Erick Paul Beltran Canepa

Master's thesis

New ways of working and their impact on future physical work spaces

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Centre for Real Estate and Facilities Management

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ERICK PAUL BELTRAN CANEPA

Faglærer/veileder:

SIRI HUNNES BLAKSTAD

Eventuelle eksterne faglige kontakter/veiledere:

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This master's thesis aims to suggest the ways in which people will work in the future and how organizations can develop their physical spaces to support and adapt to their employees' future ways of working.

The study hypothesizes that employees' ways of working will be greatly affected by information technology, primarily tools that will allow them to communicate and collaborate both across the hall and across the globe.

The question is: By 2022, what will the physical elements of the workplace be like in an organization with global presence? To answer this question, the study used three qualitative research methods: literature review, scenario planning and case study.

The scope of the research study was limited to Statoil, a Norwegian oil and gas company with global presence. The use of Statoil corporate scenarios enabled the study to suggest Statoil's future ways of working, but limited the results' validity to this organization, without the ability to generalize.

Among the findings is the fact that the workplace consists of social, virtual and physical spaces, which are dependent on one another. Employees will probably work in different places - office buildings, satellite offices, their homes, cafes - depending on their needs and preferences. As such, office buildings will be more social hubs, because despite the advances in virtual communication, physical interaction will still matter.

A case study shows that Statoil could arrange physical spaces to best support existing work practices by providing these facilities: privacy rooms, team arenas, interplay rooms, study rooms and playstation areas.

The research recommends that in order to increase collaborative capabilities in the future, Statoil should design more collaborative work spaces to support new ways of working.

Rather than requiring employees to adapt to the physical space, organizations should take a more holistic approach to office space design so that it easily adapts to employees' future ways of working.

Stikkord:

1. WORKPLACE
2. NEW WAYS OF WORKING
3. SCENARIO PLANNING
4. STATOIL

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(sign.)

Preface

This report is part of the final examination of the master's degree program in Real Estate and Facilities Management at the Norwegian University of Science and Technology (NTNU). Because the field of study covers several disciplines, the program is offered in cooperation between the Faculty of Architecture and Fine Art, and the Faculty of Engineering Science and Technology. This master thesis represents 30 credits of the total 90 credits of this master's degree program.

The completion of this research study has been done in addition to the duties and responsibilities related to the job position Business Developer Facilities Management in Statoil ASA.

The work done in this master thesis was carried out in the period from September 2010 to May 2011, but the project work was initiated previously as part of a research design project created in the Scientific Methods course during the spring of 2010.

This master thesis highlights the relevance of future ways of working and their impact in the planning and design of office work spaces. By using scenarios and based on some assumptions, the research study reveals the ways people could work in the future. Furthermore, a description of an idea of the work spaces that possibly will support these new ways of working is presented by using a case study.

The motivation to work on this research study originated after becoming involved in a corporate initiative intended to drive new ways of working in Statoil. This initiative permitted me to recognize the potential and possibilities that it could have in the development of Statoil's future workplace and its consequences for the Real Estate portfolio of the company.

The work done in relation to this research study has contributed to understanding the complexity of the issues related to the development of the workplace, as well as the dependencies of the elements that constitute it.

I declare that this is an independent work according to the examination regulations at the Norwegian University of Science and Technology.

Trondheim, June 2011

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Erick Paul Beltran Canepa

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Finally, I want to thank Jan Petter for his patience, support and understanding all these years.

Summary and conclusions

In order to respond to increasing needs for collaboration in a globalized world and challenging business environment, organizations are working to identify the practices and tools that can better support them in the execution of their tasks and work processes. As technological developments and new IT solutions penetrate people's daily lives rapidly, and the level of adoption of these solutions increases, the impact on the ways people communicate and connect will continue to change their ways of working during the coming years. To understand what these work practices will be like, leaders of organizations need a view of the way people will work in the future.

The purpose of this master's thesis is to suggest people's ways of working in the future and the impact these new work practices will make on physical work spaces.

The hypothesis of this study suggests that the development of new technologies and new collaborative tools will affect the ways we work and create new opportunities for workplace solutions. As new IT solutions are developed and adopted, it will be possible to find new types of work spaces in the future. The research question to be answered in this study is: By 2022, what will the physical elements of the workplace be like in an organization with global presence?

Three qualitative methods are utilized to approach the research question: literature review, scenario planning and case study. Due to the researcher's active involvement with the development of the phenomena being studied, this research project can be classified as an action research study. This research is carried out within a specific frame limited by the use of scenarios and a case study based on Statoil, a Norwegian oil and gas company with global presence. The researcher is aware of the limitations that this issue can cause in generalizing the results and conclusions obtained in this study. Scenario planning methodology is utilized to describe how current workplace trends can evolve under different future settings and identify the possible outcomes and implications of these trends. Among these trends are: the importance of new workplaces and community development; the dependency on collaboration technologies and social networks; an increased demand for greater social responsibility; and more sourcing oriented organizations.

Based on the problem definition, hypothesis and research question, the following are the key findings of this study:

A workplace consists of three spaces or dimensions that enable work to be done. These spaces are the social, the virtual, and the physical. The spaces adapt to one another over time, and the workplace develops through the interaction among these spaces. The process needed to create

new workplace solutions that enable organizations to adapt and improve their ways of working is presented in this report as Workplace Development.

A framework to analyze work and Statoil's corporate scenarios bring together workplace trends to suggest three different ways of working for Statoil in the future:

Way of Working 1, characterized by an individual way to execute tasks, a diverse, global and mobile workforce with a high degree of adoption and utilization of new technologies.

Way of Working 2, characterized by the collaborative nature of doing things. Focus on sustainability issues reinforces the reduction of travel. However, to support a global workforce, collaboration technologies support knowledge-sharing and access to competencies in different parts of the world.

Way of Working 3, characterized by the need to communicate and connect people present at the same physical location, but also virtually using new collaboration technologies. The idea of a global and mobile workforce is not present because travel is restricted.

Based on these new ways of working, it is possible to assert that more flexible and distributed workplaces will appear in the future. People will work in different spaces, making choices about their workplace depending on their specific needs and preferences, which will be changing continuously.

The vision of Statoil's future workplace points to future ways of working that are different from the current ones: A greater share of employees will be members of geographically distributed teams; will divide their time among the office, home, co-working centers and working anytime and anywhere. It is possible to affirm then that less office space in form of corporate buildings will be needed, but because physical interaction between individuals will still matter, corporate office buildings will become more social hubs -- where people meet and socialize – rather than places where they go to just work.

To validate the results of this research, a case study is carried out using one of Statoil's current building projects. The case study shows how Statoil has approached the challenge of developing new office spaces and the context in which this is happening. The following ways of working were developed by the project responsible for the construction of the building after analyzing business needs, and based on the idea that business value is created through collaboration: administrative work, concentrated work, informal dialogue, workshop, information meeting, confidential meeting, and other type of work not related to projects.

Based on these work practices, five types of rooms were defined under the categories work and meeting spaces, in addition to the support rooms. The main office spaces for Statoil's future building at Fornebu are: ***privacy room, team arenas, interplay room, study room, playstation area***.

The following are the conclusions in this research study. These are presented using the same framework utilized to analyze work: what is done, who does it, how it is done, and where and when.

What is done

Future work practices and people's ways of working will be different from the ones that exist today. Individual and collaborative work will be supported by new tools, and new work practices will appear based on those tools, creating the need for new workplace solutions located in different places. This corroborates the hypothesis of this research. However, the case study presented in this report has neither evidence of collaborative ways of working happening in the future across geographic borders, nor reference to individual or collaborative work outside the office building presented in this case.

Who does it

The future challenges that global companies are facing related to access to competent resources in different parts of the world, and the need for collaborative tools that enable access to those competencies and allow companywide knowledge-sharing, are increasing. The study shows that these challenges will become a characteristic of the future ways of working. On the other hand, the placement of employees in the office building used in the case study has been done using a traditional approach; employees moving to the new office building are going to be placed according to their organizational membership. This is going to enable collaboration *within* their organizational units. In order to support knowledge-sharing and collaboration *across* organizational units, efforts should also be made to place employees according to their ways of working, discipline or roles, independent of their place in the organizational chart.

How it is done

There is no doubt about the relevance of technology and IT tools in future ways of working. The case study reveals how new AV/IT tools are put in place in a pilot project to support more collaborative ways of working in a new office building. It seems that there has been more focus on the IT solutions than the tasks that need to be supported by these tools. There is a gap between the idea of Statoil's ways of working defined by the project and the IT/AV solutions put in place in the pilot area. These IT solutions are tools supporting *future* ways of working and not the *current* ways of working defined by the construction building project.
In the future, it could be an advantage to assess and understand *new* ways of working *before* executing the processes related to choosing a specific IT solution or office space design.

Where and when

In the future, people will still need a physical room to execute their work tasks. But the physical space needed will not be restricted only to the space located in corporate office

buildings. The study shows how a mobile workforce will require Real Estate & Facilities Management units to adapt their real estate portfolios and find the balance between the number of workstations for co-located workers and those who work outside the office, from home or any other place using virtual environments. As people adopt more flexible ways of working, the *flexibility of workplaces* will become an issue leaders in Statoil will need to address. The more mobile and distributed nature of future workers will increase the need to adapt existing workplace solutions according to their needs. Workplace flexibility can be enabled by utilizing new IT tools and/or by designing new types of office spaces. But the importance of corporate policies and standards should not be underestimated: These policies and standards should be reviewed and eventually changed in order to adapt existing workplace solutions to the new realities created by new ways of working.

The research study recommends that Statoil establish a Workplace Development unit composed of a permanent, cross-functional group of experts from corporate staff functions that will be responsible for defining alternative workplace solutions based on future ways of working of the different business areas in Statoil and their business needs. This Workplace Development unit would also coordinate the efforts of each support function regarding future workplace developments; anchor proposals for changes with corporate management; ensure their implementation; and communicate change to the rest of the organization. Due to the focus and priority collaboration has in the company, it is also proposed that the unit responsible for Corporate Real Estate and Facility Management designs and shapes more *collaborative office work spaces* to support the collaborative ways of working in Statoil, and in close cooperation with other support functions and business areas.

Further research could embrace an analysis of future ways of working in other companies with global presence using the same or a similar methodology utilized in this report. It could be interesting also to compare the type of work spaces those studies could recommend as future office work spaces.

Another topic of study could be an analysis of the organizational change processes employed by other organizations when dealing with the implementation of alternative workplace strategies and the way those companies measure the added value of the impact those strategies have on physical spaces.

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1 Introduction

The purpose of this chapter is to introduce the topic of this master's thesis report: to understand how new ways of working are going to make an impact on the future workplace.

To gain insight into the subject of this study, the chapter begins with a description of the background and purpose of this research. After this description, the problem for discussion will be presented, including its limitations.

Additionally, the hypothesis and research question will be presented along with a short explanation about how this research study was approached.

1.1 Background

During recent years, companies around the world have met a challenging, highly unpredictable and complex business environment. To adapt to these challenges, businesses have increased the focus on flexibility and striven for simplification of their activities. Efforts have also been made to support the execution of tasks and work processes with new and more sophisticated information technology (IT) solutions.

It is indisputable the role and relevance technology has had in supporting business needs until now. New technology trends have continuously been developed and more innovative IT solutions have been implemented to support the different ways people work.

However, the place where people work is constituted not only by technology. Despite the impact IT solutions have had in increasing business efficiency, it is still necessary to have a look at other factors and trends that are making an impact on the ways we work, and the ones that are shaping the future workplace today.

Office areas have been during the last years indispensable in ensuring employees the ability to perform and execute their tasks in a proper way. Companies facing growth and expansion in their business activities have increased the need to acquire new office buildings and spaces. This task has particularly become challenging when this expansion has happened internationally due to globalization processes.

On the other hand, those companies facing decline in their business activities have been obligated to find effective ways to dispose office buildings in their real estate portfolios to adapt to new organizational needs. These companies have been forced to find ways to adjust real estate portfolios and reduce vacancy rates according to the existing office space requirements by using different methods and management tools.

Flexibility and efficiency have become principles used by many organizations in their real estate strategies for dealing with these changes and fluctuations in a flexible manner. Flexibility and efficiency contribute to improvements in the financial performance of these organizations: The less capital is tied up in the form of an asset - such as an office building - the more the flexibility companies have to use their financial resources, managing working capital in a better way and thereby increasing the efficiency of their primary work processes.

To be in accordance with overall business and real estate strategies, the aim of workplace design has been to facilitate the creation of workplace concepts that, among other things, support organizations' work processes, promote collaboration and contribute to higher efficiency levels. Based on these concepts, new office solutions, such as open-plan offices, have been implemented. Many organizations have followed this trend and imitated this workplace solution to achieve flexibility and efficiency at work.

Workplace solutions must support work processes, activities and tasks employees in an organization execute on a day-to-day basis. However, it is interesting to observe how many companies have tried to standardize workplace solutions without taking into consideration the tasks that are executed by an individual or a group of employees. The "one size fits all" way of thinking, used to approach the complex nature of the workplace, encompasses some risks.

Current workplace trends and innovation in technology are pointing to a different future. The focus of workplace design has traditionally been on the architectural aspects of it, but the interaction among members of an organization also takes place outside the physical working space, which is usually located in an office building. The diverse nature of the work tasks, based on changing business needs, makes the idea of a common workplace solution an option destined to fail because of its lack of flexibility and capacity to adapt.

Predicting the future is a task with a high degree of complexity and uncertainty. Even so, the trends already taking place today suggest a future different from the present. If leaders recognize this fact and decide to believe in some key characteristics of the future workplace, companies will be able to set a direction and shape it. In course of action they will need to watch the development in trends and understand how their organizations should react and adapt to them (Weiseth & Beltran, 2010).

Many organizations have already started working on issues related to the future workplace and improvements on collaboration capabilities. The Norwegian-based global telecommunication company Telenor has worked with a project called Way of Working (Telenor ASA, 2006), intended to find new ways of work and improve the virtual environment of the company.

The American Microsoft Corporation has developed in The Netherlands a methodology called IMPACT (van der Bie, 2010a), which is utilized to define the effects technology has in an organization's ways of work, considering three elements: people, places and technology.

Royal Dutch Shell initiated a corporate program in 2009 in order to improve its ways of work. The program was called Shell Works and utilized the processes associated with moving to new office buildings as a catalyzer for implementing new ways of work (Statoil ASA, 2010a).

These examples reflect how necessary and relevant it has become for executives of companies with global presence to find the balance between organizational business needs and the technology that is developed and available to support work processes.

To achieve this, they need an idea about how their employees will execute their tasks and work processes, and the impact technology will have on these work practices in the future.

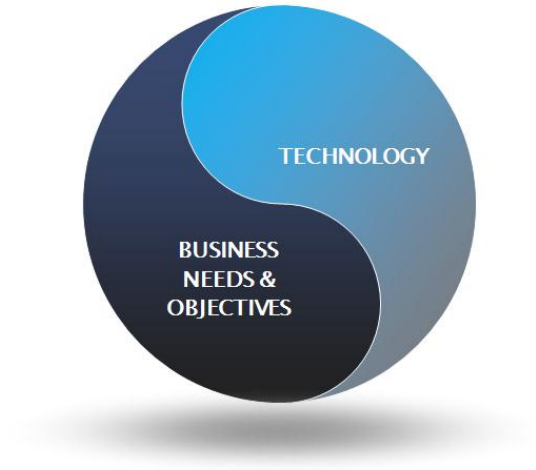


Figure 1-1: Balance between business needs and technology development

Technology and new IT solutions are enabling people to create, communicate and connect anytime, anywhere. Because of this, providing an idea of the ***way people will work*** needs to include also an idea about ***the place where*** this job will get done in the future.

Despite virtual environments, the role space plays in collaboration interfaces is still important: To make collaboration happen, people need a physical space.

1.2 Purpose

This research study aims to suggest the ways of working of people in the future and the impact these new work practices will make on physical work spaces.

To achieve this purpose, the research study develops a model to describe future ways of working and provide the characteristic elements of the future workplace.

The study also suggests what future workplaces can be like, focusing on the physical elements (work space) that constitute it.

1.3 Problem definition

Leadership and management teams of organizations with global presence are struggling to have access to human resources needed to execute business-related tasks and work processes. Efforts have been made by these organizations to take advantage of competencies available in

a specific place and utilize them to support the execution of tasks in other places around the world.

Needs for communication and collaboration among people who are geographically separated from one another have increased because of, among other things, globalization of business activities and execution of international projects.

In order to stay connected and interact across geographic boundaries, the dependency on collaborative IT tools and solutions has become more relevant and, at the same time, a way for businesses to survive in a challenging business environment.

To meet business needs, new forms of cooperation based on new technologies and IT solutions have been developed. Use of video-conferencing equipment, video camera connected to PC or laptop, smart mobile telephones and other types of electronic solutions are some examples of how technology has had a major impact on the way we work today. Flexibility and efficiency in the workplace are achieved now by using distributed work teams and new IT-based solutions.

New technologies are constantly being developed and new ways of working have appeared based on these developments. The world is changing rapidly, and in order to survive in a competitive world, companies will need to adapt to these changes in the same way.

In the future, tasks and work processes are going to be carried out utilizing more new tools and methods; people's working contexts will change and so their workplaces.

In an economy increasingly dependent on individuals who are valued at work for their availability to interpret information within a specific subject area, work is done anytime, and anywhere. A definition of the modern workplace needs to recognize this reality (PdK Consulting, 2010).

These new ways of working enabled by IT tools will have a direct impact on the way office space will look and be utilized in the future.

Therefore, it is relevant and critical to provide an idea of future ways of work and initiate today the necessary changes to shape the idea of the future workplace.

Global corporations have begun to understand these new trends and have launched various initiatives that will lead them to the development of new working and collaboration methods in the future. However, it still remains uncertain how the future work space will be influenced by these new work practices. This is the main challenge of this research study: to understand how new ways of working enabled by information technology are going to make an impact on the future workplace.

1.4 Definitions

The following section will present different definitions or meanings needed to establish a common understanding of the main concepts utilized in this report.

Workplace
Workplace consists of three elements or dimensions that enable work to be done (Vartiainen, et al., 2007). These elements are the social, the virtual, and the physical.

Physical, virtual, and social elements of the workplace are particular environments where individual workers and groups of people collaborate.

A detailed description of the term workplace is given in chapter 3 of this report.

Workplace management
Workplace management is the process concerned with changing user needs, workplace and office layouts and concepts, space standards, evaluation of effects of different workplace solutions and design examples (Blakstad & Torsvoll, 2010).

The final report of the ProWork project introduced the term *workplace management* as the management of the workplaces as quantitative resources, including processes in design, change and use of workplaces (Nenonen, et al., 2009).

Workplace development
To differentiate from the traditional approaches of workplace management involving processes that *manage* something that already exists, this report introduces the idea of workplace *development*.

This is based on the understanding of the current definition of Facilities Management (CEN, Comité Européen de Normalisation, 2006), which underlines both the notion of *management* and *development* of the agreed services that support organizations' primary activities. Since workplace is part of the Facilities Management discipline, this research study makes the distinction between the management and development of the workplace in the same way.

Thus, workplace development is defined in this report as the processes needed to create new workplace solutions that enable organizations to adapt and improve their ways of working in order to achieve their goals and objectives.

Since the purpose of this research study is related to an idea of the future of work, including new ways of working which will require new workplace solutions, it is possible to say that the results of this study will have focus on workplace development. Consequently, the effects of these results will have an impact on workplace management.

Workplace solution
A product or service constituted by a combination of a determined physical space, a specific IT solution and the social environment created by these physical and IT-related elements.

Knowledge-intensive organization
Knowledge-intensive organizations are characterized by having knowledge as their primary input and output (Gjersvik & Blakstad, 2004a). Processes within these organizations are mostly related to communication, coordination, processing of information, and the combination of knowledge.

Knowledge work
Knowledge work can be defined as the creation, distribution and application of knowledge by highly skilled, autonomous workers using tools and theoretical concepts to produce complex, intangible and tangible results (Nenonen, et al., 2009).

Collaboration
Collaboration takes place when two or more people communicate and interact to reach a goal (Weiseth, Munkvold, Tvedte, & Larsen, 2006).

Other authors refer to the term collaboration in similar ways. Collaboration happens when people work together, share knowledge and expertise enabled by communication and Web 2.0 technologies to create business outcomes (Collaboration Consortium, 2009).

Organizations are more conscious about the effects good collaboration can have in business results. But some research studies (Hansen, 2009) also point out the consequences that bad collaboration – collaboration characterized by high friction and a poor focus on results - can make in teams and individuals working to achieve a goal.

According to Hansen, collaboration can happen in two ways: collaboration *within* a company and collaboration *outside* a company. When it comes to collaboration within a company, collaboration can occur across organization units, including collaboration across divisions, business units, product lines, country subsidiaries, and functions. This is what Hansen calls companywide collaboration. Companywide collaboration differs from traditional teamwork, which often refers to local teams of five to ten people *within* a business unit, division, or department.

Other definitions
It is difficult to prepare a list with a definition of concepts related to new ways of working. Terms and definitions change constantly in this field. The list included in Annex A.1 Definitions shows definitions of some terms utilized in this report. The main source of these definitions are the American authors Jeanne C. Meister and Karie Willyerd, two

internationally recognized writers and speakers, and founders of Future Workplace, an American-based organization working on strategy development that focuses on the re-invention and re-definition of corporate learning and human resources. (Future Workplace, 2011).

1.5 Limitations

Due to its complexity, a study about the workplace, including all the components that constitute it, will soon become a challenging task.

Based on the problem definition specified in 1.3, and the definition of the workplace in 1.4, this research study will focus on the *physical spaces* of the workplace only.

Furthermore, workplace trends shaping the future workplace today presented in Chapter 3, and used to develop future ways of working, assume that no major natural catastrophes happen. In the future, the evolution of trends and external factors occur at its normal pace.

1.6 Hypothesis

In the future, the development of new technologies and new types of collaborative tools will affect the ways we work and create new opportunities for alternative workplace solutions.

Workplace solutions will probably not be like the solutions that exist today. The demands and needs for office space will be different, and new workplace solutions will be developed. Over the coming years, the idea behind what we understand today as a "normal" way of working will change, and with it, the current idea of office space utilization and work spaces.

1.7 Research question

To understand future ways of working and the idea of the future workplace, this research study will analyze how the ways people work, what they work on, the tools they use, and where they work are going to look in 2022.

The year 2022 was chosen as reasonable point of reference. Ten years' time is long enough for distinct changes to happen, without becoming a utopia.

After completing this analysis, it will be possible to establish a notion of future ways of working in a knowledge-based organization. By concentrating the efforts on understanding the way people collaborate and the impact these ways of work will have on the physical spaces in the future, it will be possible to conceive and idea of future work spaces.

The idea is to answer the following research question:

> By 2022, what will the physical work spaces be like in an organization with global presence?

A systematic procedure for exploring and shaping the future will be utilized to approach this research question. This master's thesis will utilize a framework to analyze future ways of work and identify the main characteristics of the future workplace in an organization with global presence. Statoil global scenarios, used in the development of Statoil's corporate strategy, are used to give a structure and to support the analysis in this work. An analysis of these scenarios will help to identify what could become Statoil's ways of working in 2022.

The idea of Statoil's future work spaces will be supported using a case study.

1.8 Thesis outline

This master's thesis will comprise six chapters. After the introductory chapter, a presentation and defense of the methodology chosen in this research is presented in chapter 2.

Chapter 3 outlines the theoretical concepts related to the term workplace. It also includes a short introduction to scenario planning. The reviews on literature on the elements needed to carry out an analysis of future ways of working are presented: a framework to analyze work and Statoil's corporate global scenarios.

Furthermore, workplace trends shaping the future workplace and a brief idea of the processes back workplace development are introduced. The theoretical background needed to understand and analyze future work spaces is also presented in this chapter.

Chapter 4 presents the results obtained in this research, while Chapter 5 will include the discussions and analysis using the problem and research question as starting points.

Chapter 6 establishes the conclusions of this research by articulating the results, the discussions and analysis, and presenting the final considerations and recommendations.

The thesis outline is represented with an illustration in Figure 1-2.

Figure 1-2: Thesis outline

2 Methodology

Chapter 2, Methodology, presents the methods utilized in this study based on the problem under discussion and the research question presented in Chapter 1.

These methods are: literature review, scenario planning and case study.

The chapter begins with a description about methods in general and continues with the presentation of the approach utilized to answer the research question.

The chosen methods are presented afterward, including a section to discuss their validity and reliability.

Finally, an outline of the operational procedure followed in this study is explained.

2.1 Approach

A method is about how information is collected, organized and interpreted (Larsen, 2008). This chapter gives a short description about methods in general, and the methods utilized in this research study. It also explains the procedure applied to approach the research question, including its strengths and weaknesses.

Social sciences study how people and groups of people develop in relation to each other (Olsson, 2009). In this report, the main research topic is related to the way people will work in the future and the implications of these work practices on the physical aspects of the workplace. Due to this, this master's thesis can be classified as a social science-related study.

Depending on the problem, qualitative or quantitative methods are used in research studies related to natural and social sciences. Sometimes a combination of both can be necessary to find the answer of a concrete problem or question.

A *quantitative* method is related to quantitative data; numbers and variables that are possible to quantify. A *qualitative* method is related to data that cannot be quantified, often represented by written information in forms of words or illustrations.

Qualitative research is an enquiry method that is often utilized in social studies, and it is characterized by having smaller but focused samples, and by producing results only for the particular case studied.

In this study, the problem that needs to be solved is related to future ways of working and the impact of these practices make on the physical elements of the workplace.

It is challenging to find reliable data about things that may happen. Future-related studies cannot speak about something that has not yet happened. However, it is possible in these studies to predict the consequences a particular course of action can have later under certain circumstances (Halvorsen, 2009).

The question to be answered is the following:

> By 2022, what will the physical elements of the workplace be like in an organization with global presence?

To answer the research question as a scientifically based future study, the consequences some factors and trends can have on current ways of working - under certain circumstances – need be described.

These predictions will reflect possible outcomes of these trends. Based on these outcomes, it will be possible to predict people's future ways of working. By analyzing these *new* ways of working, it will be possible to understand and establish an idea of the future workplace.

According to the workplace definition utilized in this study, workplace is a place where people work and it is constituted by three spaces: physical, virtual and social. Based on the problem under discussion and the research question, this research will only focus on the idea of future physical spaces.

To sustain these predictions and the notion of something that has not happened, empirical data from a case study will be utilized to verify whether the outcome of trends is following the same course.

The thesis approach is represented with an illustration in Figure 2-1.

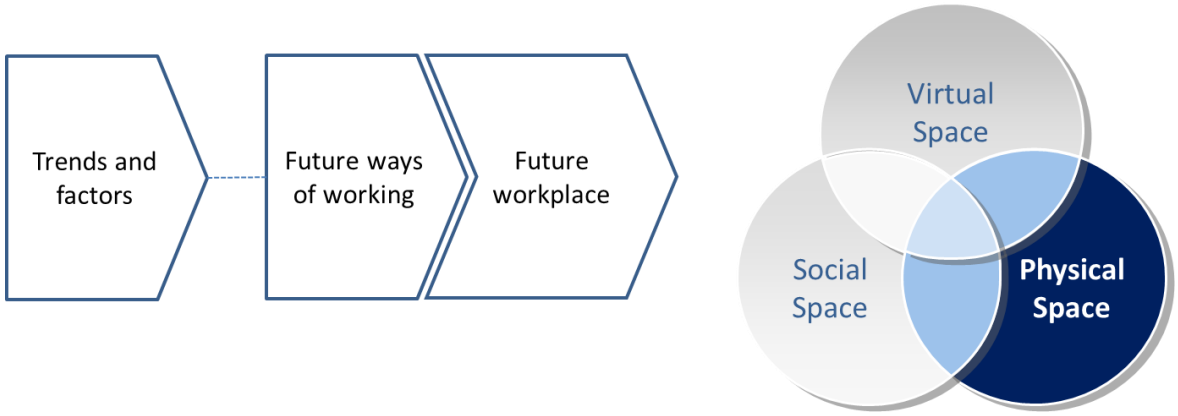


Figure 2-1: Thesis approach

2.2 Description of chosen methods

The methods utilized in this report are qualitative methods and include:

- Literature review
- Scenario planning
- Case study

In this research, the case study is composed of two parts: a section describing the processes utilized to develop an idea of the future workplace and a second section including the relevant aspects of a pilot project executed to design and test new office spaces.

This section explains the methods mentioned above and their contribution to answer the research question in this study.

2.2.1 Literature review

To get insight into the theoretical background of the topic of this study and the methods utilized in qualitative research, a literature review was carried out. Practical information about the execution of this review is given in Chapter 2.4 Outline of research study.

2.2.2 Scenario planning

The utilization of scenarios is a method commonly used in strategic planning. It is considered a tool to predict or prepare the path for something that may happen in the future (Øverland, 2002).

The advantage of using scenarios in this research is related to the opportunities this methodology creates in order to describe and present the different alternatives that may occur in the future in connection with work practices, without being normative. A normative work would point out the way things should happen in the future, something it is almost impossible to confirm or validate in this study.

More information about the use of scenario planning can be found in Chapter 3.3 Introduction to Scenario Planning.

2.2.3 Case study

Case studies are commonly used in social science and are related to an in-depth investigation describing a contemporary event or process in its natural ambit (Yin, 2003).

According to Yin (2003), a case study answers research questions related to *how* and *why*, whereas quantitative questions such as *how many* or *how much* can be answered by quantitative methods such as surveys and data analysis. Furthermore, case studies do not need the researcher's control of the object in study, unlike research studies using experiments where the researcher's involvement is needed.

Case studies are the most common research strategy used by researchers of business and management. The data and information used can be obtained through interviews, observations, physical object or the analysis of archival information (Muhdi & Daiber, 2008).

According to Yin (2003), six sources of evidence in case studies can be identified:

> **Documents**: administrative documents, newspapers, articles, or any document that is appropriate to the research.
>
> **Archival documents**: organizational records, lists of names, survey data, and other similar records.
>
> **Interviews**: open-ended, focused, and structured (surveys). Open-ended interviews take place when a relevant person comments on certain events in order to provide the researcher insight into events. A focused interview happens when a person is interviewed during a short period of time and answers a set of questions. A structured interview helps to gather data using a detailed set of questions in a similar way a survey does.
>
> **Direct observations**: observations that take place when a researcher visits a specific location. The idea is that the researcher collects data from the field without disturbing the context in which things happen.
>
> **Participant observation**: observation where the researcher participates actively in the event being studied. This kind of observation may influence the reliability of the study, because the researcher can alter the development of events.
>
> **Physical artifacts**: physical evidence such as tools or instruments collected during the study as part of a direct observation.

Case studies need to satisfy both conceptual and structural requirements (Muhdi & Daiber, 2008). The conceptual requirements are related to the validity and reliability of the case study. This issue will be discussed in Chapter 2.3 Validity and reliability.

Concerning the structural requirements, there are some elements to be considered when presenting a successful case study. A case study must be relevant for those who read it and, at the same time, it must invite them to discover the different insights, without omitting important perspectives and circumstances. It has to describe as close as possible the reality of the event without including too much data. It is therefore necessary to find a balance and include all data needed to support its validity.

In addition, a case study has to be written using a clear structure and language, and it should not be longer than necessary to present the necessary information.

Because the author of this study has actively been part of workplace development initiatives in Statoil, the study can be classified as an *action research study*. An action research study is a type of research that is orientated toward bringing about change, often involving respondents

in the process of investigation. In action research studies, researchers are actively involved with the situation or phenomenon being studied (Robson, 2002).

2.3 Validity and reliability

Reliability refers to the accuracy or exactness in a study. If a measurement is repeated several times and the results obtained are the same, then it is said that a study has a good reliability (Larsen, 2008).

In general, qualitative research studies have some challenges with reliability. These studies focus on reduced samples and collect high amount of information from many variables simultaneously. This fact facilitates getting a holistic idea of a concrete problem, but makes it difficult to generalize the results and apply the conclusions in a generic way.

Concerning this master's thesis, it will be difficult to achieve satisfactory reliability levels, because it may become a demanding task to reach the same results obtained in this study in new and similar research done by others. Furthermore, the variables taken into account this time can change if the same research is carried out again later. The high level of uncertainty and complexity of future events can also influence the reliability of this study, something that may lead to different results and conclusions.

Validity is related to the relevance or applicability of a study (Larsen, 2008). Thus, a valid study is a study that measures the right things.

The data and material collected during this research have been used to answer a concrete question connected to something that may happen in the future. The research methodology utilized is in accordance with the ones utilized in similar studies (Saurin, Ratcliffe, & Puybaraud, 2008). Relevant information has been collected with the research question as background. However, the analyses presented in this report are based, focused and restricted to a concrete organization, Statoil, making the results valid only for this particular organization.

Despite this restriction, it will be still possible to apply the same methodology in other organizations using similar studies if the necessary adjustments related to the organizational variables are made.

The ambition level of this master's thesis is restricted to a concrete research question and the organization utilized in the case study. Analyses and its understanding are valid for this concrete organization. Because the results are presented as part of a structured research process, it may be possible to apply some of the conclusions to other companies with similar challenges related to collaboration in global settings.

Because this study utilizes only qualitative methods, there are some disadvantages in connection with how much the student can generalize the results obtained with the investigation.

2.4 Outline of research procedure

The first step in the development of this master's thesis was to find out the methods that would be helpful in answering a problem related to future research studies. The research started looking for references, publications and articles related to future studies in Norway and abroad. These sources pointed to a concrete methodology, scenario planning, which could be helpful in this type of research. Information about scenario planning and how it is utilized in this study can be found in Chapter 3.

After ensuring that the main research method was in place, a review of literature related to future workplaces and workplace trends was done. This also included a review of the terms utilized to refer to workplace. The sources utilized were mainly available on the internet and in books available in online bookstores. Several books and publications were ordered and bought for this research. This process helped to establish a common understanding of the meaning of the term workplace in this report.

Because publications related to future workplace and new ways of working are relatively scarce, it was necessary to find more information about these topics in other types of publications and articles. Reports prepared by relevant and prestigious management consulting companies, research networks and articles in online magazines were found and utilized. Membership fees were paid in some article-based online publications to get access to this information.

The search for data and relevant material was done using internet search engines. The words used as starting point in the different searches included "new ways of working", "workplace", "future workplace", "future work", "alternative workplace", "alternative workplace programs", and "workplace strategies". The initial search results led to other links that made deeper and more comprehensive results possible. Some information was also found with the support of the databases such as BibSyS, after receiving training in an introduction course carried out by the institute in one of the gatherings arranged in Trondheim.

The results obtained from the review of these articles, reports and books were also the main source to support the process of mapping trends connected to future ways of working. According to scenario planning methodology, a mapping of current trends and driving forces is needed to understand a future event.

After the search of relevant qualitative information mentioned before, the main elements to define a framework to analyze new ways of working were provided. This framework constituted by *Statoil's corporate global scenarios* and *the four dimensions of work* is presented as a contribution of this research study.

A hard copy of Statoil's corporate global scenarios was obtained after contacting the manager of strategy and business development in Global Business Services in Statoil, Johan Leuraers. To clarify the utilization and validity of these scenarios, an open-ended interview was conducted with him.

By engaging in a creative process, the author of this research utilized the framework to bring together workplace trends and driving forces with Statoil's scenarios in order to predict possible outcomes. The result was the establishment of a notion of future ways of working. The utilization of Statoil's own corporate scenarios made it possible to assume that these new ways of working can be the same as *Statoil's future ways of working*.

To validate the results of this analysis, a workshop was arranged and a presentation of Statoil's new ways of working was given to a cross-functional group in Statoil. The group included representatives from the following disciplines and corporate entities: Facilities Management, Human Resources, Information Technology, Health, Security & Environment, Management Systems, Communication, and the internal supplier of business support services in the company, Global Business Services.

The workshop was part of a corporate initiative in Statoil. The author of this report took an active part in the arrangement and preparations of the workshop: preparing and presenting the idea of *Statoil's new ways of working* to this reference group, and facilitating the discussion and taking notes of the feedback received from the participants. The feedback was used to prepare a new updated version, which is the one presented in Chapter 4.

Statoil's future ways of working was the previous step to establish the idea of future work spaces. To understand the idea of future workplace, including the physical spaces that constitute it, the analysis of the ways of working was needed.

To validate the results in this research, a case study was developed. The development of the case study in Statoil included analysis, interviews, direct observation, and participant-observation.

The access to documents in Statoil was gained mainly through electronic means. The use of software to share documents is widespread in the company, and the author had access to memos, presentations, surveys, figures, pictures, minutes from meetings, and other documents that were relevant to preparing the case study. The project responsible for the execution of the new office building project located at Fornebu has a virtual space where files and documents are stored electronically. The researcher had access to this virtual space.

To get insight into the topic related to Statoil's future work spaces presented in the case study, an open-ended interview was conducted with Mona Torsvoll, discipline adviser of Workplace Management in Statoil.

As part of work duties, the author of this research participated actively in the preparation of the following sections in the case study: *Statoil's workplace vision*, *Capabilities of Statoil's future workplace*, *Statoil's personas*, and *Ways of working of a Statoil's profile*. The background of these activities was related to a Statoil's corporate initiative mentioned before and not to the building project the case study refers to.

The information related to the pilot project and the new office building was obtained by reviewing documents and presentations available and stored in the aforementioned virtual space of the project.

The information regarding the use of personas in Microsoft was obtained after a visit to Microsoft offices in Amsterdam using an open-ended interview with Ilco van der Bie. The personas or archetypes presented in the case study are intended to support the conclusions obtained in *Statoil's new ways of working*. These archetypes will allow the exemplification of the future ways of work in Statoil in a concrete and illustrative way.

Figure 2-2: Research procedure illustrates the different sources utilized to develop this research study and the results obtained using those sources.

On the left side of the figure, the different topics obtained from the literature review are presented. The figure makes a distinction between literature review from documents, books and articles, and the active review done by the researcher in his role as business developer in Statoil. This active review is called "participant-observation" in the figure.

The right side of the figure represents the results of this research developed as part of this thesis. The results are placed next to the input needed to develop them.

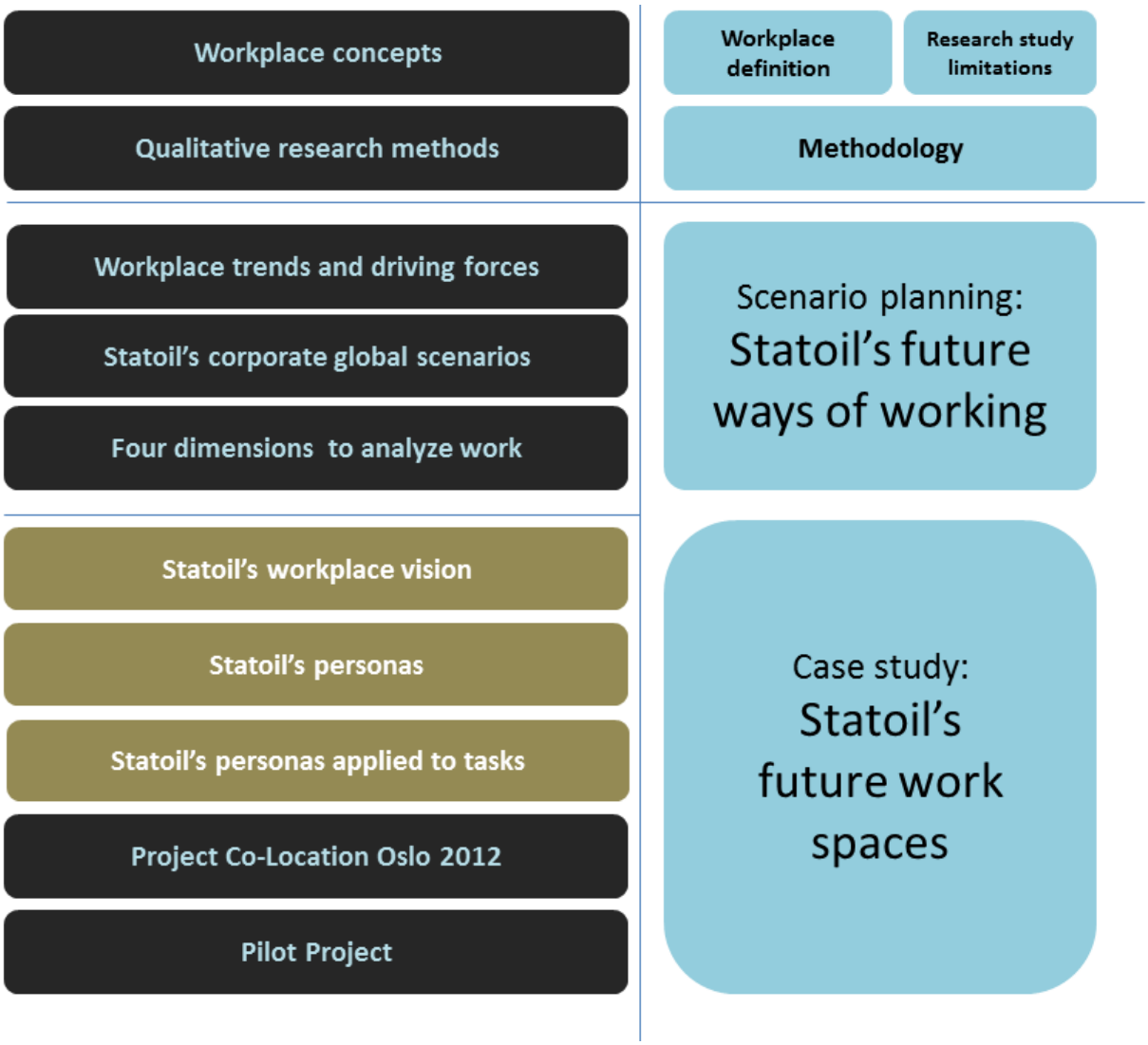
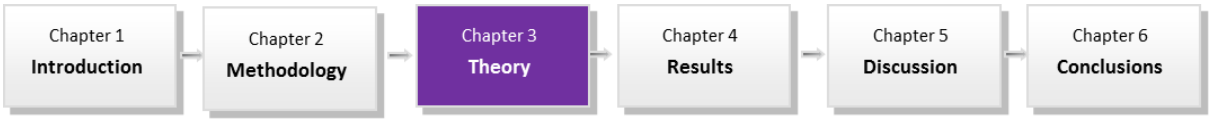


Figure 2-2: Research procedure

3 Theory and literature study



Chapter 3 Theory and literature study, examines the theoretical framework of this research project. It includes a review of the workplace concepts, and the introduction of a framework to analyze work which will be utilized in Chapter 4.

A short introduction to scenario planning is presented as well as Statoil corporate global scenarios.

The main characteristics of the future workplace are described: workplace trends, collaboration and collaboration technologies, and the changes in the global context making an impact on the ways people work.

All these elements mentioned above will become the fundament of the analysis of future ways of work presented in Chapter 4.

Furthermore, a description of current office space solutions is presented including the reason and the process leading to its decision.

Finally, the main elements of the processes companies engaged when designing new office spaces are briefly explained.

3.1 Workplace concepts

To establish a common understanding about the term "workplace", this section introduces different ideas found in literature, and establishes the one to be utilized in this research.

In a real estate and facilities management context, the word *workplace* is commonly associated with the physical environment, a room or office space. In an environment related to information technologies, the workplace will probably be associated with the IT tools and solutions supporting employees in executing their tasks. Human resources personnel will make some associations between workplace and the cultural or social environments, benefits and compensations, or maybe the ideas or beliefs people in an organization share. Some people could also say that some elements related to ergonomics, health, safety and security, and working environment are also related to the term workplace.

According to the dictionary, the word *workplace* is defined as the room or building where people work; while an area rented or sold for commercial purposes is known as *workspace* (Oxford University Press, 2010). This workplace definition is not robust enough, as it omits many elements workplace is composed of. Therefore, it is necessary to present other and different meanings of this term, because a common understating of it will be needed to develop the idea of future work.

The definition used as a starting point includes two important elements that limit the idea of workplace: the words *place* and *work.* These words are quite diffuse as they do not specify clearly what kind of places and what kind of work is done.

A knowledge-intensive organization needs *somewhere* for its employees to work in order to perform its activities and fulfill its purpose. Workplaces for knowledge workers have traditionally been located in office buildings (Blakstad & Torsvoll, 2010). According to these authors, the workplace's physical *appearance* has changed, and the work no longer is restricted to one work-desk, one office building or even to one location. The idea of a workplace related to a physical place is present, but the notion of other places, different from a work-desk, is recognized.

An implicit definition and broader idea of the workplace was given by a research project known as The Knowledge Workplace (KWP). KWP was a research initiative on new office solutions and new ways of working in knowledge-intensive organizations that had as a goal to develop knowledge about the relationships between three elements: i) organizing,

organization development, and new ways of working, ii) modern information and communication technologies and, iii) architecture, new office solutions, and physical infrastructure (Gjersvik & Blakstad, 2004a).

The idea behind this initiative can illustrate and concretize the perceptions people have about the idea workplace, which was explained before as it includes organizational, technical and physical elements.

Workplace consists of three elements or dimensions that enable work to be done (Vartiainen, et al., 2007). These elements are the social, the virtual, and the physical. Physical, virtual, and social elements of the workplace are particular environments where individual workers and groups of people collaborate. Nenonen, et al. (2009) utilize a similar framework to explain the elements of the workplace.

According to Vartiainen, et al. (2007) and Nenonen, et al. (2009), the physical, virtual and social spaces/places can be understood as follows:

PHYSICAL SPACE

Physical space refers to facilities that employees use for working such as in an office, at home, in a plane or car, or at a conference, and the physical environment that supports it, such as office design and layout, equipment, temperature, light, etc. Physical space is a tangible environment. According to Nanonen, et al., when these spaces are in use, they are places that can be classified in many ways: private, semi-private and public places, quiet places, etc.

VIRTUAL SPACE

A virtual space refers to an electronic working environment, virtual workspace or collaborative working environments. These spaces can be accessed by different interfaces and both individual and collaborative activities can be performed in them.

Vartiainen, et al. (2007) say that the internet and intranet provide a platform for working places for both simple communication tools, such as e-mails; and more complex ones, such as collaborative working environments, which integrate different tools such as e-mail, audio conferencing, video-conferencing, group calendar, chat, document management and presence awareness tools.

The same authors suggest that the significance of virtual spaces will grow when members of a distributed team communicate and collaborate from different locations. They will be not only distributed in physical places but also simultaneously use virtual places (video-conference and documents shared on the intranet). They also will be related to other team members who must share common goals to be able to reach the aim, and possibly also share common ideas, beliefs and values (social/mental space).

SOCIAL SPACE

A social/mental space refers to cognitive constructs, thoughts, beliefs, ideas and mental states that employees share. It also includes the means for developing people' and organizations' capabilities. Creating and forming joint mental spaces require communication and collaboration (Vartiainen, et al., 2007). The work of knowledge workers is a continuous process and a mixture of working on one's own, asynchronous and synchronous communication and face-to-face meetings.

To conceptualize the idea of the future workplace, this report will distinguish the physical, virtual and social elements that constitute it.

Figure 3-1 shows the three elements of the workplace and its dependencies; the elements adapt to one another and develop the workplace by interacting with one another.

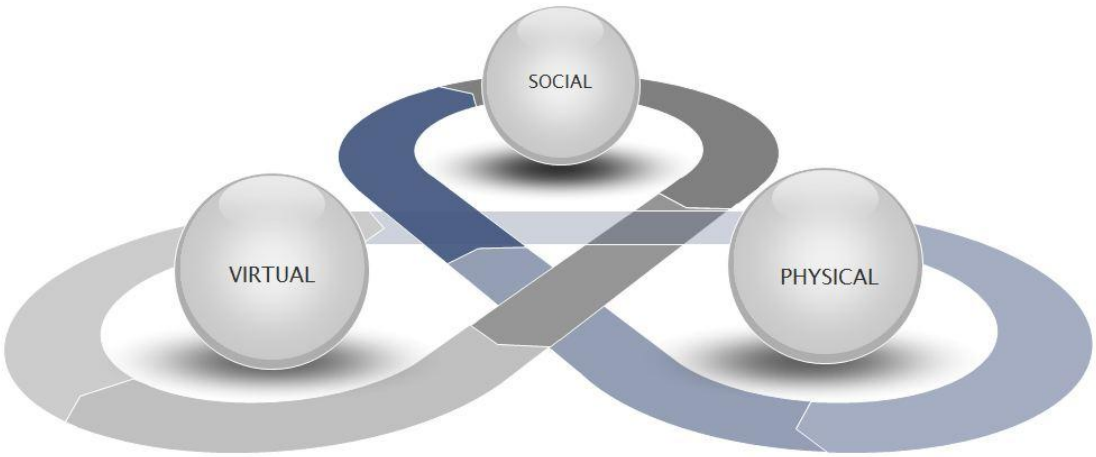


Figure 3-1: The three elements of the Workplace

An important insight from organizational research is that a change in any element will have consequences for the others. This interdependency requires companies to identify and manage these consequences. Even more significant, if these companies make coherent changes in all three elements, they will achieve synergies and a much higher impact on productivity and business value. The elements adapt to each other over time and the workplace develops as these elements interact (Weiseth & Beltran, 2010).

For some researchers, the term workplace has some negative connotations as it limits the possibilities for developing new and fresh ideas, perspectives and the capacity to respond to and initiate positive change in organizations (Meyer, 2010). Instead, the word *playspace* has been introduced to illustrate the necessity to leave behind the constraining connotations and

habits of mind of the workplace, where the product is more important than the process, to replace it with a more dynamic engagement and lively creative process of innovating, learning and changing that involves passionate commitment and enthusiastic participation of employees working in an organization.

Other authors look at the workplace as a tool for achieving a company's goals. Well-designed and well-planned workplaces make organizations more competitive. It is important to think of the workplace as a *single integrated system*. "Organizational ecology" is a term that refers to the way experts look at organizations in terms of how work and workers are convened in space and time and how those kind of decisions both affect and are affected by decisions about the nature of information technology, the design of work processes, human resources policies and practices, and ultimately the organization's philosophy and values (Becker & Fritz, 1995).

According to Becker & Fritz, organizational ecology is composed of three key elements: a) the decisions about the physical settings in which work is carried out b) decisions about the processes used for planning and designing the workplace system, and c) decisions about how space, equipment, and furnishings are allocated and used over time.

These decisions must be taken considering factors such as the nature of work and business processes themselves; the specific organization's culture and values; externalities making an impact on the way workers execute their work tasks; the way workspaces are utilized and the location of corporate buildings; workforce demographics including age and gender; and lifestyles influencing the way people work.

This integrated and total workplace concept within the organizational ecology framework suggests that organizations need to conceive of the workplace as a system composed of different elements that are linked by *the physical movement of people and the electronic movement of information in a way that enhances the organization's ability to meet its fundamental business objectives* (Becker & Fritz, 1995). This notion is quite similar to the ones recommended by Vartiainen, et al. (2007), and Nenonen, et al. (2009), but it does not consider the social elements constituting the workplace; communication and collaboration forms are not considered in the notion of organizational ecology suggested by Becker & Fritz. However, the term workplace can be understood here as the environment enabling workers to perform and add value to an organization.

3.2 A framework to analyze work

To structure the presentation of results and analysis later in this report, a framework to analyze work is introduced now.

A commonly used framework to analyze ways of work based on four dimensions is utilized in this research study. According to Vartiainen, et al. (2007), work can be analyzed using these four perspectives:

- *What is done,* assignment, tasks, objects, including the processes (such as transaction processing, innovating, communicating, learning, etc.) that will define the work to be done

- *Who does it*, people

- *How it is done*, work and communicative actions and practices and how technology will enable those processes to be carried out (such as data access, groupware, mobile ware, etc.).

- *Where and when* work is done, including people's interactions to exchange and develop knowledge and information.

Figure 3-2 shows an illustration of this framework to analyze work.

Figure 3-2: Illustration of framework to analyze work

3.3 Introduction to scenario planning

Scenario planning methodology plays a central role in answering the research question. This section establishes the theoretical framework and background needed to discuss and interpret the results.

Scenario planning is a disciplined method for imagining possible futures that companies have applied to a great range of issues (Schoemaker, 1995).

Other authors have defined scenario planning in several ways, but the distinguishing factor for scenarios is that they are not predictions or forecasts. Scenarios do not try to get the right idea of the future. Instead, scenarios present alternatives to future events, challenging the prevailing paradigms of thinking (Chermack, Lynham, & Ruona, 2001).

Scenario planning methodology has its background and has been used in military intelligence. Most authors attribute the introduction of scenario planning to Herman Kahn and his work for the U.S. Military in the 1950s. Scenario planning emerged as a management tool in RAND Corporation – a company set up for researching new weapons technology – when Kahn developed a technique called "future-now" thinking. The purpose of this technique was to describe the future in stories written in forms of reports as if written by people in the future. He adopted the term "scenarios" to describe these stories (Chermack, Lynham, & Ruona, 2001).

Nowadays, scenario planning is a methodology related to business strategy and business development initiatives. Many organizations use scenario planning processes in activities related to organizational development, competence development, change and training processes (Øverland, 2002).

The methodology has experienced a constant growth since the Second World War. It arrived in Norway during the 1970s and it arose as an alternative to social-economic planning. One of the first Norwegian contributions was *Scenarier 2000*, a book about scenario development related to the public sector in Norway (Øverland, 2002).

According to Øverland, the main difference between scenario planning and social-economic planning is that the use of scenarios allows people to think about the possibility of more than one idea of the future, giving the opportunity to consider different forthcoming situations.

Figure 3-3: Socioeconomic planning (Øverland, 2002).

Figure 3-3 shows the relationship between the present and future times thought as a linear process, one possible alternative.

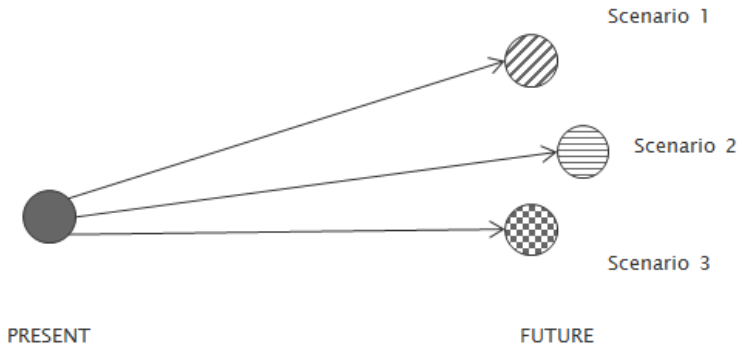


Figure 3-4: Traditional scenario planning (Øverland, 2002).

Figure 3-4 shows the relationship between the present and future times thought linearly, but with several possible alternatives.

The project *Norge 2030* (Øverland, 2002) introduced the idea of "perspective scenario planning" as an improvement of the traditional idea of scenario planning by *"softening up the idea that the future is linear"*. This means that neither the present nor the future times are connected logically together, but instead they are *cluster of realities.* Realities that are difficult to compare linearly because of their levels of relevance are also different.

There is no logical requirement that the process of planning the future can be predicted in terms of a specific direction and in detail. One must assume that there are some likely outcomes and - in principle - infinite number of phenomena that ***can*** happen in the future.

Øverland makes also a clear distinction between the processes of scenario development and scenario planning. According to him, it is absolutely crucial for developing new, lively and interesting perspectives about the future to separate the processes related to scenario development and the processes of using scenarios to define strategic and political priorities, freeing the scenario development process from the political and strategic agenda.

Scenario planning starts by dividing the knowledge into two broad domains: 1) things people believe they know something about, and 2) elements people consider uncertain or unknowable. The first component – trends – casts the past forward, recognizing that the world possesses considerable momentum and continuity. The second component – true uncertainties – involves indeterminable variables. Scenario planning consists then of mixing these known and unknown elements into a view of the future that produces a range of possibilities (Schoemaker, 1995).

Several large companies have embraced scenario planning. The Royal Dutch Shell group of companies led the commercial world in the use of scenarios and the development of more practical techniques to support these. Shell introduced the use of scenario analysis when companies in the oil industry were surprised by the OPEC's price crisis and utilized this method as part of a process for generating and evaluating its strategic options early in the 1970s (Schoemaker, 1995).

Since then, Shell has consistently used scenario planning as a strategic tool. This has been published in the book Shell Global Scenarios 2025. Jeroen van der Veer, Chief Executive of Royal Dutch/Shell Group, said that "*the new Global Scenarios 2025, bring clarity and simplicity on matters of high complexity"*. In the foreword of Shell Global Scenarios 2025, Jeroen van der Veer said, "*energy companies more than most business, need to take a long-term view* […] *These scenarios are different from forecasts in that they provide a tool that helps us to explore the many complex business environments in which we work and the factors that drive changes and developments in those environments"* (Royal Dutch/Shell Group, 2005).

Some criticism of Shell's use of scenario planning points out the few business advantages gained from the use of this methodology. Some audits of this methodology in the early 1980s found that the time and resources spent on the decision-making processes following the scenarios were as demanding as the ones creating the scenarios themselves (Chermack, Lynham, & Ruona, 2001).

Chermack, Lynham, & Ruona (2001, page 9) say that "*it is necessary to determine the impact that participation in scenario planning can have on business members, decision-making capabilities because they are directly related to business results (Schwartz, 1991)*". This issue

is among the critiques of scenario planning. Questions can also arise about the development of scenarios and the resources needed. However, some authors see as a benefit having senior executives involved in the process of scenario development, because they can achieve greater intellectual ownership (Schoemaker, 1995).

Because this research project can be characterized as an action research study, some concerns regarding the validity of the results can appear. The results of this study will be restricted to the organization utilized as case study, the Norwegian oil and gas company Statoil.

Finally, scenario planning has previously been used in a research study related to the future workplace to demonstrate how to use a scenario planning futures approach in a changing, complex and uncertain workplace environment (Saurin, Ratcliffe, & Puybaraud, 2008).

3.4 Statoil corporate scenarios

This section presents Statoil global corporate scenarios and the main elements utilized to develop them.

Statoil global corporate scenarios are utilized later in this report to present the study results and to structure the discussion and analysis afterward.

Statoil corporate global scenarios are used to help in answering the research question: By 2022, what will the physical elements of the workplace be like in an organization with global presence?

There are two main reasons for applying these global scenarios in this research. The first one it is possible to utilize *existing* scenarios and focus the analysis on the possible outcomes based on some trends, without engaging in a highly time-consuming scenario development process. The second reason is the relevance of these scenarios. The case study presented in this report is related to Statoil, and the conclusions obtained by utilizing these scenarios will increase the validity of these results since the scope of this research is limited to this global energy company.

Background

The unit responsible for the development of the corporate strategy in Statoil has developed global scenarios that describe three outcomes of the future. The time perspective is 2030 and the main purpose of these scenarios is to understand the way the energy situation in the world would look in the future. The scenarios are based on building blocks of driving forces, combined in different ways so as to illustrate the wide range of possible outcomes. According to Statoil, the scenarios are not predictions or forecasts (Statoil ASA, 2009a).

Driving forces

According to the report *Statoil Global scenarios* (Statoil ASA, 2009a), when different assumptions about driving forces are applied, different futures take shape.

The key driving forces considered in the development of Statoil global scenarios are:

- *Climate*, climate change
- *Society*, including values and behavior change
- *Politics*, considering the different ways politicians will act and be influenced
- *Economy*, economic development and wealth distribution change
- *Resources*, the way resources will be exploited and which resources
- *Technology*, technological process development
- *Energy mix*, the way energy mix will be influenced

Annex B.1 Statoil Global Scenarios: factors for each scenario.

Common elements

The directions that some variables will take in each of the scenarios are assumed to be common to all of the scenarios. The report prepared by Statoil describes the following assumptions:

- *Human activity will lead to climate change in the first half of the century*
- *World population will continue to grow and the median population age will increase*
- *China will continue to grow economically and will increase its influence in the world*
- *There will be supply constraints to the growth of energy and other resources such as water and food*
- *There will be continued technological progress*

To understand the context of the scenarios, a short description of them according to Statoil (2009) follows.

MoneyWorks

This is a world characterized by a distressed global ecosystem, an unequal distribution of wealth, an increased prevalence of social conflicts and migration as well as increasing climate-adaptation costs. At the same time, high economic activity, global trade, and technological solutions improve the lives of billions of people. High energy consumption, predominantly from hydrocarbons, is an important feature in this market driven, capitalistic world (Statoil ASA, 2009a).

NetWorks

This is a world characterized by collaborative efforts, both on a local and global scale to reduce global emissions of GHGs (greenhouse gases), though this leads to a slowdown in economic growth. The usage of resources is regulated by globally enforceable, multilateral treaties, broadly supported by voters and consumers, while wealth re-distribution and global taxation schemes have also led to widespread dissatisfaction. Anarchic forces exploit

networked media to sabotage official governance structures. Electrons dominate over molecules in this networked world (Statoil ASA, 2009a).

PatchWorks

This is a world of strong nation states and strict boundaries, large social inequalities and weak economic growth. Migration and personal freedom is restricted, resources are bartered rather than traded and changes in climate are addressed on a local rather than global level. A diverse in energy mix, varying greatly between regions, comes as a result of a strong self-sufficiency mentality (Statoil ASA, 2009a).

To understand the development of events for each of the variables on which the analysis is based, a timeline showing the scenario development is presented. Annex B.2 presents a scenario development timeline of Statoil Global Scenarios.

3.5 Characteristics of the future workplace

This section describes current workplace trends and changes already occurring in the workplace that are affecting the way people will work in the future.

There are also references to collaboration and collaboration technologies as well as changes in the global context.

3.5.1 Workplace trends shaping the future workplace today

Today, the main drivers of change in the workplace are (Ouye, 2009):

Management focus on short-term goals of competitiveness and efficiency by lowering costs and reducing time

Some organizational models try to trim the core company down to the fewest people possible, with many or most services performed by a network of contractors. Some examples show today how big corporations are on a drive to outsource many activities outside their core competencies by issuing mega-contracts to a select few contractors who manage entire functions, such as facilities management, human resource and IT services companywide. In return, these contractors agree to manage these non-core processes in a manner consistent with the company's cultural norms. The McKinsey Global Institute claims that "*It's becoming possible to buy, off the shelf, practically any support function you need to run a company – back office functions, customer care, procurement, market research, HR, IT infrastructure, facilities management, engineering design, testing, research*" (Business Week, 2006).

Pressures on workers to be flexible, adaptable and always available, and the response from the workers wanting more work flexibility

According to Creighton (2009), there will be a predominant rise in work flexibility as a prominent consideration for work in the future. Creighton refers to a survey from Deloitte in 2009 of 1,400 CFOs that reports that telecommuting - 46% - was second only to salary as the best way to attract top talent, and 33% chose it as the top preference. Other studies show that 50% of workers consider potential for work flexibility as very important for their next job move.

Environmentally sustainable practices

According to Ouye (2009), in the future there will be more focus on corporate social responsibility and sustainability, and the social accounting of a company's actions on the larger community. This trend will mean that there will be an increase in pressures or regulations for more sustainable business practices. Companies will have to consider the impacts of their workplace practices with relation to:

- Building size and efficiency
- Locations
- Commutes
- Meeting practices versus air travel (traveling for meetings will be mainly for uses that can't be done any other way, such as customer sales/demonstration centers, RD labs, and specialized equipment).
- ICT technologies (sensors, databases, and smart grids monitoring individual energy footprints will help workers make personal choices about where and how they work more sustainably).

The desire for social contact

Even as we work more remotely, it will be still important to "show up". During the 8th Symposium of the New Ways of Working Network in California (February, 2009), Joe Ouye said: "*As much as we would like to think that we can separate ourselves and evolutionary past, we are still creatures of place. We are still creatures who naturally use all our senses: tactile, visual, aural, kinesthetic to relate to each other"*. There is still no substitute for working in the same place, at the same time for productivity and innovation. There is no other way to establish trust and get things done quickly and efficiently than being at the same place at the same time. But people cannot do this all the time. Some companies such as IBM and Google are creating "home bases" in its offices: a hub of resources, hoteling desks, informal meeting and social areas, and refreshments to entice its mobile workers to come back to the office once in a while (Ouye, 2009).

Based on these trends, there will be some consequences for the traditional office concept (Langhoff, 2007):

- There will be a lot less space required; some studies show a 50% space reduction.
- Spaces will be important places to work but in the sense of a social hub, a gathering place where people meet, collaborate, and socialize.
- Places where people work will be very different. These places already exist, except they are not called "offices"; they are called "*customer service centers*" (Langhoff,

2007). These are designed to bring, for example, customers and engineers together to design a new product over a period of hours or days, featuring lots of technology to review and design new solutions, a variety of collaboration spaces, some for personal work, and social areas and services, including good food services.

- People will still need workspaces, but these will not be like offices. People will go there to meet with others, collaborate and socialize. Corporate real estate portfolios will be reduced as smaller and more distributed offices closer to homes and other services will be needed. Offices will probably look more like meeting facilities at a hotel than an office, including meeting areas, special technologies such as telepresence systems, social areas and services, especially good food. As workers become more attached to dispersed teams, they will start relying more on social network tools to keep in touch with others.

From the viewpoint of an individual worker, the future workplace will manifest itself as a dynamic movement through different places and ways of interacting with people: the workplace will become a holistic individual experience (Vartiainen, et al., 2007). At the same time, there will be a larger individual responsibility to make choices that ensure development and performance in the workplace.

Knowledge workers will increasingly elect to work at "third places" such as cafés, coffee shops, hotels, and bookstores, forcing corporate offices to reinvent themselves. Meister & Willyerd (2010) say that the mobile phone in 2020 "*will become our office, our classroom, and our real-time concierge, helping us manage both our personal and professional lives"*. Following the workplace trends about mobility and migration, employees will no longer be restricted to working in one country or region. These employees will be able to work anywhere.

3.5.2 Collaboration and collaboration technologies

To accomplish business goals and objectives, organizations need to define tasks, activities and work processes that led them to achieve their predefined overall ambitions. The execution of tasks, activities or work processes creates the need to define and establish roles that are responsible for performing and delivering results. Those roles are dependent on the outputs and inputs of other processes executed by other roles in several parts of the organization. These roles rarely execute their tasks or activities in a complete solitude.

A relationship among roles is established when interaction, within or across the processes, is in place. Figure 3-5 Collaboration within and across processes illustrates this type of interaction. Several process areas collaborate and establish networks *within* their areas of responsibility to design new and/or improve existing work processes. In addition to this type of collaboration, process areas need to collaborate *across* other areas of responsibility by

establishing networks and sharing knowledge. An increase in collaboration across and within process areas will result in new and more effective ways of working (Espedal, 2011).

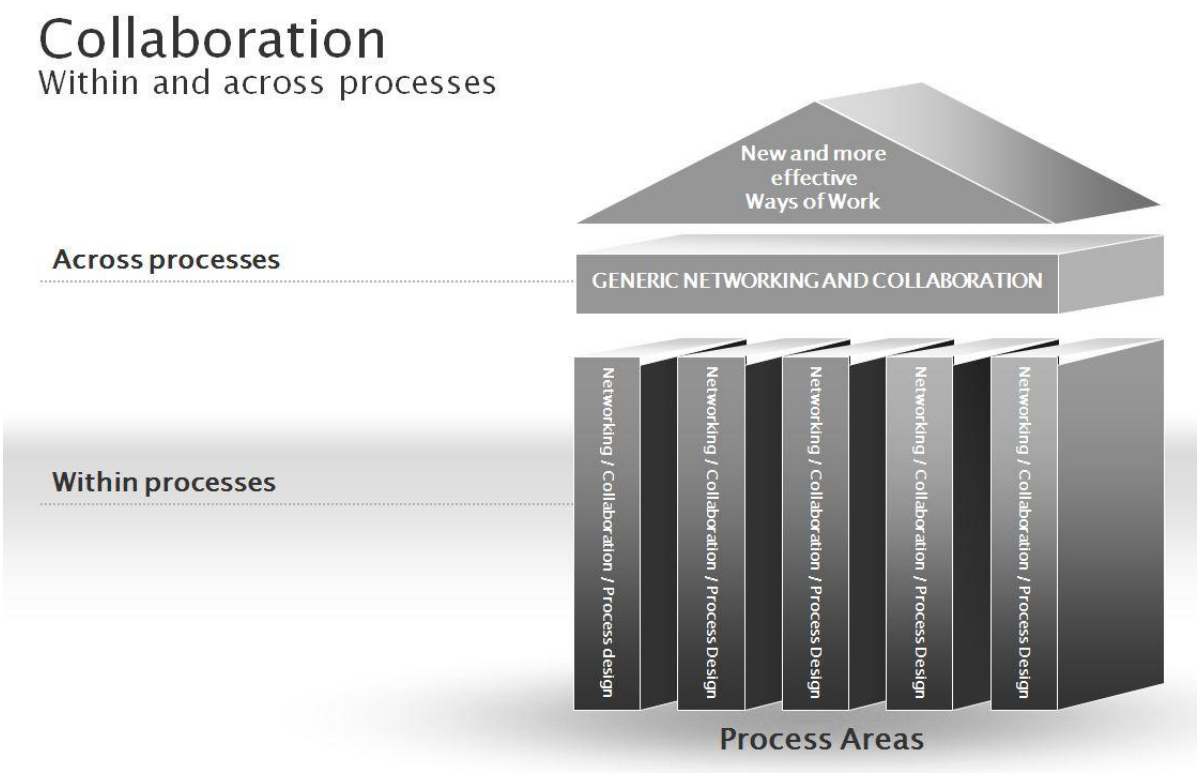


Figure 3-5: Collaboration within and across work processes

Global practice networks are even looser forms of collaboration that involve participants from similar skill areas working on common performance issues. Global practice networks are emerging in such diverse areas as open source software and extreme sports (Hagel III, Brown, & Davison, 2009).

Collaboration takes place when two or more people communicate and interact to reach a goal. (Weiseth, Munkvold, Tvedte, & Larsen, 2006). Thus, collaboration happens in the execution of tasks, activities and work processes or, in other words, in most of the daily operations of businesses. This is why it is relevant and critical for the achievement of business goals to study and improve the ways people interact or collaborate.

During the last decades, collaboration has predominantly been enabled by technology, supporting the execution of tasks, activities and work processes with new tools, techniques and IT solutions. According to Espedal (2011), technology developments have increased in two ways. The first is an increase of the pace at which technology changes and the number of

new solutions that appear every year. The second element is an increase in the expectations these solutions create among employees and the uncertainty about the effect these new solutions will have in adding value to work process performance.

Collaboration capabilities in an organization will be constrained then by the availability of these tools and solutions, and by the readiness of its employees to adopt new ways of executing their tasks with new collaborative tools. To be more effective and compete in a challenging business environment, global companies are implementing changes in the way their employees collaborate (Espedal, 2011) .

During the last decade, organizations with global networks have introduced the use of more collaborative and new IT solutions. The main driver of these new tools has been the necessity to become more effective and reduce costs. For instance, as part of a cost reduction program, Statoil introduced new travel policies to cut travel costs and launched a campaign to increase the use of video-conference capabilities during the second half of 2009. The result achieved by this policy was a reduction in corporate travel by 25% during four months (Weiseth P. E., 2010).

After the summer of 2010, the company continued its efforts to increase collaboration among employees and introduced Microsoft's Unified Communicator to support the way its employees communicate and execute daily tasks. Currently, efforts are focused on the development of an internal social media tool, called *MyProfile*, one of the functionalities in Microsoft software SharePoint 2010. This tool aims to support business activities by allowing employees to establish both discipline and private networks within the company boundaries, identify competence clusters and share knowledge with others colleagues across geographic borders. These are concrete examples of how technology can improve efficiency and add value to an organization today.

The changes in the technology scene have happened in a continuous way and it evolves swiftly. According to an article published by McKinsey Quarterly (Bughin, Chui, & Mankiya, 2010), Facebook has quintupled in size to become a network of 500 million members. Almost 4 billion people use mobile phones, and for 450 million of those people, the Web is a fully mobile experience.

The same article says that the way information technologies are deployed are changing, as new development such as virtualization and cloud computing reallocate technology costs and usage patterns. New possibilities for new business models are also created as consumer patterns also change. McKinsey points out that the technology environment is raising serious questions for executives about how to help their companies capitalize on the technological transformations under way.

Many available advances in future technologies and innovation in computer and communication sciences have been observed and many others will be observed during the

coming years. Advancing technologies and their swift adoption are upending traditional business models (Bughin, Chui, & Mankiya, 2010).

There are many predictions about future technology available today, but the most tangible solutions are related to travel replacement technologies such as conference calling, telepresence, avatars, and robotic stand-ins. In addition, the world is witnessing new discoveries, innovations and adaptations that combine living and non-living systems. By 2020, the growth of teleconferencing using intelligent avatars capable of standing in for people attending meetings is expected. These avatars may be augmented by tiny, portable experts systems that can support decentralized decision-making processes (Creighton, Ouye, & Langhoff, 2009).

Real and virtual worlds will be integrated. Virtual reality programs will be further developed, allowing individuals the experience of being able to travel nearly anywhere on the globe and to interact with others just as they would in reality (COST European Cooperation in Science and Technology, 2009).

Through the network, people will access and interact with their offices, files and family in both physical and virtual worlds. High-definition telepresence will be available in almost all buildings, including homes. Companies will turn even more towards collaborative technology in response, for example, to cost-reduction initiatives (Creighton, Ouye, & Langhoff, 2009).

3.5.3 Changes in the global context

Literature reviewed shows some changes in the global context making an impact in the way people work. Those changes are related to demography, community development, increased energy demand, and climate.

Changes in demography

Worldwide, demographic trends show some of the most dramatic changes in hundreds of years. Fertility rates are declining in most of the world, and most Western European countries now have declining populations. By 2020, less than half of the world will be producing enough children to replace itself (Creighton, Ouye, & Langhoff, 2009).

Asia and Latin American countries are experiencing some benefits of these changes, because they have a large bulge of working-age adults. In the next decade, 1.2 billion people will come into the age of employability; of these 90% will be in the developing and emerging markets. This youth bulge can be viewed as dangerous or as an economic dividend. The threats will mainly affect countries with high rates of youth employment and having problems creating new jobs. On the other hand, most developed countries will need to continue their population growth fuelled not by replacement births, but by immigration. These countries will need to compete to have access to a younger and highly educated group of immigrants from countries such as Brazil, Russia, India and China in order to close the gaps between the available job force and the labor force that is actually needed (Creighton, Ouye, & Langhoff, 2009).

By 2020, all those who were born between 1946 and 1960 will have reached normal retirement age (65 years old), but there are many indications that most of them - and many of those who are born later - will continue working during their retirements years (although not necessarily in their current jobs), creating a situation where several age generations – and their ways of working – will come together at their workplaces (Creighton, Ouye, & Langhoff, 2009).

Community development

Cities will continue to be the center of the creation of new knowledge. Large cities with a critical mass of professionals will continue to grow. Those without the services and attractions for those professionals will wither away. Richard Florida wrote in 2009 that "*Well-educated professionals and creative workers who live together in dense ecosystems, interacting directly, generate ideas and turn them into products and services faster than talented people in other places can"* (Florida, 2009).

According to the study *City Living Helps Limit CO2 Emissions* (Hodson, 2009) cities are more location-efficient, meaning key destinations are closer to where people live and work. They require less time, money, fuel, and greenhouse emissions for residents to meet their

everyday travel needs. The study quotes Scott Bernstein, president of the Center for Neighborhood Technology, who said "*people can walk, bike, car-share, take public transit. Residents of cities and compact communities generate less CO_2 per household than people who live in more dispersed communities like many suburbs and outlying areas".* Since commutes account for about 60% of travel needs, reducing commutes by working at home or sites closer to home would alter these results.

Increased energy demand

Some recovery signs have been identified in some major economies, leaving behind the effects of the financial crisis from 2008. At the same time this recovery process happens, the demand for energy is increasing. The demand for oil from developing countries has increased recently, and some research studies say oil production has peaked and it will be in decline. Furthermore, costs of extracting oil in new fields have dramatically increased compared with the older fields. A higher demand for oil and higher production costs will push oil prices to even higher levels. As a consequence, air transportation will be more expensive, making some parts of the planet inaccessible for normal travel (Creighton, 2009).

A higher concentration of people living in cities will gradually happen due to the reduction of commuters. As distance equals money, the cost of transportation wipes out advantages of production in lower-wage countries and some possible shock programs for non-petroleum energy production will be implemented (Creighton, Ouye, & Langhoff, 2009).

Climate change

NASA published on internet the following facts about climate change: *"Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted and trees are flowering sooner"* (NASA - National Aeronautics and Space Administration, 2010).

NASA also says that *"the effects that scientists had predicted in the past would result from global climate change are now occurring: loss of sea ice, accelerated sea level rise, and longer, more intense heat waves".* Climate change caused by human activity could lead to large-scale food and water shortages and have other catastrophic effects on life (NASA - National Aeronautics and Space Administration, 2010)

To avoid these effects, some governments in developed countries are thinking about the creation of some form of carbon tariff or worldwide "cap and trade" legislation. In the near future, some corporate emissions rating systems linked to this cap/trade system can be developed. The premise will be "companies must be responsible, not just for profits, but for the wellness of their workers and the planet" (Creighton, Ouye, & Langhoff, 2009).

3.6 Office space solutions

This section will take a look at the reasons companies have for initiating the development of new building projects or new workplace solutions, and the choices they must make. It will also summarize the existing solutions for work spaces available in office buildings today.

To describe the future physical elements of the workplace, the knowledge about the work that will be done and the physical spaces where these work activities will occur is required.

3.6.1 The reason: business objectives

The main purpose of an office building is to support the processes of those who are working inside and are responsible for carrying out tasks and executing activities in a cost-efficient way. It is also expected that the office building satisfies user requirements related to the services necessary to satisfy people's basic needs. Office buildings also have a role in defining a company's image, since they have a social and symbolic function (van Meel, Martens, & van Ree, 2010).

According to van Meel et al., there are nine objectives that are often associated with new office concepts. A short description of these nine objectives follows:

1. Enhance productivity

The term productivity is understood here as the "*balance between the total occupancy costs of a workplace and its contribution to employee performance"* (van Meel, Martens, & van Ree, 2010, page 22). Among the factors influencing productivity in the workplace are ergonomics and indoor climate (hygiene factors) and the work spaces created to support the tasks and activities of people. There are other factors that have an impact on productivity such as salary, social working environment, etc., but these issues will not be address at this moment in this report.

There are many research studies related to workplace productivity, but the results obtained in these studies reflect the complexity and difficulty of approaching and measuring productivity in the workplace (New Ways of Working Network, 2010).

2. Reduce costs

Costs related to property management can be reduced if the space utilization rates in office buildings increase. Better indicators of workstations per square meter can produce savings in space costs. Companies have utilized some tools to increase office space rates including desk sharing and standardization of workstations recently.

3. Increase flexibility

Due to the changing nature of tasks and work processes executed by employees in an organization, it is essential that work spaces have the capability to adapt in an agile way. It is essential that these adaptations happen with the minimum impact on business operations in order to reduce interruptions of work processes, and in a cost-effective way.

To make sure these adaptations can be done after the building is finished, different types of flexibility can be necessary: *building flexibility* (extension, division, and sublet of the building), *spatial flexibility* (changes in the layouts of the office floor plan), and *workplace flexibility* (workstations that can be flexibly used for more than one employee) (van Meel, Martens, & van Ree, 2010)

Arge & Blakstad (2010) use the term adaptability to refer to the ability of buildings to react to internal and external changes. These authors make a distinction of the different ways a building can be addapted to these changes using three types of strategies or physical measures: generality, flexibility and elasticity. *Generality* refers to the ability a building has to adapt the use of space for different purposes without changing its properties; *elasticity* relates to the ability of a building to increase or reduce its space based on needs, while *flexibility* is understood as the ability to satisfy changes in demand by changing a building's properties. In addition, Blakstad (2001) proposes the term *extendability* to refer to the posibilities a building has to be extended, horizontally and/or vertically. Figure 3-6 shows a visualization of these concepts.

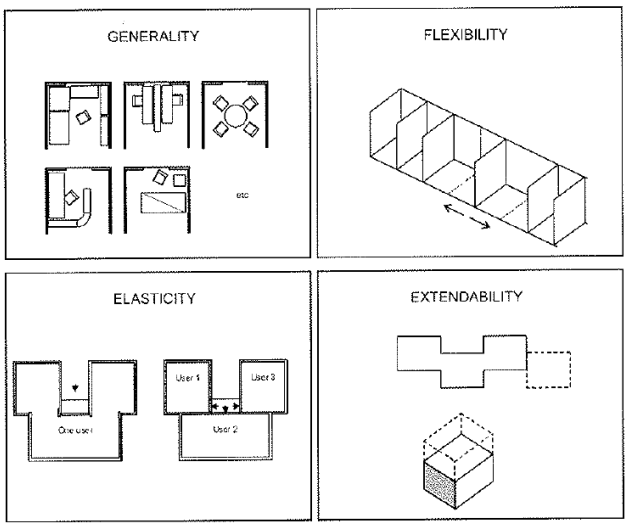


Figure 3-6: Generality, elasticity, flexibility and extendability (Blakstad, 2001)

4. Encourage interaction

The way employees in an organization interact with one another is a critical factor in the achievement of business objectives and results. The way people share their knowledge and experiences is essential to compensate for the lack of competencies in some parts of the organization. This fact becomes even more relevant when competencies are needed across country boundaries and the access to high-competent talents is scarce. Knowledge-sharing can support improvements in the learning processes of an organization and teamwork, also enhancing social cohesion and the development of new ideas that can lead to new products and more profits.

The way the physical layout of the places people work is shaped plays an essential role in the way people interact. According to van Meel et al. (2010, page 23)) "*floor plans localize people and can thereby stimulate or hinder interaction*". Office design solutions can stimulate interaction by creating social areas in office landscapes, such work lounges or coffee bar areas, or by removing physical obstacles such as walls by using transparent divisions.

Depending on the business processes and tasks to be executed by employees in an organization, it becomes essential to find the balance between the physical collaborative spaces that support interaction and creation of new ideas, and the private physical spaces needed for social and visual privacy.

5. Support cultural change

Office design can become a catalyst of change made in the culture of a company. Buildings and office space are tangible and permanent, and can create an immediate effect on the way people perceive the mentality, management style and work practices in an organization. Therefore office design can have a higher level impact than other tools used to communicate a cultural change in a company.

6. Stimulate creativity

By using attractive colors and patterns in the office, and including as part of office inventories some non-traditional elements far from the idea of the traditional desktop, chair and shelves, companies are stimulating and supporting the creative process of their employees. For some organizations, creativity and innovation is vital for survival in a challenging business environment, and that is one of the reasons this capability has played a more preponderant role in office design during the last decades. The stimulation of creativity and the creation of possibilities for more innovation will be dependent on the type of organization and the characteristics of its tasks. Office design solutions will then need to adapt to these organizations' needs. Creativity is seen by some organizations as a risk in the execution of, for example, manufacturing-related processes.

7. Attract and retain staff

Attracting and retaining staff has become a critical issue for business survival in many organizations. The challenge of recruiting the talent needed to fulfill the demand for

competencies in determined work processes plays a more important role now than some years ago. The same happens when companies need to retain those employees and key resources who have acquired the knowledge and know-how during many years at work.

To support this process, organizations have recognized the importance of using office design solutions to create attractive offices and facilities and use them to help attract employees. The same is done to keep staff satisfied with their working environment.

8. Express the brand

Office design solutions equipped with state-of-the-art technology, eye-catching brainstorming rooms and generous spaces for informal communication have become a trend to support and express branding in organizations. Branding tries to create a particular image or perception of an organization, products or services among its customers or other relevant stakeholders. Marketing campaigns are normally associated and recognized as effective tools to support branding, but the physical work environment has been now accepted as a driver in communicating a message or identity from a company to customers.

9. Reduce environmental impact

Companies all over the world have been under pressure from environmental organizations and influenced by younger generations - who are more conscious about the impact business activities can have in the environment - to practice corporate social responsibility and implement actions to reduce their footprints, reduce CO_2 emissions and energy consumption.

The decision of a determined office solution or the implementation of alternative workplace programs can have a considerable impact on the footprints of an organization. For instance, by introducing a desk-sharing policy, companies can increase office space utilization rates and reduce the unnecessary use of building cooling systems, heating, ventilation, lighting, and maintenance.

The authors make clear that these objectives are often related to one another, but some of them can also be in conflict. For example, the reduction of costs can conflict with a company's desire to increase employee satisfaction levels.

3.6.2 Crucial decisions

There are six critical topics for decision-making when organizations translate their business objectives into concrete workplace solutions (van Meel, Martens, & van Ree, 2010). Those are related to the location (where) and the way (how) the activities are executed. Furthermore, organizations need to take into consideration and evaluate the variables influencing the decisions concerning what kind of work spaces will support best those activities, and the implementation of IT tools and new technologies in the organization's ways of working. Based on the categorization made by these authors, a brief description of these six critical choices follows:

1. Location

Location is related to the physical place where employees execute their daily tasks and whether they work in a corporate building office or whether they use other places such as clients or projects offices, home, or public places such libraries, coffee shops.

2. Use

This term relates to the possibility employees have - or not - of sharing workstations in a building, or if they will be assigned a determined workstation in a specific office area in the building.

3. Layout

The choice concerning the way the office landscape is shaped, with or without walls, or a combination and balance of both.

4. Appearance

The way office spaces look and feel to both employees and people visiting them in a corporate building will vary based on the interior design of these work spaces. Office design is a visible way of expressing the culture and identity of an organization.

5. Filing

The amount of space assigned to the storage of archives in an organization is determined by the volume of paper files and documents a company needs to keep saved during some specific period. The access to new tools that allow the storage of documents in a digital way has reduced the need for space for those files. There is still work to be done in the current ways of work in order to move from a semi-digitalized office to a full virtual and paperless office. Meanwhile, the assignment of some areas to archive storage in office buildings will still be needed.

6. Standardization

A specific office design in an organization can be the result of a standardized workplace solution for all the departments, or can be the result of adaptations made in each department considering the previous topics mentioned before independently. The decision on whether a one-size-fits-all solution or different solutions are implemented in an organization will depend on the work processes the departments execute, the people working there, and the company culture.

3.6.3 Current work spaces solutions

According to Vos, Van Meel and Dijcks (1999), work can be done in different settings, depending on the several *places, spaces and uses* given to the physical locations where work is done. Figure 3-7 shows these three types of settings.

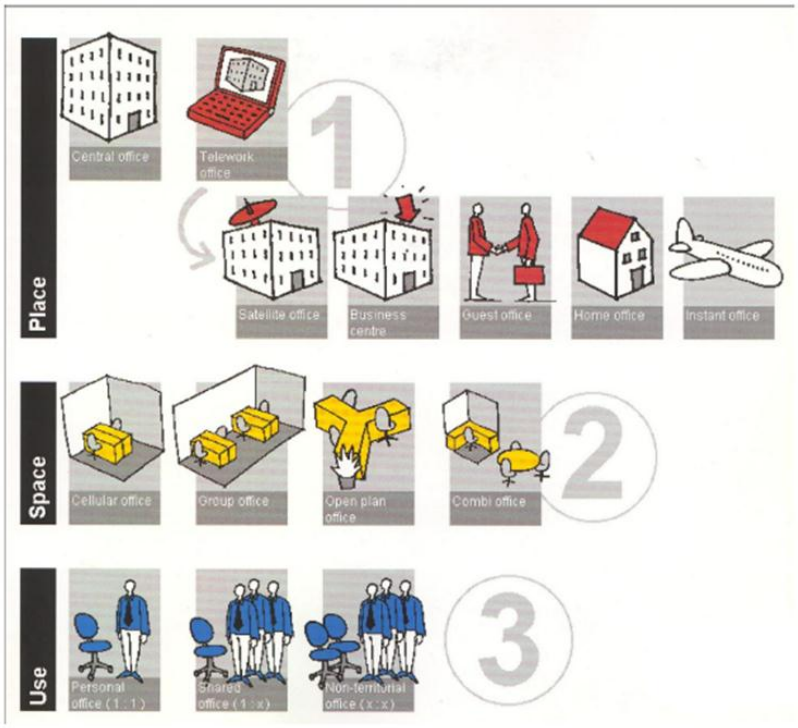


Figure 3-7: Different workplace solutions (Vos, van Meel, & Dijcks, 1999)

Based on this categorization and beginning with *places,* it is possible to find people working at corporate buildings and/or in other type of locations based on telework such as satellite offices, business centers, guest offices, home offices, airplanes, trains, boats, etc. When it comes to *spaces,* work can be done in a cellular office and/or a group office, open plan office, or using a combination of these. Finally, the *use* assigned to each office will vary depending on the number of employees assigned to each workstation. It will therefore be possible to have individual desktops assigned to each one of the employees using a one-to-one ratio (personal office), or a desktop shared by two or more employees (shared office), or a non-territorial office where no employees are assigned to any office area or workstation.

Tables 3-1 and 3-2 describe several office spaces taken from van Meel, Martens, & van Ree, Planning office spaces. After a short explanation, each office space is described focusing on the use and activities this space supports, including advantages and disadvantages.

The office spaces are grouped in three categories, work spaces, meeting spaces, and support spaces.

Work spaces

Space	Description	Use and activities	Advantages	Disadvantages
Open office	Open work space for more than ten people, suitable for activities that need relatively little concentration	Solo work requiring relatively little concentration, such as basic administration Collaborative work requiring frequent interaction between people Creative work requiring an atelier-like setting	Efficient utilization of space Ability to increase density of work stations High degree of spatial flexibility (easy to rearrange) No physical barriers to communication, which can improve interaction and workplace learning	Limited acoustic and visual privacy Not suitable for work requiring confidentiality No possibilities for individual climate control
Team space	A semi-enclosed work space for two to eight people; suitable for teamwork that demands frequent internal communication and medium level of concentration	Collaborative work requiring frequent interaction within teams Solo work requiring medium concentration such as PC work	Efficient utilization of space Relatively flexible because medium-high partitions are easier to move than ceiling-high partitions No physical barriers to communication within teams, which can improve interaction and workplace learning	Lack of acoustic privacy, limited visual privacy Not suitable for work requiring confidentiality No possibilities for individual climate control
Cubicle	A semi-enclosed work space for one person, suitable for activities that demand medium concentration and medium interaction	Solo work requiring medium concentration such as PC work Work requiring medium to little interaction between people	Efficient utilization of space Relatively flexible because medium-high partitions are easier to move than ceiling-high partitions	Limited acoustic and visual privacy Not very suitable for work requiring confidentiality Very few possibilities for individual climate control The highly individual character of cubicles can inhibit workplace learning and interaction
Private office	An enclosed work space for one person, suitable for activities that are confidential, demand a lot of concentration and include many small meetings	Solo work requiring high concentration, such as analyzing complex information Work requiring a high degree of confidentiality and many small meetings alternated with regular desk-based activities Activities that can be disturbing and distracting for others, such telephone calls	Provides acoustic and visual privacy Very suitable for work requiring confidentiality Can be used as marker of status Can be used as a meeting room by others when empty Excellent possibilities for climate control	Relatively expensive because enclosed offices demand more space and require enclosing walls Inflexible since ceiling-high partitions cannot easily be moved Danger of low utilization rate May block communication and knowledge exchange with co-workers, unless there is an open-door culture

Space	Description	Use and activities	Advantages	Disadvantages
Shared office	An enclosed work space for two or three people, suitable for semi-concentrated work and collaborative work in small groups	Work requiring mix of concentration, such as collaborative research and development Collaborative work requiring frequent impromptu interaction between two or three people	Provides a reasonable amount of privacy and confidentiality among the room's users Fairly good possibilities for individual climate control Generally appreciated by users for balancing privacy and interaction	Relatively expensive because enclosed offices demand more space and require enclosing walls Inflexible since ceiling-high partitions cannot easily be moved Danger of low utilization rate May block communication and knowledge exchange with co-workers, unless there is an open-door culture
Team room	An enclosed work space for four to ten people; suitable for teamwork that may be confidential and demands frequent internal communication	Collaborative work requiring frequent interaction within teams Solo work requiring medium concentration such as PC work Work requiring a certain degree of confidentiality	Provides a certain amount of privacy and confidentiality as well as team interaction Team setting stimulates free flow of knowledge and workplace learning within teams Fairly good possibilities for individual climate control	Floor-to-ceiling partitions negatively impact the cost efficiency and flexibility Danger of unpredictable utilization rates (often used during a project, empty when it is finished) Teams are separated from the rest of the office
Study booth	An enclosed work space for one person, suitable for short-term activities which demand concentration or confidentiality	Solo work requiring high concentration and high degree of privacy Activities that can be disturbing or distracting for others Mostly used on a bookable basis for temporary use by flexible or mobile employees	Efficient utilization of space when frequently occupied Provides a lot of privacy and confidentiality Excellent possibilities for climate control	Difficult to guarantee availability when not used on a bookable basis Protocols for use are recommended
Work Lounge	A lounge-like work space for two or six people; suitable for short-term activities which demand collaboration and/or allow impromptu interaction	Solo work requiring relatively little concentration, such as reading trade journals Collaborative work requiring informal interaction between a few people Temporarily used by flexible employees	Efficient utilization of space when frequently occupied Can act as overflow space for peak periods of high occupancy Enables discussions to take place away from open and semi-enclosed workstations	Limited privacy and confidentiality No possibilities for individual climate control Lounge furniture can be expensive
Touch down	An open work space for one person; suitable for short-term activities which require little concentration and low interaction	Work requiring little time and little concentration, such as checking e-mails Temporarily used by flexible employees	Efficient utilization of space Can act as overflow space for peak periods of high occupancy High degree of spatial flexibility	Only suitable for a limited range of office activities Lack of acoustic and visual privacy

Table 3-1: Workspaces according to van Meel, Martens, & van Ree, 2010.

Meeting spaces

Space	Description	Use and activities	Advantages	Disadvantages
Small meeting room	An enclosed meeting space for two to four persons, suitable for both formal and informal interaction	Suitable for small meetings Suitable for confidential discussions Often used without booking	Size suits majority of scheduled meetings and confidential discussions Can be used as bookable workstations when not used for meetings	Availability cannot be guaranteed Due to its small size, not very suitable for presentations that require a data projector
Large meeting room	An enclosed meeting space for five to twelve people, suitable for formal interaction	Suitable for scheduled meeting with groups Suitable for confidential meetings Suitable for presentations In most cases centrally booked and maintained	Can be converted to smaller rooms when folding walls are used Can also be used as a brainstorming room when properly equipped Can also be used as work space for project teams when space is scarce	Needs rules for use and policy for no-shows Utilization tends to be high at certain times only
Small meeting space	An open or semi-open meeting space for two to four persons, suitable for short, informal interaction	Suitable for small ad hoc meetings Suitable for non-confidential discussions Often used without booking	Size suits majority of ad-hoc meetings and non-confidential discussions Encourages informal meetings and networking since there is no need to book in advance Can be used as informal workstation or waiting area when not used for meetings	Due to its informal use, availability cannot be guaranteed Noise can be distracting to adjacent staff Lack of privacy and confidentiality
Large meeting space	An open or semi-open meeting space for five to twelve people; suitable for short, informal interaction	Suitable for large informal meetings Suitable for non-confidential meetings and presentations Suitable for small social office events Often used without booking	Encourages informal meetings and networking No need to book in advance Can be used as informal workstation or waiting area when not used for meetings	Due to its informal use, availability cannot be guaranteed Noise can be distracting to adjacent staff Lack of privacy and confidentiality
Brainstorm room	An enclosed meeting space for five to twelve persons, suitable for brainstorming sessions and workshops	Suitable for brainstorming sessions and workshops, semi-confidential presentations and discussions In most cases, centrally booked and maintained	Can also be used as a large meeting room when properly equipped Can stimulate creativity and innovation when properly designed and equipped	Danger of unpredictable utilization rates
Meeting point	An open meeting point for two to four persons, suitable for ad hoc, informal meetings	Small and short ad hoc meetings Suitable for non-confidential discussions	Facilitate impromptu meetings and encounters Can be used as waiting areas for visitors	Noise can be distracting to adjacent staff Limited privacy and confidentiality

Table 3-2: Meeting spaces according to van Meel, Martens, & van Ree, 2010.

Support spaces

In addition to work and meeting spaces, space is needed for the execution of support activities in an office space. According to van Meel, Martens, & van Ree (2010), it is possible to find open, semi-open or enclosed spaces to support the following activities:

- ***Filing:*** for storage of files and documents.
- ***Storage:*** for storage of office supplies.
- ***Print and copy area:*** for printing, scanning and copying.
- ***Mail area:*** for pick up or delivery of personal mail.
- ***Pantry area:*** for storing coffee, other beverages and snacks.
- ***Break area****:* for taking a short break from work.
- ***Locker area:*** for storage of personal belongings.
- ***Smoking room*****:** for smoking cigarettes.
- ***Library:*** for reading books, journals, and magazines.
- ***Games room:*** for playing games with colleagues.
- ***Waiting area*****:** for receiving visitors.
- ***Circulation space*****:** for the circulation of people on office floors.

3.7 Shaping the future workplace today

Changes in the future workplace require taking action today.

This section presents briefly how this change process can be supported by some techniques and tools. These will be later used to compare how Statoil deals with this kind of change process.

Bringing together the different work, meeting and support spaces to a concrete office design solution is a complex and critical task. Therefore, it is essential to define the organizational objectives to be achieved at an early stage in order to determine the office concepts needed for the organization and decide what type of office spaces best meet these objectives.

In addition, and according to some authors, it is an advantage to launch a vision-driven workplace when working on this kind of planning process. By defining a future idea of the workplace, the employees of an organization will commit to a common decision and the direction set by this vision, facilitating faster and purpose-oriented decision-making processes (Becker & Fritz, 1995).

In order to illustrate future ideas of the workplace, companies have utilized methods to help them establish a common understanding of future ways of working. Archetypes are intended as tools for describing an individual's story, and have certain patterns or elements that help people to identify with them (Gjersvik & Blakstad, 2004a). By applying the use of archetypes, a future workplace vision can be translated in more concrete terms for an individual in a company since archetypes can represent some roles present in the workforce of an organization.

The Dutch office of Microsoft Corporation in Amsterdam has applied these archetypes to make a representation of new ways of working when moving to a new office building. Microsoft attached "personas" to the archetypes that describe an almost real-life person and how she or he goes through different scenarios or a description of a future way of performing an activity (van der Bie, 2010b).

In a more academic environment, knowledge work archetypes are defined as both process tools to develop workplace design and knowledge mediators that may carry learning from one case to another.

The idea is to utilize these archetypes to communicate how people work, and then develop physical solutions to support these kinds of work. This is based on the assumption that different kinds of knowledge work may need different kinds of spatial support or space (Gjersvik & Blakstad, 2004b). According to these authors, archetypes should be detailed and generic, descriptive and evocative, locally meaningful, globally recognizable, and relevant.

Furthermore, within the context of organizational change, *pilot projects* can be thought of as a kind of living simulation, a chance to experiment with altered states of consciousness associated with new ways of working without having to completely abandon all of the familiar routines (Becker & Fritz, 1995). Pilot projects can allow people who are open to new ways of working to test the ideas before they are implemented companywide.

The development of an organization's new ways of working and workplaces cannot occur without the support of at least a couple of top management executives who feel that a change is needed and who are committed to spending time and attention supporting the development of a workplace that enables long-term organizational objectives (Becker & Fritz, 1995).

4 Results

This chapter includes the results obtained in this research study after carrying out the methods and procedures described in Chapter 2 Methodology.

The results are structured in two sections:

- The first part shows three possible future ways of working in Statoil using the framework to analyze future ways of work and Statoil's global corporate scenarios. This is presented using a table: "Statoil's future ways of working".

- The second part is a case description to study the impact of future ways of working on the design of future work spaces. One of Statoil's current building projects is used as a concrete example. The case study shows how Statoil has approached the challenge of developing new office spaces and the context in which this is happening. The case study is introduced in this report as "Statoil's future work spaces".

4.1 Statoil's future ways of working

Statoil's global scenarios have been utilized to develop the idea of Statoil's future ways of working. External factors and workplace trends have been brought together and applied to these scenarios to develop Statoil's view of possible outcomes of the future.

To present the results, a framework to analyze ways of working is utilized. It consists of two elements: *Statoil's corporate global scenarios* and the four *dimensions of work* (Vartiainen, et al., 2007) presented in Chapter 3.

A representation of this framework is illustrated in Figure 4-1.

Figure 4-1: Framework to analyze future ways of working

Table 4-1: Statoil's future ways of working shows each global scenario analyzed in relation to the four dimensions of work, according to Vartiainen, et al. (2007). A column thereby constitutes a certain way of work that may occur in the future. Each row represents one of the four dimensions of work.

The results presented in Table 4-1 were obtained as part of an action research study as described previously in Chapters 2.2.3 and 2.4.

	MoneyWorks	NetWorks	PatchWorks
WHAT IS DONE	More individual ways of working and getting things done. More focus on economic personal benefits: "I live to work".	More collaborative ways of work. Focus on sustainability, climate change impact and CO2 emissions reduction.	Everyone works leaner and quicker, but the era of the multinational corporation is over as protectionist measures and access constrains prevail.
WHO DOES IT	Lack of competence and expertise causes an increase in demand for freelancers and consultants. Migration of highly competent resources from less-developed to highly developed countries. Older generations will remain in work longer, but they will not necessarily work for the same employer after retirement age.	Different members of a team distributed geographically work together on the same assignment. People work locally to lessen impact on climate change. Migration becomes restricted. Attracting and retaining good workers is increasingly a core challenge, especially as baby boomer generation retires.	Migration is relatively low and access to core competence is a challenge. India becomes the world leader on export of intellectual capital.
HOW IT IS DONE	More project-based ways of work. High penetration levels of new technologies in society.	Technology support collaborative efforts. Less travel, more virtual interaction. Use of innovative solutions: nanotechnology.	People cannot meet face to face. There is a lot more information available. Work is done locally, using local supply sources and by rationing. Minimum travel. More energy efficiency measures
WHERE AND WHEN	Several locations depending on task assignment. Mobility increases. Global workers highly dependent on air travel. Corporate buildings exist, but they use less area.	Working at home or in co-working centers near home prevails. Augmented realities and virtual work increase due to technological development.	Increase of population in mega-cities makes commuting almost impossible. Co-working centers and virtual work prevail
	WAY OF WORK 1	**WAY OF WORK 2**	**WAY OF WORK 3**

Table 4-1: Statoil's future ways of working

4.2 Case study: Statoil's future work spaces

This is a case study prepared during the autumn 2010. The procedure utilized to carry out this case was previously explained in Chapter 2.

This research study aims to study new ways of working in a global organization and the impact of these new practices in the development of future work spaces.

The purpose of this case study is to validate the results of this research.

This case makes use of Statoil's new office building located in Fornebu (outside Oslo, Norway) as an example to illustrate future work spaces and the processes which led to them.

Due to the prioritization of international project and operational deliveries, the growing globalization of Statoil's activities has created the need to find solutions that support business processes globally. New business challenges have appeared, and the need of new collaborative solutions has increased recently.

Collaboration is regarded as a key issue in delivering business value in Statoil. *"To deliver in the position we have earned, hard work, leadership and collaboration will be required",* said CEO Helge Lund to leaders participating in a corporate summit in March 2010.

Statoil has been recognized as an industry leader in the application of collaboration in its Exploration and Production business segment through its Integrated Operations (IO) initiative (Collaboration Consortium, 2009). The aim of this initiative is to use real-time communication to improve the efficiency of interaction between disciplines and decision makers, regardless of geographical location. Fiber-optic cables and solutions for high-speed communication connect platforms, people, and computers in a new way, opening the paths for improved collaboration.

After the merger with the oil division of Hydro, Statoil managed to increase the use of video conferences by ten times in 20 months. This made a remarkable change in behavior, and provided the company with increased capacity and innovation capability, in addition to considerable cost reductions and improved work-life balance.

At the present time, Statoil makes Unified Communication solutions available. These solutions allow Statoil more flexible communication and drive efficient ways of working globally even further.

When it comes to workplace solutions, Statoil's standard workplace solutions are based on a traditional idea of work with fixed, team-based collaborative relationships and conventional interaction methods in collocated work settings (Weiseth & Beltran, 2010).

4.2.1 Business drivers

The international and rapidly changing nature of Statoil's activities creates the need to find new and more effective ways of work in order to remain competitive. To take advantage of the existing competence, utilizing the know-how and expertise of Statoil's employees in projects around the world, more collaboration across the organisation is needed.

Collaboration within the processes and networks will remain important, but the effects of Statoil's collaborative efforts can be strengthened if the company also increases the focus on the ways employees work generically across processes (Espedal, 2011).

Information Technology is rapidly changing, and so are the expectations of people using it. To get the full effect of the possibilities new IT solutions can create, and utilize the best practices Statoil already knows, it is necessary to look at factors and trends that are making an impact on the ways we will work in the future and promote these best practices today.

4.2.2 Easy to Work: Statoil's workplace vision

In November 2009, Statoil introduced a new corporate vision, *Crossing energy frontiers,* and defined the overall ambition of the company: *Globally competitive – an exceptional place to perform and develop* (Statoil ASA, 2010b).

According to this vision, Statoil is standing at a new frontier and has the possibility to make significant changes in the ways their employees will work and collaborate during the next decade (Statoil ASA, 2009b).

These changes will require strong leadership that sets the target and drives performance. The CEO of Statoil, Helge Lund, in a newsletter published on Statoil's intranet in January 2010,

said "*the company must work to find new and more intelligent ways of working*" (Statoil ASA, 2010c).

"Build a global organization and common processes" is part of Statoil's ambition to action and delegated to Corporate Staff Officer (CSO) in 2010. One of the delegated activities within this action was "*Drive new ways of working, collaboration and problem solving facilitated by information technology"*. Corporate Information Management and Technology (CIMT) was given the responsibility for executing this activity. One of the deliveries within this activity was "Shape the future Statoil workplace".

The development of an idea of Statoil's future workplace was executed during the second half of 2010. A cross-functional work group with representatives from the corporate staff functions was established. The group included representatives from Corporate Communication, Human Resources, Health, Safety and Environment, Information Management and Technology, Management Systems, Facility Management, and the internal provider of support services in Statoil, Global Business Services (GBS).

The cross-functional group acted as a reference group to ensure the quality of the work and validate the results presented by the team responsible for this initiative. The author of this report was part of this team and actively engaged in this work, doing the necessary research, creating the documents needed by the cross-functional group, and preparing the final version of the document that was presented to the management group of the Corporate Staff Officer in December 2010. The work was supervised by Statoil collaboration manager, Per Einar Weiseth.

The strategic thinking process the work group engaged in aimed to conceive a likely workplace future and to explore the paths leading to it. This resulted in a vision of Statoil's future workplace that the company can believe in, making possible the identification of possible implications and actions necessary to achieve it.

The work initiated in 2010 is still in progress and some actions required to realize the idea of Statoil's future workplace have been implemented by corporate staff functions already in 2011.

According to this vision, Easy2Work (Weiseth & Beltran, 2010), Statoil's workplace will be more *collaborative, agile, mobile, visual, global, diverse, and over all hyper-connected.*

Statoil's future workplace will be more **collaborative**, allowing people to communicate, create and connect in order to achieve better results. Employees will exchange experiences and knowledge using more collaborative IT tools. More collaborative space will be needed to support employees' needs for collaboration.

Workplaces will be more **agile:** Work settings will be more flexible and will change even faster due to the flexible nature of communication methods, work processes and rapid

development of new technology and IT solutions. Work will be done anytime and anywhere, requiring a more **mobile** workplace, moving from fixed workplace solutions to more dynamic and adaptable ones.

Workplaces will be more **visual**, requiring tools and methods to show ideas, facilitate brainstorming sessions, support decision-making processes and collaborate. Increasing video capabilities to communicate and connect employees separated by geography will become a priority.

In addition to the internationalization of Statoil's activities, and due to the scarce access to qualified competencies and resources, Statoil's workplace will become more **global**. This globalization process will create challenges concerning time zones and the need for more asynchronous ways of communication and the need to increase video meeting capabilities to support synchronous communication. Statoil's future workplace will be more **diverse**; a more multicultural and multilingual workforce will be a characteristic of the future workforce in Statoil, including a broader spectrum of generations including those who will not retire and continue working after pension age to compensate for the lack of qualified personnel.

Following the development of social networks, Statoil's future workplace will become **hyper-connected**. Employees will connect using both external and internal social networks to share their knowledge and interests, as well as develop discipline networks.

The characteristics of the future workplace are defined and elaborated on using the perspective of an individual working in Statoil. Annex C.1 Capabilities of Statoil's future workplace, describes these characteristics.

4.2.3 Use of Statoil's personas

To illustrate even more how the idea of Statoil's future workplace will impact the ways of working for its employees, Statoil developed profiles representing the most characteristic roles in the organization.

Seven profiles were chosen as representatives of Statoil's workforce:

- Operator off/on-shore
- Administrative support services
- First line managers
- Discipline experts
- Project member
- Business Analyst/Developer
- Executive Vice Presidents, Vice Presidents

Those profiles are created using the seven capabilities of the future workplace presented in 4.2.2. These seven characteristics will have different relevance to people in different positions. Annex C.2 Statoil's personas, describes these profiles.

4.2.4 Statoil Personas applied to tasks or work processes

Based on the profiles or Statoil's personas described in Chapter 4.2.3, Statoil elaborated on them even further to illustrate the profile's ways of working.

The representation of these ways of working for a specific profile was described and structured as follows (Weiseth & Beltran, 2010):

- Task overview, or an illustration of the daily tasks executed by the profile during a week
- Based on these tasks, a simplified analysis of collaboration needs for the profile
- Afterward, a representation of the physical and virtual elements that support the execution of the profile's daily tasks
- Finally, an overview with the main conclusions taken after analyzing the ways of work and workplace for the profile.

An example of this representation of the ways of work of a concrete profile is presented in the Appendix section of this report. Annex C.3 Ways of working of a Statoil's profile shows a representation of the tasks executed by one of the Statoil's profiles.

4.2.5 Vision translation: Statoil's future work spaces

Facility Management in Statoil has defined four physical spaces or environments that employees could use to work in the future (Torsvoll, 2010). These physical spaces could become solutions that respond to the external context, current work trends and working context mentioned in the previous chapter.

Work at the office

Work in an office building the same way it is done today, but reducing current levels of office space utilization. Buildings become more social hubs and meeting places to socialize and collaborate.

Working at home

Work from a home office. No commuting needed, enabling flexible, family-friendly work days, especially when children are small.

Working at a co-working or community center

Work from a co-working or local community center close to home, within walking distance. This will become a simplified version of today's office buildings, especially for mega-cities where commuting will cause a loss of effective time due to travel time and quality of family life.

Working anytime and anywhere

A lot of travel, no specific daily office location, limited time on each office building. Virtual realities will substitute the need for space.

Figure 4 2: Expected change in office space utilization illustrates the shift from traditional office space to more alternative physical work spaces. This diagram is not based on actual data, but only what Statoil expects will happen in the future.

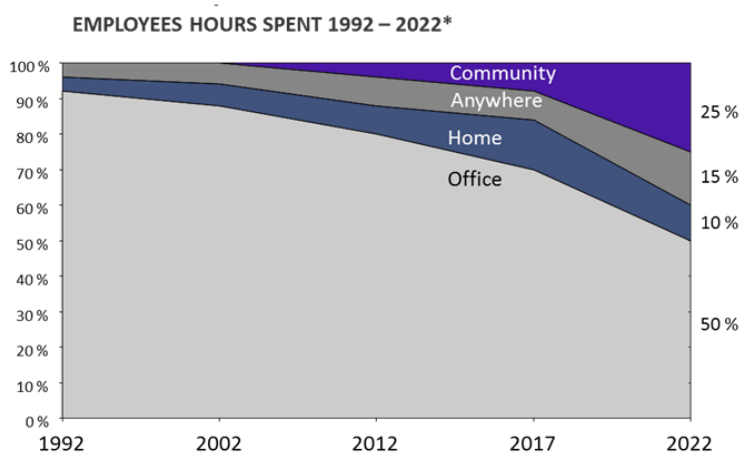


Figure 4-2: Expected change in office space utilization (Weiseth & Beltran, 2010)

In the future, office space utilization levels will be reduced due to a decrease in the demand for the current workplaces. The use of various spaces will vary, depending on the type of work and interdependence of tasks to be done.

Statoil believes that a change process will occur gradually over the time. The four physical spaces mentioned before will exist together, changing their preponderance and importance as the penetration of new technologies and implementation of more effective ways of work are a reality.

4.2.6 Statoil's new office building: Project Co-Location Oslo 2012

Statoil is planning and executing several building projects in Norway and in other locations abroad. The most relevant ones, considering the number of square meters of office space and number of workplaces involved are: the project Co-Location Oslo 2012 located outside the city center in a suburb called Fornebu, the project VISA (Vision Sandsli) in the city of Bergen, the project Stjørdal, a town near the city of Trondheim, and the collocation activities in Stavanger, where the company has its headquarters.

The project executions outside Norway are related to the establishment of office spaces in existing buildings and do not include the construction of new buildings as in Norway at this time.

The case study is related to the first of these projects, which is the most relevant for the purpose of this study: the project **Co-Location Oslo 2012.**

This project is one of the many activities in the integration process initiated in 2007 when Statoil merged with the oil division of Hydro. The project goals are based on the following vision: "Statoil's new Oslo office will be an exceptional place to perform and develop", inspired by the overall ambition of the company.

Several locations were taken into consideration when deciding on the location of the new building. After analyzing and evaluating different alternatives, the corporate management decided to build a new office building at Fornebu, an area where several real estate development projects have been executed recently. The Norwegian companies Telenor and Aker Solutions have previously established offices in the area, as well as other residential projects. Annex D.1 shows the location of Statoil building at Fornebu.

The project execution of the Statoil's new offices in Oslo was sanctioned at the beginning of 2009. After the decision of the corporate management of Statoil, a project organization was established after a short period.

The management of the company defined critical success factors for the execution of this project, and they include the following parameters and indicators.

- HSE — No personal injuries, no major accidents
- Reputation — Protect and manage the company's reputation
- Quality — Takeover as per agreed progress plan, quality and price
- Users — Satisfied users
- Environment — Green solutions

The builder and owner of the building is IT Holding Fornebu. Statoil has entered into an agreement to rent this building for 25 years.

To secure a compliant and efficient building execution process, two separate sub-project organizations were established under the overall project management: the Construction Project and the User Involvement project.

The Construction Project has the main responsibility to build the new office building according to a master plan and make sure the deadlines are followed as agreed with the landlord.

The User Involvement project includes the following responsibilities: layout & interior, AV/IT tools, pilot of new area layouts, and the processes needed to succeed days 1 to 100. The User Involvement project has the responsibility of identifying and implementing technical specifications in order to establish the room plan and define the generic office floor.

The resources engaged in this sub-project include a reference group and employee representatives, business areas representatives and discipline advisors in the respective areas of responsibility, including communication, project management, HSE and corporate social responsibility, quality & risk management, building construction, and security.

The principles and guidelines for identifying technical specifications and establishing the room plan were defined early. The responsibilities between the sub-project User Involvement and User Representatives were separated. Table 4-2 shows the areas of responsibility for each sub-project.

User Involvement Project's responsibilities	**User representative (Business Areas) responsibilities**
Visualize the building's potential	Business area's specific needs to be confirmed and verified
Implement technical specifications	Provide necessary information for placements
Establish room plan	Organizational development and new ways of working
Responsible for information toward user and reference group in relation to the implementation of room plan	Communication toward own Business Area
Coordination and management of the final placements	

Table 4-2: Responsibilities between the sub-projects (Statoil ASA, 2010d)

Main phases in the User involvement project

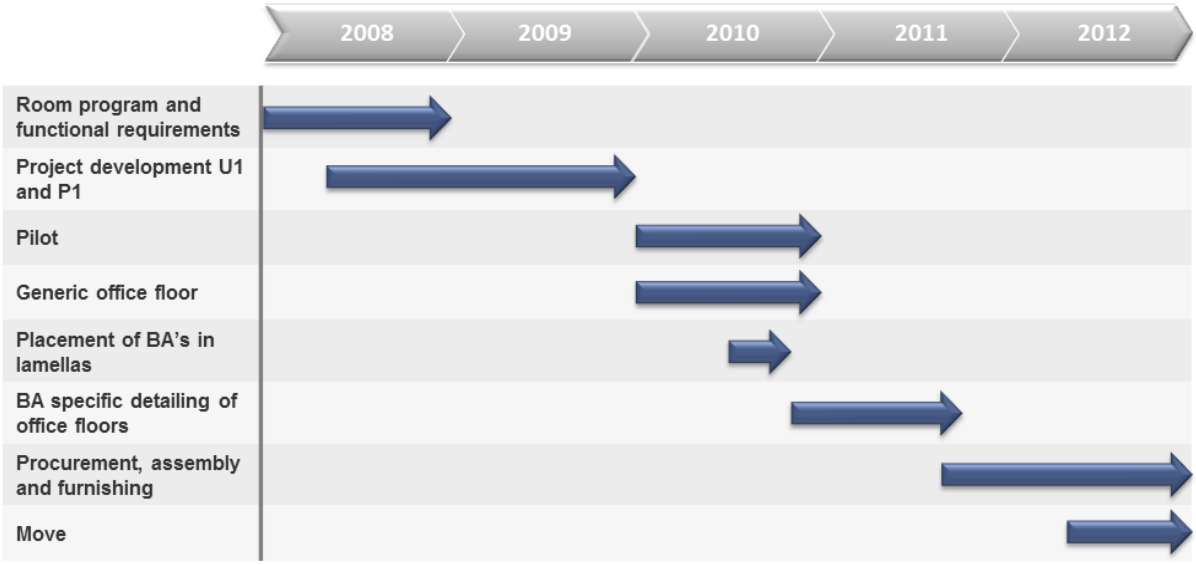


Figure 4-3: Main phases in the User Involvement project (Statoil ASA, 2010d)

The office building: Five Elements

Five Elements is the name of Statoil's new office building in Oslo. The construction period is defined to be between 2010 and 2012, and the takeover is planned for September 1, 2012.

The building has 65,500 m^2 of indoor areas, 10 acres of outdoor area, a separate conference center, a large number of meeting rooms and space for 2,500 workplaces. Annex D.2 present some views of the building.

During 2010, and in a parallel process not related to the construction of the office building, Statoil carried out an extensive organizational development affecting the whole company. This organizational change process called *Statoil 2011* was taken into account when the placement of the business areas had to be done in the new building. Local work groups from each new business area had to be established to support the detailing phase of the project. The placement of the new business areas in Five Elements was anchored with the new management teams.

An illustration of the placements assigned to each business area is presented in Annex D.3 Placement of business areas in the new building

The building will locate the offices for the employees of the following business areas and support units in Oslo:

- Exploration (EXP)

- Development & Production International (DPI)
- Technology, Projects & Drilling (TPD)
- Marketing, Processing and Renewable energy (MPR)
- Corporate Management (CEC)
- Corporate Staffs (CSO), Corporate Finance (CFO) including Investor Relations (IR) and Legal, Corporate Audit (COA), and Corporate Communication (CCOM)
- Global Business Services (GBS)

A common approach to achieve common solutions was defined by establishing an equal handling of all business areas and support functions, preventing special needs from becoming general but taking into consideration specific business needs, and offering equivalent information to everyone.

4.2.7 Developing new office space in Statoil

According to governing documents in Statoil, workplaces need to be the foundation for a good working environment. The Facility Management function must provide workplaces that support the working processes of the customers. In addition governing documents point out that area utilization must promote collaboration, support work processes and adapt for efficient point, both professionally and socially.

To develop new office spaces in the new building, a strategic approach was utilized to bring together several elements from the business areas and a strong belief that value is created through collaboration.

The process for defining office space was done by the sub-project User Involvement in collaboration with business areas. The existing work processes for the Facility Management process were followed. Annex D.4 presents these FM processes.

The project developed proposals suggesting concrete solutions that had to be anchored and further developed with the user representatives and the main user group. The recommended solution had to be approved by the main user group. Based on this recommended solution, the steering committee committed to a solution for a generic office floor.

Figure 4-4 shows the main phases of the User involvement project needed to establish the generic office floor and the time framework defined for each of these phases.

Figure 4-4: Main phases preparing Generic office floor (Statoil ASA, 2010d)

A short description of the different phases follows:

Pre-Project phase includes participants from the main user group and reference group. In this phase the principles for a generic office floor are established taking into consideration the room program, technical specifications, Statoil specific standards, and user defined principles.

Generic office floor phase is intended to establish and get approved the generic office floor. The main user and reference group together with work groups with representatives (5-10 people) from the business areas and staff units participate in this phase.

Detailing of solutions phase is set up to define the business area specific office solutions. Workshops including representatives from the specific business areas and staff units are established.

Purchase and deliveries phase to acquire furniture and interior needed according to the specific office solutions defined in the previous phases.

Moving and re-setting of Vækerø phase is set up to coordinate and execute the moving of workplaces to the new office building and restore the existing offices at the standard levels agreed upon with the landlord.

Analysis of business needs

A building's office space areas need to satisfy a number of demands. After defining the generic office floor principles, lamella capacities and flexibility of the building, the project had to clarify customer needs in a detailed way. The involvement of IT was also necessary making sure that all customer needs were sufficiently clarified.

The demands vary depending on the business areas but in general are related to the following issues: confidentiality, concentration, emergency, representation, discussion, collaboration, and break-out areas.

In terms of use of space, the project had to clarify issues concerning the number of workplaces needed, the number of special rooms, meeting rooms, work rooms, archive rooms, and focus rooms needed to satisfy business areas' needs.

The business area representatives were responsible for informing the project about work processes in the different units, ways of working and specific needs generated by these ways of work. Specific requirements related to room type, function and technology were also established by business areas' representatives, as well as the total number of employees in the respective units.

To support business areas in the assessment of business needs and analysis of ways of working, the project assisted them by facilitating a tool to analyze business needs and requirements. Annex D.5 Tool to analyze business needs shows the questionnaire utilized by business areas representatives to assess existing ways of working and business needs.

The project took responsibility for developing the adequate layouts according to the work processes of the business areas and for describing the advantages and disadvantages of the proposed solutions. After presenting the proposal, the business areas representatives considered the alternative solutions versus the work processes. They were also responsible for aligning this solution with process managers, business areas management and user representatives and anchoring with them the preferred solution.

The project was responsible for ensuring compliance with the customer's final and preferred solution and Statoil's governing document TR2042 – Workplace Management.

Generic principles for utilization of office floors

The generic principles to be utilized in the development of office floors were defined and recommended by the sub-project User Involvement and approved by the steering group in September 2010. The following are the generic principles to be followed when developing the generic office floor:

- **Quality** Sound principles for space planning solutions
  Focus on users' perception of quality in the working areas
- **Flexibility** Accounts for special requirements and user's needs.
  Handles organizational changes and new working processes
- **Cost effectiveness** Less probability of delay in completion
  Reduced operational expenses in internal relocations

The extended user group worked with the architects and Layout & Interior project to establish sound principles for space planning that ensure user quality. Elements that do not function very well at Vækerø today have been taken into account, and solutions found accordingly. Some examples: working and walking zones are separated, meeting rooms are distributed, open premises concentrated along facades to increase outside view.

Flexibility has been an important factor in the entire project, and must also be implemented in the generic office floor to ensure that the facilities can handle organizational changes. Moreover the solution is made in such a way that it can adjust easily to special requirements from users. Flexibility involves: fewer tailor-made solutions allowed, office floors become similar, standardization.

The generic office floor is developed to prevent special requirements regarding office solutions from becoming standard and driving cost. Moreover it is efficient to construct 13 similar office floors, hence reducing the probability of delays. Simpler and less costly to handle internal relocations, they do not need reconstruction.

Generic office floor

The building is planned around a technical grid with spacing between grid lines of 3m in both length and width. Each grid module of 3x3m is fully equipped with technical installations for office purposes, including lighting, ventilation, cooling, and fire installations. Use of modular walls assembled up to an acoustic ceiling makes it easy to establish rooms anywhere within the area encompassed by the technical grid.

Figure 4-5 shows the lamella representing a standard office floor in the new building:

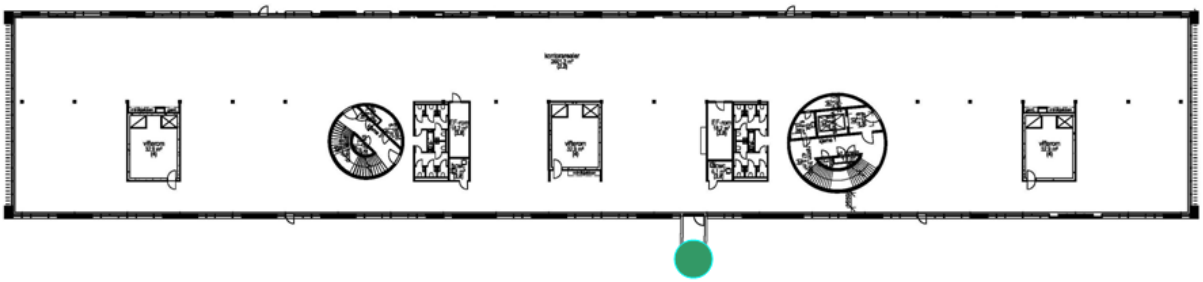


Figure 4-5: Lamella representing an office floor (Statoil ASA, 2010d)

Access to the office floors is via the lifts located in the center of the building and the common access located at the end of the common corridors (represented by the green dot in the figure). In addition, the building has a number of fixed support rooms and installations that divide the floor plate into smaller areas.

A typical office floor at Fornebu includes the following physical spaces: office space for workstations, meeting rooms, focus rooms and break-out areas. A representation of the typical office floor is shown in Figure 4-6.

Figure 4-6: Standard office floor (Statoil ASA, 2010d)

Specific office floor

The project facilitated workshops where the business areas representatives converted the generic office floors to a specific business area organization by placing the work areas and rooms based on the business areas team sizes, interaction with other business areas and/or support functions and communication needs.

In addition, the workshop concretized specific needs from the business areas in concrete workplace solutions: technical work places, confidential areas, advanced meeting rooms, business area management area, and new ways of working.

To comply with Statoil's corporate requirements, the project supported the design process with governing documents of the company including: Human Factor analysis, TR 0926 Working Environment, TR 2042 Workplace, Human Factor FM, and FR21 Facility Management (FM processes).

4.2.8 Pilot project

During 2011 major decisions need to be taken regarding how to size, furnish and equip the office spaces of the new Statoil building at Fornebu. In order to test new and alternative solutions before moving to the new building, a reconstruction project was initiated by the Co-Location Oslo project at Statoil's offices located in Vækerø, Oslo.

According to Statoil, a construction project is a natural opportunity to further develop the office space. Even though Statoil has standardized solutions, a conscious decision has to be made about what the standard of tomorrow will look like. The pilot area is an arena where

multiple disciplines can meet and participate in the development of more integrated solutions. Process owners and subject matter experts look at the pilot area as a fertile soil for developing and test new standards and hence push for constructive change.

A pilot area was established based on the following requisites:

- Be useful across business areas and support functions.
- Be related to interaction among information, communication, technology, surroundings and ways of work.
- Use knowledge and experience gained from the process with other similar initiatives in Statoil.

The new office area was finalized during the spring of 2010 and it became a pilot area for the construction projects in Oslo, Bergen, Stjørdal, and Stavanger. These building projects are scheduled to be operative within three years, and that was the reason these projects decided to cooperate in a common pilot solution. These locations have a number of unique characteristics and work processes, but there are some similarities. Based on these similarities Statoil used a common approach on how to build an efficient and user friendly office space.

The people responsible for the pilot area believe that an office space should be designed based on the people using the area, rather than forcing people to adapt to a given solution. Consequently, they mapped business needs and obtained a thorough understanding of selected work areas.

The pilot project defined "International Interaction" and "Project Collaboration" as two areas to be analyzed in order to give input on how to design and equip the pilot area. The pilot area was shaped and equipped based on the assessments and experiences obtained from these two analyses, as well as input from relevant stakeholders. The main principles of the pilot were anchored with relevant process owners, subject matter experts, and relevant construction projects in Statoil.

International Interaction: Input from nine meetings with two business areas (INT and TNE) was the basis for the analysis. In each meeting, an analysis of the challenges related to how to run a meeting in an efficient manner and with high audio/video quality was done. A number of challenges were identified and further evaluated, based on their relevance for the business units and the construction projects. See Annex D.6 Challenges running meetings and Annex D.7 Challenge specification – example.

Project Collaboration: Several ways of working were identified by the Co-Location Oslo project and mapped based on where they took place – inside or outside office landscape.

Table 4-3: Ways of Working identified by Co-Location Oslo project shows the different ways of working utilized to design new office spaces.

Ways of working	Description
Administrative work	Reading and answering e-mails, creating memos and presentations
Concentrated work	Creating and reading documents
Other work	Work not related to a specific project – business or private
Informal dialogue	A short conversation – business or private
Workshop	Dialogue, high degree of collaboration
Information meeting	Mainly monologue. Low degree of collaboration
Confidential meeting	Sensitive topics discussed

Table 4-3: Ways of Working identified by Co-Location Oslo project (Statoil ASA, 2010e)

Then, each activity was mapped based on *where it is done* and then rearranged based on where it *should be done*. Figure 4-7 shows ways of work and where they happen; inside or outside office landscape, called, respectively, primary and secondary areas.

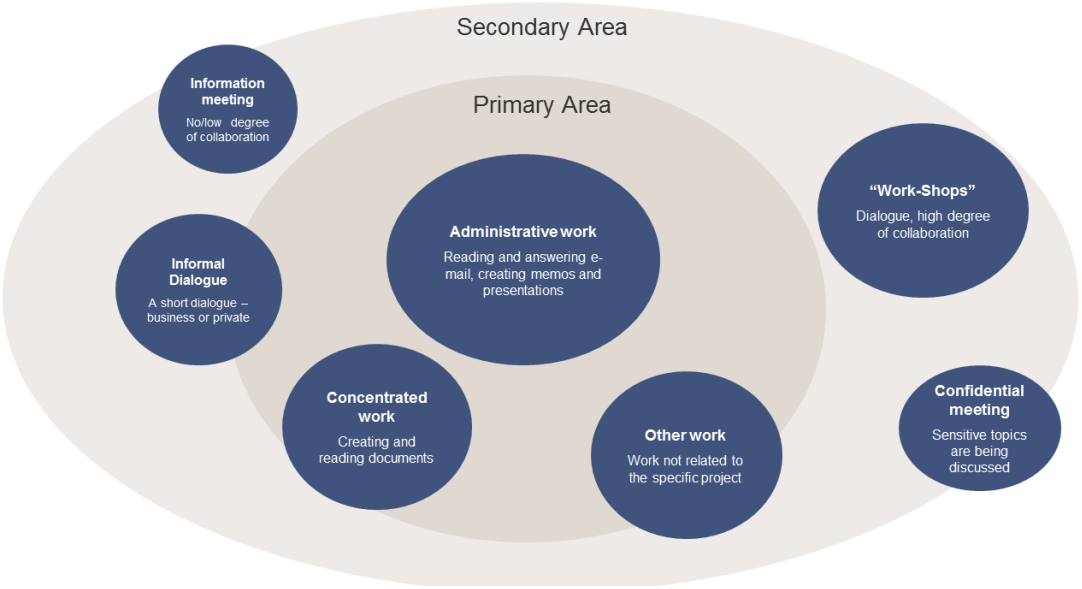


Figure 4-7: Existing ways of work showing where these happen today (Statoil ASA, 2010e)

Figure 4-8 shows the rearrangement done based on where these ways of work *should* happen to increase collaboration.

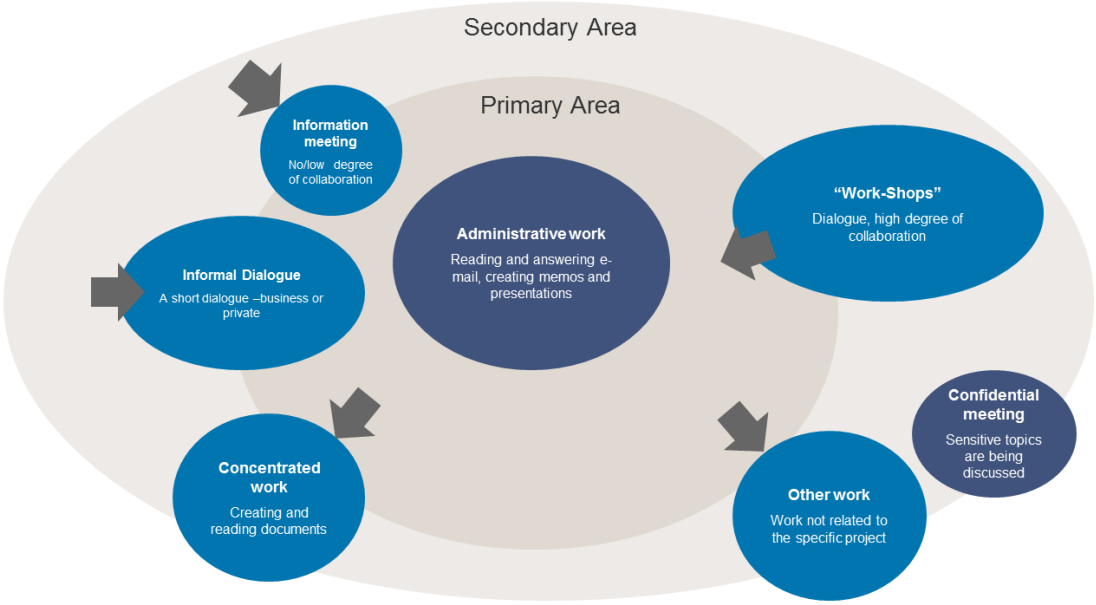


Figure 4-8: Ways of working where these should happen (Statoil ASA, 2010e)

Based on the assumption that "value is created through collaboration", the activities were clustered in three main areas: areas for concentration, areas for teamwork, and a variety of areas for collaboration. See Figure 4-9: Classification of activities based on collaboration needs.

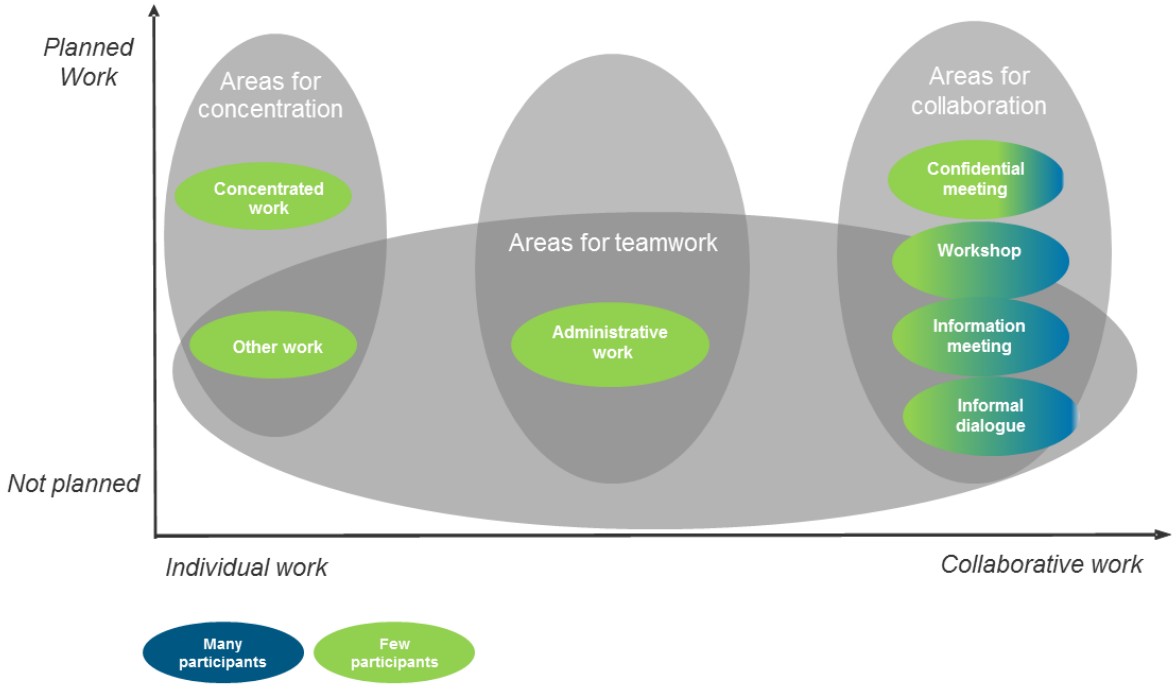


Figure 4-9: Classification of activities based on collaboration needs (Statoil ASA, 2010e)

Open office spaces were defined as a "collaborative arena". Ways of working requiring higher concentration levels were moved out of these areas. Instead of executing all types of activities at the same place, tasks now will be done in places where other similar activities are executed.

Based on this principle, the office space solutions developed by the project were the following:

Privacy room or rooms furnished for ad hoc activities such as private and confidential calls or conversations. The room is 9 m^2 (3 x 3 m, one grid module).

Team arenas are areas intended to enhance collaboration, creativity, knowledge-sharing and exchange of experiences. A number of nearby areas support individual needs for concentrated work and small meetings. The pilot area of this type of rooms varies from approximately 54m^2 (6 grid modules) to 81m^2 (nine grid modules).

Interplay or rooms that aim to enhance information and knowledge-sharing of people located in different physical locations. The rooms have several sizes; the smaller ones are large enough for two people, while the medium-sized ones have a capacity for three or four people. The largest Interplay room, called Interplay Large, can accommodate twelve people.

Study is an area for concentrated work. The arena is therefore sheltered from team arenas to prevent noise and visual interruptions. Use of mobile phones is not allowed. Collaboration is done outside this area, or in the adjacent Privacy and Interplay rooms.

Playstation area aims to enhance informal dialogue and provide opportunities for short breaks in a relaxing environment. The area is also available for short-term touchdown to read and send e-mails or check the latest news.

Figure 4-10 illustrates the area layout of the pilot area including the different types of office space solutions.

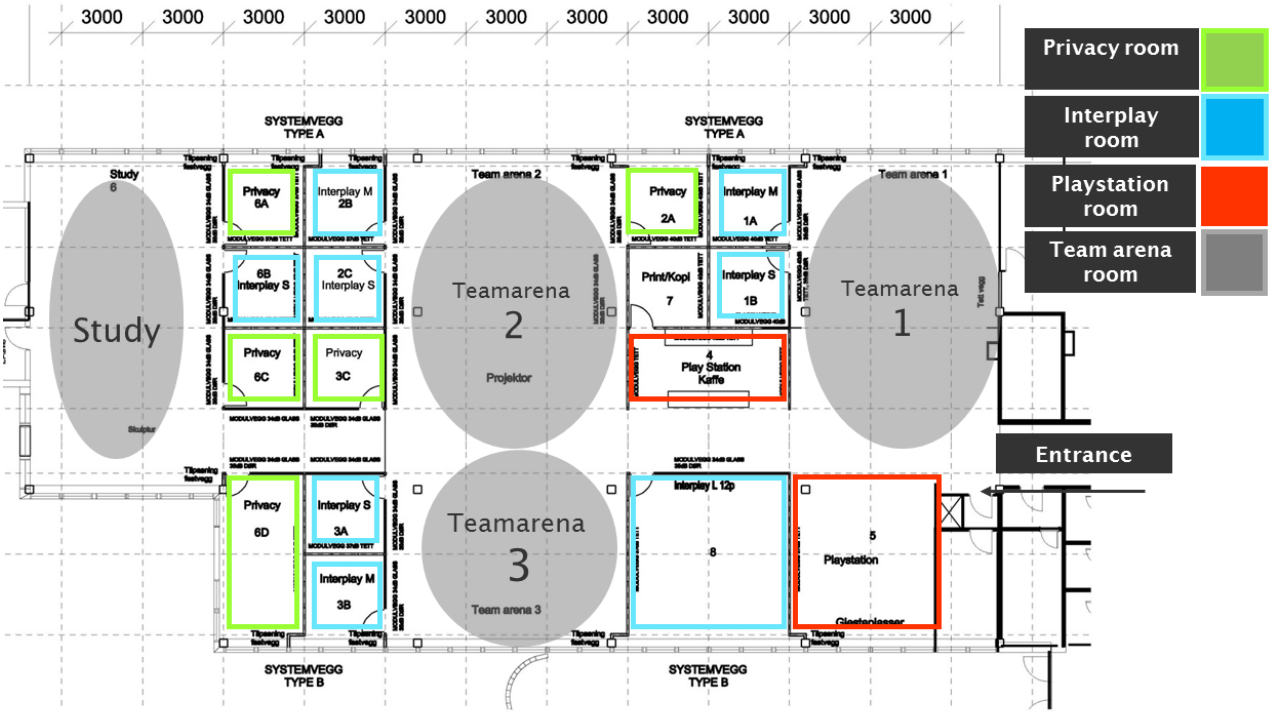


Figure 4-10: Pilot project - office space solutions (Statoil ASA, 2010e)

The pilot area contains a mix of solutions that either are part of existing Statoil standards or potentially future Statoil standards. Altogether, more than fifty new solutions are being tested. Each of the following disciplines is represented: AV, IT, Interior, Construction and Architecture. The first version of the pilot area contained a combination of existing and non-existing solutions, products from a new furniture agreement, and some local adjustments.

A visualization of the pilot project is shown in the Chapter Annex in this report. See Annex D.8 Statoil's pilot office space – photo impression.

Figure 4-11 and Figure 4-12 show respectively the IT solutions and furnishings for each work space in the pilot area.

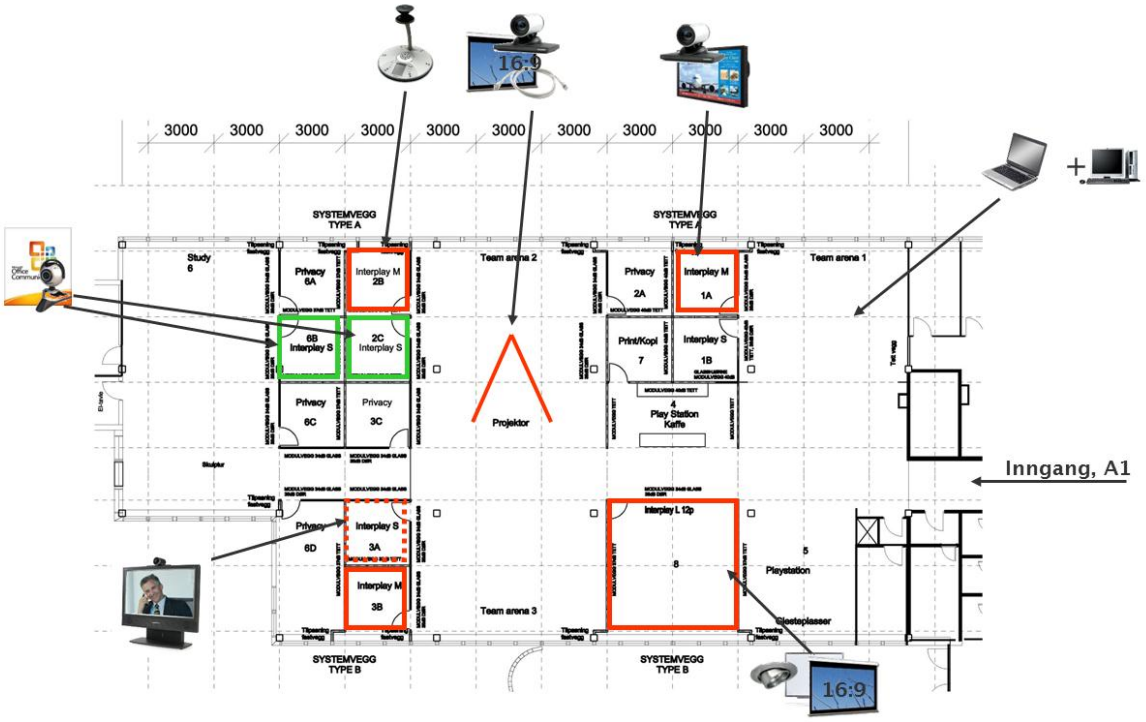


Figure 4-11: Pilot project - IT solutions (Statoil ASA, 2010e)

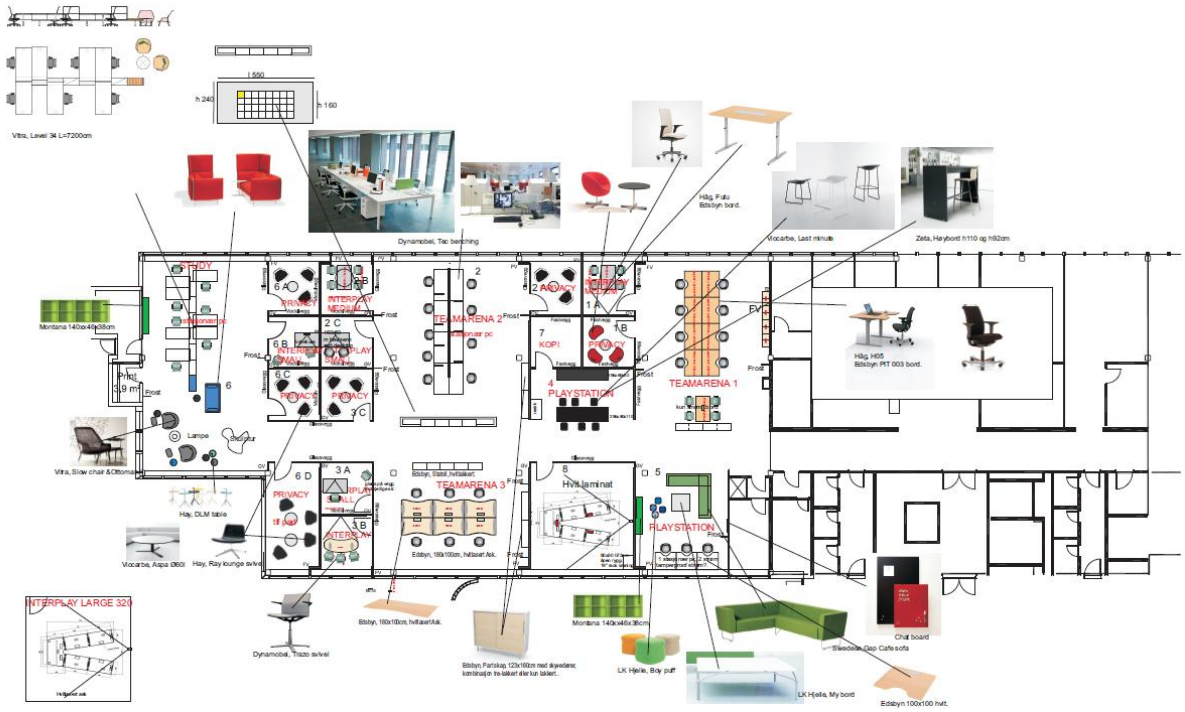


Figure 4-12: Pilot project - furnishings (Statoil ASA, 2010e)

5 Discussion

The following chapter includes an analysis of the results obtained in this research study.

The background for this analysis is the problem in discussion and the research question "By 2022, what will the physical space of the workplace be like in an organization with global presence?"

After the presentation of the results, the chapter is structured in two sections:

- Statoil's future ways of working
- Statoil's future work spaces

The results obtained will be interpreted and discussed using the theoretical elements presented previously in this report.

5.1 Statoil's future ways of working

This section presents a discussion based on the four dimensions of work.

To summarize, Statoil's future ways of work is described based on each of the scenarios afterward.

Finally, these future ways of working are compared with current practices in Statoil, and an idea about what Statoil's work spaces will be like in the future is presented.

To understand what the future office space will be like in the future, a common understanding of the ways people will work is needed; future ways of work will become the foundation of future workplace solutions.

A workplace solution is the result of specific needs a person or groups of people have. It is also a complex topic because the workplace is composed of several elements that depend on each other. To isolate one on these elements, for instance the space, is not an easy task. Furthermore, the research question set up the context of this study in the future. The research study became then a study of a phenomenon happening in the future, without the possibility of analyzing historical data.

The utilization of scenario planning methodology became a convenient tool in this research. Based on some workplace trends and global events happening today, it was possible to assume some likely outcomes about the ways people **can** work in the future. These possible outcomes defined the possible ways of working in the future.

Statoil's global corporate scenarios (MoneyWorks, NetWorks, PatchWorks) were utilized as the scenarios to define future ways of working. It is possible to mention some advantages and disadvantages related to the use of these scenarios.

Among the advantages is that the scenarios had been previously defined by Statoil, allowing more time to focus on answering the research question rather than spending unnecessary time developing the scenarios. This is according to Øverland (2002) something that is absolutely crucial to develop interesting perspectives about the future. In addition, because the scope of

this research is limited to this company, the results obtained in this analysis become relevant for this organization.

On the other hand, the development of Statoil's global corporate scenarios had as a purpose understanding what the energy situation in the world would look like in the future. The time perspective utilized in these scenarios is 2030, while this research study indicates an earlier future, 2022.

These facts were not considered an impediment to developing this research. First, 2022 was chosen as a reference to illustrate that the focus of the analysis should not be the near future, freeing the analysis from current concerns and considerations. Second, the scenario description introduced previously in this report presents a general view of possible contexts without being only an energy-related representation of the future. Furthermore, the elements constituting the driving forces and common elements of these scenarios support the idea of generalizing its utilization in this study.

The other element in the analysis of future ways of working is the framework to analyze work (Vartiainen, et al., 2007). The framework constituted by four dimensions (what is done, who does it, how is done, where and when) helped to structure the analysis related to future ways of working for each scenario. This was a convenient way to structure the analysis, making easier both the identification and classification of the ways people will possibly work in the future.

By bringing together external factors and workplace trends with Statoil's global corporate scenarios, an idea of future ways of working was established. The following is an analysis and discussion of this future ways of working idea using each one of those dimensions:

WHAT IS DONE

This work dimension is related to the type of assignments, tasks and processes that define the work to be done.

The scenarios MoneyWorks and NetWorks present a reality that is quite similar to the current situation some people experience at work today. The characteristics of MoneyWorks reflect a more individual approach, while the ones of NetWorks focus on more collaborative efforts.

Nowadays, some tasks and work processes are executed by people using both an individual and collaborative approach. Current practices, such as the ones in Statoil, show that organizations are focusing on increased collaboration and using resources to increase its collaboration capabilities due to the added value this way of work gives to an organization.

It is possible to interpret then this phenomenon as a trend that will continue and be predominant in the future, meaning that people will move from individual to more collaborative ways of working.

The reality presented in the scenario PatchWorks seems to constrain this trend due to protectionist measures, reducing the possibilities for global collaboration across geographic borders and locations. This can be a reality in the future, but this fact will not restrict collaborative efforts. Collaboration can happen in a specific place, locally, but it can also take place across geographic locations supported by collaboration technologies.

This is already a reality today; PCs, laptops, telephones and mobile devices include videoconference capabilities, allowing people located in different places to connect and communicate. Many of these devices allow also desktop sharing and other functionalities that support creative processes despite distance and time.

WHO DOES IT

This dimension focuses on people, the ones responsible for executing tasks or work processes.

According to the analysis, the main challenge – which is common for the three scenarios – is the access to competent resources needed for organizations to execute a determined job. This is mainly caused by the demographic changes presented previously in Chapter 3, but its implications vary according to the scenario in which this event happens.

In MoneyWorks, the lack of resources increases the demand for freelancers and consultants, and migration from less to highly developed countries happens. This phenomenon can mean an increase in workforce diversity in the future; people working for the same company will have different academic and cultural backgrounds, religion, language and ways of doing things.

Because NetWorks focuses on sustainability and reducing the impacts produced by climate change, the workforce will lean toward work done locally, reducing migration possibilities. The main challenge will be then the establishment of the necessary social and discipline networks to get things done in a global context. Distributed teams or a distributed workforce will become a reality for most businesses, challenging the collaboration capabilities of these organizations. The relevance of collaboration technologies in this scenario will become rapidly evident, because it will be necessary to support communication and knowledge-sharing in global networks. This is actually a focus area in Statoil today. Efforts for increased global collaboration enabled by information technology are being put in place today (Espedal, 2011).

The restrictions imposed on migration possibilities in PatchWorks reduce the opportunities to access competent resources, decreasing the possibility of a more diverse workforce present at

the same place in this scenario. However, diversity can be achieved virtually as resources present in other locations become part of workgroups or teams through new IT tools and technologies.

Another element in this analysis is the presence of several generations of people in the future workforce. Demographic trends show the growth in life expectancy. People possibly will work longer because it is expected that people will live longer than before.

Due to the lack of resources in the future, older generations will become a valuable resource for organizations as they have the knowledge and experience younger ones do not have. Retirement age will probably be an important issue to discuss in the future workplace since there will be pressures to retain those competent resources longer due to the increased demand of these in specific discipline areas.

HOW IT IS DONE

This dimension of work is related to work practices and how technology will enable them.

According to the analysis, MoneyWorks is characterized by project-based work and high utilization and adoption of new technologies. The focus on technology in NetWorks is also high, as it supports collaborative efforts. Due to reduced travel activities, virtual interaction plays an important role in this scenario.

The analysis shows that technology plays an important role in both of these scenarios. Today, the role technology plays in how things are done is undisputable and there is almost a general consensus about the role and impact technology will have on the ways people work in the future.

In PatchWorks, the lack of incorporation to the external world and strong focus on local work can be interpreted as one reason to increase virtual work capabilities, but there are unfortunately not enough references to support this idea using only this dimension of work.

WHERE AND WHEN

This is the dimension in the framework to analyze work that is the most relevant for this research study. This dimension includes the element *where* which refers to the place work will be done in the future.

MoneyWorks shows that the global nature of tasks and workforces will increase mobility and travel. People will work from different places or locations, increasing their communication needs when traveling. The idea of corporate building still exists in this scenario, but following the workplace trends present today, less space will be needed. This can be interpreted as a

reduction in space needs due to the mobility of the workforce and a decrease in office space demand based on the fact that people do not work attached to a specific work space anymore.

NetWorks points to future work spaces different from those present today. Work will happen outside corporate buildings, at home or in co-working centers near home. Supported by technology developments such as augmented realities and other virtual capabilities, work will be done independent of the place people are located. The focus on sustainability and reduction of CO_2 emissions strengthens the idea of work spaces closer to home. Therefore the idea of corporate building is not predominant in this scenario.

PatchWorks refers to a future in which commuting is almost impossible. The possibilities of traveling to and from work will be reduced to a minimum in this scenario. Working from co-working centers, home and/or virtual work will prevail in the future, according to this scenario.

The idea presented in this scenario can seem quite extreme and improbable today, but it describes a reality that has happened recently in totally different settings. Some natural catastrophes such as the volcano eruption in Iceland in 2010 limited travel for thousands of people in Europe, and the recent earthquake in Japan (March 2011) shows how fragile transport infrastructure and supply chain productions can be.

In both cases, alternative ways of working had to be improvised in order to ensure the transport of people and raw material, as well as the provision of food and satisfaction of basic needs. These examples and the setting where work is done in PatchWorks should contribute to reflection on the relevance of alternative workplace solutions in the future.

An explicit reference to *when* work is done is not found in this analysis. But the global and mobile nature of the future ways of working present in these three scenarios support the idea of work done at anytime and anywhere.

If each scenario is now analyzed independently using the four dimensions framework, it is possible to define the ways of working for each scenario:

Way of Working 1: MoneyWorks

The ways of working in MoneyWorks can be characterized by an individual way to execute tasks, a diverse, global and mobile workforce with a high degree of adoption and utilization of new technologies.

Way of Working 2: NetWorks

The ways of working in NetWorks are characterized by the collaborative nature of doing things. Focus on sustainability issues

reinforces the reduction of travel. However, to support a global workforce, collaboration technologies support knowledge-sharing and access to competencies in different parts of the world.

Way of Working 3: PatchWorks

The ways of working in PatchWorks are restricted to local communities focusing on protectionism and local issues and restricting the possibility of migration. The idea of a global and mobile workforce is not present since travel is also restricted. The ways of working in this scenario create the need to communicate and connect people present at the same physical location, but also virtually using new collaboration technologies.

The representation of future new ways of working using Statoil's scenarios can be analyzed and compared with the ways of working present in Statoil today.

Some similarities can be found between current Statoil's ways of work and the ones presented in MoneyWorks and NetWorks. The efforts made by Statoil to increase collaboration capabilities are making an impact on the ways people work and interact in the organization today. These efforts are enabling a change process in Statoil that can be represented as a transition from individual ways of working, exemplified by MoneyWorks, to more collaborative ones as those illustrated by NetWorks.

Nowadays, some Statoil employees sporadically communicate with superiors and colleagues face to face by commuting to the main office from home every day. When those employees are working in multiple locations, the combination and emphasis of their spaces are different from co-located employees, just because of the greater number of physical places they rotate and use. Still they do not need to communicate virtually.

Statoil will move from the existing fixed desktops to new workplaces that will vary constantly according to the needs and work processes executed. Statoil's employees will be able to decide among different ways of work based on the tasks and level of interaction with others. As a consequence, different working contexts are going to be needed and new workplaces solutions will appear according to each individual.

When the need for interaction and communication with colleagues located in different places still exists, and the possibilities to physically meet them are constrained, the support of collaborative technologies and IT solutions is crucial.

This is the situation Statoil is experiencing today; Statoil's activities are global and the access to competence is scarce. To remain competitive, Statoil needs to find new and more effective ways of working such as knowledge-sharing supported by, for example, discipline networks

or IT tools to help colleagues located in different places to solve problems. It is here collaboration technologies and IT collaborative solutions play an essential role.

The changes in the ways people will work in the future, facilitated by information technology, will change the scene where work is done. Regardless of the scenario taken into consideration in this analysis, Statoil's future work will be done in several places different to the ones in which it is done predominantly today: co-working centers, home offices, and virtual environments.

Individual telework in solitude at home without physical and/or virtual connections to others is an extreme and rather rare case. Following workplace trends, the traditional office corporate building will still exist. The main difference from those existing today is that corporate buildings will become places where people will socialize and meet. Due to the focus on carbon emission reductions and energy consumption, buildings will need to increase office space utilization and/or reduce office space areas.

Despite the utilization of Statoil's corporate scenarios, the results presented previously in this report and the analysis and discussion from this section, do not have the necessary elements to become exclusively Statoil's ways of working. These results and analysis can also be applicable to other organizations with similar characteristics.

To validate the results obtained in this research, a case study was prepared using a concrete example. One of Statoil's new building projects was presented as a case, and the following section includes the analysis and discussion of it.

5.2 Statoil's future work spaces

This section presents an analysis and discussion based on the case study "Statoil's future work spaces" presented in Chapter 4.

The discussion and analysis is structured in two parts: the process of developing a future idea of Statoil's workplaces, and the work spaces that are planned to be built in a new corporate office building at Fornebu.

Statoil's workplace vision

Following the idea from Becker & Fritz (1995) regarding the advantages of defining a future idea of the workplace in an organization, it is possible to sustain that Statoil has done the right thing. Statoil has developed a workplace vision, called *Easy2Work* (Weiseth & Beltran, 2010), which aims to set a common direction and define the necessary actions to realize it.

However, it is too early to evaluate the effects of this initiative. There is no evidence at this point about the results of the work related to the implementation of this vision in the company. According to theory, Statoil has done the right things, but it is still uncertain that the things needed to implement this vision are being executed in the right way.

Being part of the team that prepared this vision, the author of this research study had the opportunity to introduce in Statoil the idea of workplace constituted by the physical, virtual and social spaces (Vartiainen, et al., 2007) in the same way this term is utilized in this report.

According to the project responsible for preparing this vision, the advantages for Statoil of doing this were evident; corporate staff functions were presented a more holistic idea of the place people work, establishing a common understanding and recognizing the dependencies among these three spaces.

Instead of focusing on the delivery of results related to their own function, corporate staffs could now start working together for a common cause: Statoil's future workplace. As an example of this new practice, initiatives originating from one corporate staff function are now

presented and discussed with representatives from other corporate staff units in order to analyze their effects and coordinate implementation.

The seven capabilities used to describe the main characteristics of Statoil's future workplace (Weiseth & Beltran, 2010) make no reference to concrete office space solutions. It is possible to observe in Annex C.1 Capabilities of Statoil's future workplace that the elaboration of each of these capabilities acts more as a description of working practices for each individual, more than concrete examples of where people will specifically work in the future.

However, these practices point out future ways of working done in a more agile and mobile way than the ones done by people today. This can be interpreted and related to more dynamic work situations with people moving constantly and requiring more flexibility and diverse functionality of the workplace solutions.

For an employee who is not close to a future idea of work, the presentation of a conceptual idea of something related to the future can appear disturbing and difficult to understand. To allow those employees to identify themselves with this notion of the future, and following the examples taken from other companies such as Microsoft in The Netherlands (van der Bie, Microsoft and the New World of Work, 2010b), Statoil developed the idea of *personas* or archetypes to illustrate and facilitate the comprehension of the notion of future ways of working. These new ways of working were then applied to an individual working in the company.

After reviewing the work related to Statoil's personas as described in Annex C.2 Statoil's personas, it is possible to establish some remarks. It is not found any revolutionary idea of work that considerably differs from current practices in Statoil. These personas are representing an idea of more collaborative work supported by technology and IT tools. Compared with current practices, it represents a shift in people's behaviors with strong references to collaboration. The idea of individual work is almost not present in any of these profiles. Instead, the focus is on the idea of executing daily tasks interacting with others, sharing knowledge and experiences at the same time.

Regarding work spaces, the use of Statoil's personas reflects indirectly the idea of a global and mobile workforce. Working at anytime and anywhere will become a characteristic way of working for these personas. For instance, the Statoil's personas *project member, business analyst/developer, Executive Vice Presidents/Vice President* belong to this category. To support their activities, the use of more collaborative tools such as laptops, telephones or new devices that allow them to communicate virtually with others in an effective way will be necessary.

The idea of working anywhere is strengthened even more by the representation of the work processes made for one of the personas, the *Executive Vice President/Vice President.* See Annex C.3 Ways of working of a Statoil's profile. By applying the workplace definition used in this study to the tasks this persona typically executes during a working week, it was

possible to identify the physical spaces where these tasks were carried out, in addition to the virtual and social spaces.

According to this representation, the physical spaces of the future workplace in Statoil are not confined only to a corporate office building. Different work contexts will require people to work where it will be needed. This a view that differs from the traditional standard workplace solution in Statoil: Instead of executing a task in an assigned work space provided by Statoil, the future worker will have the option to choose where – and when – he or she wants to execute work tasks.

For those personas representing more collocated ways of working, work spaces will become a place where they will execute tasks requiring their physical presence, as the persona *operator off/on-shore*. Other personas will increase the utilization of meeting office spaces, for both virtual and physical meetings, such as the personas *administrative support services* and *discipline experts*. The need for collaboration with colleagues located in other geographic zones or buildings will increase the need for virtual meeting spaces for these individuals. This is in accordance with the efforts made by Statoil to increase collaboration capabilities. Based on these Statoil personas, it is possible to sustain then that the need for office spaces supporting collaboration will increase in the years to come.

The preparation of Statoil's workplace vision has worked as a catalyst and initiated activities in several corporate staff functions to adapt existing solutions to the new ideas of future work. As presented in the case study, Facility Management in Statoil has defined four physical spaces where Statoil employees could eventually work in the future. In addition, Statoil expects that the share of people working in office spaces located in corporate buildings will decrease as these new physical spaces increase their share due to new ways of working. This confirms workplace trends mentioned by New Ways of Working Network and authors such as Meister & Willyerd (2010).

Statoil's new office building at Fornebu

The discussion related to this subject will be presented according to the four dimensions to analyze work presented previously in this report. This is done to give a structure to the following discussion. The case study will be analyzed according to the framework: what is done, who does it, how it is done, and where and when.

WHAT IS DONE

According to the case study, the work to be done in the offices under construction at Fornebu was analyzed by the User Involvement project. This analysis was done before the execution and construction of the pilot area in Statoil's offices at Vækerø.

It is important to mention that these ways of working are not related to *Statoil's future ways of working* presented as part of the results in this research study. The activities of the User Involvement project which led to the establishment of the ways of working, and to which the case study refers, took place independently and were not related to the preparation of Statoil's workplace vision, nor with the completion of this research.

The ways of working identified by the project and presented in table 4-3 follow the existing practices people in Statoil use to execute their daily tasks: administrative work, concentrated work, other work, informal dialogue, workshop, information meeting, and confidential meeting.

According to these ways of working, there are no references to the work done with other people located in places outside the building or geographic zones. This is remarkable, since the analysis done has its background in two concrete areas: *"International Interaction"* and *"Project Collaboration"*. There are elements corroborating more collaborative ways of work in this analysis, but there are no signs of collaboration across geographic borders.

It seems that the focus has been in studying people's ways of work, ignoring the mobility elements that characterize today's workforce and workplace trends (Langhoff, 2007). However, the analysis utilized to identify business needs as given in Annex D.5 explores some elements related to mobility and communication forms. Unfortunately, these elements are not present in these ways of working used to shape Statoil's office space.

WHO DOES IT

According to the case study, there are several business areas and corporate staff units moving in to the new Statoil office building. These organizational units will perform several business activities done by people sharing business objectives and professional knowledge. That is

probably the main reason people are grouped as a concrete organizational unit; they perform similar tasks or work processes within their field of expertise.

Despite the activities requiring specific professional know-how, it is possible to find other activities that appear to be common across the different business units. For instance, the ways of working described by the project and discussed previously do not make any difference among organizational units. Those ways of working are generic as they do not mention any profession-related topic that can make them exclusive or special.

The placement of the business areas in the new office building follows the organizational structure in Statoil; people will be placed in the different lamellas according to the organizational unit they belong to. This can look like quite reasonable and practical, but it could be interesting to analyze alternative criteria for the placement of people in the new building.

For example, people from *different* organizational units could be placed together according to the tasks they perform - or their ways of working - in specific office areas designed to support specially these practices in collocated places in the building. Instead of having several areas to support ways of working related to *concentrated work* or *informal dialogue,* located in each floor and for each business area, it could be an advantage to collocate those in a physical space designed with the same functionality, but where people do the same type of tasks surrounded by other persons they normally do not have the opportunity to meet because they work in a different part of the organization.

This idea could support the collaborative efforts Statoil is putting in place today as collaboration forms both within and across processes (Hansen, 2009) could be supported by this kind of work spaces. Furthermore, it could also have some positive implications in office space utilization rates due to a more effective use of work spaces in the building.

HOW IT IS DONE

Based on the information provided by the case study, the use of IT tools plays an important role in Statoil's ways of working. Several IT and AV tools have been tested during the pilot project. Workplace trends show how collaboration technologies are changing the way people communicate, connect and interact (Ouye, 2009). Statoil is trying to adapt these new technologies, but this is becoming a challenging task due the speed at which these changes are happening today.

The purpose of the IT and AV tools available in the pilot project is mainly to support collaborative ways of working. The use of video conferencing is predominant, as solutions including web-cameras, telepresence and other video devices are present in the pilot area.

It is interesting to point out that these IT/AV solutions are developed to support interaction of people located in different places, but the ways of working described by the project in Statoil make no references to the need for these tools. According to the description of ways of working *"Information meeting", "Informal dialogue"* and *"Confidential meeting"*, meetings could take place in an office space without the support of collaboration technologies. Other ways of work make reference to the use of collaborative software (reading e-mails, creating memos and presentations), but it is not explained *how* this could happen in a collaborative context.

Based on this observation, it is possible to affirm that there is a gap between the idea behind Statoil's ways of working presented by the project and the IT/AV solutions that are being utilized in the pilot project. These IT/AV solutions are implicitly pointing out *new work practices* supported by virtual environments. It seems that some elements of these new practices have probably not taken in consideration when the project developed those ways of working.

WHERE AND WHEN

According to the case study, the principles used by the project to establish *where* the different ways of working will be performed in the new building make a distinction between individual and collaborative work as presented in Figure 4-9.

Figure 4-9 shows that primary office spaces will support the ways of working related to *administrative work, information meeting, informal dialogue, and workshop,* while secondary office areas will become the physical space for the following work practices: *confidential meeting, concentrated work, and other work*. Thus, primary areas become areas to execute collaborative tasks while secondary areas are meant to support more individual ways of work that require higher concentration levels.

The results show that Statoil work spaces in the new building at Fornebu are classified in five groups or type of rooms: *team arenas, study area, privacy rooms, interplay rooms, and playstation area.*

Team arenas presented in the pilot project can be compared with an "open office" or "team space" as described by van Meel, Martens, & van Ree (2010). Based on the description of the characteristics of these two type of work spaces, *team arenas* appear to have some functionalities that resemble more a "team space" than an "open office" space. Team spaces are designed to support collaborative and solo work with some level of concentration. The description of the *team arenas* presented in the case study is similar to this type of work space.

Following the description of these authors, the work spaces designed and constructed in the pilot project do not include the following type of rooms: "cubicles", "private office" or "shared office".

The type of room *Study area* appears as an innovative work space solution in the pilot project. There is no theoretic reference in this study that reveals this kind of work space. Statoil's *study area* is similar to an "open office" space, but without collaboration possibilities. The main purpose of the study area is to support high-level concentration work. The work space solutions mentioned in the theory chapter restrict concentration work to smaller spaces for one individual only such the "study booth" work space. *Study areas* allow groups of people physically present to work together in an open office space solution, but without disturbing each other.

Privacy rooms are equipped with furniture that enables its utilization as a "small meeting room" based on the description of meeting spaces by van Meel. Because of its size, there is a privacy room in the pilot area, which is used as a "brainstorm room" as described by van Meel.

Since these *privacy rooms* are not equipped with IT/AV tools, the possibilities for communication are restricted to face-to-face physical meetings or virtual meeting using mobile telephone devices. These rooms play also an important role as support spaces for confidential or private conversations in *team arenas*.

Interplay rooms are the most advanced rooms of all the work spaces in Statoil's pilot project in terms of utilization of collaboration technologies. Due to their collaboration capabilities, these rooms are the ones that better respond to the interaction of people located in locations outside Fornebu. The virtual spaces these tools support allow collaboration regardless the restrictions of space.

The case study does not mention the number of *interplay rooms* that are planned for Fornebu, but since collaboration is regarded as a strategic issue in Statoil, it could be expected that efforts will be made to increase the number of these rooms as well as the utilization of IT/AV tools.

Depending on their size, *interplay rooms* can be compared with "large meeting rooms" or "small meeting rooms" based on the same classification of work spaces found in literature mentioned before.

Closing the list of work spaces planned for the new office building, *playstation areas* are designed to support informal dialogue and short-term work. It has some similarities with van Meel's "work lounge", "touch down", "meeting point", and the support spaces "break area" and "plantry area".

Final general remarks

Flexibility was considered as one the main elements when the generic principles for utilization of office floors, utilized to design the office space of the new building, were established. According to the case study, flexibility is understood as the capacity to easily adjust to *special requirements and users' needs*.

Based on the definition of flexibility from van Meel et al., (2010), it is uncertain what kind of flexibility Statoil makes reference to. The authors make a distinction between *building flexibility, spatial flexibility, and workplace flexibility*.

The case study does not make any reference to the level of flexibility the new office building has, but when it comes to spatial flexibility, the space solutions are constructed using materials and methods that allow an easy implementation of changes in the office layout if needed.

Based on the explanation of adaptability measures described by Arge & Blakstad (2010), and according to the data obtained from the case study, it is possible to sustain that the new office building is *flexible* since it is built to be adapted to satisfy changes in demand in the future. The level of generality, elasticity, and extendability this building has is unable to be determined based on the information obtained in this study.

Finally, it is not possible to find references to workplace flexibility in this case study either; known strategic space management tools - such as desk sharing - are not mentioned in this case at all.

To successfully handle future changes in the way people work, Statoil needs to make efforts to implement workplace solutions that support the needs of a more mobile and distributed workforce. Therefore, changes in policies regarding existing utilization of workstations and office space should be addressed by the management of the company.

6 Conclusions

This chapter presents the final conclusions of this research project.

Recommendations based on the observations and results from the study and a proposal about the research topics to be studied further are included at the end of the chapter.

Based on the problem definition, hypothesis, and research question, the conclusions obtained in this study are presented in this chapter. The research question in this study was: By 2002, what will the physical work spaces be like in an organization with global presence? Following the structure utilized to present the result and discussions previously in this report, the conclusions will be presented in the same way.

What is done

Future work practices and people's ways of working will be different from the ones that exist today. Individual and collaborative work will be supported by new tools, and new work practices will appear based on those tools, creating the need for new workplace solutions located in different places. This corroborates the hypothesis of this research. However, the case study presented in this report has neither evidence of collaborative ways of working happening in the future across geographic borders, nor reference to individual or collaborative work outside the office building presented in this case.

Who does it

The future challenges that global companies are facing related to access to competent resources in different parts of the world, and the need for collaborative tools that enable access to those competencies and allow companywide knowledge-sharing, are increasing. The study shows that these challenges will become a characteristic of the future ways of working. On the other hand, the placement of employees in the office building used in the case study has been done using a traditional approach; employees moving to the new office building are going to be placed according to their organizational membership. This is going to enable collaboration *within* their organizational units. In order to support knowledge-sharing and collaboration *across* organizational units, efforts should also be made to place employees according to their ways of working, discipline or roles, independent of their place in the organizational chart.

How it is done

There is no doubt about the relevance of technology and IT tools in future ways of working. The case study reveals how new AV/IT tools are put in place in a pilot project to support more collaborative ways of working in a new office building. It seems that there has been more focus on the IT solutions than the tasks that need to be supported by these tools. There is a gap between the idea of Statoil's ways of working defined by the project and the IT/AV solutions put in place in the pilot area. These IT solutions are tools supporting *future* ways of working and not the *current* ways of working defined by the construction building project.
In the future, it could be an advantage to assess and understand *new* ways of working *before* executing the processes related to choosing a specific IT solution or office space design.

Where and when

In the future, people will still need a physical room to execute their work tasks. But the physical space needed will not be restricted only to the space located in corporate office

buildings. The study shows how a mobile workforce will require Real Estate & Facilities Management units to adapt their real estate portfolios and find the balance between the number of workstations for co-located workers and those who work outside the office, from home or any other place using virtual environments. As people adopt more flexible ways of working, the *flexibility of workplaces* will become an issue leaders in Statoil will need to address. The more mobile and distributed nature of future workers will increase the need to adapt existing workplace solutions according to their needs. Workplace flexibility can be enabled by utilizing new IT tools and/or by designing new types of office spaces. But the importance of corporate policies and standards should not be underestimated: These policies and standards should be reviewed and eventually changed in order to adapt existing workplace solutions to the new realities created by new ways of working.

The research study recommends that Statoil establish a Workplace Development unit composed of a permanent, cross-functional group of experts from corporate staff functions that will be responsible for defining alternative workplace solutions based on future ways of working of the different business areas in Statoil and their business needs. This Workplace Development unit would also coordinate the efforts of each support function regarding future workplace developments; anchor proposals for changes with corporate management; ensure their implementation; and communicate change to the rest of the organization. Due to the focus and priority collaboration has in the company, it is also proposed that the unit responsible for Corporate Real Estate and Facility Management designs and shapes more *collaborative office work spaces* to support the collaborative ways of working in Statoil, and in close cooperation with other support functions and business areas.

Further research could embrace an analysis of future ways of working in other companies with global presence using the same or a similar methodology utilized in this report. It could be interesting also to compare the type of work spaces those studies could recommend as future office work spaces.

Another topic of study could be an analysis of the organizational change processes employed by other organizations when dealing with the implementation of alternative workplace strategies and the way those companies measure the added value of the impact those strategies have on physical spaces.

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Annex

This chapter is divided in four sections:

Annex A: Definitions

Annex B: Statoil Global Scenarios

Annex C: Statoil's future workplace

Annex D: Statoil's new office building at Fornebu

Annex E: Uttaksskjema

Annex A.1 Definitions

The main source of these definitions are the American authors Jeanne C. Meister and Karie Willyerd, two internationally recognized writers and speakers, and founders of Future Workplace, an American-based organization working on strategy development that focuses on the re-invention and re-definition of corporate learning and human resources. (Future Workplace, 2011).

Asynchronous communication: communications that occur independently of time and place. It is the opposite of *synchronous communication*, where communication occurs simultaneously and in real time.

Augmented realities: a virtual environment created by computer-generated effects combined with user's views of the real world.

Avatar: a graphical representation of a person in a virtual world. An avatar may be an accurate representation of an individual, or it may be a fanciful and mythical alter ego.

AV/IT tools: audiovisual- and information technology-based tools.

Blog: an individual or group online Web log maintained with regular entries on the subject of the contributor's choosing.

Collaborative software: software that allows individuals in diverse physical locations to work together over the Internet on the same documents or projects in real time.

Corporate social network: a Web site behind a company's firewall that allows users to construct a profile they use to interact with others using social media tools.

Facebook: the largest social network in the world, according to comScore.com. (www.facebook.com)

Lamella: a floor or structural horizontal section of an office building.

Microsoft Sharepoint: software solution that allows users to utilize the web to create virtual document spaces and share information with others.

Microsoft Unified Communicator: an integrated software solution that allows users to communicate using e-mail, phone, audio and video conferencing, voice mail, and instant messaging systems.

Smart mobile telephone: telephone device that allows users to communicate and connect with others using functionalities similar to those found in computers.

Social networking: the act of participating on a Web site that allows users to construct a profile to interact with others by using social media tools.

Social media: a range of Web 2.0 tools where people create and disseminate content.

Telepresence: collaborative environment solution characterized by high-quality, lifelike video that allows people to collaborate face to face virtually.

Web 2.0: a term used to describe Web technology combined with social interaction, such as blogs, wikis, and social networking sites.

Wiki: a page or collection of pages designed to allow anyone with access to contribute or modify the content.

Annex B.1 Statoil Global Scenarios: factors for each scenario

Factors	MoneyWorks	NetWorks	PatchWorks
CO_2 equiv. in 2100	850ppm	450ppm	650ppm
Climate policy	Lot of talk, limited action	Global agreement & actions	Local focus & actions
Temperature rise in 2100	5°C	2°C	3.5°C
CO_2 market	Yes, regional & ineffective	Effective & global	No
Natural resource exploitation	High: "full blast"	Constrained by policy	Constrained by access
Natural resource management	Economical principles	Supra-national & regional policy	National and local
Governance	Large corporations	Voters & Consumers	National political elite
International co-operation	Med: primarily trade	High: supra-national bodies	Bi-lateral: no super-power
Instability	Terrorism high: Local warfare	Transformational stresses	Suppression & regional warfare
Social values	Individual freedom. Market trust	Our world! Conservation	My tribe! Local security
Social behavior	Consumerism	Knowledge valued & shared	Self sufficiency
Migration	High: economic & climate	Medium: economic, borders open	Low: borders closed
Wealth distribution	Uneven	Even - planned redistribution	Highly uneven
GDP growth	High initially – costs come later	Lowered (regulation) then high	Lowered by protectionism
Trade	Global	Global	Bi-lateral
Global currency	Dollar	Dollar	Several
Energy technological breakthrough	Low: Hydrocarbon focus	High: Efficiency; Renewables	High: Efficiency; Renewables
Technology transfer	High: global market	High: policy driven	Restricted: National & bi-lateral
Transportation technology	Combustible engine	Electric engine	Electric engines, dominate
CCS	Low: windows dressing	Medium: fading	Limited

Annex 1: Statoil Global Scenarios. Factors for each scenario (Statoil ASA, 2009a)

Annex B.2 Statoil Global Scenarios: scenario development timeline

(Statoil ASA, 2009a)

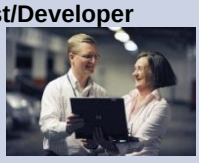
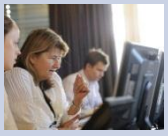
Annex C.1 Capabilities of Statoil's future workplace

Capability	The ability to…	I am…
Collaborative	work with others for a common purpose or benefit	• Driven by my work with others, and interchangeably working on my own • Attending only two formal meetings a week but spending much time with others • Making deliveries that fit with the deliveries from others and nicely make up the final delivery • Interacting with information and persons both standing and sitting with the use of touch- and sensor-based displays • Not spending much time on administrative tasks and concentrating on core tasks 90% of the day
Agile	move quickly and lightly	• Responding to a request within 30 minutes, because I have easy access to the information and people I need • Changing environments, choosing tools and creating the optimal workplace for the task in hand • Able to make decisions and commit resources quickly due to clarity in priorities and responsibilities • Rewarded differently during my career; my salary becomes a mixture of fixed pay and work group performance-based bonuses • Working alone when I need to concentrate, but I bring along my colleagues when I develop new ideas and implement them
Mobile	change quickly from one state, condition or place to another	• Working anywhere supported by a variety of mobile devices with rich features • Moving along different tasks, workplaces, projects, colleagues and collaboration tools during a working week • Doing my job equally well when travelling to and fro by train or plane and dropping in at a café, as when at my office, home, project facilities, or the offices of partners, suppliers, and clients • Keeping up with my peers and friends anywhere supported by my devices
Visual	communicate with visual images and video, including visualizing something that is invisible or abstract	• Always seeing the ones I am talking to, in person or by video conferencing • Communicating my ideas to others using images, animations and video and a variety of visualization techniques • Collaborating supported by easily accessed devices with video and audio functionalities, which also provide a richer context from "the other side" in communication • Provided with a visual image of who and what are in my surroundings as I enter a new location • Able to show myself as a real person or have avatars attending discussion and meetings

Global	do work with people spanning throughout the entire world	• Adapting my working hours according to my colleagues' presence in other times zones around the world • Working every day with colleagues of another national culture and with another native language • Unaware and indifferent to where my co-workers are employed and where they are located • Working at different office locations, but still adhere to Statoil's way of work wherever I go • Getting the fit-for-purpose support services whenever and wherever I need them
Diverse	work with many, and different, kinds of people	• Enjoying the respect from my colleagues', irrespective of my ethnicity, background, religion, and so on • Able to work on changing tasks and environments that can become adverse • Collaborating with people who belong to very different age groups than myself • Solving more complex and dynamic tasks by working with a wide range of disciplines and multifaceted personal qualifications
Hyper-connected	be extensively related to other people inside and outside company borders	• Introducing myself to other people in my near surroundings by using my personal cloud • Able to set strict limits between time at work and time off, though I can navigate within the scope of 24/7 • A member of several private and public networks and interact both synchronously and asynchronously with their members • Able to communicate easily without any obstacles or elements interfering in my physical space • Supported and my work enhanced by gadgets and objects in my environment that communicate and coordinate themselves to solve my current tasks in hand

(Weiseth & Beltran, 2010)

Annex C.2 Statoil's personas

PROFILES	"EASY TO WORK"
Operator off/on-shore  	I perform and collaborate as part of a team. I communicate and connect with my peers using more sophisticated visualisation tools and methods. I share my experience with my national and international colleagues using networks that are accessible and available when I need them. Technology supports my tasks and communication during all day.
Administrative support services  	Supporting core business processes in an efficient and agile way is part of my every day work life. I collaborate with my peers and clients in order to deliver solutions adapted to business needs. I have the opportunity to meet employees from all over the world. I am multicultural and multilingual.
First line managers  	It is all about collaboration. I have access to new and more innovative IT solutions that support me in staying connected. I communicate with my team using integrated devices. My team is distributed in different parts of the world and uses English as common language. We are available anywhere and communicate both asynchronously and synchronously using different tools.
Discipline experts  	I solve my tasks using the relevant parts of my professional network, regardless of their employment or location, and our working arrangements and available tools support this kind of work. We communicate our results and share expertise in a more visual way.
Project member  	By using context-based pre-setup of collaboration templates (process- and IT-tools) it becomes easy to arrange complex collaboration sessions. Examples are brainstorming across time and space (distributed across geography, both synchronous and asynchronous, using several tools), real-time problem solving across time zones (rich media with all participants, using virtual models and figures and video and holograms of the current problem) and all types of co-working sessions.
Business Analyst/Developer  	I try to find a balance between my private and work life by using different work contexts. I am mobile and collaborate with my colleagues anytime and anywhere. I have a global mind-set because I have worked in different countries and cultures. I collaborate using different tools and stay connected to my colleagues using social networks.
Executive Vice Presidents, Vice Presidents  	Decision making processes are truly global and split across country boundaries and times zones. I am not Norwegian, but I respect the background and company's culture. I collaborate with the organization I am responsible for using social networks and my presence is known by anyone. I work with distributed teams and I work anywhere.

Annex C.3 Ways of working of a Statoil's profile

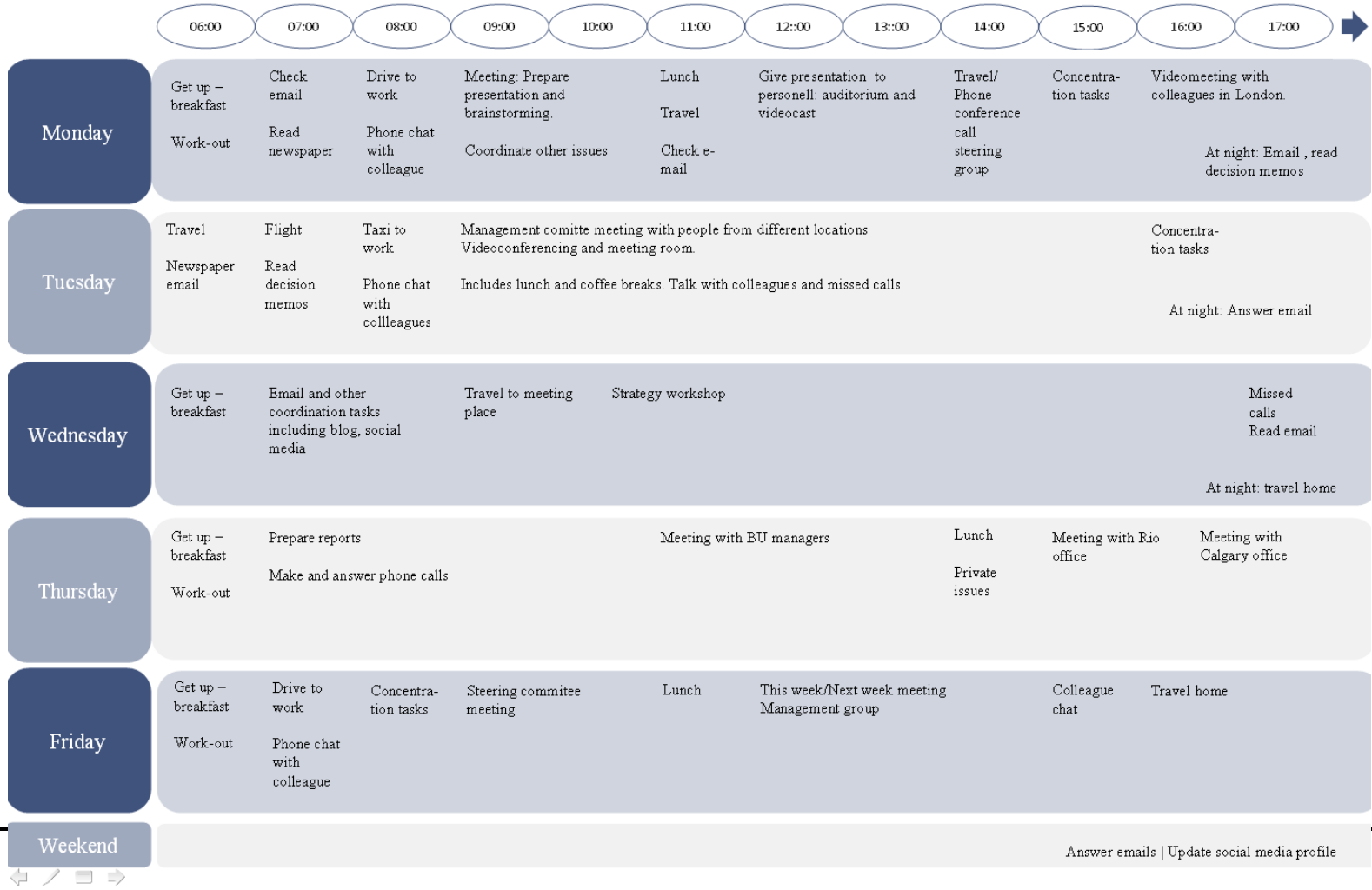
Easy to
work

Executive Vice President – Vice President

VISUAL | MOBILE | COLLABORATIVE | AGILE
HYPER CONNECTED | GLOBAL | DIVERSE

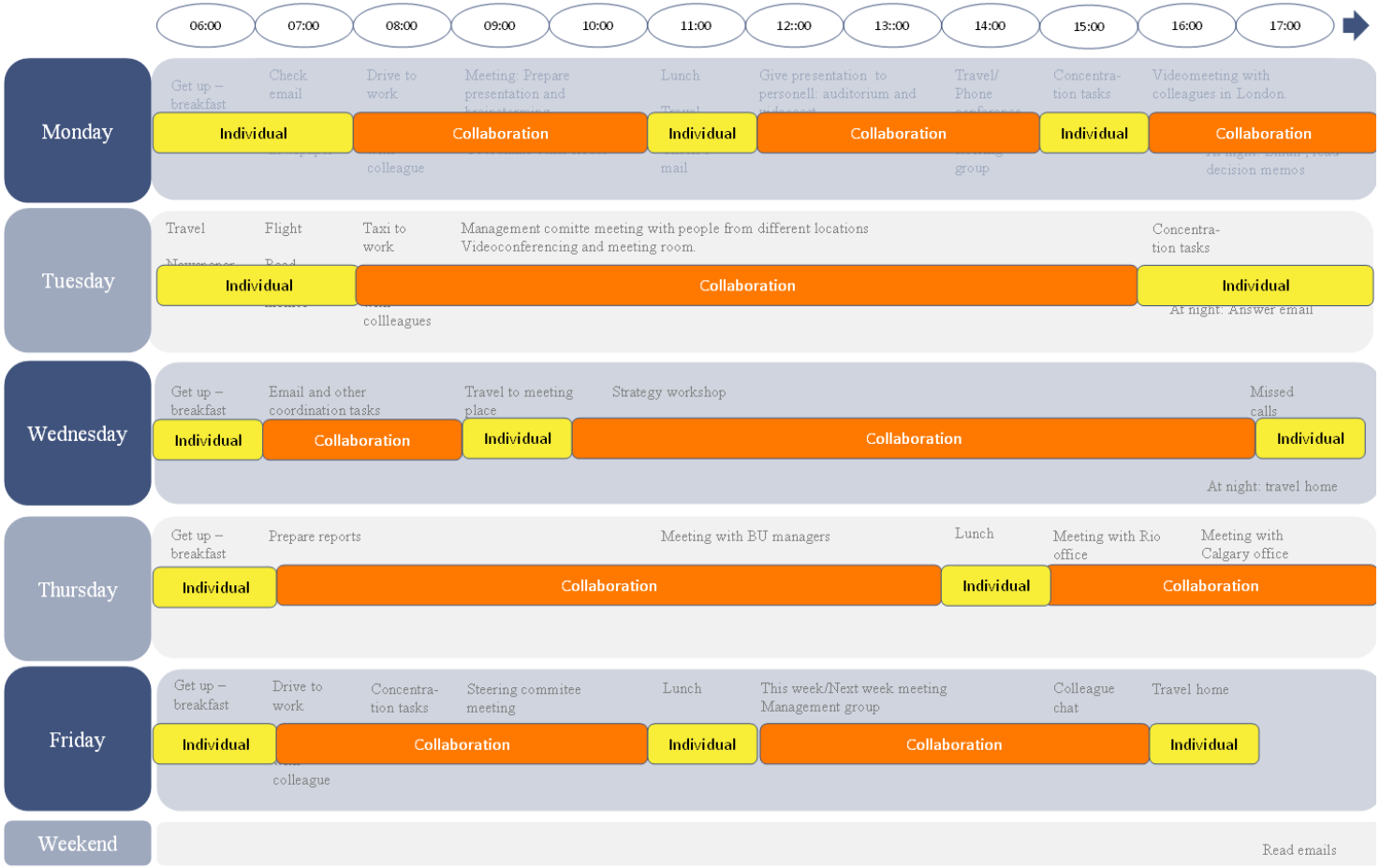
The week of: Executive Vice President – Vice President

Task overview – a representation of daily tasks



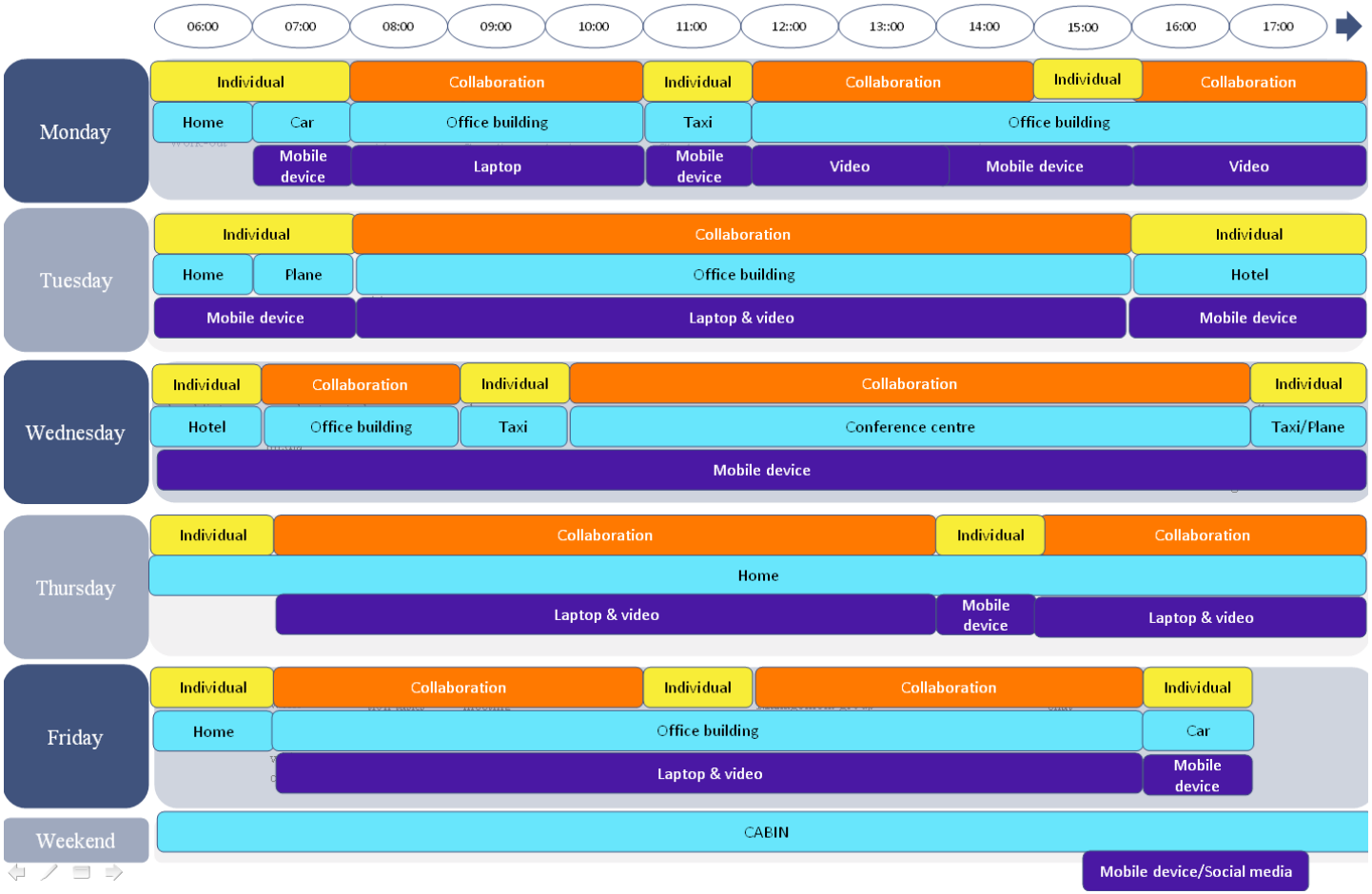
Collaboration needs of: Executive Vice President – Vice President

Individual and Collaborative work

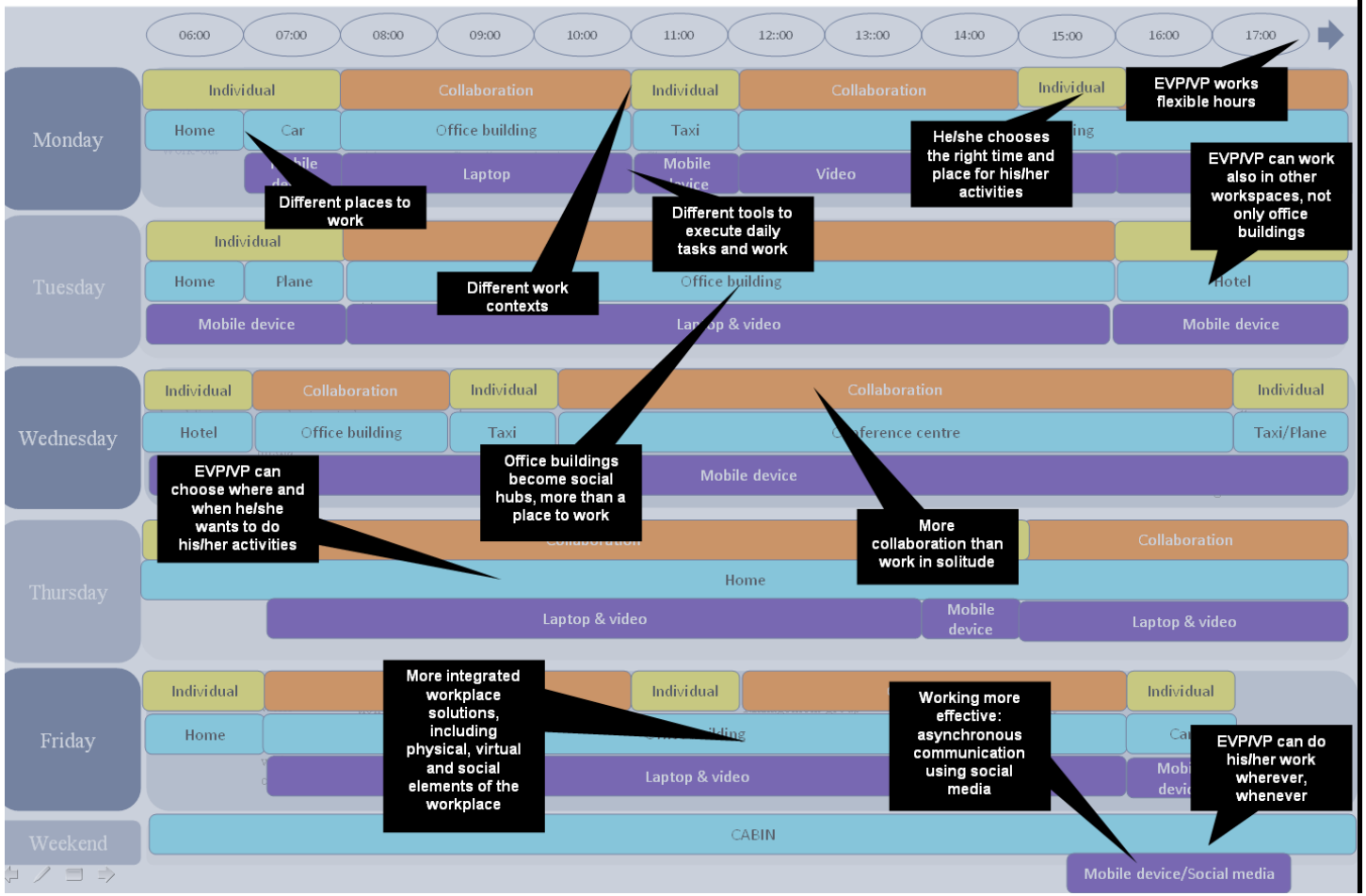


The workplace of: Executive Vice President – Vice President

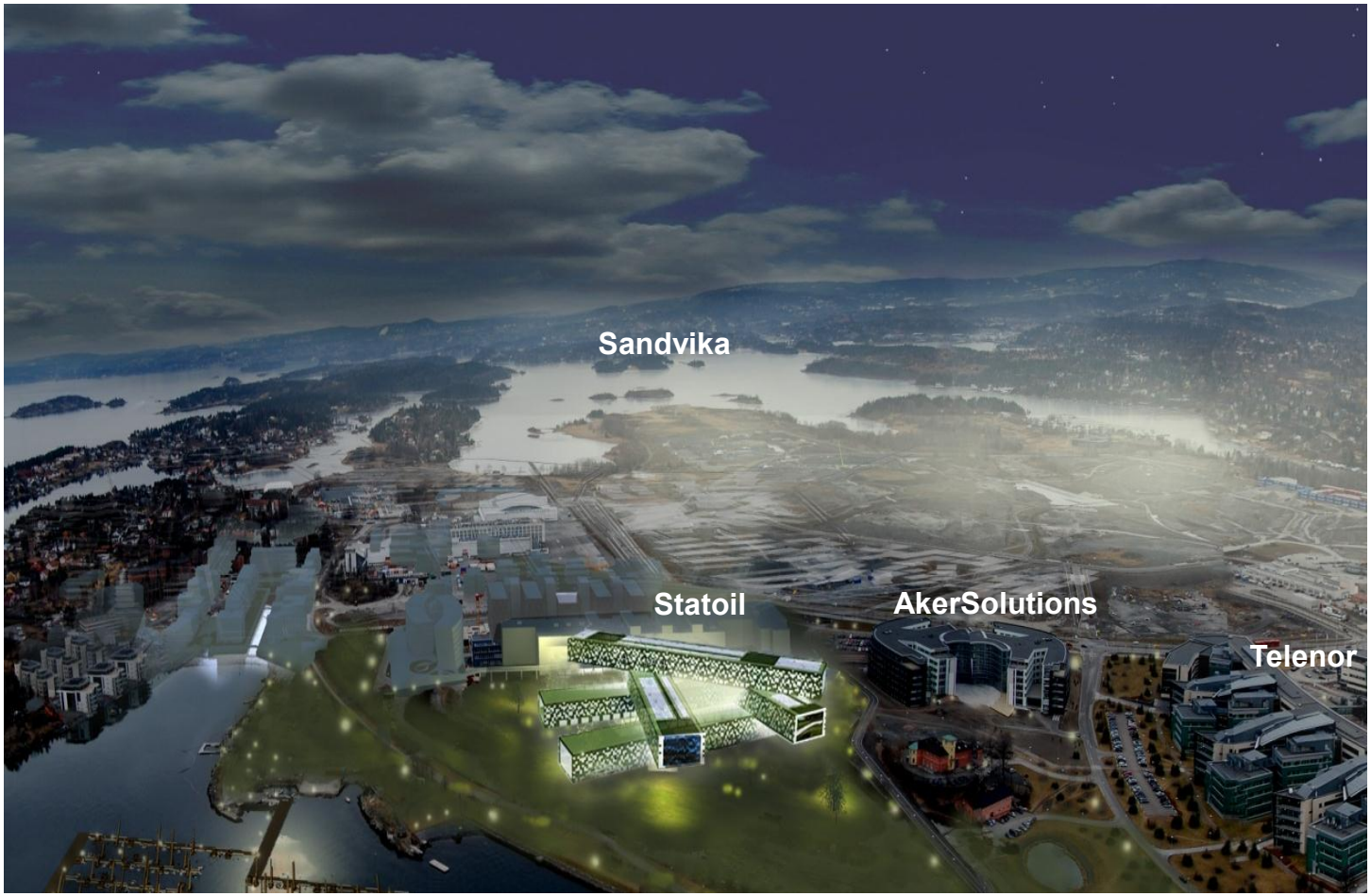
Physical and Virtual elements



The workplace of: Executive Vice President – Vice President
Lessons learned



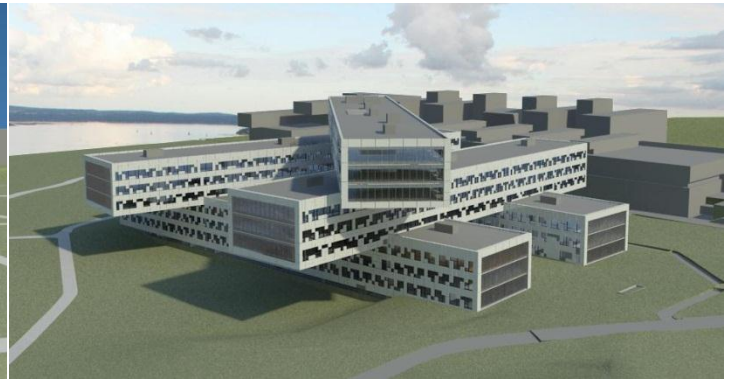
Annex D.1 Location of Statoil at Fornebu



(Statoil ASA, 2010d)

Annex D.2 Building views

From the west 

 From the north

From the south 

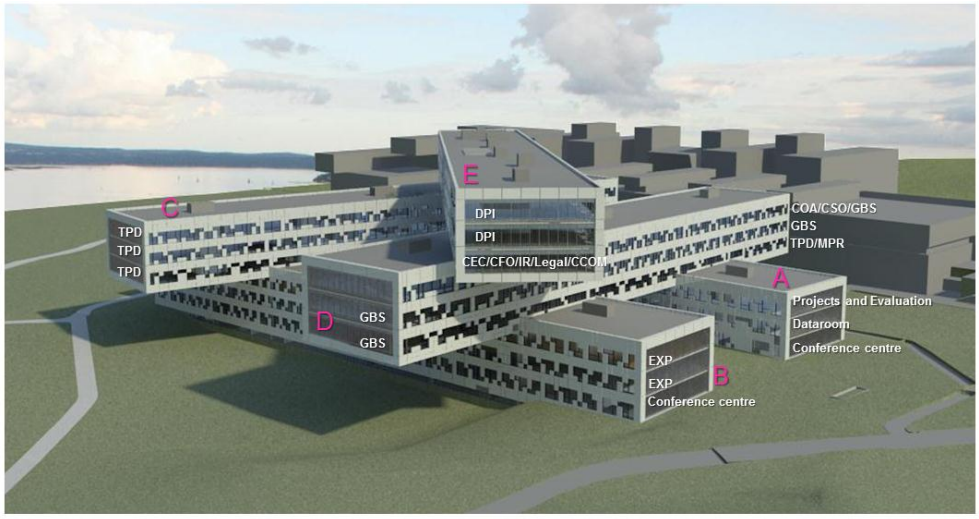
 From the east

(Statoil ASA, 2010d)

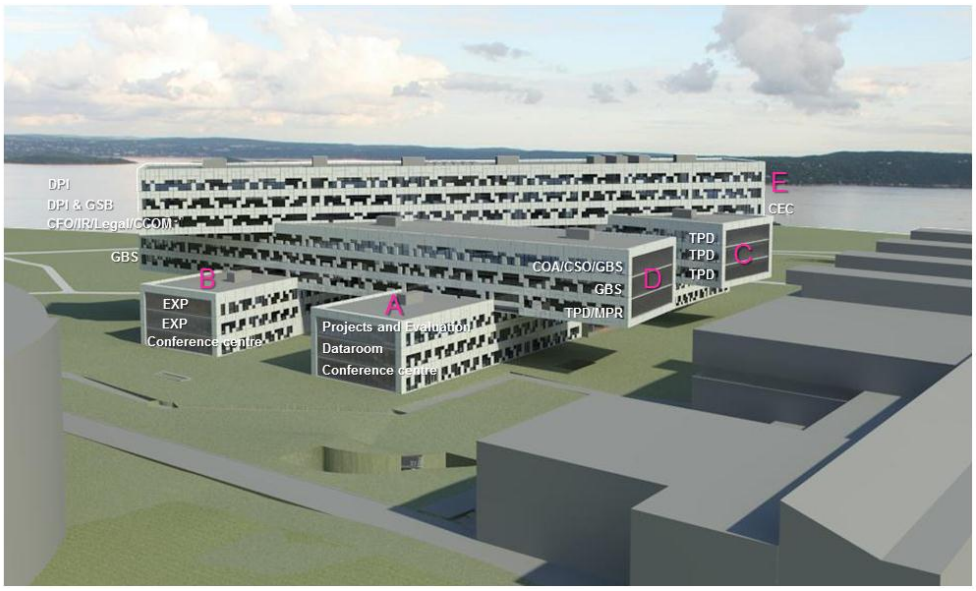
Annex D.3 Placement of business areas in the new building

(Statoil ASA, 2010d)

(Statoil ASA, 2010d)

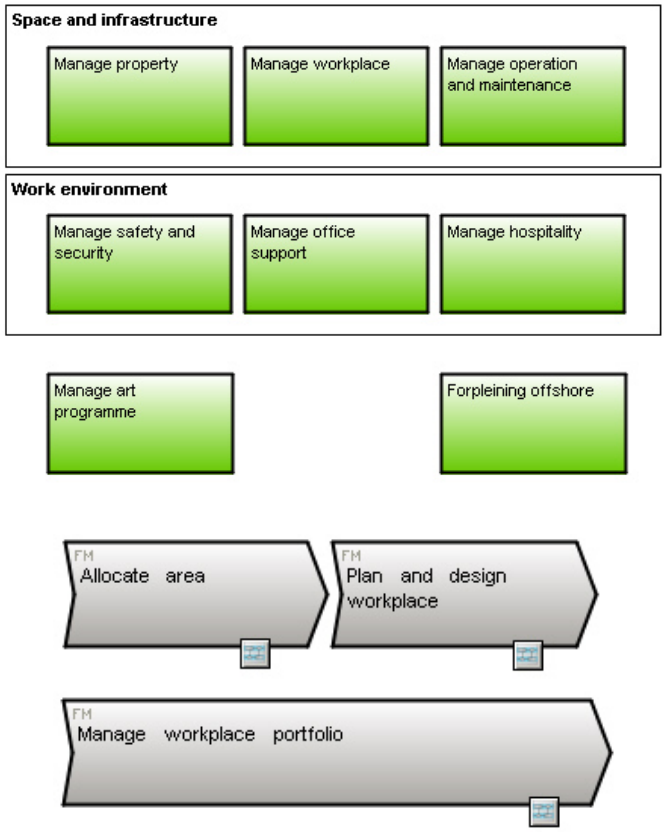


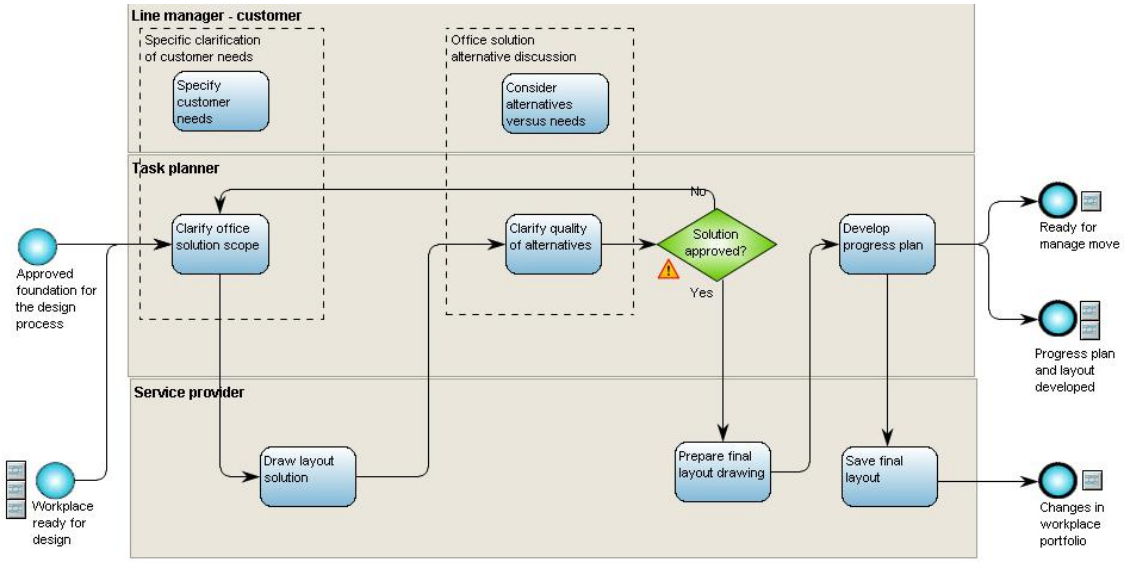
(Statoil ASA, 2010d)



(Statoil ASA, 2010d)

Annex D.4 FM processes





(Statoil ASA, 2010d)

Annex D.5 Tool to analyze business needs

Analysis of business needs		
	Guidelines	**Business area name**
Employees	Number of employees in unit	
	Number of standard work stations	
	Number of technical workplaces	
	Number of guests stations	
	Growth/ reduction in number of employees in 2012	
Key success factors	Which elements are critical for creating value/achieve unit's goals (ways of working, physical environment, technology, confidentiality) ?	
Special needs	Specify the technical and physical needs for your unit. For instance does your tasks depend upon special rooms (24/7), specific technology (ie. Linux/ others), heavy archives, plotter, walls to visualise information etc.	
	Does your unit have special requirements for confidentiality? (need for area with restricted access)	
Collaboration	What are the most critical interfaces to other business areas?	
	What are the most critical interfaces internally in your business area. Prioritise if possible.	
Analysis	What are the main characteristics of how work is executed? (be generic!)	**Presence**
		Permanent at Vækerø ○○○○○ Travelling every weekday
		Permanent at work station ○○○○○ Seldom at work station
		Work methods
		Paper work ○○○○○ Screen work
		Similar tasks each day ○○○○○ Different tasks every day
		Individual work ○○○○○ Collaboration
		Work requiring constant concentration ○○○○○ Interaction is necessary to perform tasks
		Meetings
		Information ○○○○○ Communication
		Virtual ○○○○○ Face-to-face
		Communicator at work station ○○○○○ Videomeeting
		Spontaneous ○○○○○ Planned
		Few participants (1-2) ○○○○○ Many participants (18+)
		Short duration <15 min ○○○○○ Long duration (1-2 +days)
Challenges	What challenges do you have with today's solutions at Vækerø ? (ways of working, physical environment and technology)	

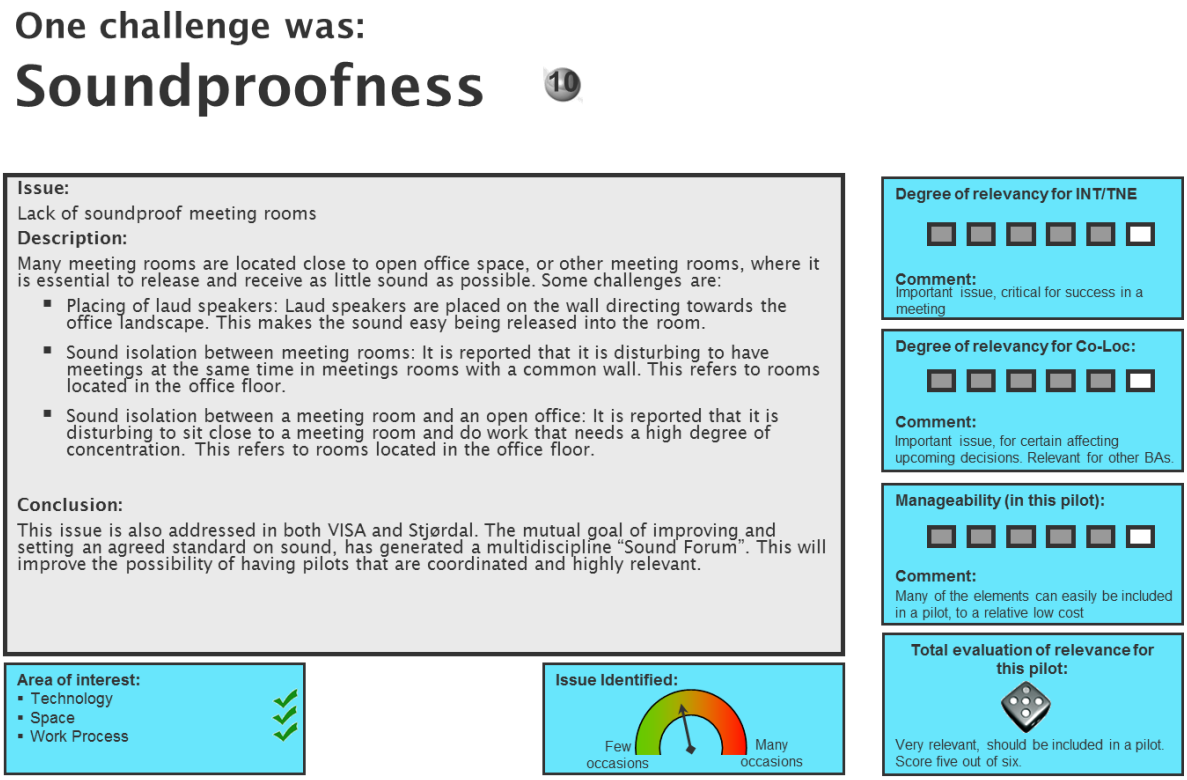
(Statoil ASA, 2010e)

Annex D.6 Challenges running meetings

	Issue	Problem
1	Sharing data	Not an easy and secure way for sharing data
2	Data transmission	Sudden breaks in data transmission
3	Sound quality	Varying sound quality
4	Image Quality	Varying image quality
5	Non-verbal expression	Lack visibility of non-verbal expressions
6	Different time zones	Challenges when arranging meetings in different time zones
7	Confidential meetings	Space not suitable for confidential meetings
8	Visual ergonomics	Not optimal visual ergonomics
9	Air quality and heat	Differences in air quality and heath
10	Soundproofness	Lack of soundproof meeting rooms
11	Utilization of meeting room	Not optimal utilization of existing meeting rooms
12	Establishment of meeting	Long time to establish a meeting

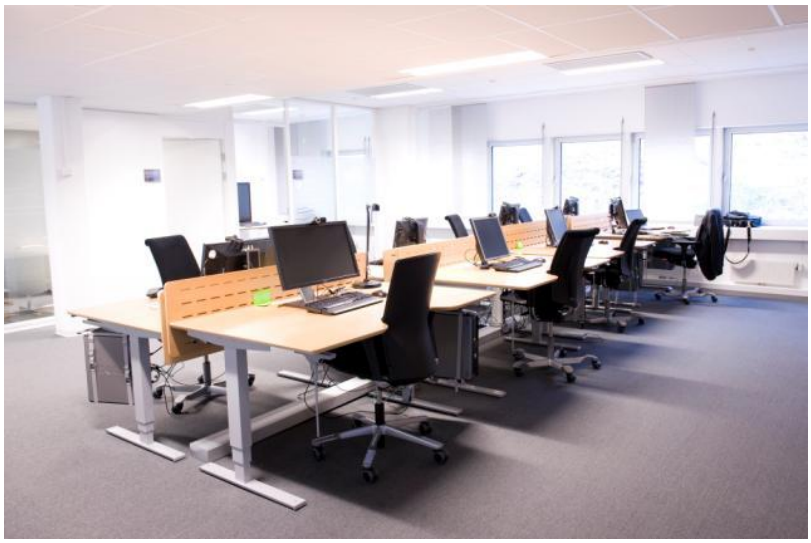
(Statoil ASA, 2010e)

Annex D.7 Challenge specification – example



(Statoil ASA, 2010e)

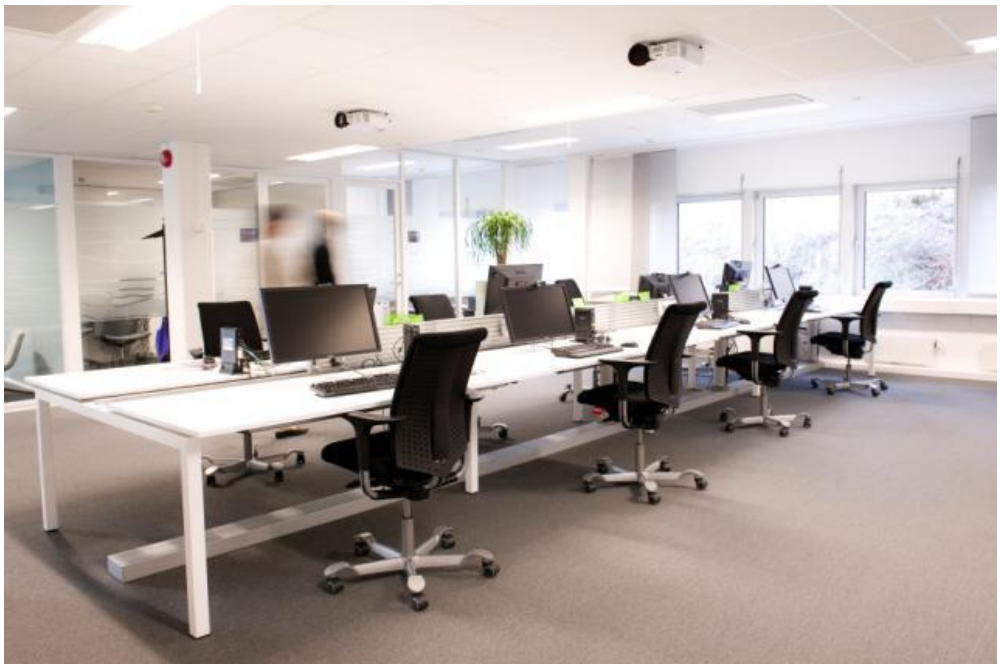
Annex D.8 Statoil's pilot office space – photo impression



From top: entrance to pilot area, Team arena 3, team arena 1.Source: Statoil ASA

Interplay rooms (small, medium and large size)

Source: Statoil ASA



Team Arena 2 (top) and Study area

Source: Statoil ASA

Annex E.1 Uttaksskjema

NTNU
Norges teknisk-naturvitenskapelige universitet

Fakultet for arkitektur og billedkunst

Saksbehandler
Ero

MASTEROPPGAVE I STUDIEPROGRAMMET MASTER I EIENDOMSUTVIKLING OG FORVALTNING

for

Masterstudent : Erick Paul Beltran Canepa

Fagområde Eiendomsutvikling og -forvaltning

Utleveringsdato: 01.september 2010

Innleveringsdato: 22.juni 2011

Tittel *New ways of working and their impact on future physical work spaces*

Formål *To suggest people's ways of working in the future and the impact these new work practices will make on physical work spaces.*

Følgende hovedpunkter skal behandles:

1. New ways of working

2. Future workplace

3. Collaboration

Trondheim
(sted)

31.august 2010
(dato)

..... **Veileder / Faglærer ved NTNU**

..... **Leder for studieprogrammet**

NTNU

Det skapende universitet