining the Paradigm" (Dettmer 2003, p. 57-78). This annex explains the concept of Strategic Intermediate Objectives Map. For in-depth discussion and description of the tool it is strongly advisable to consult the book.

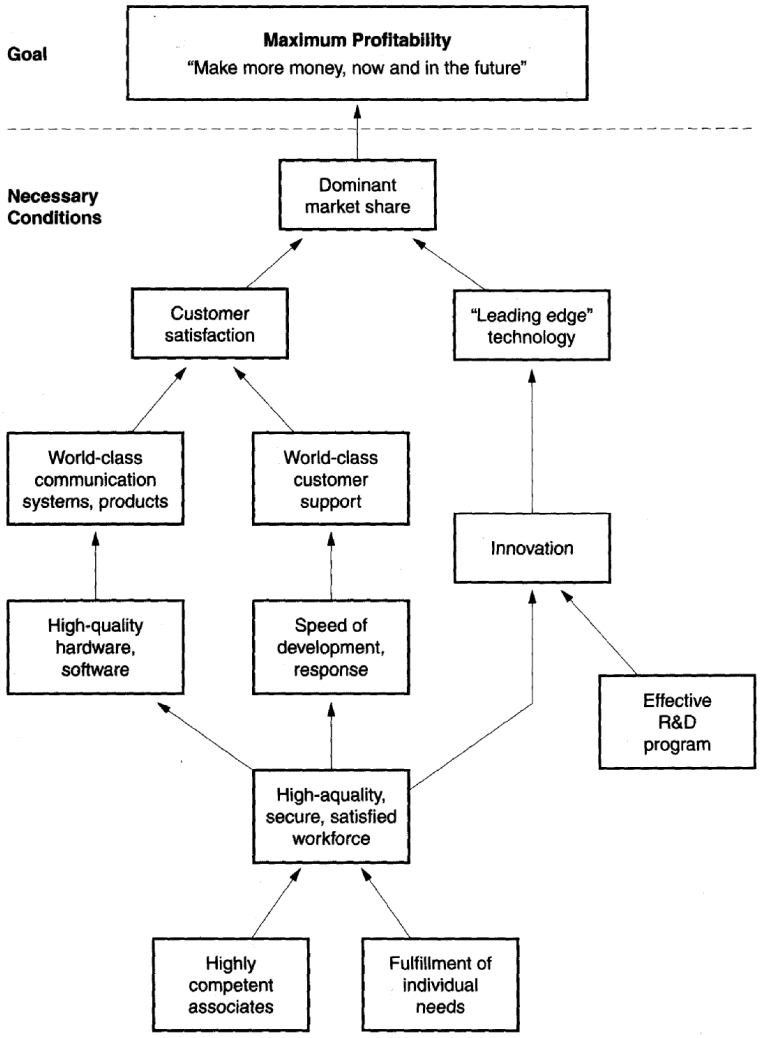
Every system has a goal which is in some way is related to the kind of activity the system engages to (the mission). Simply speaking the goal of the system is whatever the system's owners say it is. Thus in order to understand goals, we have to identify who are the system's owners (Dettmer 2003, p. 60). In our case of city business environment we assume that the owners of the system are all related interest groups, or system's participants.

Knowing the goal is generally not enough. "One of characteristics of complex systems is that their goals inevitably have several preconditions that must be satisfied if the goal is to be achieved" (ibid). These preconditions could be called "critical success factors", "necessary conditions" or "intermediate objectives". The meaning of these preconditions are

characterized by dependence of the goal of the system on achieving the preconditions. "They are discrete elements whose presence is required for success" (ibid).

The conditions necessary to achieve the system's goal may be arranged in hierarchy, which Dettmer calls Strategic Intermediate Objectives Map (Dettmer 2003, p. 63). See

Figure 14. Strategic IO Map example



Adapted from Dettmer 2003, p. 73

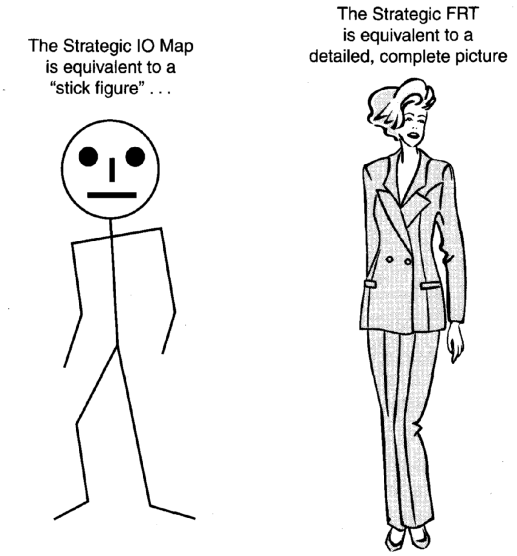
The Strategic Intermediate Objectives Map is a good definition of a system, which becomes the core of organization's strategy (Dettmer 2003, p. 70).

CONSTRUCTING A STRATEGIC FUTURE REALITY TREE

This annex is based on William Dettmer's book „Strategic Navigation: A Systems Approach to Business Strategy", Chapter 10 "Designing the Future: Laying Out Strategy" (Dettmer 2003, p. 157-182). The annex explains the concept and procedure of constructing a strategic future reality tree. For in-depth discussion and description of the tool it is strongly advisable to consult the book.

Strategic Future Reality Tree is closely related to Strategic Intermediate Objectives Map as the first is constructed virtually on the skeleton of the latter (see Figure 15 below).

Figure 15. Relation of Strategic IO Map and Strategic Future Reality Tree



Source: adapted from Dettmer 2003, p. 160.

Dettmer proposes that construction of Strategic future reality tree should be performed in seven successive steps, listed in Table 46 below.

Table 46. Guidelines for assembling a Strategic Future Reality Tree

No.	Step
1	Determine desired strategic effects
2	Articulate injections
3	Compile other elements for the body of the S-FRT
4	Assemble the S-FRT
5	Look for opportunities to incorporate positive reinforcing loops
6	Search for possible negative branches
7	Verify and validate the Strategic Future Reality Tree

Source: Adapted from Dettmer 2003, p. 163.

Determine desired strategic effects

Determining the desired strategic effects is as easy as converting the wording of necessary conditions or intermediate objectives and undesirable effects to desirable form. This should be done for all necessary conditions and goal from Strategic intermediate objectives map and all undesirable effects (UDEs) from Current reality tree (Dettmer 2003, p. 163-164).

Articulate injections

Injections (or actions, required to change the course of events) are also taken from Current reality tree and Strategic intermediate objectives map (ibid, p. 164). Root causes in the Current reality tree are underlying causes of all undesirable effects. Thus, changing them

will effect in the transformation of the system. Some of the injections we may find in Strategic intermediate objectives map, as mapping the future may that are not apparent know yet will be faced in the future. Dettmer proposes to use 3M's Post-it notes for replication of the entities to injections and place them on large sheet of paper for further constructing of the Strategic future reality tree. Yet we, as in case of Current reality tree, used the diagram creation computer software Dia (http://live.gnome.org/Dia) for these purposes.

Compile other elements

Content of the Strategic future reality tree comes from data, facts, research about the subject under analysis ant its environment and assumptions about future reality (Dettmer 2003, p. 164).

Assemble the tree

The Strategic future reality tree is constructed starting with previously articulated injections and desired strategic effects and connecting the corresponding entities with arrows representing cause and effect relationships, similar to the construction of Current reality tree (see "Building A Current Reality Tree (CRT)" above). Constructing the connections between the layers of cause and effect requires to ask: "If [Injection #1], what is the direct and unavoidable outcome?", followed by, "Is [Injection #1] alone enough to produce the next outcome? If not, what's issing?" Then, missing elements to make the connection sufficient should be inserted (Dettmer 2003, p. 165-166).

Look for opportunities to incorporate positive reinforcing loops

Self-sustainability is an important aspect of the strategy. Self-sustainability of the strategy (or policy, in our case) is done through use of *positive reinforcing loops* (in system dynamics, they are called positive feedback loops). A positive reinforcing loop is a situation in which a desired effect can be used to improve the cause, thus creating a sort of positive tautology (Dettmer 2003, p. 167; Sterman 2000, p. 12). When designing the system, positive reinforcing loops should be identified and enabled because of their strong positive effect on dynamics of the system.

Search for negative branches

The negative branch is the tautology, similar to positive reinforcing loop, explained above, yet negative. In system dynamics domain it is also called negative feedback or self-correcting loops (Sterman 2000, p. 12). In fact, negative branches are conceptually modelled

real-life problems and have negative effect on the overall dynamics of the system. Thus it is crucial to identify and break these loops.

Verify and validate the tree

Dettmer provides well defined rules for validating the thinking process cause-and-effect trees, called the *categories of legitimate reservation*. (Dettmer 2003, p. 170). For the detailed explanation of categories of legitimate reservation it is advisable to consult William Dettmer's book „Goldratt's Theory of Constraints: A Systems Approach to Continuous Improvement", Chapter 2 "Categories of Legitimate Reservation" (Dettmer 1997, p. 31-61).