

BE304E MANAGEMENT CONTROL

**Beyond the “Iron triangle” of scope, time & costs:
Managing uncertainties in big construction projects in different contexts**

A Comparative study of big construction projects in Ukraine and Norway

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Abstract

Only 10% of big construction projects end up within the planned budget and 6 out of ten construction projects face time overruns (Flybjerg et al., 2010). These problems are very tangible, especially if the project's price bracket is the six-digit number or even more. There are a lot of explanations why do time and costs overruns occur, but all of them can be considered forms of uncertainties, which could be conventionally divided into three groups: uncertainties in estimates, uncertainties related to the project parties and uncertainties associated with the stages in the project life cycle. In this regard, study of management control systems in handling uncertainties of big construction projects seems to be important.

The purpose of this study is to explore and compare how uncertainties are being managed in big construction projects in different contexts. One Norwegian and one Ukrainian big construction projects are chosen for investigation. Empirical results are mainly obtained from six interviews with "key figures" in management of construction of studied projects.

Examining the MCS in Norwegian and Ukrainian projects, I have obtained interesting results, which are contrary to the expectations and assumptions of the theoretical framework. It became known that both Ukrainian and Norwegian projects managers utilized very similar MCS for handling uncertainties: a combination of belief, boundary, interactive and diagnostic controls. The inequalities can be seen only in belief and boundary systems, which could be explained due to the cultural differences between Norway and Ukraine. Meanwhile, diagnostic and interactive control systems are almost identical in both projects. Thus, it seems that internationalization and globalization of economy harmonize the contexts, in which big international projects execute, and consequently the choice of tools and MCS used for handling uncertainties in international construction projects.

Keywords: uncertainty, management control, management control systems, big construction projects, project management, projects' life cycle, projects' stakeholders.

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List of acronyms

MC – Management Control
MCS – Management Control System
PLC – Project's Life Cycle
PM – Project Management
PMBOK – Project Management Body of Knowledge
PMI – Project Management Institute

I. INTRODUCTION

“If you do not have uncertainty, you do not have any evolution”

Perminova et al, 2008

1.1 Background of the thesis

Thousands or even millions of different projects realize every year. Projects can be various shapes and sizes, from the small and straightforward to extremely large and highly complex. Most of the big construction projects have international character and involve a lot of contractors and subcontractors from different countries. These projects are usually very complex, and their values exceed six-digit numbers. What is interesting is that 9 out of ten construction projects (90%) have underestimated costs, and 6 out of ten construction projects (60%) end up with time overruns (Flyvbjerg et al., 2010). Harvard Design Magazine reports that Sydney Opera House, for example, was completed ten years late and cost 15 times more than it was originally projected (Flyvbjerg, 2005). There are a lot of explanations why do time and costs overruns occur. Numerous studies indicate complexity of projects as one of the main reasons (Ireland, 2007), other – see the problem in poorly-defined scope (Hubbard, 2009), unstable environment (first of all economy and politics), etc., but all of them can be considered forms of uncertainties and risks (Flyvbjerg, 2008).

1.2 Why is it important to study uncertainties in big construction projects?

Every project is unique endeavour, and even if the project is repetitive, it is still unique, because it always creates a new result. The primary challenge of project management (PM) is to achieve all of the engineering project goals (Ireland, 2006) while honouring the preconceived project constraints (Phillips, 2003). Typical constraints are scope, time, and budget, often called an “Iron Triangle” (Atkinson, 1999). Every side of the triangle represents a constraint: one side of the triangle cannot be changed without affecting the others. The time constraint refers to the amount of time available to complete a project. The cost constraint refers to the budgeted amount available for the project. The scope constraint refers to what must be done to produce the project’s end result. Thus, every project demands accomplishment of unique scope of works within strict constrains. Moreover, the final product or result of the project has to meet quality

requirements. Many factors as well as different parties are involved in project's realization. Therefore, a lot of unknown and unpredictable factors could appear and influence the project (Akintoye & MacLeod, 1997). These "unknown factors" should be understood and managed (Ward & Chapman, 2003). Handling uncertainties must be based not only on delivering projects on time, within budget and quality requirements, but also with meeting or exceeding stakeholders' expectations.

It is important to establish distinction between the terms risk and uncertainty. According to Knight (1921) uncertainty is immeasurable, not possible to calculate, while the risk is measurable. Hubbard (2009) describes uncertainty and risks as follows:

- Uncertainty – a lack of complete certainty, an existence of more than one possibility. The "true" outcome/state/result/value is not known.
- Risk – a state of uncertainty where some possible outcomes have an undesired effect or significant loss.

Hubbard uses the terms so that one may have uncertainty without risk, but not risk without uncertainty. The measure of uncertainty refers only to the probabilities assigned to outcomes, while the measure of risk requires both probabilities for outcomes and losses quantified for outcomes. Thus, uncertainty has a problematic feature that managers have a limited framework of reference to base their decisions on (Leijten, 2010). True uncertainty implies that neither the possible outcomes, nor the probability of occurrence can be foreseen. Therefore, in my work I use term "uncertainty" as an event that cannot be foreseen in advance deriving from the lack of knowledge, while "risk" is the potential that a chosen action or activity will lead to a loss (or an undesirable outcome). I do not describe the probabilities for losses of the outcomes of the projects, thus I use term "uncertainty".

1.3 Relevance of the research and need for knowledge

The study of managing uncertainties in big construction projects is in the line of the most topical themes for research nowadays (Berry et al., 2009). Thus, it seems essential that more emphasis should be placed on the study of real control systems as they operate in practice, especially design and use of MCS (Berry et al., 2009), because control is that element of a construction project that keeps it on-track, on-time and within budget (Lewis, 2000): it begins early in the

project with planning and ends late in the project with post-implementation review, having a thorough involvement of each step in the process. Thus, each project should be assessed for the appropriate level of control needed: too much control is too time consuming, too little control is very risky. Before accepting responsibility for a project, the project manager must know exactly what type of the project is and what are the main projects' constrains. It is important also to reveal on the earlier stages, which stakeholders have the strongest impact and interests in the project (Turner, 2006). When the project manager and his team know all these components, they can start detailed planning, negotiation for resources and building the necessary MCS, which helps them, for instance, to monitor and correct results achieved with results planned.

1.4 Problem statement and research questions

Uncertainty management has become a common element of preparation and implementation processes, particularly in the construction projects (Turner, 2006). Despite this development, project managers still face certain grades of uncertainties and difficulties to overcome them. This work focuses on two big construction projects in different contexts (two case-studies). These two have been studied elaborately.

Problem statement of the paper is:

How are uncertainties being managed in big construction projects in different contexts?

A comparative study of big construction projects in Ukraine and Norway

The main research questions are:

- 1) What are major uncertainties in relation to construction projects in Ukraine and Norway?
How are they managed?
- 2) What are the differences and similarities between management control systems in handling uncertainties in construction projects in Norway and Ukraine?

In order to accomplish the task I use examples of two big projects (which have been realized recently, but did not meet their initial plans):

- A project of construction of Norway's one of the most famous sporting arenas, built to the Ski World Championship 2011 – "Holmenkollen" (Oslo, Norway);

- Construction project of the biggest stadium in Eastern Europe designed and built to UEFA elite standards and for the EURO 2012 – “Donbass Arena” (Donetsk, Ukraine).

1.5 Why do I want to investigate big construction projects in Norway and Ukraine?

In my research I do analyse MCS of big construction projects in different contexts. According to the theoretical framework (DiMaggio and Powell, 1983; Levitt & Mahalingam, 2007; Meyer and Rowan, 1977; Miroshnik, 2002), construction industry in another country may have different instances of the same institutions, local rules, building codes and practices that lead to different taken-for-granted regularities of behaviour and different tools of MC used to handle uncertainties, which arise during the PLC. Thus, MCS are likely to be differentially implicated in different countries (Harrison & McKinnon, 1999).

Therefore, I have chosen construction projects, which were realized in different contexts, but within the same industry and with similar constrains¹. It gives me an opportunity to compare MCS in handling uncertainties of construction projects in different countries. The projects under study are international, because they involved many foreign contractors and subcontractors. They both were constructed for the big sporting events and became local symbols of Norway and Ukraine. These countries are both situated in Europe, but have different economies, traditions and norms, etc.

Norway is a stable, well-developed country with standards of living that are among the highest in the world. Norway as well as Ukraine is not a part of European Union, but it actively participates in the European Union’s single market². Norway is very open state in terms of its business. It is a part of Schengen area, which makes cooperation with other European countries easier. Ukraine is relatively young country, with unstable economy, weak political and law systems. With the dissolution of the Soviet system, the country moved from a planned economy to a market economy. Ukraine is not a part of European Union and Schengen Area. Ukraine currently balances its relationship with Europe and the United States with strong ties to Russia. The World

¹ Detailed information about projects is in Methodological part (subparagraph – “Argumentation in support to the projects’ choice”).

² <http://lovdata.no/> (EØS-loven — EØSI. Lov om gjennomføring i norsk rett av hoveddelen i avtale om Det europeiske økonomiske samarbeidsområde).

Bank classifies Ukraine as a middle-income state³. Significant issues include underdeveloped infrastructure and transportation, corruption and bureaucracy (Pogarska, 2008). Thus, two projects which were chosen for my research have been realized within different institutional environments. Therefore, it is possible to assume that groups of uncertainties, their sources and management control tools used for handling these uncertainties in Ukrainian and Norwegian projects will differ significantly.

Access to the persons involved in management of these two big construction projects and possibility of getting formal and informal information in regard to the projects management and management control were considered as important factors while choosing the topic and the objects of the research. Thus, theoretical and practical background, as well as the access to the primary data, some project documentation has played a significant role in choosing the topic for my research. Theoretical motivation includes incentives to study how uncertainties were managed in the different construction projects. From the practical side, I would like to compare the MCS used for managing uncertainties in Norway and Ukraine.

1.6 How do I plan to achieve the goal of my research?

For conducting a research I use qualitative analysis, and the semi-structured interviews as a major instrument of collecting data. I analyse project documentation as well as the other secondary data (information from the official web-sites, books, theses, earlier publications in the particular field, etc.). To highlight the research problem I use case-study research strategy, communicating directly to the “first persons” of the big construction projects both in Norway and Ukraine.

The theoretical framework combined into one united approach and consists of two major parts: theory of Project Management (Aaltonen, 2011; Yang, 2010; Atkinson, 1999; Turner, 2006; Toor & Ogunlana, 2010; and others) and Management Control (Simons, 1995; Canonico & Söderlund, 2010; Leijten, 2010; etc.). Along with the above mentioned sources I apply to the institutional theory (DiMaggio & Powell, 1983; Meyer, Rowan, 1977, etc.) in order to define cross-national similarities and differences in the big construction projects. I use also widely known standard among theoreticians and practitioners – A Guide to the Project Management

³ <http://www.worldbank.org.ua/> (What are Middle-Income Countries?)

Body of Knowledge (PMBOK, 2008), developed by the Project Management Institute, in order to describe the basic definitions of the Project Management.

1.7 Structure of the thesis

To answer the research questions following structure of the Master Thesis was chosen (Fig. 1.1): Chapter 1 provides the reader with introduction and background of the research, a theoretical framework is presented in the Chapter 2, including the most important and relevant theories for the problem statement. Chapter 3 describes the methodology used for conducting our research. Empirical findings are described in the Chapter 4 and analysis and discussion are conducted in the Chapter 5. Finally there are conclusions and some other openings for future research.

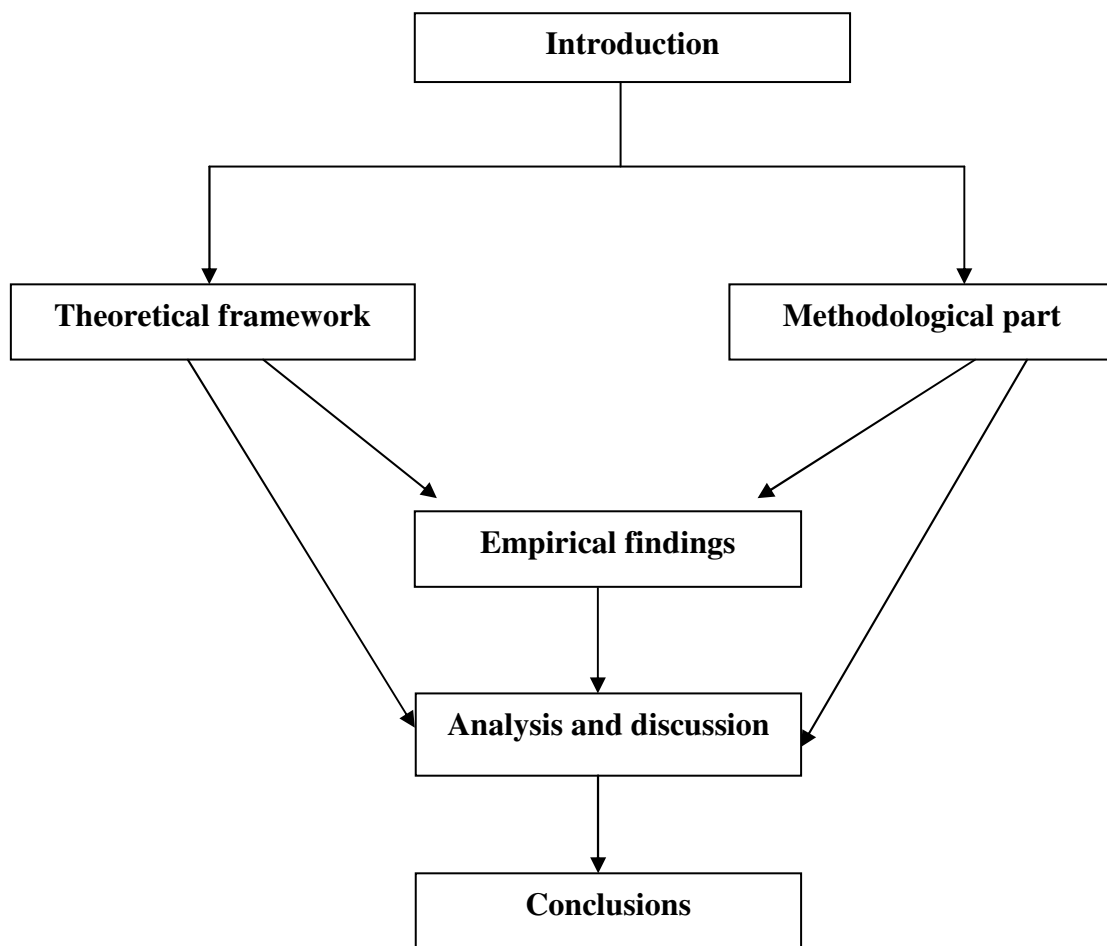


Fig. 1.1 Structure of Master Thesis

II. THEORETICAL PART

In this chapter I introduce to the reader important concepts and components that underpin the relevant theory to the problem statement, and hence, help me to design empirical and analytical parts. I describe main groups of uncertainties related to the big construction projects, and then apply management control theories in order to understand how these uncertainties could be managed in different contexts from the theoretical perspective. In the end of the theoretical chapter I present a model for analysing components of MC in different contexts.

2.1 Nature of the projects and their management

“A project is different from usual work. It has a single focus. It is a child in the midst of a family of adolescent and adult tasks”

Lientz & Rea, Project Management for the 21st Century

2.1.1 What is a Project?

The PMBOK defines a project in terms of its distinctive characteristics: “A project is a temporary endeavour undertaken to create a unique product, service or result”. Projects have social, economic, and environmental impacts that far outlast the projects themselves (PMBOK, 2008). Projects are temporary and unique, they are undertaken to achieve an objective, conforming to specific requirement on time, costs and resources, often called an “Iron Triangle” (illustrated in the Fig. 2.1).

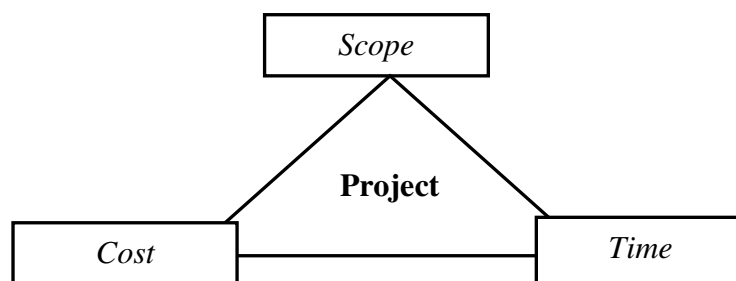


Fig. 2.1 Iron Triangle (Atkinson, 1999)

Every side of the triangle represents a constraint: one side of the triangle cannot be changed without affecting the others. The time constraint refers to the amount of time available to complete a project. The cost constraint refers to the budgeted amount available for the project. The scope constraint refers to what must be done to produce the project's end result. It is worthy to note that in the latest versions of the PMBOK, PMI has done away with the project triangle, the reason for this is that a project has many more constraints to be observed other than the scope, the time, and the cost.

Balancing the competing project constraints including, but not limited to (PMBOK, 2008): scope, quality, schedule, budget, resources and risks. The relationship between these factors is such if any factor changes at least one other factor is likely to be affected (e.g. if the schedule is shortened, often the budget needs to be increased; changing the project requirements may create additional risks, etc.). Frigenti & Comminos (2002) marked out three factors that differentiate projects from routine operations:

- *Uniqueness*. Even if the project is repetitive all the time it is unique, because it creates a unique product, service, or result. For example, office buildings are constructed with the same or similar materials or by the same team, but each location is unique – with a different design, different circumstances, different contractors, etc. (PMBOK, 2008).
- *A temporary nature* indicates a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. Temporary does not necessarily mean short in duration, most projects are undertaken to create a lasting outcome.
- *Progressive elaboration*. Due to the uniqueness of project results, the precise details in terms of the deliverables contributing to the results are not known from the outset. Because of this, the deliverables' characteristics, and in fact the project parameters will need to be progressively elaborated. The two words are defined as follows: 1) progressively – proceeding in steps; continuing steadily by increments; 2) elaborated – worked out with care; developed thoroughly. Different authors sometimes call the third factor *uncertainties about the outcome* (instead of progressive elaboration), e.g. PMBOK (2008).

2.1.2 Types of projects

Before accepting responsibility for a project, the project manager may need to negotiate for resources. Knowing the type of project is the key to this. There are different types of the projects, subjected to different criteria, e.g. projects that cost more than \$1 bln and last 5-7 years are called megaprojects, at the same time these projects can have commercial or non-commercial goals, local, regional or international character and so on (Appendix A). There are also multi-criteria approaches for defining types of the projects. Frigenti & Comminos (2002) proposed to distinguish projects as Fog, Movie, Quest and Painting by Numbers. They are defined by how much is known about the ultimate goal, and the level of knowledge about how to reach that goal:

- *“Painting by Numbers”* are the projects where the stakeholders all know exactly what needs to be done, and how it needs to be done. Problems that may arise during the realization of such type of the projects are usually quite predictable. Typical example of painting by numbers project is building a house, where the project manager and his employer have experience in this trade.
- *“Going on a Quest”*: The stakeholders know what they want to achieve, but are not clear how. The project manager can negotiate for resources based on the large number of unknowns. The example is R&D project.
- *“Making a Movie”*: The methods to be used are known, but the end result is not clear. For example, creative projects, where the final result could be a masterpiece or a flop.
- *“Walking in the Fog”*: The most difficult type of project. The main stakeholders are not only unclear about how things need to be done, but are also not totally sure about what the end result should be. This type of project needs a strong leader, and he must ensure that the project has the complete commitment and support of the senior stakeholders. The example of such project is introduction of a new Business Excellence program (e.g. Six Sigma or Lean Manufacturing⁴).

Table 2.1 analyses the four project types in terms of project processes and tools, and a suggested management approach. The management approach described in Table 2.1 is useful on the earlier stages of project. ‘Fog’ or ‘quest’ projects need a good leader, progressive elaboration and step-by-step plans. In the ‘movie’ cases it is better not to spend too much time on planning and

⁴ <http://www.suite101.com/content/project-management-a98155>

concentrate attention on the final result. In the ‘painting by numbers’ situations it is important to take into account all the risks, constrains of the project and interests of all parties involved.

Table 2.1 Four types on the projects (adapted from Frigenti & Comminos, 2002)

| Project type (description by Obeng) | Project | | Management approach |
|---|----------------------|--------------------------------|---|
| | Process | Tools | |
| Fog - Pure research - Change initiatives - First-time projects | Not well understood | Not well developed | Proceed with caution one step at a time. Focus on the next beacon and carefully move towards it. Having reached a beacon, the path to the next beacon becomes clear through the fog |
| Movie - Film production - Systems development - Prototype development | Well understood | Well developed | Because the PM and production processes are well known, avoid spending too much time on definition and planning. It is better to concentrate on finding a good product (script), and the project process will be easily managed |
| Quest - Business improvement - Product development | Not well understood | Not necessarily well developed | The projects require considerable research in the project initiation and definition phases, so a picture can be built up of a means approach required to achieve the final outcome. Care should be taken not to get into too much detailed planning and design, but rather progressively elaborate the project. |
| Painting by numbers - Construction and engineering - Similar projects done in the past | Very well understood | Very well developed | Painting by numbers projects are complex, and tend to be large and involve many parties. As time and costs are predictable, the challenge is to deliver within tight financial, time and specification constrains. Diligent application of process and workflow is critical to success. |

Projects can generally be classified as being of a Fog, Quest, Movie or Painting by Numbers type. As a project elaborates it can move from one state to another. For example, the early stages of a business improvement project could be described as ‘fog’. As clarity emerges, targets for improvement are set, moving the project into a ‘quest’ state, but the best approach to achieve the project is not yet clear. As the project further elaborates, the design and implementation details emerge which, when sufficiently clear, lead to the ‘painting by numbers’ state. During the implementation the project is predominantly in the ‘painting by numbers’ state, although it may at times need to revert back to ‘quest’ or ‘fog’ if unforeseen factors arise, requiring further elaboration.

The uniqueness nature and limited duration of projects require additional efforts to build effective project teams and generate trust, both within the team and between the team and the project stakeholders, i.e. interested parties (Grabher, 2002). It is very important also to understand what uncertainties and risks are involved in the project and how to manage them.

2.2 Understanding uncertainties of the project

There are several approaches to classify uncertainties related to projects. Some authors observe sources of uncertainties, another separate them according to potential impacts, etc. Table 2.2 represents a short summary on existing approaches.

Table 2.2 Different approaches for classifying uncertainties in projects

| Criteria | Author/year | Types of uncertainties |
|-------------------------------|------------------------------------|---|
| By the sources of uncertainty | Jaafari (2001) | <ul style="list-style-type: none"> - External (commercial and competitive pressures, collision of social, political and institutional norms and rules); - Shifting business objectives (shifting requirements of project stakeholders, etc.) - Poorly defined methods for project realisation |
| | Perminova et al. (2007) | <ul style="list-style-type: none"> - Internal (system complexity). - External (government, industrial standards). |
| By nature | Leijten (2010) | <ul style="list-style-type: none"> - <i>Technical</i>: a technology or work processes to be applied is known or prescribed to have a certain chance of failure - <i>Implementation</i>: apart from the possibility that technology or work processes fail once in a certain period of time, failure can also occur because actors working with the technology deviate from the expected work processes. |
| By potential impact | Ward, Chapman (2001) | <ul style="list-style-type: none"> - Variability associated with estimates; - Uncertainty about the basis of estimates; - Uncertainty about design and logistics; - Uncertainties about objectives and priorities; - Uncertainties about fundamental relations between project parties. |
| | Jensen, Johansson, Lofström (2005) | <ul style="list-style-type: none"> - Uncertainties in vertical relations; - Uncertainties in horizontal relations |
| By parties involved | Zou et al. (2007) | Risks and uncertainties related to: <ul style="list-style-type: none"> - Clients - Designers - Contractors - Suppliers/subcontractors - Government agencies - External issues |

In my research I use classification based on the potential impact, developed by Atkinson & Crawford (2006). This classification includes all the elements and accumulates in themselves all previous researches on this topic. According to Atkinson & Crawford (2006) there are three key areas of uncertainties:

- 1) Uncertainty in estimates;
- 2) Uncertainty associated with project parties;
- 3) Uncertainties associated with the stages in the project life cycle.

Classification developed by Zou et al. (2007) will be used in addition to Atkinson & Crawford's one to give a wider understanding of uncertainties associated with project parties.

2.2.1 Uncertainties in estimates

Uncertainty in any project concerns estimates of potential variability in relation to performance measures like cost, duration, or quality related to particular planned activities (Atkinson & Crawford, 2006). The causes of uncertainty about estimates may include the following (Buehler, Griffin et al., 2002; Armor, Taylor, 2002):

- lack of a clear specification of what is required;
- novelty, or lack of experience of this particular activity;
- complexity in terms of the number of influencing factors and associated interdependencies;
- limited analysis of the processes involved in the activity;
- possible occurrence of particular events or conditions which might affect the activity;
- emerging factors unknowable at the start of the project;
- bias exhibited by estimators, typically optimism bias.

Thus, uncertainty comes from ambiguity, vagueness and contradictions associated with lack of clarity because of lack of data, incomplete and inaccurate detail, lack of structure to consider issues, the working and framing assumptions being used to consider the issues, known and unknown sources of bias, limited control of relevant project players, and ignorance about how much effort it is worth expending to clarify the situation (Chapman & Ward, 2003). Thus, it is important to identify the main features and limitations of the project and know how to manage different types of the projects. According to the theory there are also other ways to manage

uncertainties related to the project's estimates: using organizational capabilities, culture and learning by experience.

Organizational capabilities, i.e. organization structure and work breakdown structure (WBS), co-ordination and control systems, environmental scanning capability, communications and information systems, knowledge management, and support for organization learning, all affect the quality and scope of project management undertaken (Ward, 2005). Organizations which have efficient and effective systems for co-ordination and control, environmental scanning, and organization learning will be comparatively well placed to foster efficient and effective uncertainty management (Atkinson, 2006). Unfortunately, many organizations demonstrate scarcity in their approach to uncertainty and learning. Sometimes shortcomings in organizational capabilities are not evident until systematic attempts to identify and manage uncertainty are made (Dixon, 2000).

If to understand that *culture* in its nature can be a mechanism for organizational control, it can have its impact on the quality of uncertainty management. Culture can become obvious in several areas as in planning, formal processes, regulations, attitude to risks and mistakes. These cultural characteristics can either facilitate or hinder the development of uncertainty management (Handy, 1995). In particular, these cultural behaviours can reflect an inability or unwillingness on the part of managers or groups to recognize the difference between (a) bad management and poor performance due to factors that are not under a manager's control; and (b) good managers who apply proactive uncertainty management to reduce problems and enhance performance, and managers who are just lucky. Addressing such conditions can be one of the most significant benefits of formal uncertainty management processes (Atkinson, 2006).

Knowledge management and learning by experience, both in the organizational level and individual, are major contributors to uncertainty management in different ways. Quality of estimates directly depends on the access to the data and basic information about the industry, laws, market, etc. Decreasing of uncertainty directly depends on the reliable data's availability. Nevertheless, many organizations and project managers are not successful in creating data base of lessons learnt, or sometimes cannot present such data in the form useful to be used.

2.2.2 *Uncertainties associated with project parties*

The following writers Aaltonen (2011), Atkinson (1999), Toor (2010), Turner (2006), Wateridge (1998), Yang (2010) and many others concluded that successful implementation of the project is impossible without defining the project's parties, i.e. stakeholders. The PMBOK (2008) describe stakeholders as individuals or organizations, who are actively involved in the project or whose interest may be positively or negatively affected by the performance or completion of the project. Stakeholders may also exert influence over the project, but the final effect is never exactly known. A project may seem successful to the client, but a completely unsuccessful for contractors or end users (Toor & Ogunlana, 2010).

In such cases theoreticians recommend to focus on the key stakeholders (Frigenti & Comminos, 2002), which influence and interests are greater than others. Examples of project stakeholders include, but not limited to the customers, owners, user groups, project manager, development team, the testers, upper management, resource and line managers, lobbying organizations, and society at large. Some of the most important stakeholders are shown in Fig. 2.2. While employees and other agents of a project owner are essential to the achieving of project performance, they also contribute to uncertainty about future performance (Atkinson & Crawford, 2006).

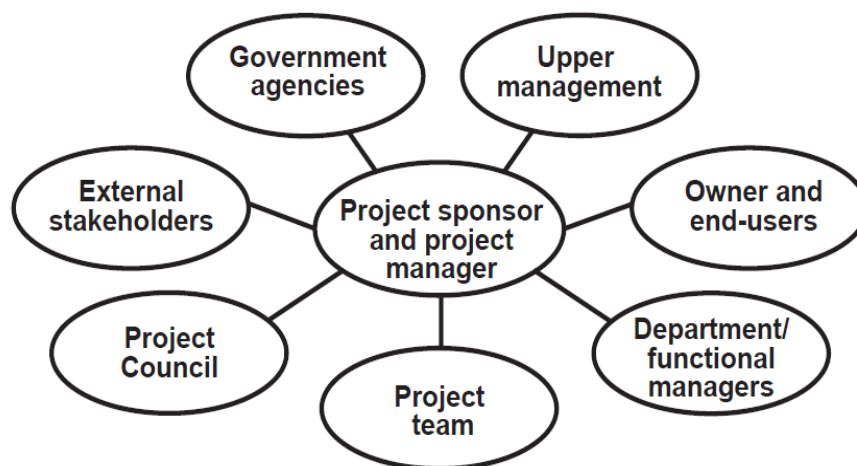


Fig. 2.2 Project's Stakeholders (Frigenti & Comminos, 2002)

This uncertainty arises due to several factors, including (Ward, 1999): uncertainty about the level of performance that will be achieved; the objectives and motivation of each party; the quality and reliability of work undertaken; the extent to which each party's objectives are aligned; with the project owner's objectives, and the scope for moral hazard where one party is motivated to do

things which are not in the best interests of the project owner; the actual abilities of the party; and availability of the party.

In any organisational context including all projects, different parties have different knowledge and perceptions of the nature of sources of uncertainty and different capabilities for their management (Chapman & Ward, 2003). Graham and Gabriel (2003) state that stakeholders' management needs to be continuously elaborated and converted into tactical actions by the project core team. After developing the list of stakeholders, the next important step is to consider why these individuals support the project by asking how they will benefit from a successful project. Yang et al. (2010) proposed their own approach to effective methods for successful stakeholder management, which is presented in Appendix B. Authors made an analysis of the most effective and frequently used methods by managers for identifying and estimating stakeholders, gathering information, making and implementing these decisions.

They have found out that personal past experience, meetings, negotiations, focus groups and workshops, "snowball sampling", i.e. asking the obvious/identified stakeholders to identify others of importance, called, is also considered very effective (Patton, 1990), and intuition (Chinyio & Akintoye, 2008) are among the most effective methods in stakeholders' management. However, "choice of approaches will depend on the purpose of the stakeholder analysis, the skills and resources of the investigating team, and the level of engagement" (Reed et al., 2009). Every party has its influence on the project's objectives: cost, time, quality, safety and environment. The influence will be individual for every single project, since different stakeholders have different impact on the project realization. Thus, it will be interesting to investigate how different stakeholders influence the project objects in different contexts.

a) Role of trust in managing uncertainties associated with project parties

Many authors include *trust* as a way to reduce uncertainty in the projects. There are different types of trust in projects: trust to insight and outside parties. A main problem is that a project context is more temporary than ongoing operations where reutilization, learning from past experiences, memory of past experiences is easier (more available), the parties are relatively constant, and experimenting and the development of optimum practice is possible (Ward, 2002).

In our case there are necessitates of involvement of outside parties, who may be unfamiliar to the project owner. Such new and temporary relationships increase the importance of trust, since project parties may have little or no prior knowledge of the other parties' technical or fiduciary standards, and there is a lack of time for familiarity to develop from shared experiences or demonstrations of non exploitation of vulnerability (Atkinson, 2006).

A further problem is that total control over the activities of project parties is neither possible nor desirable. An understandable reliance on controls can lead project staff to feel that they are not trusted (and vice versa), and this can have adverse consequences of a moral hazard nature. The problem with trust is that it can spiral, both positively and negatively (Coopey, 2002), as a result there is always the equilibrium to be struck between the use of controls and trust. Handy (1998) argues that where you cannot trust, you have to check all the systems of control involved, to ensure that any gaps in trust are replaced with controls.

2.2.3 *Uncertainties associated with stages in the project life cycle*

Many significant sources of uncertainty that need to be managed in projects are associated with project life cycle (PLC) (Atkinson & Crawford, 2006). The PLC refers to a logical sequence of activities to accomplish the project's goals. Regardless of scope or complexity, any project goes through a series of stages during its life (Fig. 2.3): 1 – Initiation, 2 – Planning, 3 – Executing, 4 – Monitoring and Controlling, 5 – Closing a project.

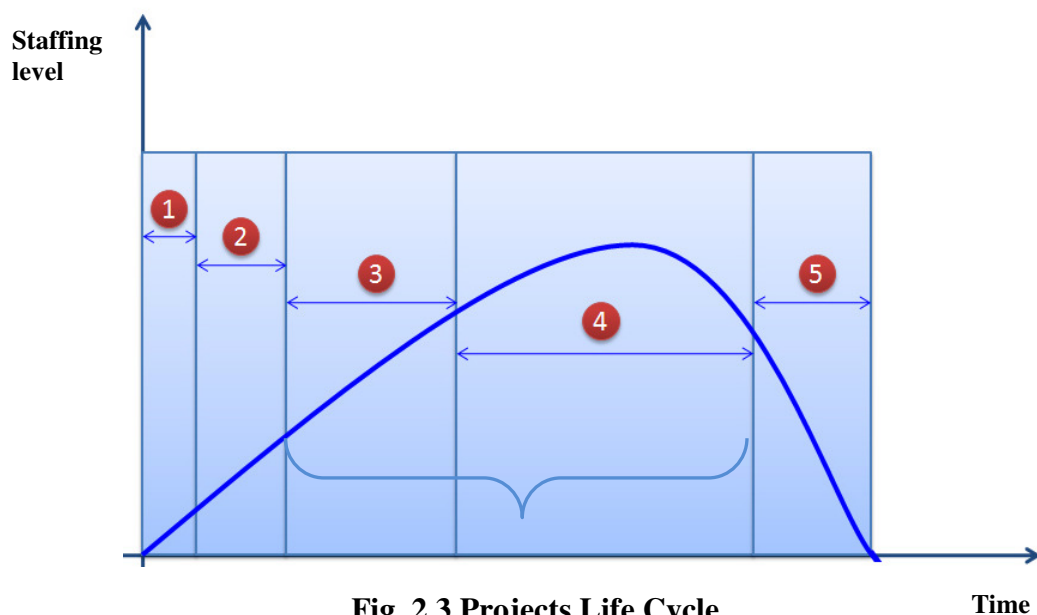


Fig. 2.3 Projects Life Cycle

The first is Initiation or Birth phase, in which the outputs and critical success factors are defined, followed by a Planning phase, characterized by breaking down the project into smaller parts/tasks, an Execution phase, in which the project plan is executed, and lastly a Closure or Exit phase, that marks the completion of the project. The Graph above shows us that staffing level, i.e. people involved in the project, increases steadily until the last stages of the PLC. Not all the projects will visit every stage before they reach completion. Some projects do not follow a planning and/or monitoring stage. Some projects, for example, will go through steps 2, 3 and 4 multiple times. There is a principle in PM that stakeholders influence, risk and uncertainty go down with the project's time, but the costs of changes are increasing steadily (Fig. 2.4 illustrates this dependency). Thus, it is important to have a very strong management planning and control on the earlier stages of the PLC and during the whole project's realization.

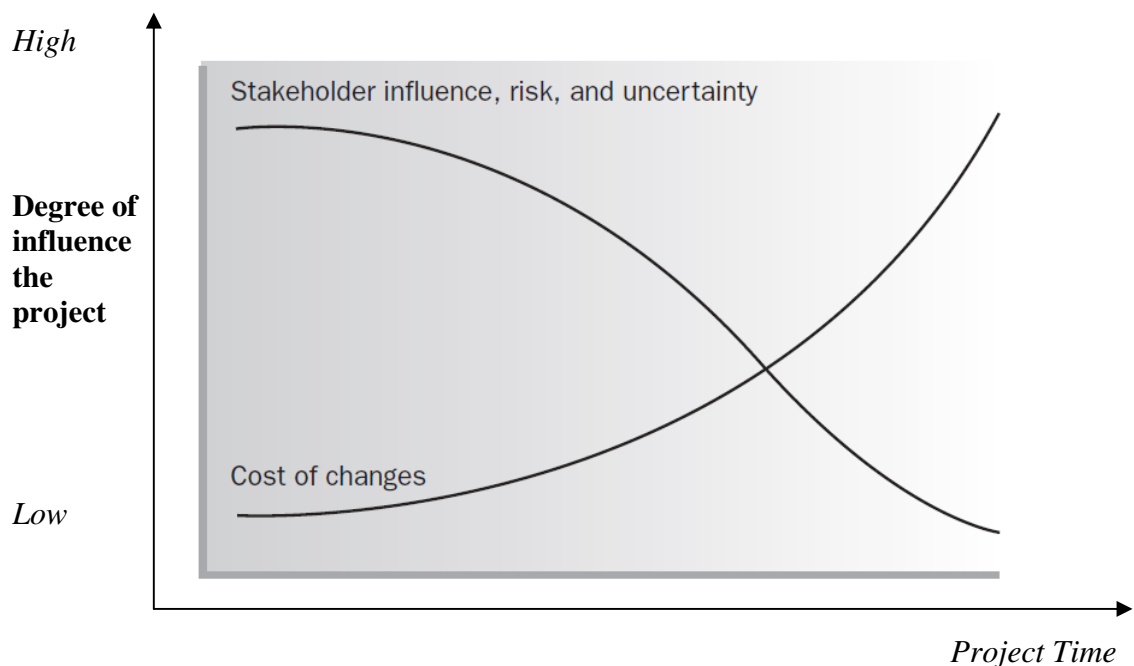


Fig. 2.4 Impact of variable based on project time (PMBOK, 2008)

Worth to notice, that stakeholders' influence, risk and uncertainty are greatest at the start of the project. These factors decrease over the PLC. Ability to influence the final characteristics of the project's product, without significantly impacting cost, is higher at the start of the project and decreases at the end. Diverse MC tools and methodologies prevail in the different PLC's phases (Lock, 2008, Turner, 2006, PMBOK, 2008). Each stage of PLC is connected with different uncertainties. A widespread challenge in projects is to have the design and plan stages carefully enough, because a project could pass through to execution stage with scarcity of required

specifications for production (for example technical details). During execution this gives rise to difficulties necessitating additional design development and production planning, and consequently adverse effects on the performance criteria of cost, time and quality (Atkinson, 2006). This problem is mostly significant when stakeholders are trying to oblige difficult for realization, practically unrealistic milestones dates and budget bounds.

Sometimes this can be caused by politically motivated performance criteria, targets, and operating constraints: e.g. budgets too small to allow adequate resources to complete the project by a stated time, or to a given level of functionality (Flyvbjerg et al., 2003). In the design stage of the PLC the nature of the project deliverable and the process for producing it are fundamental uncertainties (Ward, 2003). The allocate stage of the PLC is an important part which is connected with decisions on structure of the project, recognition of suitable suppliers and employees involved in work, and allocation of tasks between them (Atkinson, 2006).

In principle, much of this uncertainty is removed in pre-execution stages by attempting to specify what is to be done, how, when, and by whom, at what cost. In practice, significant amount of this uncertainty may remain unresolved through much of the PLC (Chapman, 2003). Very often execution stage faces uncertainty when there are some design changes (Christensen, 1998). Changes may have wider technical implications than first thought, leading to subsequent disputes between client and contractor about liability for costs and consequential delays (Williams et al., 1995). In the plan stage, looking forward to the deliver and support stages, and developing appropriate responses for key sources of uncertainty, can reduce or eliminate potential later problems at relatively low cost. The key here is identifying which issues need this attention in the plan stage, and which do not (Atkinson, 2006).

2.3 Management control and management control systems

Control is that element of a project that keeps it on-track, on-time and within budget (Lewis, 2000), it begins early in the project with planning and ends late in the project with post-implementation review. Control helps to define and manage uncertainties. Each project should be assessed for the appropriate level of control needed: too much control is too time-consuming, too little control – is very risky. Project deviation occurs because known potential threats are not adequately solved or the threats are unknown or overlooked. Project managers' decisions on risk are therewith the nexuses of MC.

MCS is a system which gathers and uses information to evaluate the performance of different organizational resources like human, physical, financial and also the organization as a whole considering the organizational strategies. Anthony (2007) defined MC is the process by which managers influence other members of the organization to implement the organization's strategies. MCS are tools to aid management for steering an organization toward its strategic objectives and competitive advantage. Thus, MC is concerned with coordination, resource allocation, motivation, and performance measurement, mainly based on management accounting. Second, it involves resource allocation decisions and is therefore related to and requires contribution from economics especially managerial economics. Third, it involves communication, and motivation which means it is related to and must draw contributions from social psychology especially organizational behaviour (Maciariello & Kirby, 1994).

MC in project management is exercised through monitoring, reporting and forecasting the output, comparing this to the project objectives and sending corrective signals to the input of data and resources (Figure 2.5.). The output is made to conform closely to the objectives. MCS are needed for cost, risk, quality, communication, time, change, procurement, and human resources (Räisänen & Linde, 2004). The growing tendency to reduce inefficiency and to alleviate managerial uncertainty pushes organizational designers to introduce higher levels of control and a growing bureaucratization of PM (Räisänen and Linde, 2004), which might be counter-productive.

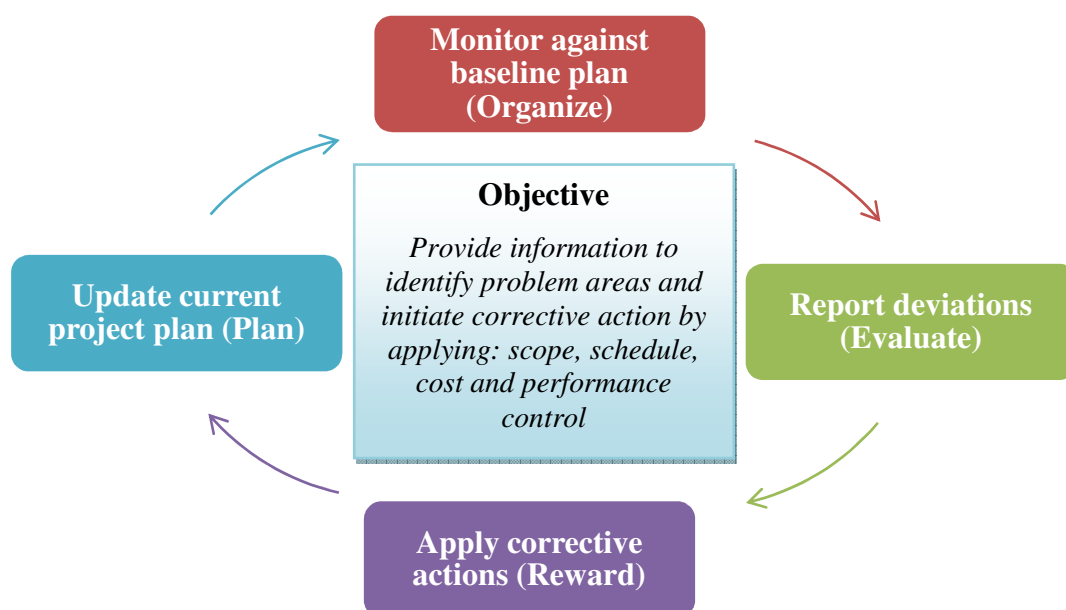


Fig. 2.5 Elements of the project control cycle (adapted from Wideman, 2010)

Characteristics and goals of MCS can be follows (Wideman, 2010): (i) facilitate detailed planning; (ii) be able to measure performance in relation to the plan and quickly report any deviations from the plan; (iii) be able to communicate planning and performance information to all parties involved; and (iv) identify objectives and highlight important operations leading to these objectives. Referring to MC, contingency and institutional frameworks claim that the design of MCS depends on the context of the organizational setting in which such controls are activated (Canónico & Söderlund, 2010; Mellemvik et al., 1988; Otley, 1999; Scott, 1995, etc.).

2.3.1 Management control and its context

According to Mellemvik et al. (1988, p. 104) accounting (and hence, management control) is a “language designed to reduce uncertainties”; it cannot be isolated from the social process operating in and around projects. The context of MC can be understood as a system, which consists of “accounting structures and processes” as a constituent of MCS, which in turn being a broader definition, includes “other organizational structures and processes” as well (see Fig. 2.6). Thus, the context of MC consists of structures and processes both within the project (I will call it internal context) and outside it, in its environment (correspondently external context). Other MCS, structures and processes are obtained on the intersection of external and internal contexts of the project.

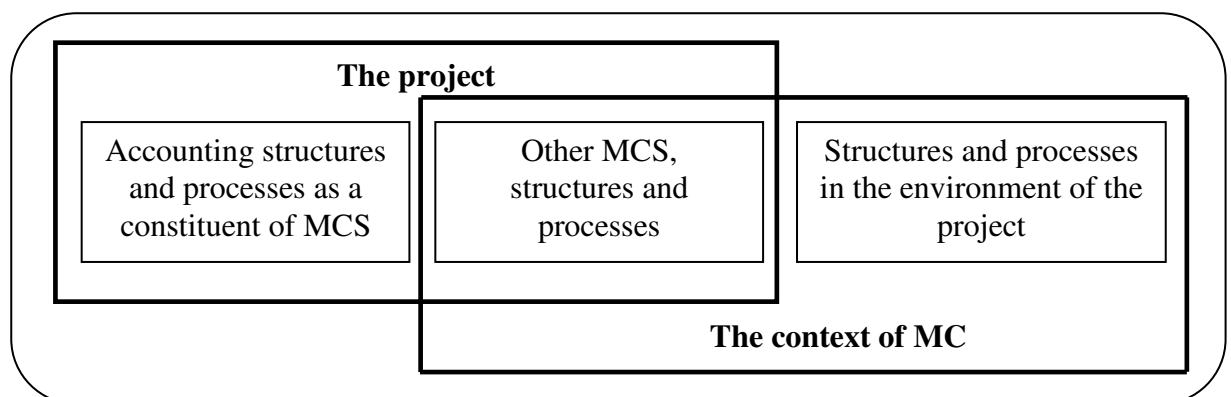


Fig. 2.6 MC and its context (adapted from Mellemvik et al., 1988)

From the theoretical perspective, MCS in different countries (contexts) will differ significantly due to the differences in environment of the projects, both external and internal. Let’s provide some support arguments to this statement. There is substantial evidence that firms in different types of economies react differently to similar challenges (Knetter, 1989). Institutional theory

states that design of MCS is dependent upon the rules and belief systems prevailing in the environment (DiMaggio and Powell, 1983; Meyer and Rowan, 1977). Mellemvik et al. (1988) and Macintosh (1985) consider that information gathering and interpretation techniques vary between actors according to their personalities and cognitive style, which could be different in different countries. The size of the project also influences the choice of MC tools and systems. We may find an argument in Chenhall (2003) that large organizations associated with more formal, traditional MCS (e.g. budgets, formal communication, sophisticated controls) and vice versa.

In my research I do analyse MCS of big (international) construction projects in two different countries. According to contingency theory these projects are utilize more formal MCS, first of all budgets and formal communications. According to institutional theory, construction industry in another country may have different instances of the same institutions, local rules, contracting practices, etc., which lead to different taken-for-granted regularities of behaviour, and hence, use of different MCS. For comparing big construction projects with varying institutional environments I have to take into account also diverse pressures in global and home institutional environments, e.g. global and local building standards, and human resource management practices (Rosenzweig and Singh, 1991; Zaheer, 1995). Summing up all above mentioned I would suggest that many uncertainties in big construction projects could be caused by the institutional environment (e.g. building codes and practices, governmental regulation, etc.) and due to some contingent parameters (e.g. size of the project, its strategy, etc.). Levitt & Mahalingam (2007) identified the following six factors that can cause uncertainties in PM in different contexts during the PLC: problems due to different information gathering techniques; delays due to conflicting aesthetic views; problems due to differences in building codes; problems due to differences in available building materials; delays due to differences in contracting practices; and delays due to differences in regulations.

Institutional theory does not provide the answers in terms of defining management tools for managing risks and uncertainties in the big construction projects, but understanding institutional differences and possible problems give us a good background for comparison two big construction projects within two different contexts.

2.3.2 Legal, cultural, economic, and political environments of the international projects

Miroshnik (2002) defines legal, cultural, economic, and political factors as the main constituents of the context of MC of international project. Legal environment includes legal tradition, effectiveness of legal system, treaties with foreign nations, laws effecting business, etc. Cultural environment consist of customs, norms, languages, attitudes, motivations, social institutions, status symbols, religion. Economic environment has in it such factors as level of economic development, population, education, infrastructure, natural resources, climate, membership in regional economic blocks, monetary and fiscal policies, nature of competition, wage and salary levels, etc. Political environment includes stability and form of the government, foreign policy social unrest, government attitude towards foreign firms and so forth.

Miroshnik (2002) states that managers should be continuously monitoring the environmental variables in the countries involved, especially those that may have a significant positive or negative impact. She adds also that the economic, political and physical environments (population, geography, etc.) are important issues in big international projects. However, cultural environment (communications, religions, values and ideologies, education, social structure, etc.) has a special importance (Miroshnik, 2002). Different cultural environments require different managerial behaviours. “Strategies, structures and technologies which are appropriate in one cultural setting may lead to failure in another. Managing relations between multicultural organizations and cultural environment is thus a matter of accurate perception, diagnosis and appropriate adaptation” (Miroshnik, 2002).

Thus, within the concept of an organization as a culture, it is sensible to recognize the possibility and likelihood of distinct subcultures existing among managerial teams, members of different social classes and so on. Moreover, cultures in organizations are not independent of their social context (Dent, 1991) and ways of managing uncertainties are also vary (Miroshnik, 2002). Thus, accounting and management control systems are likely to be differentially implicated in different countries (Harrison & McKinnon, 1999), such as Ukraine and Norway. They may embody different assumptions about organizations, leadership and power displays, reward systems, rationality, authority, communications, respect for individuals and friendliness and socialization

process in the projects, perception of time, space and so forth (House et al., 1999; Ashkanasy et al., 2000; Miroshnik, 2002).

2.3.3 Diagnostic, belief, interactive and boundary controls

Control mechanisms refer, in Simons' view, to "the formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities" (Simons, 1994). MC is primarily achieved by the use and combination of four 'levers of control': (1) beliefs systems, (2) boundary systems, (3) diagnostic systems, and (4) interactive systems. *Beliefs systems* are formal systems used by top managers to define, communicate, and reinforce the basic values, purpose, and direction for the organization. Belief systems are created and communicated through formal documents such as credos, mission statements, and statements of purpose (Simons, 1994). Belief systems are thereby expected to contain references to core values, to performance levels, and to the modalities through which the individuals should handle relationships both internally and externally. Typically, belief systems are instantiated through formal documents, such as mission and corporate statements. They are generally used to empower and commit individuals to organizational objectives and to show directions on how to search for new opportunities.

Boundary systems are formal systems used by top managers to establish explicit limits and rules which must be respected (Simons, 1994). They set the boundaries of corporate strategy and tactics. They are intended to constrain the degree of freedom of managers, and as a result should focus the creativity on relevant issues. They are usually stated in negative terms, i.e. penalties on misbehaviour. They are meant to contain cost escalations and their existence allows top management to delegate decision-making. When boundary systems are excessive for a particular organization, they end up slowing down the pace of adaptation to exogenous changes and environmental conditions (Canonico & Söderlund, 2010).

Diagnostic control systems are the formal feedback systems used to monitor organizational outcomes and correct deviations from preset standards of performance (Simons, 1994, p.170). Diagnostic control systems are instantiated through business plans and budgets. They represent tools available to top management in order to monitor and evaluate business results. Their data are expected to be accurate. Their rationality lies in the argument that evaluation of business

processes and results improves the allocation of resources and improves motivation. Such systems are also used to measure output variables, performances, and strategies adopted by the organization (Peljhan and Tekavčič, 2006).

Interactive control systems are formal systems used by top managers to regularly and personally involve themselves in the decision activities of subordinates (Simons, 1994). They help in focusing attention on particular issues, creating dialogue, and stimulating learning, facilitating new ideas and strategies to emerge in response to opportunities or threats in the competitive environment. Their data are provided by underlying systems and available regularly to top management. Their use requires an organizational climate that encourages openness and accepts constructive criticism and debate. The use of interactive control systems is called for when organizations face strategic uncertainties, requiring opportunity-seeking behaviour (Canonico & Söderlund, 2010). Table 2.3 shows us the main logic of control underlying each of Simons' levers, applied for projects.

Table 2.3 Control levers in project management (adapted from Canonico & Söderlund, 2010)

| | Belief systems | Boundary systems | Diagnostic systems | Interactive systems |
|--------------------------------|--|--|--|--|
| Main control mechanisms | Control is enabled by committing workers to organizational objectives | Control is enabled by constraining the degree of freedom of managers | Control is enabled by monitoring and evaluating projects progression and results | Control is enabled by working proximity and proactive decision making |
| Peculiarity in PM | May promote or hinder explorative bottom-up behaviour at single project level | Avoid the risks that projects shift towards external logistics | Allow comparison in terms of measures of efficiency and effectiveness | Create an internal discussion arena among a variety of project managers on strategic issues |
| Critical issues in PM | Projects may prove to be heterogeneous and could require different attitudes towards beliefs | May lose the potential cross-fertilization across phases | Do not provide a representation of projects interdependencies | May be difficult to manage when number of current operations is high, could tend to escalate |

Thus, belief systems relate to the fundamental values of the projects. Boundary systems describe constraints in terms of employee behaviour, i.e., forbidden actions. Interactive systems focus on communicating and implementing the project's strategy. The purpose of an interactive system is to promote debate related to the assumptions underlying the organization's strategy and ultimately to promote learning and growth.

MAIN THEORETICAL FINDINGS

Despite a myriad of studies on project management, manageability problems in the big construction projects persist. This chapter reports on a study on how uncertainties can be understood and managed in big construction projects in different contexts. I conclude that uncertainty is an event that cannot be foreseen in advance deriving from the lack of knowledge, and projects are unique endeavours that produce a set of deliverables within clearly specified time, cost, quality constraints, etc. Projects are not repetitive in nature, have defined timescale, limited resources, approved budget, involve uncertainties and are targeted towards achieving beneficial change. Based on the theory presented earlier in the chapter I can figure out the following types of uncertainties and ways of managing them (Table 2.4).

Table 2.4 Main theoretical findings in regard to projects' uncertainties and ways of managing them

| Types of Uncertainties | Tools to Manage Uncertainties |
|---|---|
| <i>Uncertainties in estimates</i> | <ul style="list-style-type: none"> - Identify main features and limitations of the project as well as a type of the project (tools to be used will depend on them); - Using organizational capabilities; - Building organizational culture; - Using knowledge management; - Learning by experience. |
| <i>Uncertainties associated with project parties</i> | <ul style="list-style-type: none"> - Trust, or controls, or the equilibrium between the use of controls and trust; - Continuous updating and gathering information about stakeholders / Learning by doing ; - Snowball sampling, focus group meetings, meetings and workshops, intuition; - Negotiations/communication with stakeholders; - Analyzing uncertainty associated with project parties: (i) the trustful environment, (ii) the monitoring environment, (iii) the negotiating environment and (iv) the circumscribed environment |
| <i>Uncertainties associated with stages in the project life cycle</i> | <ul style="list-style-type: none"> - Stakeholders influence, uncertainties go down with the project time, but the costs of changes are increasing steadily; - Important to have a very strong management planning in the beginning and strong MC during the whole project's realization. - For uncertainty management PLC can be decomposed on smaller processes and steps |

Referring to MCS, contingency frameworks claim that the design of control systems depends on the context of the organizational setting in which such controls are activated (Camprieu, 2007; Chenhall, 2003; Otley, 1980, etc.). Institutional theory in tern "prepares a strong basis" for

understanding institutional differences (economical, political, cultural, etc.) in the PM in different contexts. Cultural environment is conceived to have a special importance in designing MCS in big (international) projects. Different cultural environments require different managerial approaches for managing uncertainties, because they embody different assumptions about organizations, leadership and power displays, reward systems, etc. (House et al., 1999; Ashkanasy et al., 2000; Miroshnik, 2002). Thus, MCS are likely to be differentially implicated in different countries (Harrison & McKinnon, 1999), such as Ukraine and Norway. In the empirical and analytical parts I use following model, developed for analysing and comparing two different contexts of PM: Norwegian and Ukrainian (Fig. 2.7).

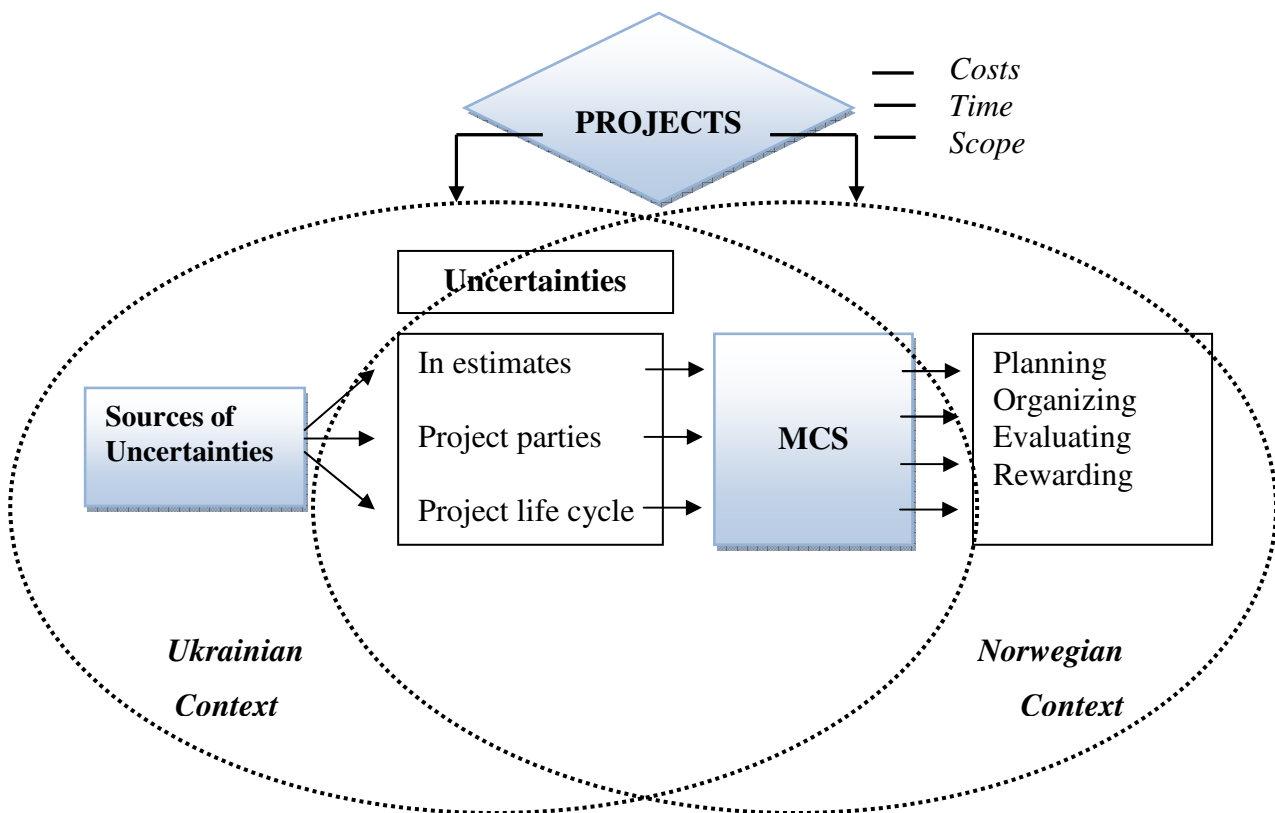


Fig. 2.7 Components of management control in two contexts

Big construction projects, having their strict constraints in terms of costs, time and scope, which are the main objectives of the projects at the same time, face many uncertainties that could be grouped into: 1) uncertainties in estimates, 2) uncertainties related to the project parties and 2) uncertainties associated with stages of PLC. The sources and types of uncertainties are dependent upon the context in which unique projects are realized. All these parameters in turn affect the design of MCS, used for handling uncertainties related to three above mentioned groups.

III. METHODOLOGICAL PART

“The questions that researchers ask in their projects are in turn affected by the philosophical assumptions that underline the way they see the world”

Easterby-Smith, 2008

The topic and the aim of research affect the method or the combination of methods researcher chooses for conducting the research (Johnson & Duberley, 2006). This chapter is written to give an overview of the research methods and data gathering techniques employed during the research. In attempting to reach the goal of my research, I employed qualitative analysis as a major tool for collecting and analysing data. I can use qualitative analysis when “we wish to understand meanings, look at, describe and understand experience, ideas, beliefs and values” (Holliday, 2007). The chapter ends with consideration of validity and reliability issues concerning obtaining and interpretation of the empirical data. Some obstacles of my research are also mentioned in the end of the chapter.

3.1 Timeframe of the research

Previously prescribed work schedule is very important part of management and management research in particular. The timeframe of the research covers a period from January 2011 until May 2011. While doing my research I passed through the following stages (adapted from Gubrium, Holstein, 2002): thematizing, designing, interviewing, transcribing, analysing, verifying and reporting.

Table 3.1 examines the description of the main stages of doing my research. The biggest difficulty of the research was to get into the contact with respondents, which are very busy people, and to receive their consents to be interviewed. This stage of the research obtained to be one of the most time-consuming and complicated. Thematizing and designing was also challenging, because the projects under study and respondents were changed several times. It influenced the topic and vector of the research, and consequently theoretical frame of references and methods used for conducting research.

Table 3.1 Schedule and the main steps of MOPP

| No. | Period | Results | Stage |
|-----|---------------------------|--|--|
| 1 | 10-25.01.2011 | Choosing a topic and research questions | Thematising & Designing |
| 2 | 26.01.2011 | 1 st MOPP seminar, defending the MOPP's proposal, discussing the topic, research question and methodology of the research | |
| 3 | 28.01.2011 | Delivering the 1 st Work Requirement | |
| 4 | 29.01.2011- 22.03.2011 | Taking into consideration all remarks and comments from the advisors, correcting; Getting the contact with respondents; Preparing the topics for conversation with my respondents; Reformulation of the research question and discussion about my research strategy and methodology, searching for relevant theory, Writing Theoretical and Methodological chapters. | |
| 5 | 23.03.2011 | 2 nd MOPP seminar, delivering the 2 nd Work Requirement | Interviewing, transcribing, analysing, verifying |
| 6 | 31.03.2011- 28.04.2011 | Conducting the interviews with my respondents, receiving the feedback, rewriting the earlier draft; Analysing the legal base and documents, surveys, etc., writing empirical and analytical chapters of MOPP. | |
| 7 | 29.04.2011 | 3 rd MOPP seminar, delivering the tentative paper | |
| 8 | 30.04.2011- 04.05.2011 | Taking into consideration all remarks and comments from the advisors, correcting, rewriting | |
| 9 | 06.05.2011 | Meeting with scientific advisor | |
| 10 | 07-18.05.2011 | Final remarks | Reporting |
| 11 | 19.05.2011 | Delivering the MOPP | |

The topic, research questions, methods, main findings, etc. were discussed with Management Control course lecturers from Bodø Graduate School of Business during the MOPP seminars and with scientific advisor, which greatly helped to clarify the vector of the research. The course literature and lectures from "Research Methods" gave me an opportunity to choose research methodology and to cope with a huge amount of data obtained.

3.2 Thematising & Designing

The first and very important step in doing research is choosing a topic and defining objects of the research. Researchers have to know exactly what are they going to study and how? What methods can be applied to receive the information and answers needed, etc.? Thus, first I should

discuss briefly my research topic and research questions development, and then describe philosophical position, strategy and data gathering and analysing techniques used for doing my investigation.

3.3 The research question development

Every research starts with the developing of the problem statement and research questions. This step is crucial, because it gives focus, sets boundaries, and provides directions for the future work. Besides it will help for better understanding of what is the aim of the research and what we want to achieve. The problem statement of my work is: *How are uncertainties being managed in big construction projects in different contexts?* I provide a comparative study of the big construction projects in Ukraine and Norway. It worth to notice, that research topic comes from the certain problem or/and from the field that is interesting to a researcher. Problematic of my work lies in the specifics of management of the big projects. This field was chosen because of the personal interest of the author, current topicality and relevance. After choosing the main subject of the research, it is important to make it narrower and to focus on specific research problems. This step requires monitoring of existing theory and imagination to find out what is really interesting for you. In our case the research problem and the sphere of interests is fundamental risks and uncertainties that big projects face.

Most research problems are difficult to solve without breaking them down into smaller tasks. Decomposition of something big into smaller tasks, i.e. several sub-questions, helps to control the final result. The sub-questions of my work are: (1) What are major uncertainties in relation to construction projects in Ukraine and Norway? How are they managed? (2) What are the differences and similarities between management control systems in handling uncertainties in construction projects in Norway and Ukraine? These research sub-questions are relevant to the problem statement and may help me to design the research and to reach the goals of the study.

3.4 Philosophical position

Researchers need to be aware of their own philosophical assumptions (Easterby-Smith, 2008), thus to write a research it is important to define a philosophical position. All philosophical positions and their attendant methodologies, explicitly or implicitly, hold a view about social

reality. Easterby-Smith (2008) identifies two opposing theoretical attitudes to the nature of social entities: positivism and social constructionism. Positivism is a belief that social phenomena and their meanings have an existence that is not dependent on social actors. They are facts that have an independent existence. Social constructionism is a belief that social phenomena are in a constant state of change because they are totally reliant on social interactions as they take place. Even the account of researchers is subject to these interactions, therefore social knowledge can only be inter-determinate (Walliman, 2006).

In most cases philosophical position cannot be define as pure positivism or social constructionism. Very often researchers use a combination of different techniques in order to reach the goal of the research. My philosophical position is closer to the social constructionism, which characterises by following factors (see Table 3.2). According to Easterby-Smith (2008) the task of the social constructivism scientist should not to be to gather facts and measure how often certain patterns occur, but to appreciate the different constructions and meanings that people place upon their experience. The main technique of social constructionism is conversation, by which researcher receives an understanding of the problem.

Table 3.2 Philosophical position (adapted from Easterby-Smith, 2008)

| Criteria | Social constructionism |
|----------------------------------|--|
| <i>The observer</i> | - Is involved of what is being observed |
| <i>Human interests</i> | - Are the main drivers of science |
| <i>Explanations</i> | - Aim to increase general understanding of the situation |
| <i>Research progress through</i> | - Gathering data from which ideas are included |
| <i>Concepts</i> | - Should incorporate stakeholder perspective |
| <i>Units of analysis</i> | - May include the complexity of “whole” situation |
| <i>Generalization through</i> | - Theoretical abstraction |
| <i>Sampling requires</i> | - Small numbers of cases chosen for specific reason |

Due to the philosophical position I can define research strategy: being involved in the active research, I gather data using the small number of cases chosen for this purpose (one big construction project is in Norway, and the second one – is in Ukraine). Research topic is observed in different contexts. Therefore, different factors will have different impact on the research projects. Starting a research I have to be aware about possible strengths and weaknesses of the chosen approach. According to Easterby-Smith (2008) the social constructionist paradigm has strengths in the ability to look at how processes change over time, to understand people’s meanings, to adjust to new issues and ideas as they emerge, and to contribute to the evolution of

new theories. They also provide a way of gathering data which is seen as natural rather than artificial. However, there are significant challenges and weaknesses of social constructionism research paradigm. Data collection can be very time consuming, the analysis and interpretations of data may be very difficult, depending on the intimate, tacit knowledge of the researchers, and the results of the research may not have credibility with policy makers. Therefore, I pay lots of attention for preparing interviews and verifying the results obtained during the research.

3.5 Research design

There are different ways to design a research: explorative, descriptive and causal. Explorative is a type of research conducted for a problem that has not been clearly defined (Mitchell, Jolley, 2007). Exploratory research often relies on secondary research such as reviewing available literature and data, and qualitative approaches such as in-depth interviews. The results of exploratory research are not usually useful for decision-making by themselves, but they can provide significant insight into a given situation, and “perform some indication as to the “why”, “how” and “when” (Mason, 2004). The main disadvantage of this approach is that it is not typically generalizable to the population at large. Another type of research design is descriptive, which describes data and characteristics about the phenomenon being studied. Descriptive research answers the questions who, what, where, when and how, and often implicates a survey investigation. Although the data description is factual, accurate and systematic, the research cannot describe what caused a situation (Mitchell, Jolley, 2007).

Thus, the research design is conceived as explorative with descriptive elements as well. In order to provide an analysis of the big projects in two contexts, I need to have direct access to the organizations to collect primary data and to get the knowledge about the components of the MCS. Therefore, empirical data are mainly obtained by qualitative analysis, and notably from the interviews with key figures of construction of “Donbass Arena” (Donetsk, Ukraine) and “Holmenkollen” (Oslo, Norway). I conducted personal and telephone interviews with my respondents. Telephone and Internet technologies were used for setting up the dates for conducting interviews, getting a feedback and approving the information received during the interviews (e-mails, telephone calls).

My work is based on a *comparative study*. The examination of two or more contrasting cases can be used to highlight differences and similarities between them, leading to a better understanding

of social phenomena (Onuchak, 2009). Comparative research is commonly applied in cross-cultural and cross-national contexts (Walliman, 2006). Research focuses on two different contexts: cross-national and cross-cultural. Cross-national is because I compare project realized in two countries: Ukraine and Norway. Each country has its own specifics and characteristics. From the other side it is possible to say that my research is cross-cultural, because the phenomenon of project management has different history and different ways of development in both countries. Moreover, big construction projects involve a lot of parties from many countries. Thus, it gives us an opportunity to say that there will be differences in the project management of both countries: different systems of decision-making, management control, etc. As an approach to make a research I have chosen a *case study*. It has its own distinct features. Case studies are often described as an exploration of a “bounded system”. The object of the case could therefore be many things – for example, a community, an institution, an individual, an activity or an event. Case studies are often associated with ethnography where the purpose is to describe and interpret social groups in their natural setting using a number of qualitative techniques over extended period of time (Onuchak, 2009).

There are many argues about the term of “bounded system”, as it is difficult to define the boundaries of the study in case of space and time. Indeed, social systems are rarely bounded and, where they are, such boundaries are often constructed by the participants or researcher (Atkinson, 1996). Case studies are considered particularly valuable where the research context is too complex for experimental or survey research. Although a valid research strategy in its own right, case studies may be used to supplement other research methods including quantitative techniques – for example to generate theories before such theories are tested in the main study or to provide details that enable researchers to expand on quantitative findings (Miller, 2003).

3.6 Data collection and analysis

“Qualitative inquiry cultivates the most useful of all human capacities – the capacity to learn from others”,

From Halcolm’s Evaluation Laws (Patton, 1990)

As I have already mentioned, my work is based on the qualitative research. Qualitative techniques rely on language and the interpretation of its meaning, so data collection methods

tend to involve close human involvement and a creative process of theory development rather than testing (Walliman, 2006). A qualitative research may be generally defined as a study, which is conducted in a natural setting where the researcher, an instrument of data collection, gathers words or pictures, analyzes them, focuses on the meaning of participants, and describes a process that is both expressive and persuasive in language (Creswell, 1998). Qualitative methods consist of three kinds of data collection (Patton, 1990): (1) in-depth, open-ended interviews; (2) direct observation; and (3) written documents.

Due to the fact that we are students, I cannot use direct observation, however I can use interviews as a source of data for my research and analyse written documents. The data from interviews consist of direct quotations from people about their experience, opinions, knowledge according to the topic and compose the primary data of my research. Document analysis yields project documentation, experts records, official publications, reports, standards, laws, etc.

3.6.1 Primary data

Qualitative interviewing is seen as the major source for obtaining data in the research. Through qualitative interviews you can understand experiences and reconstruct events in which you did not participate (Rubin & Rubin, 2005). Qualitative interviewing is based on conversation, with the emphasis on researchers asking questions and listening, and respondents answering. The epistemology of the qualitative interview tends to be more constructionist than positivist (Gubrium, Holstein, 2002). In this work semi-structured and open-ended interviews are seemed to be the best way to acquire primary information (see Table 3.3).

Table 3.3 Types of interview (Easterby-Smith, 2008)

| Level of structure | Type of interview |
|---------------------------|---------------------------|
| Highly structured | Market research interview |
| Semi-structured* | Guided open interview* |
| Unstructured | Ethnography |

* - I used for conducting the interview

Mead & Schutz note that in-depth interviewers seek an inter-subjective bridge between themselves and their respondent to allow them to imaginatively share (and subsequently describe) their respondent's world. This inter-subjective bridge may be found and crossed, allegedly, with the help of particular interview techniques – expressing empathy, asking open-

ended questions, pausing to allow respondents to elaborate, and so on (Onuchak, 2009). Interviewer should offer various kinds of explanations – explanations of the project, explanations for the recording of the interview, explanations for why the interviewer is seeking native language terms or argot, and explanations for particular questions or a particular line of questioning (Miller, 2003).

3.6.2 Argumentation in support to the projects' choice

For the interviews I have chosen respondents worked under two big construction projects: one is in Norway (Holmenkollen ski arena), another – in Ukraine (stadium Donbass Arena). There are several reasons for choosing the Holmenkollen and Donbass Arena projects as units (objects) of my research. These projects are similar in many ways. First of all, they both are unique, complex and do not have any analogues in the countries studied. New construction techniques, new architectural solutions, new construction materials were used in both projects. These two projects have been realized in the same industry – sport industry, with almost the same constraints and big pressure of stakeholders. They both were constructed for the big sporting events and became the local symbols of these regions. Other similarity is in a huge number of multinational contractors and sub-contractors of the projects. The projects are interesting and “fresh”, i.e. they have not been studied much⁵, because they were finished recently.

That is why projects, chosen for my analysis, seem to be interesting in terms of similarities of unit of research and clusters in which they operate (big construction projects in sport sector). Table 3.4 gives some information supporting the choice of observable units. Norwegian project has been finished and set in operation in February 2011. Any final reports are not still prepared and any official information about the project is not published yet. Some secondary data is now available on Internet (it is, primarily, political speeches, materials from the press-conferences and other publications in media in Norwegian). The Ukrainian project has been started earlier, than Norwegian one, and it was finished in August 2009. Secondary data about the project is now available on the official web-site of Donbass Arena (in English) and in some thematic periodicals (in Russian and Ukrainian).

⁵ My “Holmenkollen” respondents mentioned that I was the first student studying risks and uncertainties of the project. Regarding “Donbass Arena” my respondent Sergey Isakov, project manager, said that there were some interviews regarding my topic, but they are not published yet.

Table 3.4 Information about projects

| Factors | Holmenkollen | Donbass Arena |
|----------------------|---------------------|----------------------|
| Industry | Sport | |
| Contactors | More than 20 | Around 15 |
| Terms of realization | Around 3 years | |
| Costs | USD 370 mln | USD 400 mln |

The final costs of both projects exceeded the planned ones more than twice (initially planned cost of Holmenkollen was –USD 125 mln, and the total planned costs of Donbass Arena – USD 185 mln). However, both projects ended up with increased costs of the projects – USD 370 mln and USD 400 mln respectively. It emphasizes once more time, that the original plans were not met, or initial costs have been calculated incorrectly. The biggest difference of these two projects is that they have been realized in different countries with different situational factors and different institutional environment. Access to the persons involved in management of these two big construction projects and possibility of getting formal and informal information in regard to projects management and control were considered as important factors while choosing the topic and the objects of the research.

3.6.3 More information about respondents

Since I am not able to interview all the parties involved in the projects (because of the huge amount of stakeholders, and due to the time and cost constraints), I decided to focus on the main “figures” of the projects. I knew project manager of Donbass Arena and Director of Holmenkollen project beforehand, thus I used “snowball method” for getting into contact with other persons related to management of the projects. Johansen et al. (2004) explain “snowball method” as a method where the researcher tries to identify persons with a high degree of knowledge on a specific topic, and then ask them about other potential respondents of relevance. I asked above mentioned persons to help me to identify other people involved in management of the projects, who could share their experience with me, and they recommended a couple of persons for each project respectively. I conducted 6 interviews, 3 per each project (detailed information is in the Table 3.5).

Interviews in Norway were conducted in English, while the project documents analysed were in Norwegian. Both languages are not native for the author of the paper. As for Ukrainian side,

interviews were conducted in Russian and English (with representative of Turkish company ENKA). It took time to translate all data obtained during the interviews.

Interviews were primarily conducted personally, except of the interview with Director of construction of Donbass Arena – Ugur Koyunoglu. He was responsible for the project from the side of the main contractor – Turkish contractor company ENKA (Istanbul, Turkey). The telephone interview lasted approximately 1 hour. Other interviews were conducted personally and lasted approximately 1.5 hour. Interview with the Project Manager of Donbass Arena, Sergei Isakov, lasted 3.5 hours. I am grateful to my respondents that they have found time to share their experience with me.

Table 3.5 Information about respondents

| Project | Respondents | Type of the interview | Date/ Time/ Place |
|---|--|-------------------------------|--|
| Holmenkollen (Oslo, Norway) | Erik Øimoen – Director of the project of construction of Holmenkollen Ski Arena (Client Organization) | Personal interview (English) | Date: 31.03.2011 Time: 14:00-15:30 Place: Rådhus |
| | Florian Kosche – Main engineer of Holmenkollbakken | Personal interview (English) | Date: 04.03.2011 Time: 17:00-18:15 Place: Dipl. – Ing. Florian Kosche AS |
| | Hagbarth Vogt-Lorentzen – Project Manager of Holmenkollen Ski Arena | Personal interview (English) | Date: 05.03.2011 Time: 12:00-13:30 Place: Terramar AS |
| Donbass Arena (Donetsk, Ukraine) | Sergei Isakov – Project Manager of construction of Donbass Arena | Personal interview (Russian) | Date: 08.04.2011 Time: 8:30-12:00 Place: Donbass Arena stadium |
| | Sergei Palkin – General Director of FC “Shakhtar” (Client Organization) | Personal interview (Russian) | Date: 12.04.2011 Time: 10:00-11:15 Place: FC Shakhtar office |
| | Ugur Koyunoglu – Director of construction of Donbass Arena (General contractor – Turkish company ENKA, Istanbul) | Telephone interview (English) | Date: 13.04.2011 Time: 15:00-15:55 |

For simplicity I will use shortened names of work statuses of interviewees in the next chapters:

- **Holmenkollen:** Erik Øimoen – Director, Florian Kosche – Engineer, Hagbarth Vogt-Lorentzen – Project Manager;
- **Donbass Arena:** Sergey Isakov – Project Manager, Sergei Palkin – Director of FC “Shakhtar”, and Ugur Koyunoglu – General Contractor.

All respondents are experienced people that participated in managing another big and unique construction projects. Interviews with my respondents were subjected to the following topics for discussion:

- Peculiarities of big projects (e.g., standards, stakeholders, limitations of the project, etc.);
- Most important sources of risks and uncertainties in the project;
- How these uncertainties were handled and by use of what kind of control tools?
- What have you (and your team) learned from this project?

Interview Guide (detailed questions for interviewer) which was used during conducting interviews is in Appendix C (English and Russian versions).

3.6.4 Secondary data analysis

In addition to the primarily data-gathering techniques, I can use several secondary and supplemental methods. For every qualitative research, data on a background and the context of the problem may be gathered. This may not be a major part of data collection, but at least researcher can receive a better understanding of the phenomena and its context. Analysing secondary data is seen as the tool to help to achieve a broader understanding of the research question and to maintain a reliability and validity of my research.

Secondary data include both qualitative and quantitative data, and they can be used in both descriptive and explanatory researches. Within business and management research such data are used mostly in case study and survey-type research (Saunders et al, 2003). Qualitative data is more likely to describe decisions making processes in the study organization. For many research questions and objectives the main advantage of using secondary data is the enormous saving in resource, in particular time and money (Ghauri & Gronhaug, 2002). In general it is much less expensive to use secondary data than to collect data by yourself. Consequently, it is reasonable first to check secondary data available on the subject of master thesis.

I started to look for the secondary data before obtaining primary data for the research. It gave me a general understanding about the projects environment and main stakeholders, but at the same time preliminary secondary data search showed insufficiency of data about risk management in big construction projects. I obtained secondary data from the official web-sites of the projects

and other Internet publications. The latter needs to be negotiated, obviously, secondary data in this case can be used as addition to primary data. However, there are some merits of using secondary data. Advantage of secondary data is that it is quickly obtained and provides a high quality of information (Steward and Kamins, 1993). Using secondary data within organizations may also have an advantage that, because they have already been collected, they provide an unobtrusive measure (Cowton, 1998). That is why obtaining secondary data when providing case study is appropriate. There are also disadvantages when using secondary data. First of all, it could be collected for the purpose that does not match the needs of the research (Saunders et al, 2003). Thus, information from the official web-sites, documents and other written materials (textbooks, newspapers, e-mails, political speeches, etc.), earlier publications in the particular field was used as a secondary data for my research.

3.7 Trustworthiness of the research: validity and reliability issues

“Always be suspicious of data collection that goes according to plan”

From Halcolm’s Evaluation Laws (Patton, 1990)

The validity and reliability of quantitative data depend to a great extent on the methodological skills, sensitivity, and integrity of the researcher. Skilful interviewing involves much more than just asking questions (Patton, 1990). In qualitative inquiry ‘the researcher is the instrument’ (Patton, 1990). Understanding this I tried to provide the high level of validity and reliability of my master investigation, because if the collected data were not accurate, relevant and could not pertain to the topic, the research would be useless.

A scale is reliable to the extent to which repeated applications of the scale produce the same results given that the attitudes remain the same (Riley et al, 2000). In a sense, reliability is about replication (being able to repeat and reproduce results). In connection with this I must be sure that data and conclusions derived on their basis are reliable. I used qualitative approach in my research in order to analyse how uncertainties are understood and managed in big construction projects in different contexts. For this purpose I investigated two different projects in two countries.

To assure the validity and reliability of the research, the topic, structure, methods and other elements of MOPP were discussed on every stage of the research. In order to create a reliable knowledge, people who worked directly with the project and use different methods of management control were interviewed. After interviewing and transcribing the materials of the conversations with my respondents, the main results obtained during interviews were typed on the paper and derived back to these persons for approval (via e-mails). Some of my respondents made certain corrections in the texts, others approved materials without any corrections. Thus, I can consider that reliability requirement was fulfilled. I support my opinions and results of the research by using quotations of the interviewees.

Validity is about whether a measuring instrument actually measures what a researcher intends it to measure (Riley et al, 2000). In this respect data is derived from very competent people (project managers, directors, engineer of the project) working with projects directly and taking strategic decisions in their projects. This was critical factor for construct validity (Yin, 1994) assuring that we measure what we need to measure. However, during the conversations I faced the problems of different understanding of the same problems related to the projects and some concepts presented in the questions. For instance, most of my respondents do not accurately distinguish the concept of risk and the concept of uncertainty, which appear to be quite different from the academic point of view. Such problems were eliminated through discussion aiming to get common understanding of considered ideas. At the same time I used empirical findings of other researchers on the topic. It made possible to enlarge my understanding and look at the studied phenomena from different perspectives. Such broad scope of the study minimized a problem of subjectivity (Riley et al, 2000; Onuchak, 2009).

Validity is concerned with the extent to which the measurement provides an accurate reflection of the concept (Johnson, Duberley, 2006). The issue of external validity (Yin, 1994) questions how wide and general the results can be used. In relation to this issue I concentrate my efforts on big construction projects in sport industry, and believe that results obtained can be generalized on a certain part of this sphere. As for internal validity, it questions if the conclusions derived correctly (Yin, 1994). Internal validity visualizes in the whole research process which we performed. Since I used different methods of research, gathering and analysing primary and secondary data, I used triangulation method to make the research narrower and more specific.

3.8 Obstacles and limitations of my research

There are some difficulties I faced with during conducting a research. First and one of the most significant obstacles is problem of the right interpretation and translation, because “the data from interviews are words” (Patton, 1990). Thus, it is very important to interpret and translate the words correctly, because words can take on different meanings in different contexts. Marshall & Rossman (2006) describe issues with translating as following: “Especially in the use of interviews, translating text becomes increasingly salient issues in the discourse on qualitative research. The focus on generating accurate and meaningful data through translation processes is paramount”. Thus, during my research I faced the problem of translation. A lot of secondary data were in Norwegian, Russian and Ukrainian, but not English. Thus, it took additional time and efforts to translate secondary and primary data obtained into English. It was difficult also to translate correctly some professional terms and shoptalk. I overcome this challenge with the help of scientific advisor.

This study has its limitations and further need for research. The empirical study was conducted in Norway and Ukraine, so the findings may mainly reflect the uncertainty management in these two regions. In future, similar studies should be conducted in other regions and other projects in the same countries to validate the main findings. Due to the projects complexities there is a need to conduct more interviews involved in the project.

SUMMARY OF METHODOLOGY

In this chapter I describe the main steps of my research, specified the main problems and limitations. I define my philosophical position as closer to the social constructionism. The research design is conceived as explorative with descriptive elements as well. The results of the research are represented as a comparative case study. Primarily data as well as the secondary data were used to get a broader understanding of the research question. Qualitative interviewing is seen as the major source for obtaining data in my research. In total, I conducted 6 interviews, 3 per each project. To assure reliability and validity of the research I used different techniques. In this respect, for example, data was derived from competent people (project managers, directors, engineer of the project) working with projects directly and taking strategic decisions in their projects.

IV. EMPIRICAL PART

To find out what are major uncertainties in relation to big construction projects in Ukraine and Norway and how are they managed, two cases will be used: the construction of Holmenkollen ski arena and elite football stadium Donbass Arena. In this chapter I observe the main features and limitations of the projects, I define main stakeholders, decision making schemes and organizational structures of the projects, because it is important to understand both external and internal environment of the projects. In the end of the chapters, I describe the systems of management controls based on Simon's approach of four levers of control.

This section is mainly based on interviews with experts both from Norway and Ukraine (three respondents per each project). The secondary data sources, like official web-sites, other publications are used in this section as well. The cases are described in connection to uncertainties that two projects faced with and ways of managing them. Worth to notice that term "uncertainty" was not used separately by my respondents. Norwegian interviewees used term "risks and uncertainties" together, while Ukrainian respondents were not accustomed to use term "uncertainty" at all. Instead, they used term "risks" or "problems".

4.1 NORWEGIAN CASE:

"THE WORLD'S MOST MODERN SKI HILL"

4.1.1 About Holmenkollen

Holmenkollbakken is a large ski jumping hill located at Holmenkollen in Oslo, Norway. It has a capacity for 30,000 spectators. Since 1892 Holmenkollen has hosted many Ski Festivals, Olympics and World Championships. The hill has been rebuilt 19 times. In my work I investigate the time period from 2008 to 2011 when the entire structure was demolished and rebuilt. New modern infrastructure, required by FIS (International Ski Federation Standards), was also provided. Infrastructure includes communication, electrical and other systems in the whole Holmenkollen National Arena, which also consists of a combined cross-country skiing and biathlon stadium, and the normal hill Midtstubakken ("Faktaark om Holmenkollen", Association for the Promotion of Skiing, 2011).

The six main spheres of the project are:

- Temporary construction;
- Electricity;
- ICT;
- Security;
- Technical control;
- Snow production.

The hill is 375 meters above mean sea level. It includes: ski-simulator,

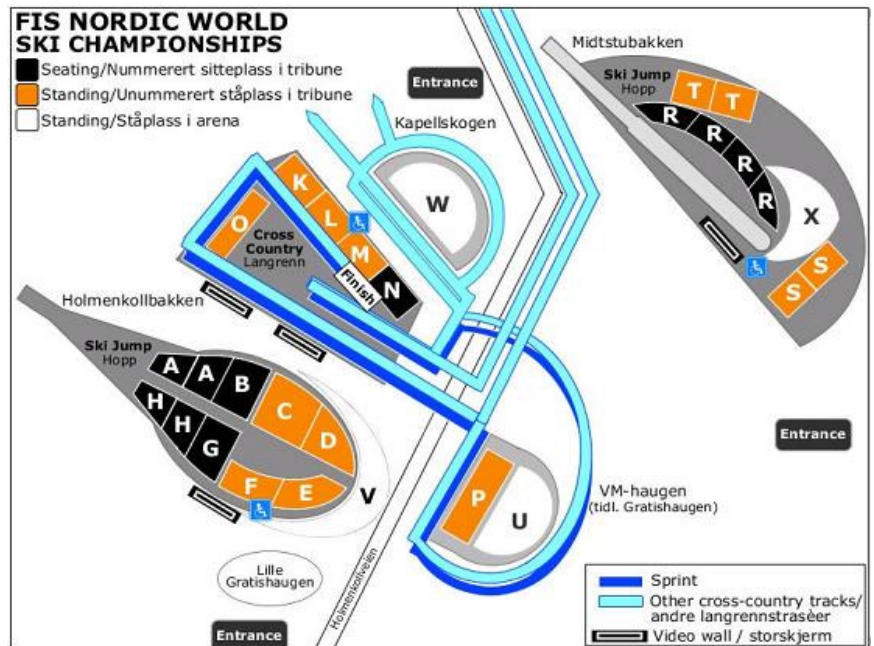


Fig. 4.1 Scheme of Holmenkollen (www.holmenkollen.com)

three souvenir shops, and

cafeteria. It is the only hill in the world with a permanent wind screen built as part of the designed construction, and the only steel jump in the world (Hagesæter, 2011). Demolition of Holmenkoll-bakken started in October 2008. “New” Holmenkollen was opened on the 3rd of March, 2010. However, many works, especially related to infrastructure, were continued up to February 2011, when Norway hosted World Ski Championships-2011. The hill is the most popular tourist attraction in Norway, and has roughly one million visitors each year (Buzzi, 2011).

4.1.2 Project's parties and project management organization

The venue owner, investor and project's initiator is Oslo Municipality. Skiing hill and the whole arena is operated by Ski forretningen, the Association for the Promotion of Skiing (“Alt om bakken”, Association for the Promotion of Skiing, 2011). After tenders Oslo Municipality signed up design-build contracts: one contract – with the team of creative specialists from architectural company “JDS Architects⁶” (Denmark), another one – with “Terramar AS⁷” (Norway), major construction contractor. The first contract is the owner-designer contract, which involved planning, design, and construction administration. The second contract is the owner-contractor

⁶ <http://www.jdsarchitects.com/>

⁷ <http://www.terramar.no/>

contract, which involves construction. An indirect, third-party relationship exists between designer and contractor due to these two contracts (Fig. 4.2).

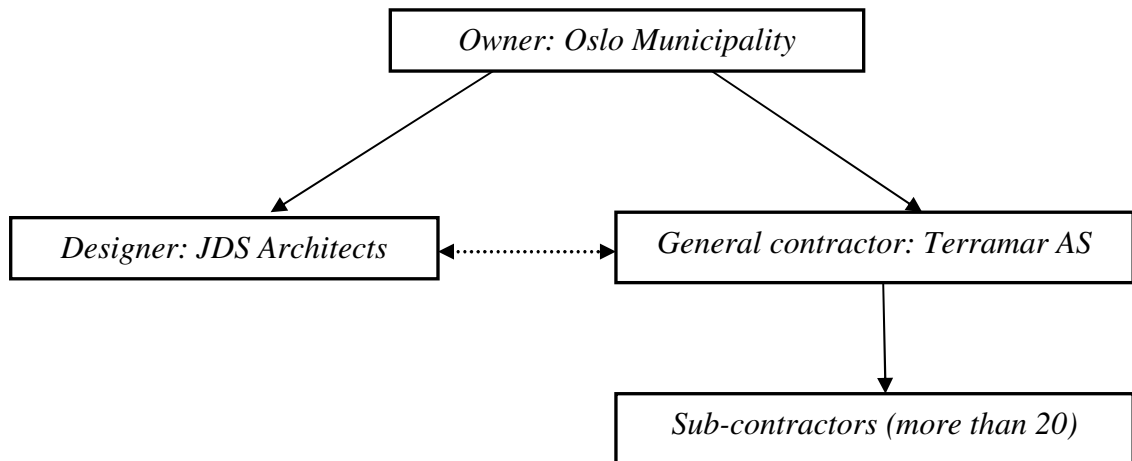


Fig. 4.2 Main parties of Holmenkollen project

There were a lot of sub-contracts on execution phase. According to Project manager and Director of the project the total amount of sub-contracts was more than 20 local and foreign firms. Organizational structure of Holmenkollen project is illustrated in Fig. 4.3. The owner of the project, Oslo Municipality, is the top element of the structure. It “produces” main decisions regarding the project’s future, invests money and takes responsibility in front of the International and Norwegian Ski Federations, sportsmen and general public. Oslo Municipality communicated with leaders of contact groups of users and Norwegian organization of skiing, which set up their own claims the expectations regarding the project. Erik Øimoen was a Director of the project and accountable for Oslo Municipality. He communicated directly with Hagbarth Vogt-Lorentzen, building committee and architectures.

Hagbarth Vogt-Lorentzen, a Project manager, was responsible for building the whole project and project’s infrastructure, management control, HR management and communication with sub-contractors. For this purposes the project was divided into 6 subprojects, every subproject was headed by respective managers (Appendix D). Florian Kosche was one of the major sub-contractors and the main engineer of Holmenkollenbakken. His team consisted of 10 people, involved in engineering works on ski hill.

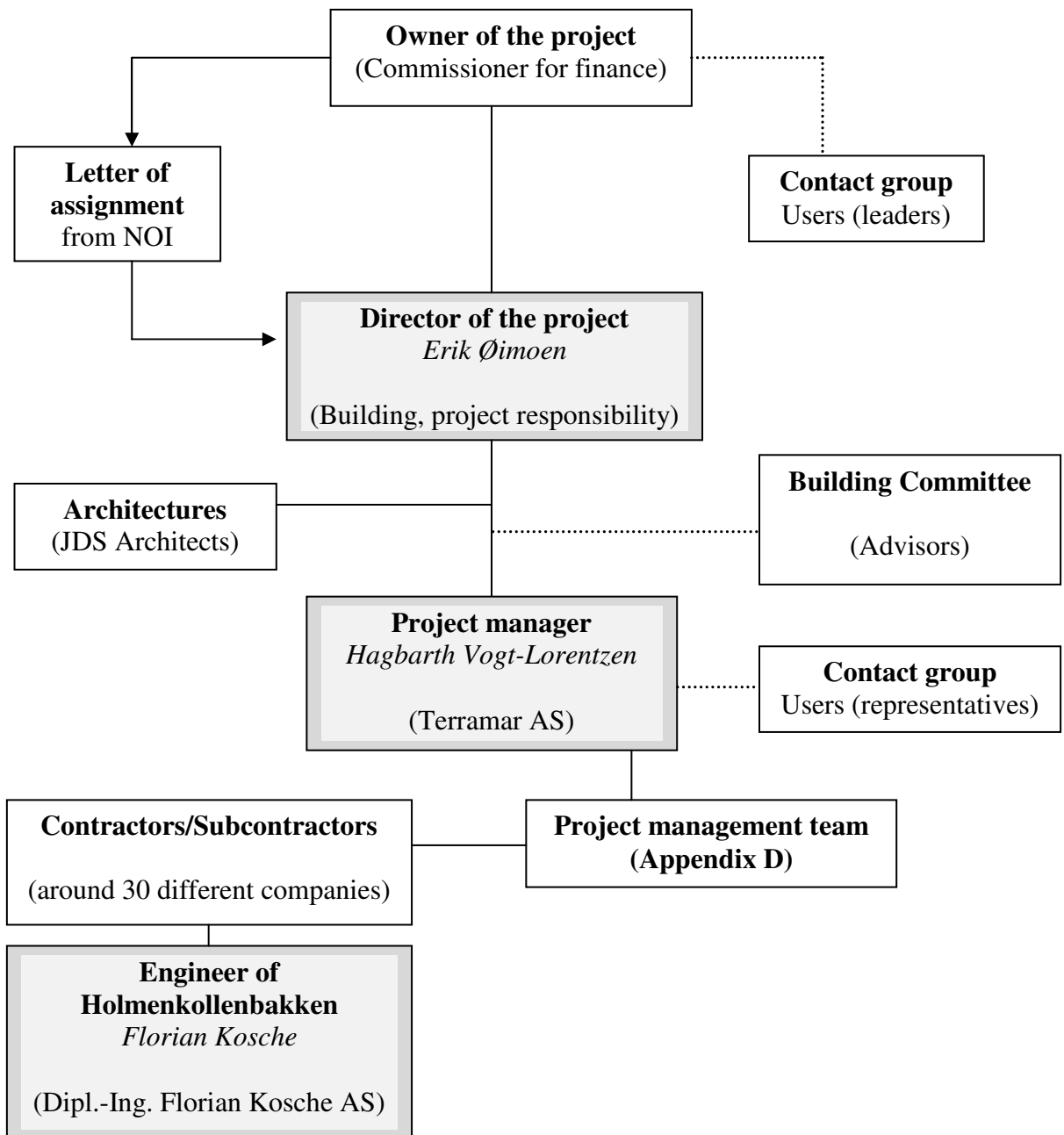


Fig. 4.3 Organizational structure of Holmenkollen project⁸

The structure of the project management is *matrix*. Several Groups of Construction managers are responsible for particular parts of the project. Relation between project manager and his subordinates is *linear functional*. The full-time project manager has considerable authority and full-time project administration staff. Initially the project's leading group consisted of 7 specialists: 6 core managers and one cost controller. During the PLC this leading group was

⁸ My respondents are marked out with grey colour.

reduced to 5 people. Two people among this group were discharged, because they were failed with their work. *“Due to the inaccuracy of their reports and discrepancy of the tasks it became obvious that they did not pay sufficient efforts to their jobs”*, - Hagbarth Vogt-Lorentzen considered.

4.1.3 Limitations of the project – sources of uncertainties

During the interviews with my respondents it became known that the project management team faced a lot of uncertainties and problems during construction, caused by serious changes in architecture, tight schedule, slow decision making processes, pressure from external stakeholders and so on.

Project was subjected to the limited time for construction, making and implementing decisions. Testing competition on Holmenkollen was planned to start in February 2010. This milestone could not be postponed in any cases. Erik Øimoen has joined the project in Jun. 2009. He characterized a project in few words: *“It was not a normal project: it was behind all the deadlines and exceeded its costs”*. Previous Director was discharged because of the slow progression, fails in costs and schedule analysis. When the decision to reconstruct the national arena was made by the city council in 2007, it was estimated to cost NOK 653 million. By 2008, the cost had accelerated to NOK 1.2 billion, and by the following year it had reached NOK 1.8 billion (for detailed information regarding project progression see Fig. 4.4).

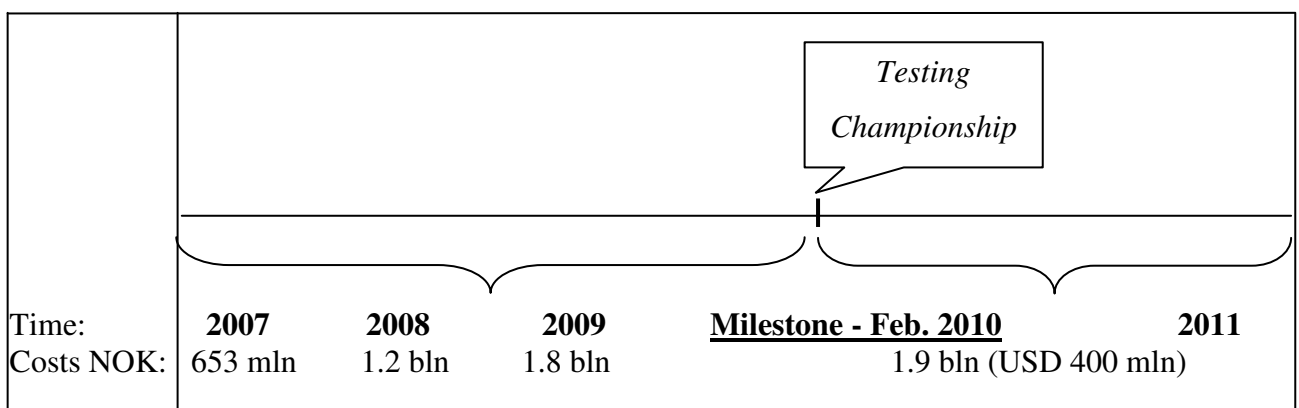


Fig. 4.4 Holmenkollen project progression in terms of costs and time

City Commissioner for Business and Culture, Anette Wiig Bryn, had to leave her position because of the cost overruns. A consultant report ordered by the Municipality concluded that the pressure to find cost savings to stay within the budget, which was underestimated to start with, resulted in slower progress, which again resulted in higher costs (Vårt Land, 2011). Erik Øimoen and Hagbarth Vogt-Lorentzen specified the final costs of the project: the costs of the new large hill were NOK 715 million, while total costs for the upgrade of the national arena and infrastructure reached NOK 1.9 billion (around USD 370 mln). This included the construction of a new ski stadium next to Holmenkollbakken, and Midtstubakken, and upgrades to the Holmenkollen Line and all infrastructures.

4.1.4 Complexity of the project

Oslo Municipality, being obliged to realize such big project, did not know exactly what they should build and how? How much money should they spend on this project? Politicians could not agree also about some conceptual moments: Will it be just a ski arena? Or they should build a monument, visiting card of Oslo and whole Norway? Moreover, they did not have any experience in such field and in the very beginning did not use help of external firms. They decided to calculate singly, how much money are they ready to spend on the project? Therefore project's initiation and planning stages were complicated and lasted much longer than they should. After long debates and communication with architectures politicians have agreed about the sum of NOK 653 mln for the construction project. *“Qualified specialists call it “content without engineering”, when the planned costs were calculated without involvement of engineering specialist and other professionals. The luck of detailed elaboration have led to the costs underestimation on the earlier stages of the projects”*, - Hagbarth Vogt-Lorentzen explains in his interview. Luck of agreement between project parties made the tasks even more complicated and has led to additional uncertainties of the project.

After the Municipality has realized that the project is late, they decided to stop planning and engineering stages of the project and go directly to the execution. *“Reduced planning and engineering stages automatically lead to uncertainties and gaps in earlier risk-analysis”* (Hagbarth Vogt-Lorentzen).

The decision making process in the project was very slow and complicated, especially on the earlier stages of the project: “*Important peculiarity of the project – was impossibility to make decision without concurrence of the main stakeholders*”, - Florian Kosche and Hagbarth Vogt-Lorentzen think. Thus, one of the biggest problems of Holmenkollen project was slow decision making process on the earlier stages. In the beginning of the project all decisions were controlled by the Client – Oslo Municipality, thus it took much time to decide what to do even if the costs of the decision was not very high. On the execution phase project manager gained the right to make decisions without agreement with the Client – up to NOK 1 000 000. Project manager’s subordinates acquire a right to make decisions without agreement with project manager – up to NOK 30 000 (see Fig. 4.5).

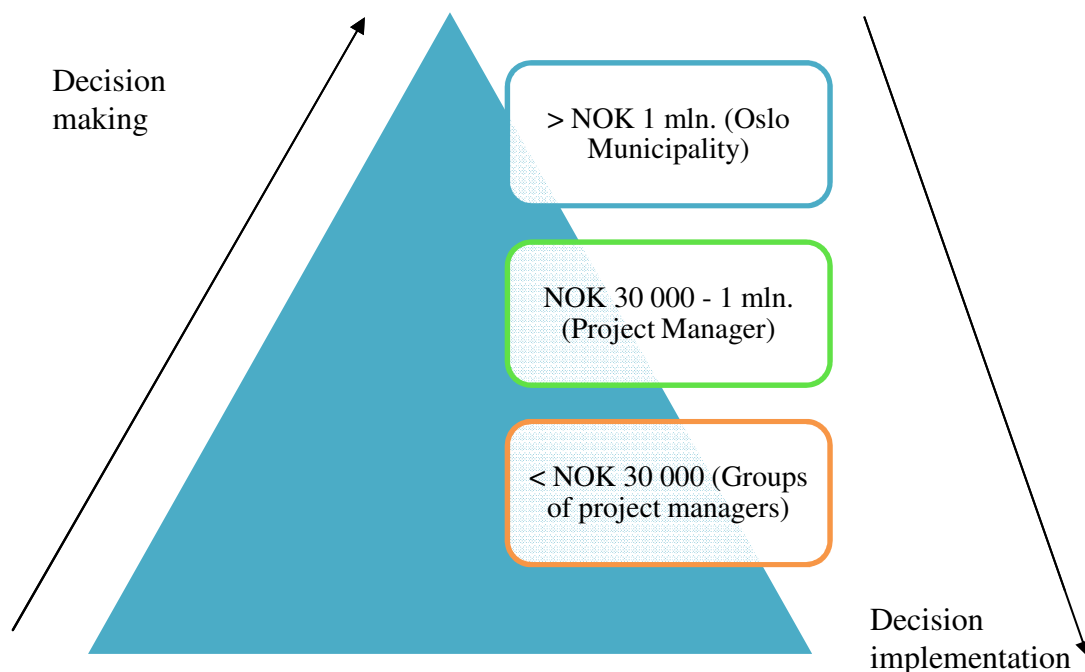


Fig. 4.5 Monetary liability level for making decisions

According to my respondents there was a “specific market situation” of the project. It refers, first of all, to the norms and rules of tenders procedures in Norway for public sector. By Norwegian law you are forced to have a competition between potential contractors – tenders. Tenders in public sector are closed procedures. In general, it is time consuming process, but at the same time very good thing because they could choose the best contractors among different firms and reduce their risks and costs. However, during tenders’ procedures client made judgments based on the numbers, and did not include reputation of the companies into account. Thus, the uncertainty in relations with contractors was increased. Project leaders could not be 100% sure that contractors would be very contrite and fulfil all conditions of the contracts.

Uncertainties related to the governmental policy and construction standard did not impact the project significantly. *“We worked according to the well-known standards and construction norms of Norway and International Ski Federation requirements for the hills”* (Florian Kosche). *“There were just some additional standards concerning recycling, heating and safety issues”* (Hagbarth Vogt-Lorentzen). Thus, the legislative base was more or less stable and has not influenced the project.

Impact of nature (so called force majeure) could be also included as a source of uncertainties. Since the team did not have additional time for construction, they had to do main construction works of Holmenkollenbakken during Sept.-Dec. 2009. *“It was the worst time for doing it, but we couldn’t postpone”* (Florian Kosche). *“The weather was not with us: wind, rain, snow, ice... but we cope with it by changing positions, replacement of workplaces. These actions increased the costs of the project”* (Erik Øimoen).

4.1.5 How are uncertainties being understood and managed in Holmenkollen project?

Every respondent notices that the most significant risk and uncertainty of the project was related to the Time-Costs-Quality constraints of the project. My respondents were “completely solidary” and several times insist on the major risk of the project:

**DO NOT FINISH
on time, within budget and with required quality**

The team of the project had to stay within budget, time frames and to finish the project with required characteristics and to secure quality of ski arena.

As we have seen in Fig. 4.4, the project consisted of two major parts: before the Testing Championship (Feb. 2010) and after. Thus, the main milestone was in February 2010, when the testing ski events should be started. The first part of the project was muddled on the slow decision making, therefore construction and all engineering works have begun much later, than it was planned. Thus, the first priority on this stage of the project was – to build the project in time. The costs increased significantly because of the tight schedule. *“We could not postpone any*

dates of Testing Championship. We had to build the arena on time at any costs. Otherwise, sportsmen, press, world community and other project's stakeholders would blame us for our failure. Personally, it meant that I would lose my reputation...", - explains Erik Øimoen. Thus, punishment and personal controls became useful tools of management control of the project. Together with restrictions of time, the goal was also to find the "good enough decisions" (that can satisfy quality requirements) in order to host the testing championship and to build a good ski jumping arena. Infrastructure was not as important as arena itself. Thus, time uncertainty was the first and most important factor to project success on the first phase of the project. During the realization of the second half of the project costs became the crucial factor, thus management methodises were change slightly as well. *"We paid much more attention to accounting, fulfilment the tasks and contracts and tried to focus on details and infrastructure. Generally, during the realization of unique construction projects you have to throw off all the needless information, dismiss your personal emotions, use your experience, intuition and knowledge to make your team work"*, - added Hagbarth Vogt-Lorentzen, project manager. Thus, formal systems, intuition and personal experience were used to overcome uncertainties related to the costs of the project. Own calculations were provided as well as "outsourced". Because not only specialists from "Terramar AS" took part in the costs and risk analysis, but also external consultants did.

There were a lot of parties involved in the project (e.g. contractors' number was more than 20 multinational firms). Big amount of contractors and sub-contractors has led to uncertainties and changes in the project's schedule. The main steel-contractor of the project was from Sweden with its sub-contractor from Poland. Several times they did not fulfil the terms and conditions of an agreement. These delays have caused deviations in the tight schedule of the project and increased costs. Contractors and sub-contractors is just a one part of the project's stakeholders. There were also other parties that had impact on the project's realization (see Fig. 4.6). Municipality of Oslo (the owner) was the initiator, main decision maker of the project, cost-controller and "middle man" in negotiations with other stakeholders. International Ski Federation produced the standards and together with sportsmen and Norwegian Ski Association expected the project team to fulfil all the terms and conditions to the World Ski Championship. Organizational committee was involved in the process of preparation to the Ski Championships; local operator of Holmenkollen arena is responsible for the current operations, museum, etc. (operational activities on the arena). Journalist all the time during the project monitored the

project's progression and published information in mass media, which caused periodical misunderstandings, and even "scandals". Florian Kosche, engineer of the project, shares Hagbarth's opinion: *"You have to be ready to work under the pressure of stakeholders, and especially from the side of media. You cannot stop it, so put it outside and do your job properly!"*

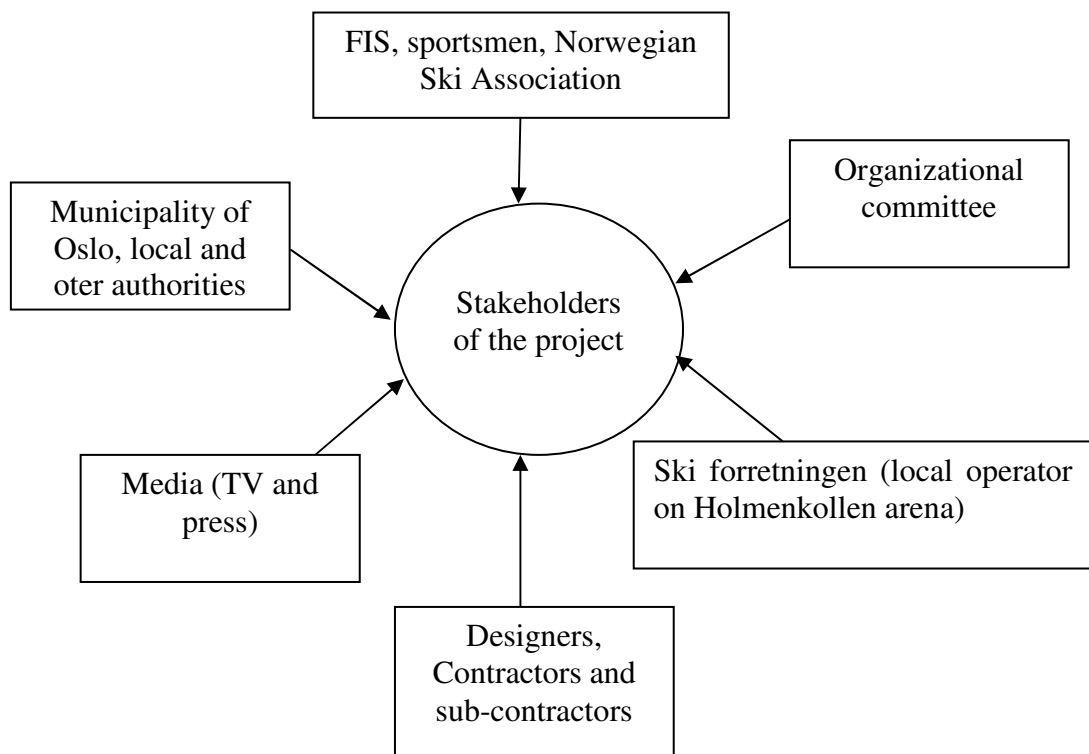


Fig. 4.6 Stakeholders that had impact on the project

Due to the big number of contractors from different countries cultural differences have appeared, as well as difficulties in communication, and influenced the project. All respondents considered that it was very difficult to communicate with the whole team of specialists and contractors insight the project. There were some problems in communication with partners from Poland and Italy, not only because of the language barriers, but because of their mentality. They did not pay much attention to the contracts and have caused delays in the PLC. Thus, it was a need to check them and sometimes use personal controls flying to these countries. Relations with designers and architectures were not easy as well. *"They are very creative people, so they can create very expensive projects. We had to limit them, otherwise, we would never ended up within the planned budget"*, - Erik Øimoen tells in his interview. On the question of how they decreased uncertainties in relations with architectures Hagbarth Vogt-Lorentzen told us that they have

calculated and found out the “Freezing” point, where they said “*enough*” to architectures (see Fig. 4.7). These point shows that any changes in design are not desirable and not possible, since the costs of changes become to be very high.

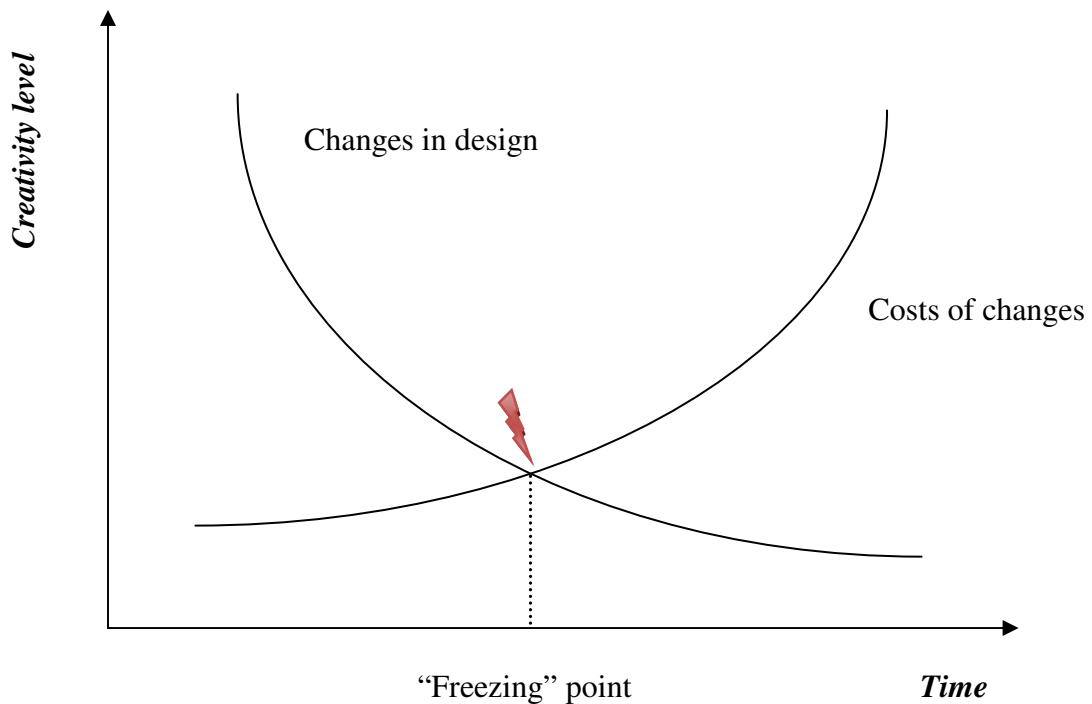


Fig. 4.7 Architectural risks and uncertainties

Hagbarth Vogt-Lorentzen tells: *“It was very important to stop the architectures in this point, because they could improve the project infinite number times. There is no limit for improvements and creativity, thus it is very important to find a crucial point where you will reduce uncertainty of the project and will not make any changes that lead to additional costs, time and changes in quality, which are the most important limitations of the project”.*

Returning to decision making, I can consider that slow decision making process has led to reduction of the planning and calculation stages of the project, which are extremely important for engineering. *“We had to start later with implementation of the project because of the delays with important decisions concerning project design: instead of beginning working under the project in August-September, we started in February. We were 5 months behind the schedule, and consequently, we did not have enough time to calculate and to finish all engineering details. Thus, the only possible decision was to combine planning and execution. This decision increased*

project uncertainties. *To start a project you have to remember, that too late decisions cost a lot*”, - Florian Kosche thinks.

Strategically important decisions in Holmenkollen were made according to the following scheme: first, managers gathered information related to the problem situation, next consultants prepared reports and possible scenarios. Three different consulting companies did their independent evaluation of risks during the project. They prepared reports and possible scenarios. According to managers of Norwegian project, consultants are very important. Erik Øimoen is sure that they are *“totally necessary, give a good input for making decisions”*. Preliminary decisions involved evaluation of information, received from consultants and independent assessing of the project management team. Thus, it was in general 3-4 possible scenarios for the future of the project. According to the respondents, common sense, intuition and “God feeling” were involved in making decisions.

4.1.6 Levers of control used for managing uncertainties in Holmenkollen project

The project management team used variety of control tools in order to keep the project on the right track. Following paragraphs summarise all findings in relation to the structure of management control (Simon’s levers of control).

Beliefs System – committing workers to organizational objectives

It was not hard to build a belief system, because skiing – is the most popular sport in Norway. Modern ski arena – is symbol and prestige of the country. According to Erik Øimoen, Director of the project, the main goal of construction of ‘New’ Holmenkollen was *“not only to build a modern ski arena for ski championships, but also create a national symbol of Norway. It was one of the biggest challenges of our project, because we were obliged to take into account and appreciate opinions, desires and requirements of every single stakeholder of the project. And of course, we had strict frames in terms of time, budget and quality”*. Project decisions were made in accordance with the interests of the stakeholders (strategy, mission, corporate values, goals, choice of suppliers, etc.). Trust could be also added as a management control tool. Because many parties have been trusted each other (trust to contractors, to people insight of the project management team, etc.).

Boundary System – constraining the degree of freedom

Project was running with a strict schedule and costs conditions. Managers also had limits of their responsibilities. Moreover, managers of the project established explicit limits and rules which must be respected by their subordinates. Subordinates were obliged for frequent reporting to the next managerial levels of the project. The scheme of the reporting was standardized. Higher level managers delegated responsibilities to their colleagues (as it was discussed in paragraph about decision-making). Creativity of the architectures was maintained since the Client wanted to build a “symbol” of Norway, but at the same time it was controlled when the costs of changes were inadmissible.

Creation of special working atmosphere and self-motivation were very important in the project. *“If people do interesting work, feel that they create something new and unique, and, especially, if they can influence the project, employees are satisfied and motivated”* (Florian Kosche). There were not used any special motivation and bonuses systems in the project, just general system of remuneration of labour. Fear of losing and punishment were used as motivation tool (to some degree, and not too much), because *“you could lose your authority and weightiness in the project if you will become a dictator. It will never work in Norway”* (Erik Øimoen). Too much pressure is very bad, because it creates the atmosphere of distrust and apprehension. It is better to create an atmosphere there every worker feels his/herself as important part of doing something good and important. Mass media were considered as a kind of motivation as well. *“Holmenkollen became an important part and touristic symbol of Oslo. The “special spirit” helped us to create working atmosphere and to build our project successfully”*, - tells Erik Øimoen.

Interactive Control System – working proximity and proactive decisions making

Changes in visions of the main stakeholders were considered as important factors of project’s success. Many issues were negotiated with external consultants and with different levels of management of the project. Relations between project’s team-members were trustful, but potential threats related to contractors were solved by *“personal checking and double-checking”*. In many situations managers used comprehensive managerial tools. *“When even weekly meetings did not give the entire picture of project progression, it became important to be on the construction site and provide personal controls, and punishment, if needed”*, – added Erik

Øimoen. He thinks that informal communication in the project was more effective than the formal one, since managers “*become a part of the project*”. Directors and managers of the big projects in Norway are really opened for communication with average executives. People can come to them, if they had some problems. Thus, problems could be solved faster and without involvement of additional number of people.

Based on interactions, project management implemented two types of controls: (i) Proactive control and (ii) Quality control. Proactive control in relations with contractors is very important in order to avoid delivery derangement. Quality control – is assurance that resources used for construction and construction itself is done due to the norms and standards. This type of control was performed by special group of qualified managers that checked the quality and prepared reports to the project manager.

Diagnostic Control System – monitoring project’s progression and results

MC of the project consisted of 3 “levels”: from the side of Client (Oslo Municipality); from the side of Project Manager; and from the side of Groups of managers. Different “levels” used varied management control tools. The Client required monthly reports and regularly meetings with Director of the project, who received all the information from the project manager (with frequency – 1 month and 2 weeks respectively). During the most “problematic” phases of the project there were 2 weeks reports and weekly meetings. Sometimes it was not enough for getting a clear picture of the project, thus Director of the project provided personal controls on construction site.

Project manager exploited a system of interdisciplinary checking. The whole project was realized through the parallel-sequential operations procedures. Thus a lot of operations were dependent on the previous ones and could not be started without completion of the earlier phases. The project was divided into subprojects and different managers were responsible for these subprojects. Project manager received monthly reports from the above mentioned managers (on the “peak” of the project these reports were more frequent). Managers used a template form for their reports. They included description of the project progress, risk matrix for 6 boxes, i.e. sub-projects, cost reports and prognoses. It was not a simple task for the project manager to match all details and project spheres into the one complete picture. Kick-off working meetings (3-4 hours

every month/ every two weeks on the “peaks”) and personal observation on the project helped him with this difficult task.

Electronic tools were also used for management control and making decisions. “*We used Microsoft Outlook and Software OPERA Project*”, – added the project manager. OPERA Project, Microsoft Excel based tool, a Norwegian analogue of MS Project, as the project management software was used for detailed planning, assigning resources to tasks, tracking progress, managing budgets and analyzing workloads. The application creates critical path schedules, and critical chain and event chain methodology. This tool gave a good basic for making decisions and management control: from the diagrams (schedules, resources, responsibilities division, etc. visualized in Gantt charts) you see the project progression, and deviations of results planned with results achieved. The Groups of “matrix” managers used weekly or daily follow-ups together with the ICT. Personal control and observation were also provided.

4.1.7 Lessons learned from the project: “Late decisions cost a lot” (Florian Kosche):

- 1) Underestimation of cost consequences. “*We had a system of management control and cost control, but we underestimated importance of the first stages of initiation and planning, during which we had to plan our expenditures*”, - adds Hagbarth Vogt-Lorentzen.
-
- 2) Gaps in the risk analysis (earlier risk analysis did not match completely with practical implementation of the project). “*We added new risks to the basic risk management plan from month to month*”, - tells Hagbarth Vogt-Lorentzen.
 - 3) Concerning decision making. Quantitative and qualitative techniques have to be combined for making decisions. Best formula for making decisions is using external consultants and own intuition. It is important also to trust your team. Good advice to the Clients – to be more flexible in making decisions, because it could lead to the lack of time for engineering, for example. And it will cause the underestimation of cost consequences.

- 4) Importance of agreement among different groups of stakeholders, harmonization of visions and aims of the project, finding a “freezing point” in relation and negotiations with architectures and engineers. You do not have to lose control and should take into account cultural differences in working with international teams. There are differences between collaboration with firms from Western and Eastern parts of Europe, for example, you can rely on your contractors from Germany, Austria and Switzerland, but you have to check your partners from Poland and Italy, because they do not pay much attention to the management control and reporting. Thus, you have to take it into consideration, because it could impact the design of MCS.
- 5) Respondents have summarized that next time they should foresee and plan some system of motivation. It was one of the omissions of the project, simply because they did not have time and did not pay attention to this problem.
- 6) Do not practice “closed” tenders and negotiate with firms before signing the contract. Learn more from the private business practices.
- 7) Importance to have experienced people in the project team. *“Experienced people overcome uncertainties related to the project much easier. They make their decisions faster, based on the previous projects. Working under the big construction project is impossible without previous experience in particular field”* – Erik Øimoen tells in his interview.
- 8) Nature risks and uncertainties are even more predictable than actions of stakeholders, but they still impact the project.



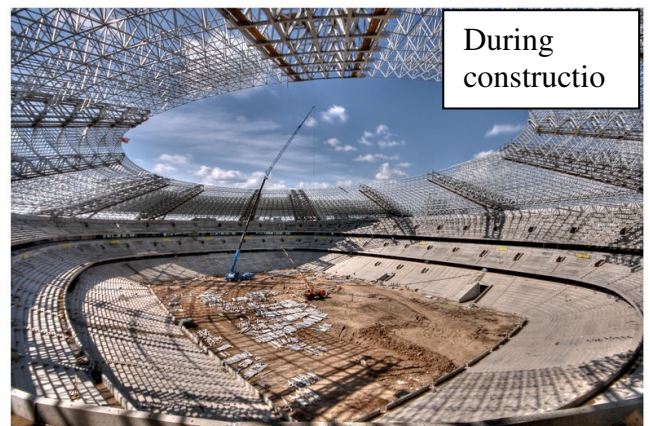
4.2 UKRAINIAN CASE: “THE DIAMOND OF DONETSK”

4.2.1 *About Donbass Arena*

The Donbass Arena is the first stadium in Eastern Europe designed and built to UEFA elite standards. With a capacity of 51,504 spectators, the Stadium hosts FC Shakhtar Donetsk matches and will host matches in Euro 2012. The initial estimated cost of the project was USD 185 mln; USD 30 mln has been allocated to set up a recreational park around the Stadium (77,000 plants grow in the park).



The final cost of the project and the surrounding park landscaping reached USD 400 mln. Construction was launched on Jun. 2006 (corresponding contract signed with Turkish company ENKA). Construction was completed in 2009 (and took 1,158 days). To erect the five-star arena to such a tight schedule (3 years) over 1,600 people worked on site at peak times. In 2010 the arena has received several awards, including: the 2009 Top Construction Site award by Donetsk Design & Construction Club, the 2009 Best International Mobotix Project award, the 2009 Best Construction in Ukraine prize. Stadium includes also 53 fast-food outlets, a fan cafe, 4 Silver bars, 3 restaurants (Diamond, Platinum, Gold), a media cafe and a lounge bar will satisfy any visitor's taste, FC Shakhtar Museum and brand shop for souvenirs.



4.2.2 *Project organization: structure, subordination and personnel*

An alternate contract was chosen for construction of Donbass Arena, compared to Holmenkollen. The model replaces the two traditional contracts with three contracts: owner-

designer, owner-construction project manager, and owner-builder. Main parties of the project and relationships between them are illustrated in the Fig. 4.8. The formal owner (client) of the stadium is Football Club “Shakhtar Donetsk” (General Director – is Sergei Palkin). The factual owner and single investor of the project is Rinat Akhmetov, President of the FC Shakhtar Donetsk and the richest men in Ukraine. Since the owner had limited experience with and knowledge of complex sport construction projects, he hired a separate private designer, project manager and general contractor. Choosing of designer and contractor was done after opened tender procedures. Project manager worked earlier with the client, and he was appointed after the client signed up the contracts with designers and general contractor.

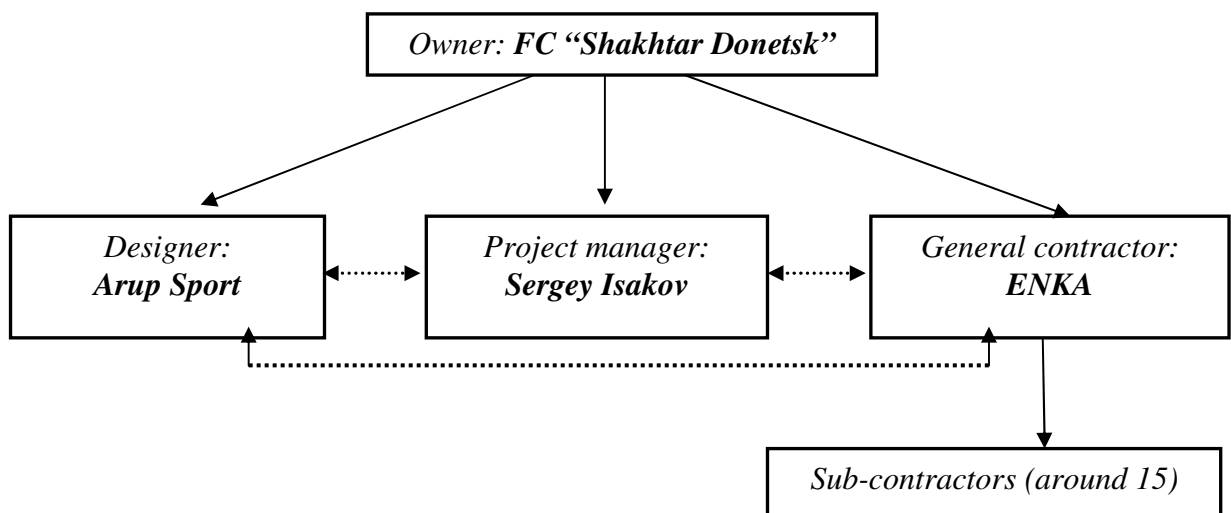


Fig. 4.8 Main parties of Donbass Arena project

The stadium was designed by “Arup Sport”⁹ group (England), authors of the world’s famous buildings, such as The Sydney Opera House (Australia), City of Manchester Stadium (Great Britain), Allianz Arena stadium in Munich (Germany), Beijing National Stadium or the Bird’s Nest (China), etc. Designer met all the wishes and requirements of the client. The contract for being a project manager of Donbass Arena was signed with Sergey Isakov (who is Technical Director of the stadium nowadays). The construction manager’s role was to provide construction advice to the designer, on the owner’s behalf, design advices to the constructor, again on the owner’s behalf, and other advices as necessary. The construction project management company was an additional party engaged in direct construction. Project manager and his team were aimed to provide assistance to this company – Turkish leading construction company ENKA¹⁰, since

⁹ <http://www.arup.com/>

¹⁰ <http://www.enka.com/Default.aspx>

ENKA¹¹ was not ready and not able to cope with Ukrainian legislation and other business factors and problems. ENKA has chosen sub-contractors independently, since the responsibility of the project was mainly on it, but client's service checked all tender procedures and could influence the decisions of ENKA. The Director of the project from the Turkish side and my respondent is Ugur Koyunoglu. He mentioned that Turkish construction firm ENKA used help of 15 subcontractors from all over the world.

Structure of management of Donbass Arena from the owner's side is linear and illustrated in Fig. 4.9. During the realization of the project, project manager of Donbass Arena was accounted for the General Director of the project, who was involved in negotiations with Board of Directors, Euro – 2012 Committee and Client of the project. Together with a project manager, General Director was involved in the project management and was responsible for "spending" investor's money.

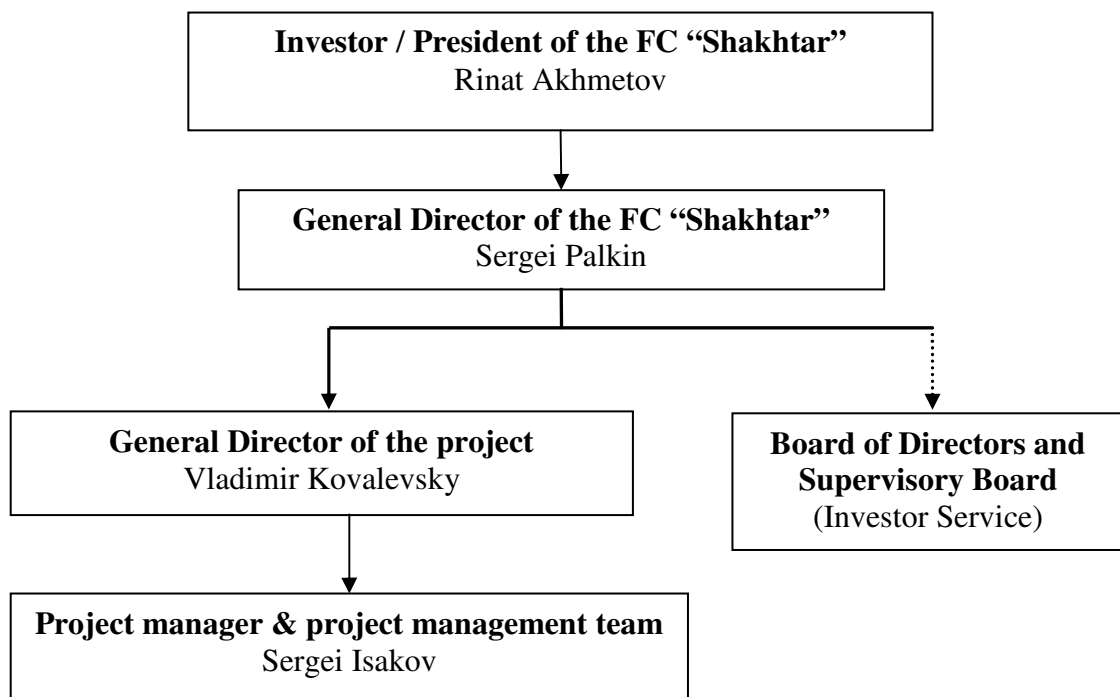


Fig. 4.9 Managers of Donbass Arena project (owner's side)

Organizational structure of the project management team was linear functional. Project management team was divided into 6 departments: PMO and Analytical department; Department

¹¹ <http://www.enka.com>

of initiation and preparation; Technical Department; Finance Department; Legal Department and Administrative Department. Each of the departments included other groups that were responsible for particular parts of the project. For example, “Department of initiation and preparation” included architectural and engineering bureaus, and front pre-project analysis office. The whole structure was headed by project manager, who was accountable for Director of the project. Turkish contractor had more or less the same structure, because it was earlier agreed in the contract. Due to the contract, Turkish company ENKA was obliged also to endorse and approve all decisions concern the project with General Director (and/or Project Manager) of the project. Director of the project was able to make decisions regarding the project up to – USD 100 000 without consent of investor. Project manager did not take any actions without consent of the General Director if the sum of decision was more than USD 30 000 (see Fig. 4.10).

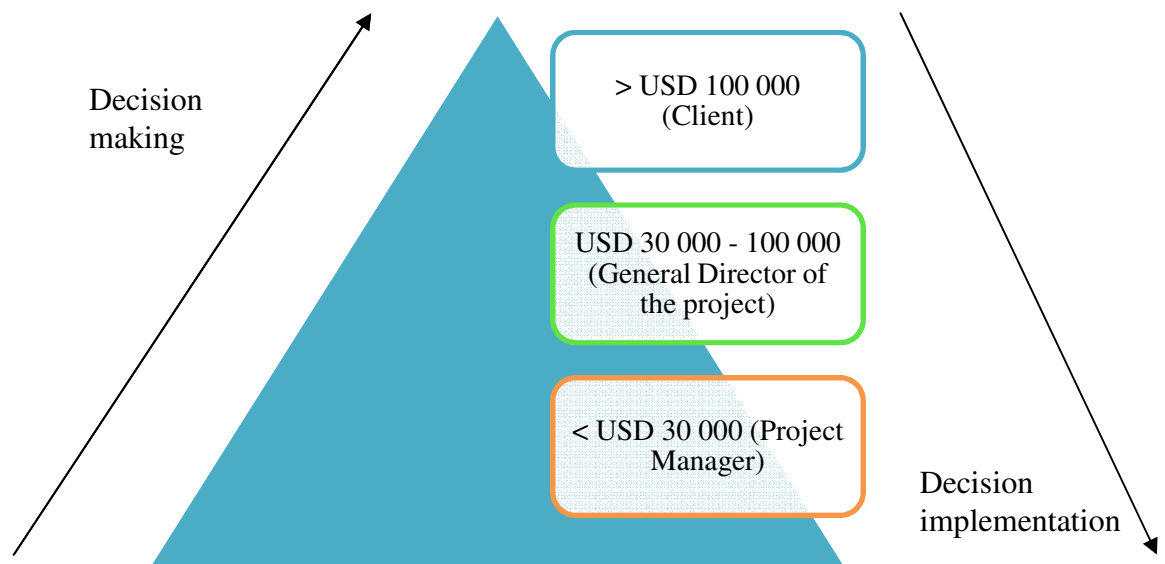


Fig. 4.10 Monetary liability level for making decisions

“Complicated way of making project’s decisions was not the only problem we faced with. In the beginning of the project we faced a problem with our personnel”, - said Sergey Isakov. In the team there were a lot of people in age of 50-60 years. These people did not want to change their style of work (that was gained during “soviet” times), improve their knowledge concerning construction materials and technologies, ICT and construction techniques. They were not competent to solve the disputable questions and sometimes made the obstacles and slowed down the process of construction itself. That is why almost 90% of those people were replaced by younger specialists. Over 1,600 people worked on site at peak times, mostly Turks and

Ukrainians. Donbass Arena and ENKA had parallel positions in the organizational structure of the project (Turkish engineer – Ukrainian engineer, Turkish experts of the customs department – Ukrainian experts of the customs department, etc.). “Our accountants were not ready to deal with Ukrainian reporting agencies, thus they prepared financial reports with the help of Ukrainian specialists”, - Ugur Koyunoglu mentioned in his interview. Due to the contract between owner and contractor, ENKA had to harmonize the organizational structure with the client’s project management group.

4.2.3 Environment of the project

Unstable Ukrainian law, regular changes in construction norms and standards, pressure from the side of media and Committee EURO-2012 are the major characteristics of the project’s environment. There are a lot of specific rules and standards in Ukrainian legal system. Company ENKA, for instance, was forced to open a representative office in Ukraine because of the Ukrainian legislation. Only residents of a country can carry out all the current activities. They must maintain accounting records in accordance with Ukrainian standards. Other features of the Ukrainian legislation and bureaucracy will be discussed further in the chapter. Fig. 4.11 examines the groups of stakeholders involved in the project.

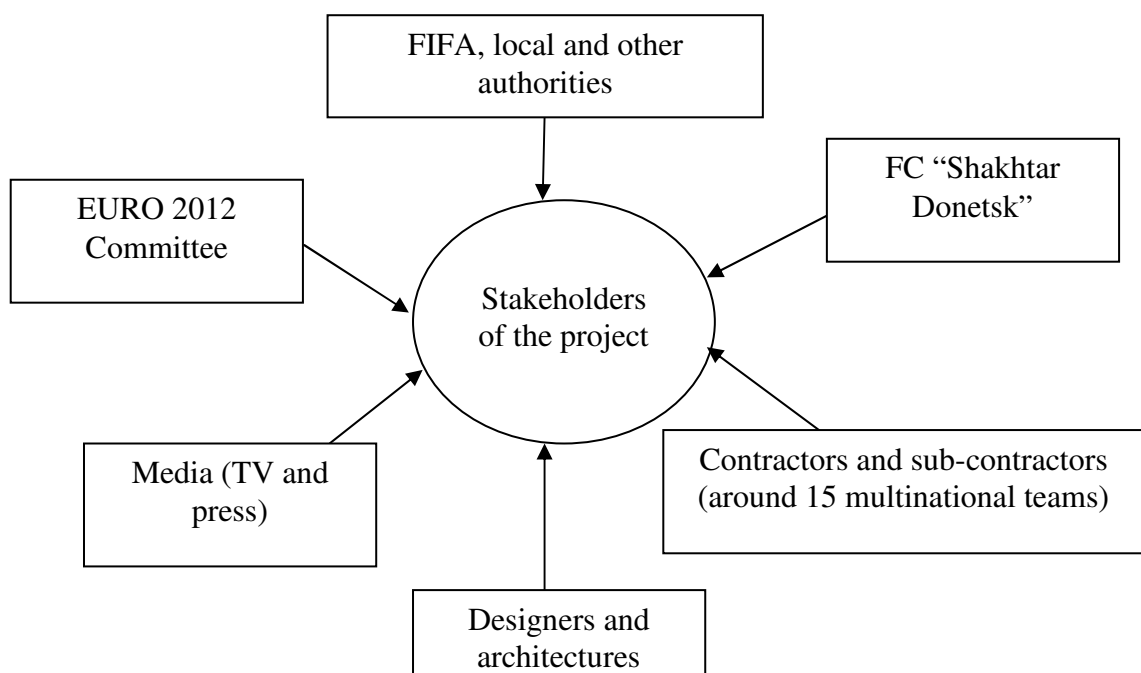


Fig. 4.11 Stakeholders of the project of construction of Donbass Arena

FIFA, local and other authorities have influenced the project in terms of issuing standards and norms of construction the arena. FIFA has checked the projects progression and received the annual reports. Local and other authorities provided testing of the materials of construction, conformed the plans of construction, etc. Architectures monitored the project's progression and kept vigilant watch over the loyalty to author's rights. FC "Shakhtar Donetsk", the main user of a stadium, was interested to get convenient arena for training, medical assistance and hosting the football matches. Media was a source of many scandals which made difficulties in relations with contractors and other parties. They monitored the project's progression through the "pleiad" of press-conferences with leaders of the project¹².

One important and distinctive feature of the project is that managers decided to gain their experience not from the own mistakes, but try to learn from the people's experience who have already done it (Portugal, Holland, etc.). Thus, the project managers went to the stadiums in Lisbon (Portugal), Amsterdam (Holland), Arena Allianz in Munich (Germany), Bird's nest in Beijing (China). The project manager and temporary director of the stadium in Lisbon, for example, shared his experience and helped a lot. *"The Lisbon's stadium was build according to the world's standards. The project has paid off in 4 years – it is just unbelievable, and it is a record time for such type of project. Thus, it was a lot of moments in management that we could learn from their experience. It helped us a lot. Now we share our experience with project managers and directors of construction of other stadiums in Ukraine, Russia and Belorussia. Thus, it was important to collaborate with local production firms, project institutes, and juridical companies (land rights issues). It is best to consult early in the project than to lose more in the end"*, - Sergei Palkin thinks.

4.2.4 Project's characteristics as the main sources of uncertainties

The decision to build a stadium was made in 2004, since that time investor have signed the contract with designers. However, in 2006, when project manager Sergey Isakov came into the project, they had 1 year behind schedule. *"Instead of planned two years of construction of Donbass Arena, we spend one year more and arena was ready in August 2009"*. The total costs of the project increased more than twice. The project management team have analysed the main

¹² Leaders in this context mean project manager, director of the project and other competent people who were involved in the project management.

reasons for their failures later. Some of the major problems in the project that led to additional costs and time of the project were the following:

- Slow and complicated decision making process due to the language problems and disagreements with parties of the project;
- Lack of clarity of the prescribed tasks, rights and responsibilities in the contract;
- Weak initiation and reduced planning stage of the project;
- Ukrainian mentality and “force majeure”.

There are some peculiarities of big projects that will be similar in Ukraine and other countries. However, there are a lot of distinctive characteristics as well. I will discuss the above mentioned factors more detailed below.

Decision making process was time consuming and complicated, since parties signed a contract and agreed that they will negotiate concerning project's decisions. *“Even simple question that did not lead to ascending the budget was negotiated between ENKA and Donbass Arena, because it was earlier agreed in the contract”*, - Ugur Koyunoglu explains. The official language of correspondents was considered English. Neither Turks nor Ukrainians were very good in English. *“We used interpreters to translate our letters from Russian or Turkish to English... Even the word ‘feet out’ was translated many times in different ways. It caused many problems, first of all – time wasting”*, - Sergei Isakov thinks. It took much time to understand each other. The process of communication and decision making was the follows: company ENKA, for example, wanted to make some changes in the project and use substitute materials for construction. Action group has discussed disputable questions with their administration. If the proposal was worth attention, it was written as an offer in Turkish. These documents were sent to the interpreters for translation into English. Very often interpreters were in lack of engineering knowledge and basics of project management. Thus, offers in English frequently have not been adequate to the initial documents in Turkish. Moreover, many moments were discussed with juridical and financial departments, since Turkish and Ukrainian legislation is different. Before the letters have come to the project management of Donbass Arena, they were translated from English to Russian. Thus, sometimes it could last more than one week for agreement between the two sides, ENKA and Donbass Arena administration.

As I have already mentioned, Ukraine is far from being the most stable country in the world, especially what concerns Ukrainian law and business environment. Since Ukrainian legislation is

not stable, it impacts construction industry as well: changes related to safety on the stadium, roof covering the tribunes, etc. For example, *“requirements to the load factors were changed several times during the PLC. Thus, we had to make some changes in our plans, improve quality. It increased the final costs of the project”* – Sergei Palkin mentioned during the interview. Moreover, Ukrainian government as well as other bodies and authorities still do not want “to talk” to foreigners. We could call it remnants of Soviet society. Because a lot of leading position in the country occupied by old people that prefer to work according to the old norms. Or even worth – these positions are occupied by the “new generation”, which tries to take their own interests and benefits in every situation.

Thus, there were a lot of problems, caused by Ukrainian law and specifics of business environment. Construction of roof was renewed a couple of times, because German subcontractors’ specialists had to harmonize their project with Ukrainian norms, which changed several times in one year. The process of testing the materials of the roof lasted around 6 months. It was done both in Ukraine and in Turkey. ENKA had problems with customs clearance also, thus, *“we had to help them, because we could lose more in consequence of idle materials. Two Ukrainian specialists helped their Turkish colleagues with customs authorities, courts, etc.”*, - Sergey Isakov said.

One of the major features of Ukrainian construction projects is that in the earlier stages of the project there is no “transcript” of the ideas of the initiator of the project, i.e. client. The same problem was in Donbass Arena project. We could call it a problem of “weak” initiation and reduced planning stages of the project. *“In Europe there is requirement of providing all the information about the future project, preliminary analysis of budget and time frames. In our project we had only the general idea which was not described as “painted by numbers” project. We have not got the complete picture even after signing a contract with ENKA, because we continued modifying some elements of the project, aligned some of the issues with the client and other stakeholders. These uncertainties have led to the big risk of getting the final results that do not meet customer requirements”*, - Sergey Isakov said.

Not only Ukrainian law and business tradition are important sources of uncertainties in the project. It became known that there were some problems related to the Ukrainian mentality also. For example, *“the New Year celebration lasts in Ukraine almost two weeks. When we build*

Donbass Arena, 01.Jan there were absent just 2 people from 1000 Turkish workers because of the sickness. But almost 90% of Ukrainians were absents due to “unreadiness” to work”, - tells Ugur Koyunoglu. Thus, the delays of the project could not be avoided. And the last, but not least in this section is that “force majeure” of the project can be related to both, the nature and to the Ukrainian government. Situation with Ukrainian legislation and governmental authorities were discussed earlier in the chapter. Nature impact refers to the winter time in Ukraine, when it is very cold, and therefore construction works were stopped several times during the project.

4.2.5 How are uncertainties being understood and managed in Donbass Arena project?

The major risks and uncertainties of the project were related to the following: Do not finish project on time with a particular planned and required quality and to avoid increasing costs of the project. Uncertainties of the project can be divided into several groups. I will describe them step-by-step.

One of the dominant uncertainties lies in relations with general contractor. It includes inconsistency of tasks, reports and difficulties in collaboration between the project teams. *“Client wants to get a product with particular characteristics in a limited period of time and within budget, at the same time contractor wants to get a profit (as much as possible), thus it could use other materials and so on just to make the “fast” money”, - explains Sergey Palkin. Such changes could influence the quality of the project. Thus, instead of trusting the contractor, project manager and his team provided personal controls and established analytical department. Project leaders underestimated importance of Analytical department in the beginning of the project. “We did not have an Analytical department from the very beginning of the project, but we realized that it is very important not “to take for granted” information from the contractor, but to check it independently” (Sergei Isakov). Another side of this uncertainty is that Turkish company “ENKA” did not have some departments in the beginning of the project, e.g. a Front pre-production. Thus, project has faced some problems on the initial and planning stages of the construction of Donbass Arena. From the Client’s side there were two specialists, who were responsible for getting permits from the government (land, electricity, and a lot of another types of documents). Turkish company did not expect that they could face a problem. Since the contract between client and builder required harmonized structure, Turkish company was under*

obligation to create the same department. *“We prescribed all the terms, conditions and the structures in the contract. The contract was very thick but we avoided a lot of potential problems you could face with during the project”* (Sergei Isakov).

Thus, uncertainty in relation with ENKA was handled by coordinated work of project managers and harmonizing working structure of the project on both sides: the client and contractor. *“The issue was to have the same controls in the two above mentioned structures, where every department of the project has a “clone-department” in the structure of your contractor (engineers from ENKA should work very closely with the same specialists from the side of the Client)”*, - Sergei Palkin mentioned during the interview. These requirements were prescribed in the contract. According to Sergey Isakov fundamental of success of the project – is in the contract between Client and contractor. *“I cannot say that we did not change anything in the contract. We continued to work on the contract during the project. New problems appeared all the time, thus we added more than 10 applications (additional agreements concerning different questions of the project)”*. Moreover, in order to avoid misunderstandings, information gathered was reliable and well-timed. That is why they provided personal controls and observations together with contractor’s reports in order to ensure the quality of the project. It was a common situation when contractor hid information in order to avoid some conflicts and misunderstandings with client. In order to get truthful information there was established technical supervision of customer service that monitored the quality of the project and gathered information. General construction department included 13 persons, mechanical works monitoring – 15 persons, electrical supervision department – 10 persons. After gathering information it was transferred to the analytical department, which developed reports for the management.

Language problem was very significant in relations with major contractor in the beginning of the project. However, project managers overcome it later. Sergey Isakov explains: *“From the very beginning me and my colleagues were not good enough in English, but closer to the end of the project we improved our skills as well as the Turkish specialists. Thus, it became easier to communicate with them. I can add also that qualified specialists will understand each other on the “round-table”, even if they do not use the same language”*, - said Sergei Isakov. Thus, key figures of the project as well as other employees improved their skills in English during the project in order to decrease the risks of misunderstanding.

As for architectures supervision during the PLC, it was not very strong. Because on the design stage they delegated powers to the company ENKA and agreed in the contract that ENKA will work out details of the project. *“We thought that we reduced the risks, but we were mistaken, because in such projects it is always better to spend more time with architectures working together with major contractor in order to get a complete project and obtain detailed plan of actions”*, - Sergey Isakov thinks. From one side they avoided risks of conflicts with architectures but increased uncertainties, concerned detailed planning and elaboration of the project. Luck of detailed planning and elaboration has caused time and cost overruns. It increased a risk of getting the final results that do not meet customer requirements as well. Analytical department partially helped to solve this uncertainty and to control the costs and schedule overruns, but it was later, not on the first stages of the project. Since that time project was already one year behind schedule and more than twice exceeded its costs. The reason for this lies in the luck of detailed planning and structuring project’s works, which they did not have in the beginning of the project.

Ukraine – is very specific country in terms of its business culture, laws and norms, bureaucracy of the government and other authorities. Construction is that industry that requires a lot of compulsory supervisions, technical controls and expertises. *“It is a wrong opinion that in Ukraine you could easy buy everything: even the court and local authorities”*, - Ugur Koyunoglu said. *“You could face authorities where you should pay to enforce the process of your case, but the expertise will be done according to all standards, because the poor-quality implementation of the project may entail casualties. It is complicated procedure in Ukraine, thus you have to be ready to spend more time for getting all permissions”*.

However, there were a lot of quality controls, security requirements and many other testing procedures, technical expertises of quality of materials of products and materials, required not only by Ukrainian governments (e.g. Ukrainian Certificates - UkrSep¹³), but Standards of UEFA. It worth to notice, that Ukrainian construction standards were changed several times during construction. UEFA also provided a strong supervision under this project. Management of the firm ENKA underestimated this situation, therefore they needed help with customs, permit documents and other approvals. *“It is much paper work and ... bureaucracy. All the time you need Ukrainian people in your team to help to solve the problems”* (Ugur Koyunoglu). Another uncertainty caused by government is inconsistency of the legislation that needs double coherence

¹³ <http://ukrsepro.kiev.ua/>

on the planning and designing stages of the project: *“You have to visit the same authorities and discuss almost the same issues, but fulfil other papers”* (Ugur Koyunoglu). It needs time and frequent negotiations which may affect the project schedule. It means that you should be patient, be ready for negotiations and use the help of local people. Formula for successful relations with Ukrainian authorities (Ugur Koyunoglu): *Time + patience + money = Alignment in the Ukrainian authorities*

Not only Ukrainian bureaucracy and unstable legislation have made work of the teams more difficult. Cultural differences and necessity of work in multinational teams required some more attention from the side of directors and project managers. There were around 15 different contractors all over the world. Thus, there were difficulties in understanding of these parties due to the cultural differences and language barriers. For example, one German contractor was very sceptical to work with Ukrainian specialists. Colleagues from Germany thought that Ukrainians are not very skilled and tried to obtrude their opinions upon local specialists. This problem was called later on as “Germany landscaping case”. Germans neglected educational level of Ukrainian specialists, for instance engineers and architectures. It was caused by the differences in norms, requirements and standards of construction projects. Germans had another views on many disputable questions. German legislation states that roads should be build like that: 1.5 meters deep down, but Ukrainian norms state that it should be 0.9 meters, thus it was no sense to spend additional resources (materials, time, money, human resources) to satisfy German standards. *“Our investor said that we can save money and spent them on other needs, at least, premiums of the economy”*, - Sergei Palkin said. *“We spent much time on discussions and correcting plans. However, we learned something from them as well: new materials, new ways of testing the materials, etc.”* (Sergey Isakov)

Cultural differences we could discern also in the approach of Turkish partners: their workers were divided into different castes, every caste had particular colour of their helmets: the white ones – the managers, blue ones – quality controllers, yellow ones – are usual workers and so on. It is not common in Ukraine to divide employees into castes or other groups. There were a lot of interorganizational and personal conflicts between managers and general workers of Donbass Arena and company ENKA. For example, *“we could not agree on some moment of the project with financial department, sometimes there were conflicts between architectures, engineers and even project managers and directors. There was a fight between Turks and Ukrainians, but we*

solved these conflicts using motivation and corporate events (fishing, etc.)”, - Sergey Isakov mentioned. Thus, possible solution was: regular meetings, accurate reports about project progression, and team-building.

4.2.6 Levers of control used for managing uncertainties in Donbass Arena construction project

The project management team used many tools of MC, which could be divided into four groups – Simon’s levers of control: belief, interactive, diagnostic and boundary systems.

Beliefs System – committing workers to organizational objectives

The goal of the project was to build symbol of Donbass and modern sport arena for hosting matches of FC “Shakhtar Donetsk” and EURO-2012. Trust as controls tool in Ukrainian projects cannot be considered as such, because Ukrainians prefer not trust, but check everything by themselves. However, both sides of the project – contractor ENKA and team of Donbass Arena succeeded in motivating people to work. Different motivation systems were used by two sides of the project (client organization and main contractor). Every system included both financial and nonfinancial incentives.

ENKA used a system of bonuses in the case of over-fulfilment the plan results. Workers had 1 day off – every 15 days. Once during 3 months all workers could fly to Turkey to visit their families due to the company. The most important nonfinancial incentive is: prestige to work in the Turkish company ENKA, which is well known and very popular company in Turkish labour market. Donbass Arena had also a system of financial bonuses – according to the results achieved during the year (in the case of improved quality, time saving and budget’s economy). One of the major tools for encouraging people to perform tasks efficiently was using own example and faithful execution of the tasks by project manager and other “top-persons”. It built respectable relationships and a special climate among the team members. Sport competitions between employees, fishing with their families and Turkish colleagues, etc. are some examples of nonfinancial incentives used by client organization for strengthening spirit of the team and encouragement to complete the project with over-fulfilment of the results planned.

Boundary System – constraining the degree of freedom

According to my respondents, MC in the project was a continuous process: controls of input (materials, people, equipment, etc.) – transformation (process of construction, people, materials, etc.) – output (final result). Checking and controlling were carried out continuously and elaborately. *“There is no sense to control only the last stage of the project. You have to be aware about the quality of “input” materials and so on, because of you will not be certain about materials used – you will never receive certain result of the project. Thus, to manage the project successfully you have to implement continuous management control, and to use system approach”*, - Sergey Isakov is sure.

Project budget and time schedule were well-defined in the contract, thus every member of the project had to follow this limitations. Managers also had limits of their responsibilities (in terms of monetary limits for making their own decisions). Project managers established the rules of behaviour, using their own examples of how should people work. Subordinates were obliged for frequent reporting to the next managerial levels of the project. Creativity of the architectures was limited as soon as the Client endorsed the project’s model.

Another side of this type of control is double-checking. *“I checked everything by myself. Sometimes my Turkish colleagues were in shock, when I started to hop and jump on some design and (or) construction elements*, - Sergey Isakov said. *It was done because we have to predict even vandalism actions of football hooligans, which are widespread not only in Ukraine”*. Moreover Ukraine has much stricter norms and standards when concerns to some spheres of the projects (e.g., the fire safety). Quality and technical controls and care of the working standards on the construction site were high from both sides: ENKA and Donbass Arena.

Interactive Control System – working proximity and proactive decisions making

Three most important limitations of the project (Quality, Costs and Schedule) were controlled by both sides: (i) from the side of ENKA: Department of quality (men in “blue helmets”), (ii) from the side of Donbass Arena - Department of Technical Supervision. Teams spent much time on negotiations. Working meetings and negotiations between project managers of ENKA and Donbass Arena had lasted every day. Concerning some vital issues, meetings of project

managers could happen even 2-3 times per a day. From the beginning of the project these working meetings lasted ca 1.5 hour, but in order to be efficient and not to waste time on dalliance, managers have learned to communicate faster, go straight to the point and solved problems immediately. For solving current/ every-day problems managers have spent approximately 20 minutes, when they have found “common language”, using literally speaking papers with numbers, drawings, sketches and other figures.

Diagnostic Control System – monitoring project’s progression and results

Diagnostic Control System is consisted of kick-off meetings, compulsory reports and ICT tools. There was formal agreement that subordinates have to report to the project management. This reports had daily, weekly, and monthly characters (i.e. on demand of the project manager). Primarily, it was checking the progression of unit managers and heads of departments (once a month). The conditions of reporting were prescribed earlier and were the same for all employees. However, to be sure in the employees, manager of the project provided one interesting scheme of control: sometimes he gave deliberately misrepresented and obviously wrong tasks, i.e. with lack of information to their employees (for example to engineers, etc.). If they did not have any question during the processing the tasks it became obvious that they do not “own” the situation and do their jobs in a wrong way. Thus, these employees were replaced by more competent ones.

Once in 6 months reports for client/investor were prepared by project manager and director of the project. Analytical tools were also used for planning and controlling the project. The team used “Spider project”, project management package, designed and developed by Russian developer company Spider Project (Moscow). It is a Russian analogue of “MS Project”. The information was processed in analytical department and used as a tool for making decisions. Firm ENKA did not confess that they used similar system, but it became known that they used “MS Project”. It is almost the same program with similar capabilities and graphs of the projects. Sergey Isakov: *“The best way to avoid projects risks and problems was to use system approach: to build a structure with clearly defined powers and requirements to the employees. We used also a system of global monitoring in our project: narrow specialists were responsible for their parts of work, analytical department gathered information and gave it to managers for making their decisions concerned project’s future”*.

4.2.7 Lessons learned: “The one who does not work does not make any mistakes”
(Sergey Isakov):

- 1) Nobody can and should not put all the responsibility on the contractors. *“That is why we did not rely on our contractors and checked their activities all the time. In that way we avoided problems with theft, fraud and so on, which are very common in the construction of similar projects (building of stadiums in Kharkiv, L’viv, Kyiv, Odessa related to EURO 2012)”*, - Sergei Palkin thinks.
- 2) Every project could fail, even the best planned. First of all because it is very difficult to go with respect to the project’s algorithm (means of production have a property to move and mix, people can be sick, media can make pressures, even the mood of directors affects the project).
- 3) Corporate culture and team building is a good mean of management control. Bonuses systems work very well in Ukraine, because people feel that they may not only influence the project, by also get bonuses for their good work.
- 4) Be ready to cultural differences and be ready to learn foreign “ways” of doing business, because you could learn a lot from every project.
- 5) Since the aim of the project was to finish the stadium before EURO – 2012, the project was started earlier. Time was not a crucial factor.
- 6) Initial and planning stages are the most important for successful handling risks and uncertainties, because you have to consider many problems and uncertainties on the earlier stages. Only personal experience, knowledge and learning by doing can help you with it.

MAIN EMPIRICAL FINDINGS

There are a lot of similarities between Norwegian and Ukrainian projects, as well as differences. First of all, budgets, time of realization, ideas and aims of the projects are almost the same. The major problem and uncertainty of both projects was DID NOT FINISH PROJECT on time, within budget and with required quality.

I have found out that projects faced similar groups of uncertainties. Slow decision making process was a distinctive feature of both project, but it was caused by different reasons. In Norwegian project it was because of the lack of competence and agreement among politicians, in Ukrainian – because of the disagreements and difficulties in communication between contractor and client organization. Projects investigated were not “painted by numbers” in the beginning, instead they were as “walking in the fog”. In Norwegian case it happened because politicians could not agree what they want to do and how? In Ukrainian case – because this country does not have a tradition, where Client prepares description what is he/she wants to build. There were a lot of international contractors and subcontractors involved in the execution. Thus, problems of work in international teams and cultural differences have aroused in both projects. Table 4.1 summarizes main differences between two projects.

Table 4.1 Differences between Norwegian and Ukrainian projects

| Criteria | Norway | Ukraine |
|--|--|---|
| Type of contacts | Traditional (two sides contact) | Alternative (three sides contract) |
| HR policy | Involve people with “big” experience, who are ready to solve the problems using their intuition and personal abilities | Hire young people preferably, willing to work, that have new knowledge. People who want to gain a new experience. |
| Government regulation and construction norms | More or less stable, do not impact the project | Changed all the time |
| Motivation | No motivation systems | Combination of financial and nonfinancial incentives |
| Approach to reporting | Monthly reports | Half-years, monthly, weekly and daily reports (if needed) |
| Meetings | Monthly, 2 weeks | Every day and even often |
| Trust | Important | Trust nobody, except yourself |
| Structure | Independent structure of contractor organization | Duplicate system of contractor and client organization |
| Software | OPERA Project | Spider project and MS Project |

Trust in Norwegian project was important factor and part of MC, while in Ukrainian project there was no trust even within the project management team. Above mentioned factors and others, presented in empirical part, had influenced design of MCS and choices of MC tools, used for handling uncertainties in two projects under study. All four groups (levers) of MC were used by managers of Holmenkollen and Donbass Arena. Table 4.2 and 4.3 summarize the main groups of uncertainties related to the projects, their reasons and methods that project managers used for managing these uncertainties.

Table 4.2 Holmenkollen project: main empirical findings

| Sources of uncertainties – project’s characteristics | Most significant risks and uncertainties | Ways of handling uncertainties |
|--|---|--|
| <ul style="list-style-type: none"> - Tight schedule - Complexity of the project - Slow and complicated decision making process, especially on the earlier stages of the project - Construction standards and specific market situation - Impact of nature (force majeure) | <ul style="list-style-type: none"> - Uncertainties in estimates (first of all, in time and quality) - Costs overruns - Late decisions - Unstable environment of the project - Cultural differences and difficulties of work in the multinational teams - Relations with architectures | <p><i>Diagnostic system of MC:</i></p> <ul style="list-style-type: none"> - Budgets and performance measures; - Kick-off meetings, negotiations - Analytical tools (MS Access, Opera Project) - System of interdisciplinary checking - Performance matrixes <p><i>Beliefs system:</i></p> <ul style="list-style-type: none"> - Trust among project management team and to some contractors - Punishment and personal controls (if needed) - Stakeholders management - Use of experience, intuition and knowledge - Preset payments <p><i>Boundary system of MC:</i></p> <ul style="list-style-type: none"> - Compulsory reports/ Progression reports - Limits of responsibilities <p><i>Interactive system of MC:</i></p> <ul style="list-style-type: none"> - Finding “good enough decisions” - Proactive control and Quality control - Using help of external consultants |

Table 4.3 Donbass Arena project: main empirical findings

| Sources of uncertainties – project’s characteristics | Most significant risks and uncertainties | Ways of handling uncertainties |
|--|--|--|
| <ul style="list-style-type: none"> - Slow and complicated decision making process - Unstable Ukrainian law and business environment - “Weak” initiation and reduced planning stages of the project - Problems in Ukrainian mentality - Impact of nature (force majeure) | <ul style="list-style-type: none"> - Time and cost overruns and risk of getting the final results that do not meet customer requirements - Bureaucracy and corruption - Uncertainties in relations with general contractor - Relations with architectures - Cultural differences and difficulties of work in the multinational teams - Misunderstandings of the partners (“Lost in translation”) | <p><i>Diagnostic system of MC:</i></p> <ul style="list-style-type: none"> - Budgets and performance measures; - Kick-off meetings, every day negotiations - ICT tools (Spider project, MS Project) - Establishment of separate Analytical department - System of global monitoring <p><i>Belief system of MC:</i></p> <ul style="list-style-type: none"> - Use of personal experience, intuition and knowledge - Combination of financial and nonfinancial incentives - Individual-based rewards - Improvements in knowledge of new materials and in English <p><i>Boundary system of MC:</i></p> <ul style="list-style-type: none"> - Compulsory reports/ Progression reports - “Very thick” contact with contractor, including all responsibilities, requirements and so on - Limits of responsibilities <p><i>Interactive system of MC:</i></p> <ul style="list-style-type: none"> - Personal observation and controls - “Harmonization” of organizational structures of contractor and client - Department of quality (Men in “blue helmets” and Department of Technical Supervision) |

In this chapter I provided the answer on my research question about major uncertainties in relation to construction projects in Ukraine and Norway and the ways of managing them. What is interesting is that MCS, used for handling uncertainties in both projects differ not as much as it was expected.

V. ANALYSIS AND DISCUSSION

In this part I analyse main findings and provide answers to the questions about differences and similarities of MCS, being used to handle uncertainties in big construction projects in Norway and Ukraine.

5.1 Changing nature of the same big construction project in time: from “fog” to “numbers”

Big construction projects are not stable, they demonstrate continuous changes. Examples of big construction projects in Ukraine and Norway have shown that it was not easy to achieve a high level of accomplishment of earlier tasks in both projects. Moreover, these tasks were changed several times. High level of uncertainty arose due to many reasons: first of all, because of the complexity of projects tasks and complexity of the projects itself, and second – because of the changing environments of the projects. All my respondents made a joke that the most “stable” moment of the project was in uncertainty about finishing it in a line with a “project triangle” of scope, time and costs. All the time managers were confronted with problems related to deviations in the budget, delays in the schedule, or failures to comply with quality requirements, but the aim of the projects was continuing to be the same – to finish on time, within budget and in compliance with quality requirements. Therefore, both projects managers were in search for the “good enough decisions” concerning projects, i.e. correcting architectural plans, substitution of cheaper, but good enough materials used for construction, etc.

By changing nature of big construction projects in this context I mean that projects tend to evolve over time, therefore management control systems for dealing with uncertainties would be different on different stages of the PLC. Let’s get back to the investigated projects and the theoretical framework. Investigated projects have been changed over time. In the beginning they were not “painted by numbers”, as usual building projects. Instead, they were as “walking in the fog” (Frigenti & Comminos, 2002). In Norwegian case it happened because politicians could not agree what they want to do and how. And they were lacking knowledge of how to realize such big project in short time period. In Ukrainian case it happened because of the distinct design of responsibilities between the project parties. In this country Client does not prepare detailed description (specification) of what he wants to build. Architectures and designers take requests

and wishes from clients about the design of the project and implement it. There are small chances for architects for the first time to prepare a prototype, which will correspond to customer's wishes for 100%, therefore, architects often drew the client to the approval of the plan, and it takes time to have consistency regarding all the details.

Thus, it can be expected that big projects have comprehensive planning stage, where rational calculations, clear technical requirements, dividing responsibilities among project management team and other project parties, and many other actions should be provided. This is very challenging moment of unique construction project – to fulfil the planning stage successfully, or at least, “carefully enough” (using the words of project managers).



My first conclusion regarding the research will be the following: big international construction projects need transformation from the “fog” stage, when main stakeholders are not only unclear about how things need to be done, but are also not totally sure about what the end result should be, into “painting by numbers”, where stakeholders all know exactly what needs to be done, and how it needs to be done (Frigenti & Comminos, 2002). This task can be completed by the project manager, who is a strong leader of the team.

When the project becomes “painting by numbers” it is much easier to control it, predict possible problems and handle uncertainties. This conclusion brings us up to the next finding – importance of concretization of space and time within frames of MCS.

5.2 From “fog” to “numbers” through “time and space” of the project

The task – to transform a project into “painting by numbers” is, probably, one of the most challenging tasks of the manager of big construction project. Thus, administrating of “space and time” of projects could become a good approach in dealing with this problem (Smith & Fischbacher, 2009). Worth to notice that “space and time” approach is very topical not only in the management control literature. Project management researchers, particularly, in the sphere of risk and uncertainty management, also stress on the importance of projects to be resilient, at particular point in time and within particular contexts (Carpenter et al., 2001). It provides

ongoing protection to all threats and simply allows stability to be maintained in a changing environment (Smith & Fischbacher, 2009). Thus, I would argue that uncertainty management “cannot exist without the construction of a space within which time – as a one-dimensional decision parameter – can function”. Here, MCS provides some of the mechanisms which “seal off a production space, free it from external uncertainties and make it possible to manage by time alone” (Mouritsen & Bekke, 1999).

There are, probably, no other types of organizations that have such an importance and dependence on time, as construction projects, which I analyse in my work. Thus, concretization of project’s space and time is very important, because projects are unique and temporary, they could not be postponed, repeated or “rewritten” at any time. Thus, managers do not have chances to fail.

There is a common expression that “time is money”. In our case time is an execution cost driver and also a “strategic weapon”, which could be made to function as a managerial technology via management control. Management control tools, such as prescribed contracts with contractors and subcontractors (first of all suppliers of necessary details, materials, equipment, etc. for construction), personal controls and observations, which were used by project managers of projects under study, are good examples of ways to manage project’s “space”, i.e. to define the spheres of responsibilities and limits of liabilities of above mentioned project parties, since actions of suppliers could be very often uncertain, and could influence the project’s progression and results therefore. How it was shown in Holmenkollen case: the problems with supplier of steel from Poland.

Another important side of managing the project’s “space” is related to the distribution of tasks and delegation of responsibilities among the project management team. Every single part of the team should know exactly what are their tasks and responsibilities, and moreover, how these tasks could be achieved. Project managers, being interviewed by me, succeeded in defining tasks for their members by preparing matrixes of responsibilities, conducting kick-off meetings and negotiations, using informational analytical tools for monitoring project’s progressions and compulsory reports, which have shown to the managers, where their employees had failed while performing their primary tasks.



Managing “space” reduces uncertainties related to responsibilities of the project parties. It provides economy of resources, because managing space of the project “saves time” on project’s realization, and money correspondently.

5.3 Be ready to handle cultural differences while managing big construction projects

5.3.1 Context of management control of big construction projects

As we can see from the theory, all types of uncertainties are interconnected and mutually influenced. Having collected all the empirical data, I can say that in practice it is actually impossible to distinguish clearly different types of uncertainties, as they all are closely connected with each other. All situations and problems have its impact on all three highlighted types of uncertainties. That is the result of the complexity of the projects and their high costs that require consistent work from all parties of the project and throughout the whole duration of the project. Using theoretical approach by Miroschnik (2002) the environment of international projects consists of legal, cultural, economic and political basic elements, which influence the project (Fig. 5.1).

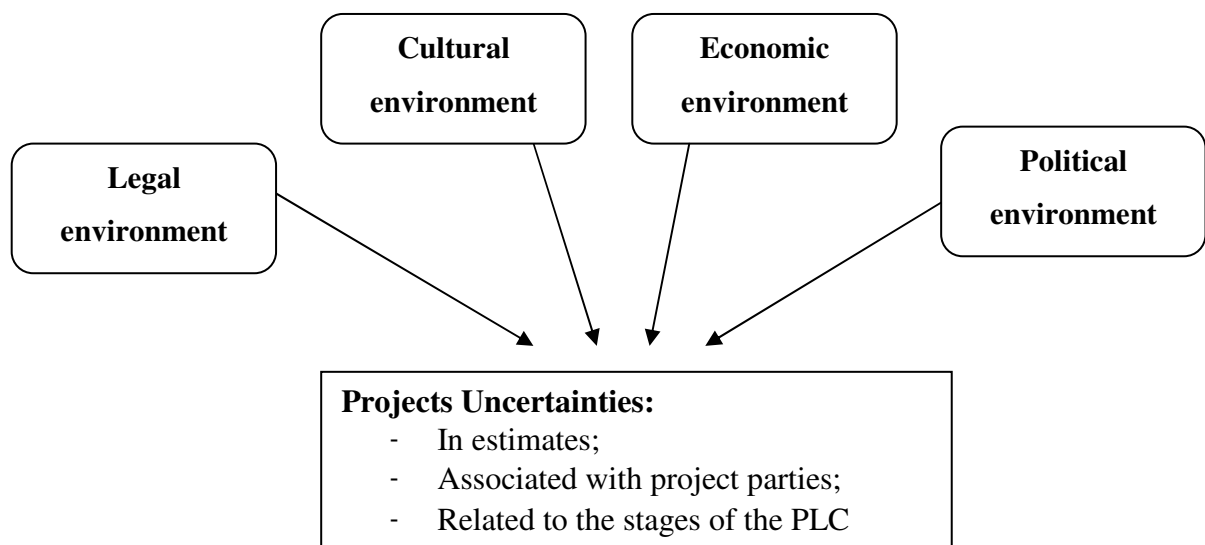


Fig. 5.1 Impact of environment on the project

However, some of factors of above mentioned environments become less influential due to several reasons. Country's economical factors of project's environment are not significant in international projects, because of the impact of "globalized" economy, which leads to the use of the same techniques and technologies in construction, same relations with international suppliers and other contractors, etc. Such basic elements of environment as legal, cultural and political factors are still in comparative importance.

Political environment, for example, was very influential in Ukraine, where international firms have faced a problem of bureaucracy and corruption, which I could say, became latent or implicit parts of Ukrainian business culture as well. Legal issues we could trace, for instance, in Norwegian legislation of closed tenders procedures for public sector enterprises (which caused additional uncertainties in relation to the project's contractors), while in Ukraine these procedures are opened. Other legal problems could be seen in the local building codes and building practices, which are not similar in different countries, as it was in Ukrainian case with Turkish and German contractors. As for the cultural environment, it has very significant influence upon the international construction projects, since together with the host-country's culture the project involve a lot of contractors from other foreign countries, which have their own cultures, languages, norms, values, motivations and many other factors.

The fact that construction projects are much influenced by international building and contracts practices, and other local rules and regulations and involve many people necessitates distinguishing between external and internal contexts within which big construction projects operate. Legal, political and economical factors become a part of external context of management control, as they require, e.g. standardized accounting reports and other procedures, which cannot be changes by willingness of the project managers. The impact of economical external context on MCS (or rather MCS design) is mainly a result of internationalization, world's construction regulation and public expectations. The latter includes also mass media, general public and other stakeholders' interests to such big projects. Meanwhile, cultural factors in this case obtain dual characteristics. Local cultures and local management practices in international construction projects meet many different cultures and business practices of their international partners. Internal context include MCS, structures and processes, used by project managers for managing projects uncertainties.

Modifying the figure by Mellemvik et al. (1988), we can design figure 5.2, which shows the MCS of the projects and its context. The culture is placed on the intersection of internal and external contexts due to their intertwined influence.

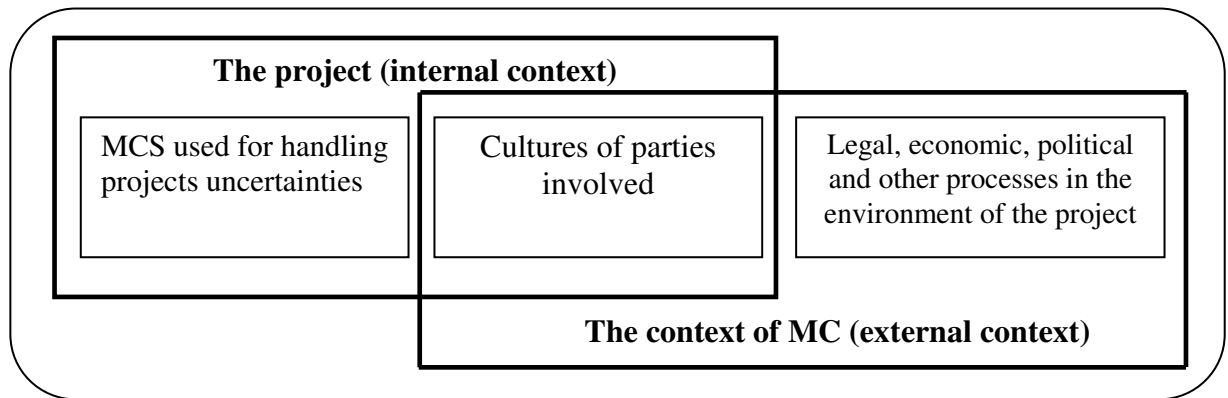


Fig. 5.2 Context of MC of the big construction project

Thus, important factor in this intersection is culture, which obtains its impact from both internal and external contexts. This inner part comprises also other MCS, structures and processes outlined by Mellemvik et al. (1988), but it must be noticed that they are also subjected to both internal and external contexts.

5.3.2 Uncertainties and sources of uncertainties: similar content – different reasons

In principle, many projects uncertainties can be removed in pre-execution stages by attempting to specify what is to be done, how, when, and by whom, at what cost (Chapman, 2003). In practice, significant amount of this uncertainty may remain unresolved through much of the PLC. Our projects faced uncertainty on the execution stage where there were some design changes. Thus, a widespread challenge in projects is to have the design and plan stages carefully enough to reduce further uncertainties related to the projects estimates, project parties and other stages of the PLC.

This problem is mostly significant when stakeholders are trying to oblige difficult for realization, practically unrealistic milestones dates and budget bounds (Atkinson, 2006). In both cases, project management teams were confronted with similar uncertainties, except of several factors, which are singularities of Ukrainian and Norwegian contexts, which are illustrated in Fig. 5.3.

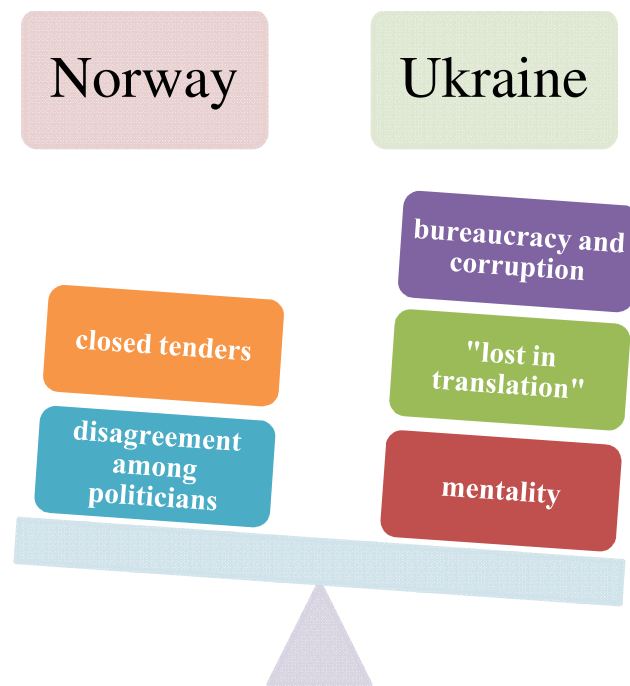


Fig. 5.3 Peculiar characteristics of projects under study in terms of sources of uncertainties

If we look more closely at these peculiar characteristics of projects under study, we could notice that almost all the problems were caused by cultural environment, except of closed tenders in Norwegian case, which were required by law. Other factors are completely related to the cultural environment. Let's give some explanations.

Ukrainian “cultural singularities” – are in bureaucracy and corruption (and mentality to some degree) and “lost in translation”, while communicating with major contractor. Bureaucracy and corruption as the obstacles of doing business in Ukraine are mentioned in almost all guides, which provide practical information for firms who are interested in Ukrainian market (Iermolenko & Kurtmollaiev, 2010). Thus, it is not a secret that companies have to be patient in dealing with Ukrainian authorities and all the time use help of native population, because they could explain the main rules of doing business in Ukraine. Exactly these methods were used in Ukrainian project of construction of Donbass Arena by Turkish contractor. Ukrainian mentality could be also added as one of the features of Donbass Arena projects, because some delays in the project's schedule were related to the neglecting of working rules by Ukrainian workers.

Next singularity of Ukrainian project is “lost in translation”. Ukrainians, in general, are not very good in English. Even the project managers could misunderstand their international partners.

Moreover, Turkish partners also used interpreters for communication with Ukrainian colleagues, thus it created uncertainty in making decisions about the project's future. Norwegian managers have also faced uncertainties in decision making, but it was caused by slow agreement among politicians. The reason of slow decision making could be seen – in Norwegian culture. Norway is egalitarian society, where every member has its own right and voice. While deciding about Holmenkollen project future, every member of Oslo Municipality has tried to include his/her own vision. Thus, projects under study had faced single uncertainty, which was on account of different reasons that came from the cultural environment.

Common uncertainties of projects investigated were related to the underestimation of costs analysis and detailed planning stages, some failures in relation to designers, contractors and sub-contractors. Impact of nature – force majeure was also considered as important factor of project's uncertainties, since construction was executed outdoors. The most influential problem of both projects was in cultural differences and difficulties of work in the multinational teams. Good knowledge in English did not help Norwegian managers to deal with their foreign partners, which were chosen after closed tenders. Norwegian managers defined closed tenders as one of the major sources of uncertainties of Holmenkollen project. I can consider it as a distinctive characteristic of Norwegian project that has led to the difficulties of work in multinational team.



Both construction projects had shown that cultural differences are very influential problems in international projects. This finding ends us up with conclusion that project managers have to be prepared to handle different cultures as well as other tasks of the projects.

5.4 Handling uncertainties in big construction projects

5.4.1 Importance of balancing between the levers of control

MCS used for managing uncertainties in both projects have been grouped in accordance to the Simon's model of levers of control, as it was shown in empirical part. Fig. 5.4 illustrated that all the levers were utilized in Norwegian Holmenkollen and Ukrainian Donbass Arena projects. In general, MCS of both projects are very similar. Diagnostic and interactive controls are almost identical. Belief systems are slightly different, since Ukrainian project managers in contrast to

Norwegian ones used both financial and nonfinancial incentives to build a MCS. There are some principal differences in balancing between boundary controls between two investigated projects. It happened due to some contextual factors, which I explain hereinafter.

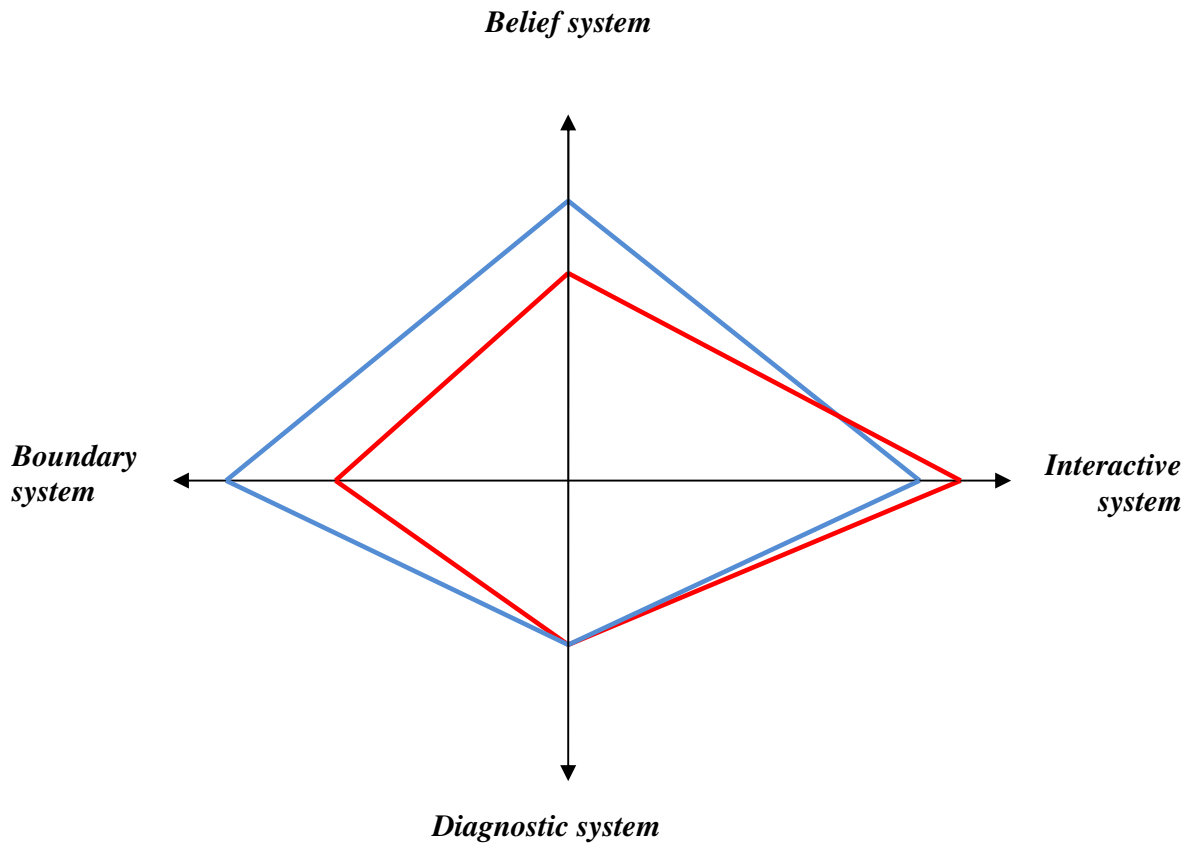


Fig. 5.4 Balancing between levers of control in two contexts

— Norway — Ukraine

Boundary control system – is wider and stronger in Ukrainian context because managers do not trust their colleagues and contractors, while Norwegian managers see the trust as important factor of MC, at least among team members. That is why Ukrainian managers tried to provide more boundaries and limits of freedom of their employees. They did not want to put all responsibilities regarding the project on their contractor from Turkey. The reason of distrust lies in Ukrainian culture and mentality, which have been originated in the Soviet times. Another important moment is that it is very common practice in Ukraine to use “carrot and stick” type of motivation. That is why boundary controls are broader, as well as a belief system. *Belief control system* in Ukraine – is wider than in Norwegian project. Managers of Donbass Arena used a

combination of financial and nonfinancial incentives, while Norwegians mostly used nonfinancial incentives, and preset payment for work. They tried to build an atmosphere of “doing something big and important”. However, all Holmenkollen respondents considered that this system needs some improvements: first of all strengthen in terms of some “bonuses” system. Therefore, I will consider that belief system was a bit stronger in Ukrainian project.

As for *diagnostic systems* of the projects, they are almost identical. Both projects used budgets and performance measures, kick-off meetings, negotiations, ICT tools, etc. The difference was in frequency of the diagnostic actions. Ukrainian managers tried to do it every day, but Norwegians were more “advanced” and gave more freedom to their subordinates, and consequently provided less controls (e.g. once a week, once a month). Budgets in both MCS were considered as important, but in both cases these budgets were not met, thus they were corrected over time. As for the ICT tools, both project management teams used local versions of MS Project (Opera Project and Spider Project – in Norway and Ukraine respectively).

There are some differences in *interactive control systems* of the projects, as it is shown in the Figure 5.4. Norwegian interactive system (formally) is broader than Ukrainian one, first of all because of the use of external consultants’ help while making plans for the future. Consultants did both qualitative and quantitative research and prepared comprehensive analysis and reports concerning project’s progression. There were no such official agreements between Donbass Arena and other external consultants from the very beginning, as it was in Norwegian project. Analytical department was mainly responsible for gathering information and making reports for the project manager and director. However, in reality managers of Donbass Arena during execution resorted to external specialists, first of all to Ukrainian research institutes and other project managers all over the world, which had practice in managing of construction of other stadiums (Portugal, Germany, Holland, China, etc.). My respondents agreed in their interviews, that use of external consultants was absolutely necessary. As for similarities, both projects utilized personal observations and controls. Departments of quality were also established and provided quality controls and testing of materials, equipment, results of construction, etc.



It is important to use all the levers of control for handling uncertainties of the projects: belief, boundary, interactive and diagnostic controls. The combination of these controls would depend upon the context of MC or projects environment.

5.4.2 Uncertainty management scheme

Based on empirical and theoretical material I can figure out the scheme that project managers could use for managing uncertainties in big projects (Fig. 5.5).

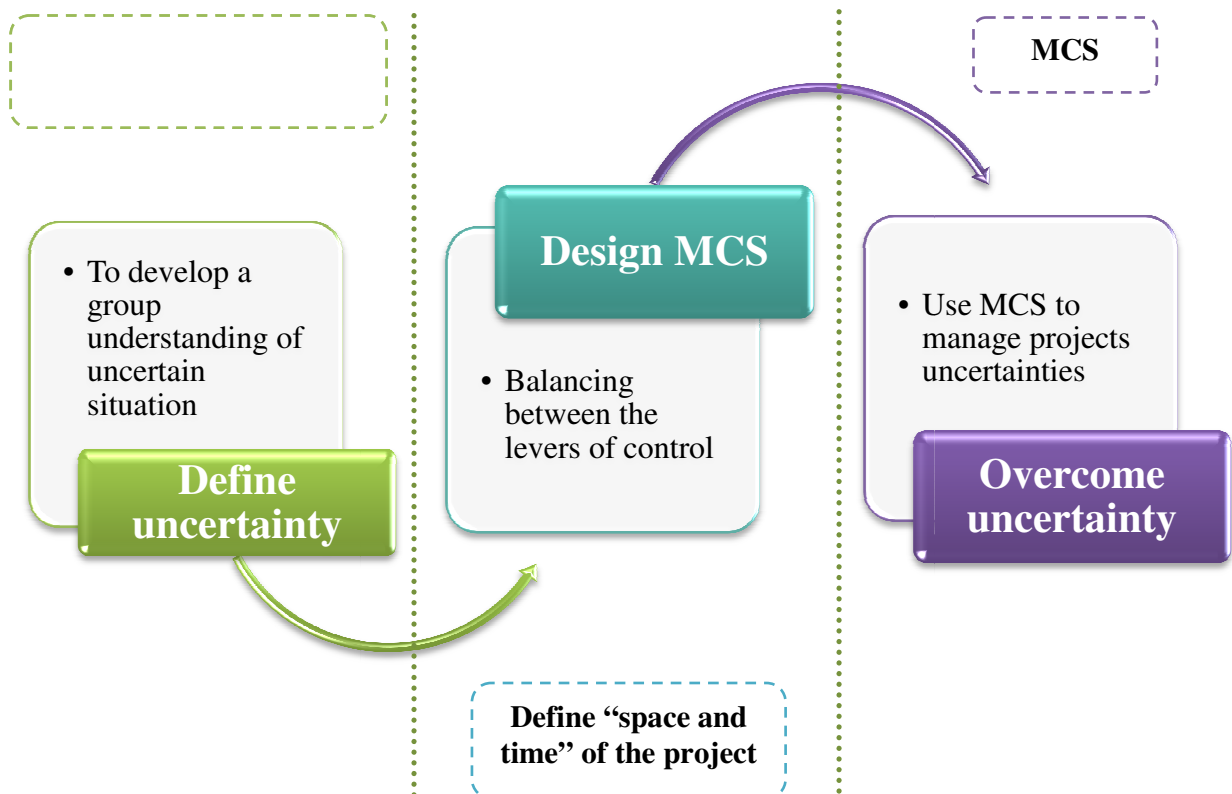


Fig. 5.5 Uncertainty management in the big construction projects

First step in overcoming uncertainties is defining uncertain situation and transforming it from the stage “walking in the fog” to “painting by numbers” by using a combination of external help, personal knowledge, experience and intuition¹⁴. After those actions it is important to specify the “space and time” of the project and to design MCS, balancing different levers of control: belief, boundary, interactive and diagnostic. The last step in this process is implementing decisions based on the information obtained from the MCS. This action might help to overcome initial uncertainty.

¹⁴ All respondents named intuition or “God feeling” as one of the tools they used for making decisions and MC

5.5 Few differences in MCS in handling uncertainties of big construction projects in Ukraine and Norway (impact of globalization and internationalization?)

In the beginning of Thesis, I have made an assumption based on the theory (Mellempvik et al., 1988; Scott, 2008; Peters, 2005; Miroshnik, 2002, etc.), that two investigated projects would have contrasting managerial practices regarding handling uncertainties in big construction projects. It happens because of the differences in both – external and internal environments of the projects. According to the researchers in this field, different contexts would lead to different taken-for-granted regularities of managers' behaviour. I supposed that strategies, structures and technologies which could be appropriate in one country may lead to failures in another (Miroshnik, 2002), and even if the projects face the same groups of uncertainties, managers would cope with it differently.

Countries of interest really have different institutional environments. They use different construction norms and rely on different business practices. Examining the MCS in Norwegian and Ukrainian projects, described in the previous chapter, I have obtained interesting results which are contrary to the expectations and assumptions of the theoretical framework.

I have found out, that managers of big international projects in Ukraine and Norway handled uncertainties using almost the same MC tools. This surprising finding could be explained by the fact that projects under study are international. Both Norwegian and Ukrainian projects involved contractors and subcontractors from different countries, for instance architectures of both projects were foreign companies. Internationalization and globalization harmonize the contexts, in which big international projects realize. There are, of course, some differences in external and internal contexts of the projects, which determine sources of uncertainties, since countries have different cultures, legislation, mentality, etc.



Thus, internationalization and globalization of economy seem to have impact construction industry, and the choice of tools and MCS used for handling uncertainties in international construction projects.

VI. CONCLUSION, CONTRIBUTIONS AND IMPLICATIONS

6.1 Summary of the study

This research has studied how uncertainties are being understood and managed in big construction projects in different contexts. It was carried out gradually, step-by-step. First, I have analyzed important concepts and components that underpin the relevant theory to the problem statement. I described main groups of uncertainties related to the big construction projects, and then applied MC theories in order to understand how these uncertainties could be managed in different contexts from the theoretical perspective. Empirical data, consisting of two cases, present major uncertainties and the ways how they were managed in relation to construction projects in Ukraine and Norway. An interesting and unexpected moment of my research – is in empirical findings. Examining the MCS in Norwegian and Ukrainian projects, I have obtained interesting results which are contrary to the expectations and assumptions of the theoretical framework.

On the question: *“Are there big differences in management control in construction projects in Norway and Ukraine?”* I could give the answer now: *“Yes, there are some, but probably not as dramatic as it was expected!”* I attribute this to the fact that globalization and internationalization affect the construction industry, as well as other spheres of economy. However, I defined some differences in external and internal contexts of the projects.

Analysis of differences and similarities between MCS in handling uncertainties in construction projects in Norway and Ukraine, have led me to the following conclusions:

- ✓ Big international construction projects need transformation from the “fog” stage, when main stakeholders are not only unclear about how things need to be done, but are also not totally sure about what the end result should be, into “painting by numbers”, where stakeholders all know exactly what needs to be done, and how it needs to be done;
- ✓ Transforming a project into “painting by numbers” could be done using the “space and time” approach. Managing “space” reduces uncertainties related to the responsibilities of the project parties. It “saves time” on project’s realization and money correspondently.

- ✓ Cultural differences are very influential problems in international projects. Thus, project managers have to be prepared to handle different cultures as well as other tasks of the projects;
- ✓ Internationalization and globalization of economy seem to have impacted construction industry, and the choice of tools and MCS used for handling uncertainties in international construction projects;
- ✓ It is important to use all the levers of control for handling uncertainties of the project: belief, boundary, interactive and diagnostic controls.

Based on the above mentioned findings it is possible to figure out the simplified scheme of overcoming uncertainties in big construction projects: first – it is important to define uncertain situation and transform it from the stage “fog” to “painting by numbers” by using a combination of external help, personal knowledge, experience and intuition. After those actions – specify the “space and time” of the project and to design MCS, balancing different levers of control: belief, boundary, interactive and diagnostic. The last step in this process is implementing decisions based on the information obtained from the MCS. Worth to notice, that big construction projects need experienced project manager, who could take a role of a strong leader of the team.

6.2 Contributions

I believe that my research have its theoretical and practical contribution, and the main research findings could be valuable for other researchers in the same particular field, as well as for practitioners, who involved in management of international construction projects. Results of the current research may be presented at the network meeting of the Norwegian-Ukrainian Chamber of Commerce (Oslo), and latter could be used by the Ukrainian, Norwegian or other companies from the different countries which are thinking about collaboration.

The research reported here makes a contribution to management control literature in different ways. First, I analysed main groups of uncertainties related to the big construction projects, using project management literature, and then applied management control theories in order to understand how these uncertainties could be managed in different contexts from the theoretical perspective. Thus, I combined two theoretical perspectives: of management control and project

management for analysing one problem. I have found some parallels in management control and project management literature concerned the concept of “space and time” of the projects.

Second, I have shown how the framework, elaborated by Simons, may fruitfully be applied to big construction project. This is relevant in light of the debate on the usefulness of Simons’ framework beyond the scope of literature in MC (Grandori & Furnari, 2008).

I want to add also that the study of managing uncertainties in big construction projects is in the line of the most topical themes for research nowadays. According to Berry et al. (2009) concept of uncertainties (risks) and culture in MC are emerging themes in management control literature. The theoretical roots of this management control research are multiple, but with most studies still in the functionalist and positivist traditions, thus it seems essential that more emphasis should be placed on the study of real control systems as they operate in practice, especially design and use of MCS (Berry et al., 2009).

6.3 Limitation of the research

The notion of management control in the project management is rather broad and it is impossible to be studied from all the perspectives in the Master Thesis. Hence, to avoid some potential misunderstandings and to outline where the study is supposed to create value I have to define the following limitation of the research:

- I concentrate my efforts on study of the MCS in the big construction projects in Ukraine and Norway. Due to the time, financial constrains and rare nature of such big construction projects I study one project from the side of Norway and one construction project from the side of Ukraine.
- I studied MCS from the managerial perspective.

6.4 Research opportunities and further disposition of the thesis

Management control continues to be a fertile field of research development (Otley et al., 1995). Berry et al. (2009) point out that there has been relatively little research on control and uncertainties and upon management control and culture. Thus, it proves the fact that the topic of my research is relevant, topical, interesting from the theoretical and practical perspective and definitely needs further research.

To the better comprehend of the topic it seems to be logical to observe some other contexts, except of Norwegian and Ukrainian, and to investigate other big construction projects, for example, in China, USA, and Germany, and to try to determine some kind of trends, depending on characteristics of intended conditions. Thus, more empirical studies investigating management control systems in international construction projects are needed. Much more case research is necessary to yield insights into how organizations can develop effective rules and procedures to manage uncertainties related to the project parties, project estimates and uncertainties associated with different stages of the PLC.

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VIII. APPENDIXES

Appendix A: Classification of the projects

| Criteria | Type of the project |
|--|---|
| <i>Purpose of the project</i> | <ul style="list-style-type: none"> - <i>Commercial</i> (the ultimate goal is getting profit) - <i>Non-commercial</i> (the goal is achievement of social effect) |
| <i>By industry sector</i> | <ul style="list-style-type: none"> - Industrial - Construction - Transport - Educational - Trading - Complex |
| <i>Size</i> | <ul style="list-style-type: none"> - Small (Less than \$10 mln / Men-hours < 40-50 thousands); - Medium (\$10-50 mln); - Big (\$50 -100 mln); - Huge (More than \$100 mln/ Men-hours > 20 mln) |
| <i>Execution time</i> | <ul style="list-style-type: none"> - Short-term (< 3 years) - Medium-term (3-5 years) - Long-term (> 5 years) |
| <i>By function</i> | <ul style="list-style-type: none"> - Manufacturing - Technological - Financial - R&D/ Marketing - HR - management - Combined |
| <i>By degree of difficulty</i> | <ul style="list-style-type: none"> - <i>Mono-projects</i> (simple separate projects) - <i>Multi-projects</i> (complex projects, consisting of a series of mono – projects and requiring a multifaceted PM) - <i>Megaprojects</i> (> \$1 billion, 5-7 years; target-oriented programs for the development of regions, sectors, comprising a number of mono-and multi-projects) |
| <i>By nature of the parties involved</i> | <ul style="list-style-type: none"> - International (cooperation with organizations (World Bank, UNIDO), or foreign countries) - National, interregional (development of national economy) - Regional (projects of regional significance) - Local (projects of local economic development) - Sectoral (projects, covering the interests of one sector) - Official / departmental (projects implemented within a single agency) - Corporate (projects aimed at achieving the corporate effect) - Projects of a single enterprise (Various projects undertaken by one enterprise). |

Source: developed by author

Appendix B: The efficiency of methods used in the process of stakeholder engagement

| Purposes | Methods |
|---|---|
| <i>Identifying stakeholders</i> | 1.1 Personal past experience |
| | 1.2 Asking the obvious/identified stakeholders to identify others |
| | 1.3 Guidelines from governments or one's own organization |
| | 1.4 Professional services |
| | 1.5 Being directed by a superior |
| <i>Gathering information from stakeholder</i> | 2.1 Focus group meeting |
| | 2.2 Personal past experience |
| | 2.3 Interviews |
| | 2.4 Public consultation |
| | 2.5 Formal memos |
| | 2.6 Questionnaires |
| <i>Estimating stakeholders</i> | 3.1 Personal past experience |
| | 3.2 Workshops |
| | 3.3 Interviews |
| | 3.4 Public engagement approaches |
| | 3.5 Surveys |
| <i>Making decisions</i> | 4.1 Meetings |
| | 4.2 Negotiations |
| | 4.3 Social contracts |
| | 4.4 Guidelines |
| | 4.5 Appealing to Executive Council |
| <i>Implementing decisions</i> | 5.1 Meetings |
| | 5.2 Workshops |
| | 5.3 Negotiations |
| | 5.4 Interviews |
| | 5.5 Social contracts |
| | 5.6 Public engagement approaches |
| | 5.7 Surveys |

Source: adapted from Yang et al. (2010)

Appendix C: Interview Guides

Interview Guide in English

The purpose of this interview is to discuss critical matters of management control in the big construction project. Answers will be used for writing a Master Theses.

Thank you for your attention!

1. What are the main peculiarities of being a manager of a big project? Could you specify some typical challenges you could face with during realization of the big construction project?
2. Which standards did you use in your work? Are they local or global? Could you, please, name some of them?
3. How could you describe, in few words, the environment of the project (relationship with local authorities, government, suppliers and other stakeholders)? Did you have some kind of stakeholders' management?
4. What management control tools did you use during the project life cycle (PLC), e.g. SWOT analysis, matrix of responsibilities, etc.? Did you use different tools during the different project's phases (initiation, planning, organizing, control and monitoring, closing the project)? Could you please give some examples?
5. What were the most important sources of uncertainty in your construction project? Could you please give some examples?
6. How did you manage these uncertainties? Did you use analytical techniques? Or did you prefer to use your intuition and qualitative judgments when making decisions? Maybe you applied something else? What exactly and how?
7. How information was gathered and used for making decisions? How did you monitor risks? How did you evaluate information and decisions? Why did you use these techniques?
8. Could you briefly describe the system of management control used during the project (for instance month plans, weekly reports, meetings, etc.)?
9. Were there any situations where you have found out the divergence of the results achieved with the results planned during the realization of the project (e.g. deviations of the budget, quality, time, etc.)? How did you overcome it?
10. Does experience from being a manager of another big construction project help to take into account all the uncertainties and improve projects disputable decisions? Is it important to have personal contacts (e.g. with suppliers, authorities) for realization such a big project?

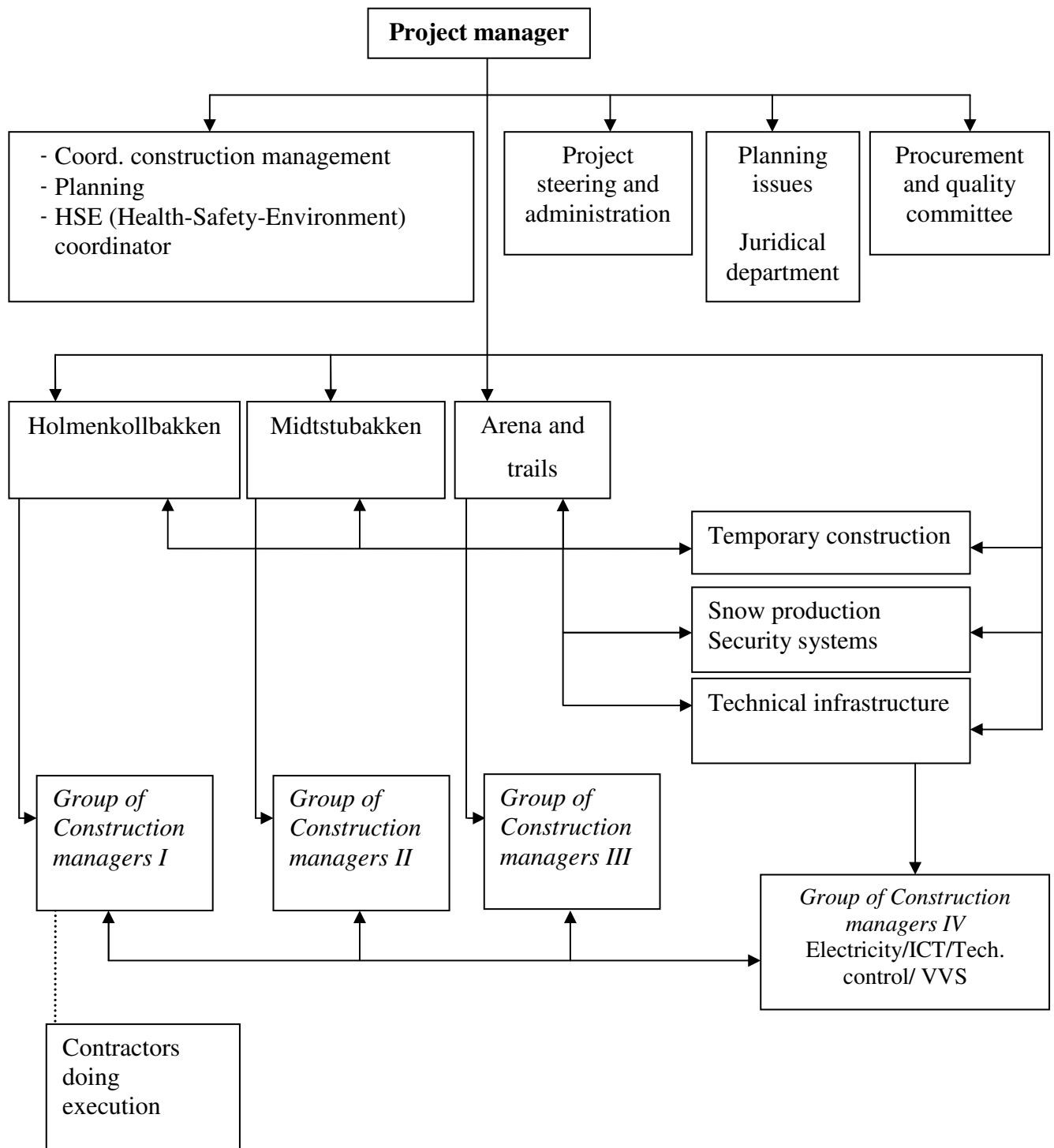
Вопросы для обсуждения на русском языке

Цель этого интервью – обсудить особенности управления крупным строительным проектом в Украине. Результаты обсуждения будут использованы для написания магистерского исследования.

Спасибо за Ваше внимание!

1. В чем заключаются особенности управления большим проектом? Назовите, пожалуйста, несколько «типичных» проблем, с которыми может столкнуться менеджер в ходе реализации крупного строительного проекта?
2. Какие стандарты были использованы при строительстве «Донбасс Арены» (международные, национальные)?
3. Как бы Вы могли описать окружение проекта (отношения с местными властями, инвесторами, правительством, поставщиками, подрядчиками и др. заинтересованными сторонами)? Есть ли у Вас специальный план по управлению взаимоотношениями со скейхолдерами?
4. Какие инструменты управленческого контроля Вы использовали при реализации проекта (например, SWOT-анализ, матрица ответственности и т.д.)? Использовали ли Вы различные методы и инструменты на разных этапах жизненного цикла проекта (инициации, планирования, организации, контроля и мониторинга, закрытия проекта)? Если да, то укажите, пожалуйста, какие именно.
5. Назовите, пожалуйста, наиболее важные источники рисков и неопределенностей в строительном проекте? Как Вам удалось преодолеть их? Использовали ли Вы аналитические методы (например, NPV), программное обеспечение? Или же в большинстве случаев вы предпочли полагаться на свою интуицию и качественные суждения при принятии решений?
6. Каким образом вы отслеживали информацию, необходимую для принятия решений? Как оценивается информация и сами решения? Почему вы используете именно эти методы?
7. Как выглядела система управленческого контроля, которую Вы использовали в ходе реализации проекта (например, месячные планы, еженедельные отчеты, совещания и т.д.)?
8. Сталкивались ли Вы с ситуациями, которые характеризовались расхождением достигнутых результатов с запланированными (например, отклонения по бюджету, качеству, времени и т.д.)? Как вы эти ситуации преодолели?
9. Как Вы думаете, опыт работы с другим большим строительным проектом помогает учесть все риски и неопределенности, возникающие в ходе реализации проекта?
10. Важно ли иметь личные контакты (например, с поставщиками, органами власти) в Украине для успешной реализации проектов такого масштаба, как строительство «Донбасс Арены»?

Appendix D: Structure of the project management team of Holmenkollen project



Source: developed by author