Master thesis

Technology-enhanced Activity Spaces in the hotel Industry: An ethnographic study of intrinsic practice transformation and system implementation in Norway and Brazil

INFOMEVI390

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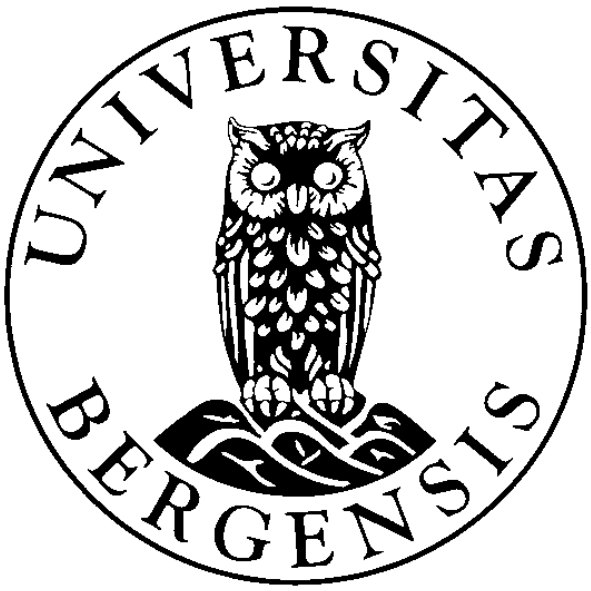

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1. Abstract

Computer technologies now surround us at a daily basis, not only in work-related matters, but also other areas of our daily lives. The tools that we employ constitute to advanced interactive habitats, and one needs to study how users employ these resources in their everyday settings. Changing conditions with the introduction of new artifacts and practices constantly inflicts people, and this ethnopgraphic research aims to contribute to how this aspect might affect the day-to-day activities at two hotels located in Norway and Brazil respectively. It wil analyse empirical evidence obtained in an ethnographic study on how various actors take advantage of technologies in different activity spaces across durations of time. A system implementation process is evaluated by looking at its impact and on how employees employ solutions to problems that might arise. The study also wishes to investigate the value of intrinsic practice transformation by providing users with tools and elaborate upon their practices in order to

transform and hopefully improve their work-related activities. One is related to converting a paper-based cleaning staff roster into a Google Doc, while the other explains the switch from a traditional fax machine to email as a technology for handling all types of communication with various suppliers. Ranges of factors are discussed that are affected due to these innovations being accomplished by the users themselves, such as how they impact the interactive ecologies. Finally, it will show how cultural differences may affect various criteria at the hotels, such as their willingness to address problems and the use of technology contra man labour.

2. Introduction

The computational power that we employ within various environments is often highly distributed, which means that designers cannot solely concentrate design around the traditional interaction between a human and a computer. A secretary within the hotel service industry will for example use several tools in order to perform her work-related tasks effectively such as a computer, printer and telephone. Apart from technological resources, several non-technical tools are deployed, such as post-it notes, sheets of paper, pens, binders etc., supporting some activities that in theory should be undertaking by the more sophisticated tool; the computer, and being highly essential for a person to perform tasks effectively. Other than secretaries, there are a vast amount of different jobs and activities related to one organization, and they often have work sessions and assignments that demand a shift between individual and interdependent activities. One can easily see that human activity within a hotel is not simply mediated by single devices, it is rather multimediated by clusters of artifacts often being shared by various individuals within an ecology (See Fig. 1).

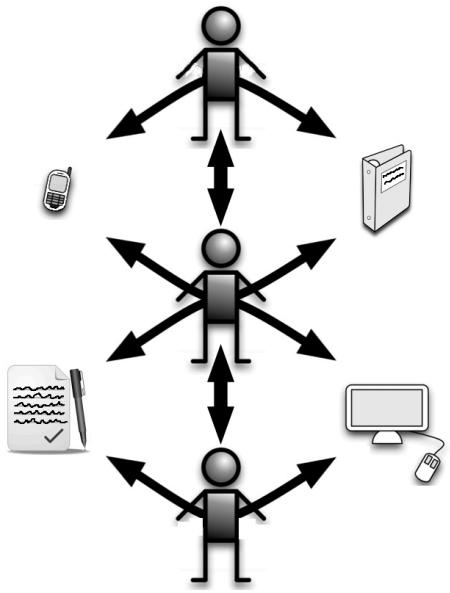


Figure 1: Humans interact with shared tools (both technological and non-technical) and other individuals. Inspired by Bødker and Klokmose (2011).

Even though various resources attend to their tasks, several new necessities will arise in the competitive hospitality industry, and new tools and systems are therefore often implemented in order to support these requirements. During a hotel merger at one of the hotels studied, completely new systems were introduced into various areas of operation. Even though large financial investments have been made to these systems, it is possible to believe that the cluster of systems and artifacts does not interoperate as effectively as one modular system designed for that specific habitat possibly could, as they are ad hoc changes made due to different new necessities and circumstances. Designers will often not have enough understanding and information surrounding such complex working environments, and to develop systems that accurately address their needs is considered extremely challenging. Myself working in the restaurant business for several years have seen many problems related to technological artifacts that are supposed to aid the process of customer service. Commercial of the shelf (COTS) software is often introduced without considering the elements mentioned above, and one has seen this to be done within the hotel industry as well. Having various tools and instruments developed by different professional designers will result in an ecology influenced by several stakeholders without the necessarily sufficient understanding of practice. To address these problems various actors at the hotels will often have to appropriate these tools in order to make them fit to their practices. Recent trends in HCI (Human-Computer Interaction) research has therefore made a shift from focusing on creating *innovative technologies* to rather concentrating on *how individuals act in these ecologies of artefacts and adapt to new circumstances, and how they can be assisted in transforming their own interactive environments*. This study will therefore contribute to this trend and look at the implications of already existing as well as new systems being introduced into a habitat, but also how users themselves can enhance practice by implementing and utilizing technological tools. These might both be instruments that are already present in the ecology that can be used alternatively, but also resources that they are not explicitly aware of. It has also been seen that cultural, cognitive and structural elements and individuals´ personalities and attitudes toward technology have a significant correlation with people's willingness to overcome these issues, but also how they deploy or actively look for new technologies.

According to this and previous research one cannot solely focus on designers' development of novel solutions; one also has to consider letting workers themselves transform their practices. Several studies have shown how workers will experience problems with artifacts being implemented into their ecology e.g. (Orlikowski 1992; Pliskin, Romm et al. 1993; Bentley, Horstmann et al. 1997; Beyer and Holtzblatt 1998; Heath and Luff 1998; Suchman, Blomberg et al. 1999; Heath and Luff 2000; Park and Chen 2012), and they might need new (or the transformation of already existing) tools to attend to these difficulties. One of the things that is therefore here suggested, is that emphasise should not always be on the extrinsic transformation

of human practices, rather the intrinsic[1], being related to technology-enabled practice transformation (Kaptelinin and Bannon 2011). The users themselves should sometimes be provided with the proper tools, and develop and/or transform their own practices, instead of the artifacts of an ecology being designed by professional designers and therefore influences coming from individuals that are not directly related to the work. Practitioners should become aware of opportunities that exist, and how they possibly can exploit this information to improve their work-related activities.

Theories within the field of HCI such as Participatory Design (PD), User-centered Design (UCD) and meta-design are all frameworks somewhat attending to these issues by including the users in the process of designing interactive artifacts. Seemingly promising methods, they tend to focus on the extrinsic transformation of practice, rather than the intrinsic. An "ecological turn" has therefore been noticed (Kaptelinin and Bannon 2011), underlining the importance of understanding ecologies of artifacts. Several concepts, such as information ecology, artefact ecology, product ecology and habitat have been emphasized in current studies e.g. (Nardi and O`Day 1999; Forlizzi 2007; Bødker and Klokmose 2011; Kaptelinin and Bannon 2011) being suggested as serving in the assistance of the complicated notion of ecologies instead of singular artifacts developed by designers. Still, they do not provide sufficient guidance in terms of analysis, evaluation and technological support for the everyday life settings and context in which actuators are situated (Cabeza and Kaptelinin 2012). One of the key claims of this paper is therefore to look at how the conceptual foundations of HCI and activity spaces of the different hotels support the human interaction with entire ecologies of technologies, but also how users themselves can serve as their own designers for their environments. Efforts at finding solutions for how this can be done have various terms in HCI such as technology-induced practice transformation (Kaptelinin and Bannon 2011), end-user development (Fischer, Giaccardi et al. 2004) and opportunity spaces (Hornecker, Halloran et al. 2006a). Interesting results have derived from these studies, but further research has to be undertaken in order to address these complex phenomenon.

Based on the motivation for conducting this study, this thesis will therefore contribute to this research, and will follow the guidelines of the main elements typical to empirical research. First a problem will shortly be discussed in order to reveal the research questions, being tools to help guide the study in the right direction and that will underline the main foci throughout this empirical study. A short presentation of the two hotels subject to research will be presented in order to give the reader a short insight into the cases studies. Research literature as well as previous and related work may help give this thesis a foundation, but may also identify plausible flaws or shortcomings in existing research. A research method is always desirable, as it allows a plan to take place. In order to scrutinize a study in a thorough and well-planned manner, one

[1] Intrinsic and extrinsic will be further elaborated later in the thesis, in section 5

needs a methodology to establish a list of procedures and rules to guide the process, and the ones chosen are often based on the nature of the study and what it is trying to reveal. This thesis is based on a qualitative case study, said to be appropriate when wanting to examine people's perceptions about their everyday social world. The collection of data is highly important as it creates the basis of study, and in this research observations and contextual interviews were conducted with relevant actors such as hotel managers, receptionists and other staff, as well as guests to assure pertinent information. Several interviews and observations were conducted with the following individuals: 10 receptionists, 6 bar/restaurant staff, 2 cleaning staff managers, 6 members of the cleaning staff, 2 hotel managers, 3 members of the kitchen staff, 2 security guards and 20-25 guests. The interviews varied in lengths of 10 minutes to 1,5 hours (the ones recorded have been transcribed), while observations could last for several hours. The various observations and interviews were distributed across different time periods, from early mornings to late evenings, on weekdays and weekends. Numerous possible problems surrounding the study were also revealed prior to commencing this thesis, in order not to fall into pitfalls that might arise, and therefore possibly enhance the validity of the outcome. The field study was conducted over the course of five and a half months at two different hotels, located in Norway and Brazil respectively. For one of the cases I stayed and interacted with actuators for three and a half months, while the other for two. This gave me a thorough insight into the use of technology and practices of their everyday working situation. Not only did it uncover how individuals take advantage of and sometimes struggle in their use of technological artifacts and how they move from different activity spaces in order to accomplish their goals effectively, but also how they can be provided with simple tools to enhance their practices. After the gathering of information, an analysis of data was performed which can be found in section 6 and 7. Section 6 discusses how employees and guests take advantage of technologies in different activity spaces, their attitudes towards technologies that exist and how the change of tools used possibly can enhance practice. Two examples are provided that shows what happens when practitioners, i. e. users themselves, contemplate on their practice and are provided with tools that can help them enhance their work-related activities. One is related to converting a paper-based cleaning staff roster into a Google Doc, while the other explains the switch from a traditional fax machine to email as a technology for handling all types of communication with various suppliers. Finally, it will show how cultural differences may affect various criteria at the hotels, such as their willingness to address problems and use of technology contra man labour. Section 7 provides an overview of what happens when a new system is introduced into many areas of the hotel operation, primarily providing an insight into the system change in the restaurant and reception respectively. Not only does it affect the practices of various individuals, but also its efficiency and ease of use. A discussion section will deliberate over the consequences of all these matters, and how it relates to my research questions. Finally, a conclusion is provided to sum up the experience based on this research.

3. The problem at hand

The definition of a problem is highly important for the research process as a whole, as this will help put things into perspective, and will therefore explicitly determine the choice of selecting appropriate methods for gathering of information, design, respondents and so forth. It also provides a focus, guiding the motivation of this research.

In this work place study I wish to investigate and perform an empirical research regarding the current aim of interaction design research and practice in one part of the service industry, specifically the hotel industry. Through field work it intends to take a closer look at whether the design and integration of various technologies in this industry enhance the support for human action in specific habitats and environments (Kaptelinin and Bannon 2011), or if it is solely concentrated around introducing advanced technological artifacts. Examples can be artifacts and technologies such as computers and printers, but also the point of sale (POS) systems often used in places such as the bar and restaurant. We need to understand the ecologies of artefacts that surround employees at a daily basis, and also how they are constantly changed and developed over time. With the introduction of these systems, several individuals are believed to be affected, and it can be interesting to examine to what degree. As with (Chalmers and Galani 2004; Bødker and Klokmose 2011) this research aims to understand the differences between the interfaces that designers claim to meet the employees` working conditions, and the way the individuals shape their understanding and use over time. It also wishes to investigate if and how user can be provided with tools or elaborate upon their work-related activities to appropriately transform their practices.

3.1. Research Questions

With the help of qualitative contextual interviews with the employees and guests at the hotels, as well as extensive observations, I wanted to get the answer to the problem at hand mentioned above, as well as my specific research questions listed below. They will serve as the main foci of this paper, and will be used to achieve a higher understanding of the cases studies.

1. ***How do the hotels integrate various interactive technologies?***

    1.1. *Are the (technology enhanced) activity spaces of the hotels supported properly considering environments, working practice and guests?*

    1.2. *Do the diverse artifacts interact optimally?*

    1.3. *Are employees engaged and involved in any implementation process?*

    1.4. *Do various actors at the hotel face any problems with the introduction of technologies and which solutions do they possibly employ?*

1.5. Do the hotel management and staff see any need for new technologies, and does there exist a common consensus surrounding the necessity for novel tools?

1.6. Do the points mentioned in 1.1, 1.2, 1.3, 1.4 and 1.5 differ among different cultures*?*

2. ***Is it possible and beneficial to help people themselves create better environments for their work, learning, and leisure activities, by providing them with tools and elaborate upon their working practice?***

   2.1. How do the conceptual foundations of HCI potentially aid in this process of transforming practice?

   2.2. Will other practices and social interactions be altered with the introduction of new tools?

4. Hotel presentation

The cases that have been chosen in this master thesis will be presented below. They will be given the pseudonyms ”Hotel Norway” and ”Hotel Brazil” respectively. These do not correlate with their actual organisational names, this to comply with prospective privacy issues. Underneath each of these two sections follows an overview of the activity spaces and technologies at Hotel Norway and Brazil respectively. These perspectives are based on actual drawings sketched by the hotel managers during interviews, and the one from Norway can be found in the attachments section. The specific technologies attached are also a result of various observations and talks with other staff in general. It is to be noted that not all of these spaces have been included in the final evaluation and analysis, due to the limitation of both time and length of the thesis

4.1. Hotel Norway

The first subject studied is a middle-sized hotel located in one of the larger cities in Norway. It is a hotel consisting of approximately 110 rooms, with everything from a single room, double room, junior suite to a suite. The feel of the hotel is highly professional, predominantly oriented towards businessmen that come to spend the night and work the day after during weekdays. In the weekends there are mainly tourists staying, passing their days sightseeing and so forth. That the hotel focuses on guests staying in this manner is clearly related to prices, being high during weekdays and cheaper in the weekends. They also have a relaxation corner situated on one of the floors, claiming to be the perfect spot after a hectic day at work or sightseeing.
It is obvious that their main guest quota especially is related to Norwegians, but also Europeans being familiar with the English language, as most information situated on the hotel is written in both languages. These are also the only two languages present on their website, employees saying that they basically never have encountered any problems with this fact.

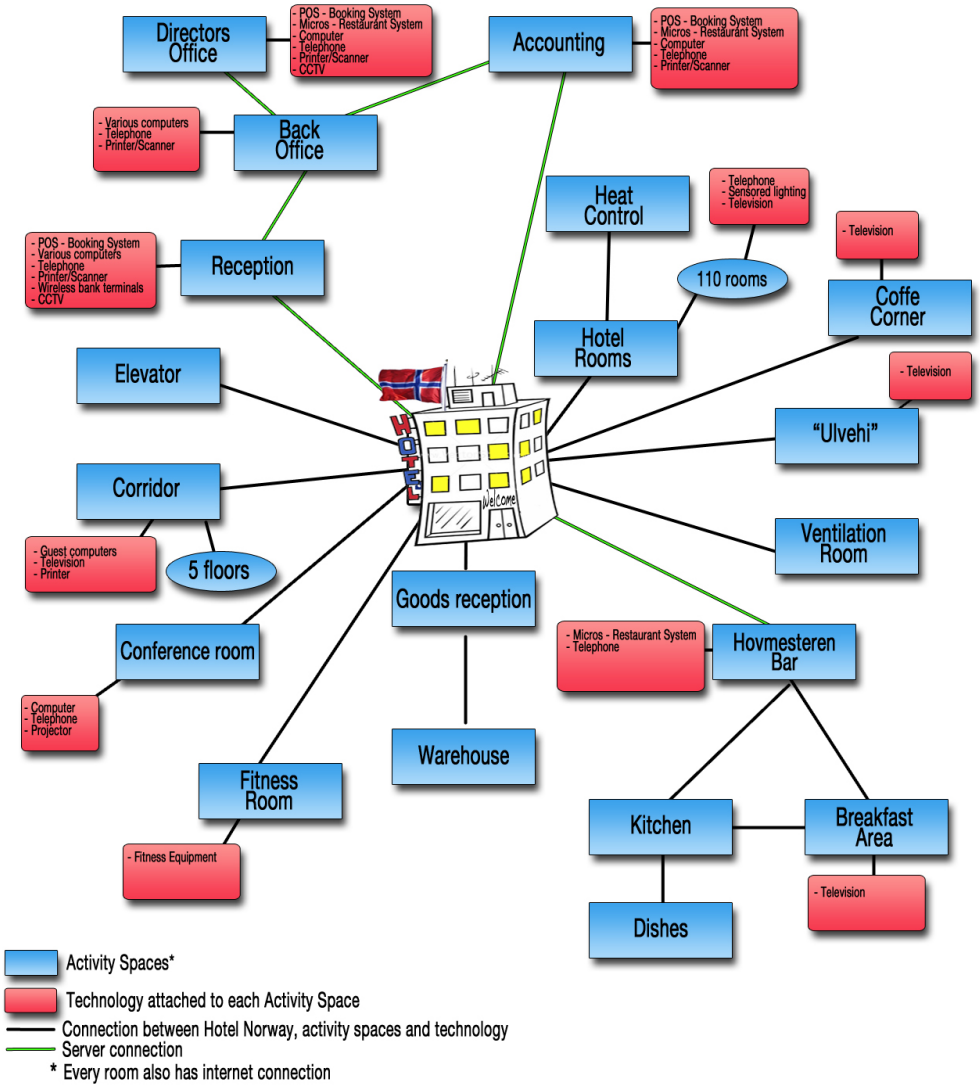


Figure 2: Activity Spaces - Hotel Norway

4.2. *Hotel Brazil*

The second study in this thesis was a hotel situated in a small fisherman's village outside one of the larger cities in Brazil, with approximately 5000 residents. It is a hotel containing 136 apartments with five different categories, ranging everything from an apartment of 29m2 with one bedroom, to an apartment of 153m2 with three bedrooms, kitchen etc. Everything about the hotel exudes relaxation, being a place where people come to vacate and escape from their everyday working life. Instead of being the "standard" hotel with one tall building and many floors, it has various small houses situated on the premises among various pools, volleyball courts and large green areas. The houses being spread in this manner creates an atmosphere that according to one of the guests was like "*feeling at home while on vacation*" (translated). According to the study, approximately 99 percent of guests vacating are there for holiday purposes only, being interesting for the study compared to the hotel in Norway. Also, around 70 percent of the guests staying are Brazilians, while the rest are mainly European and Argentinian. This can be

displayed with the website providing four languages: Portuguese, English, Spanish and Norwegian.

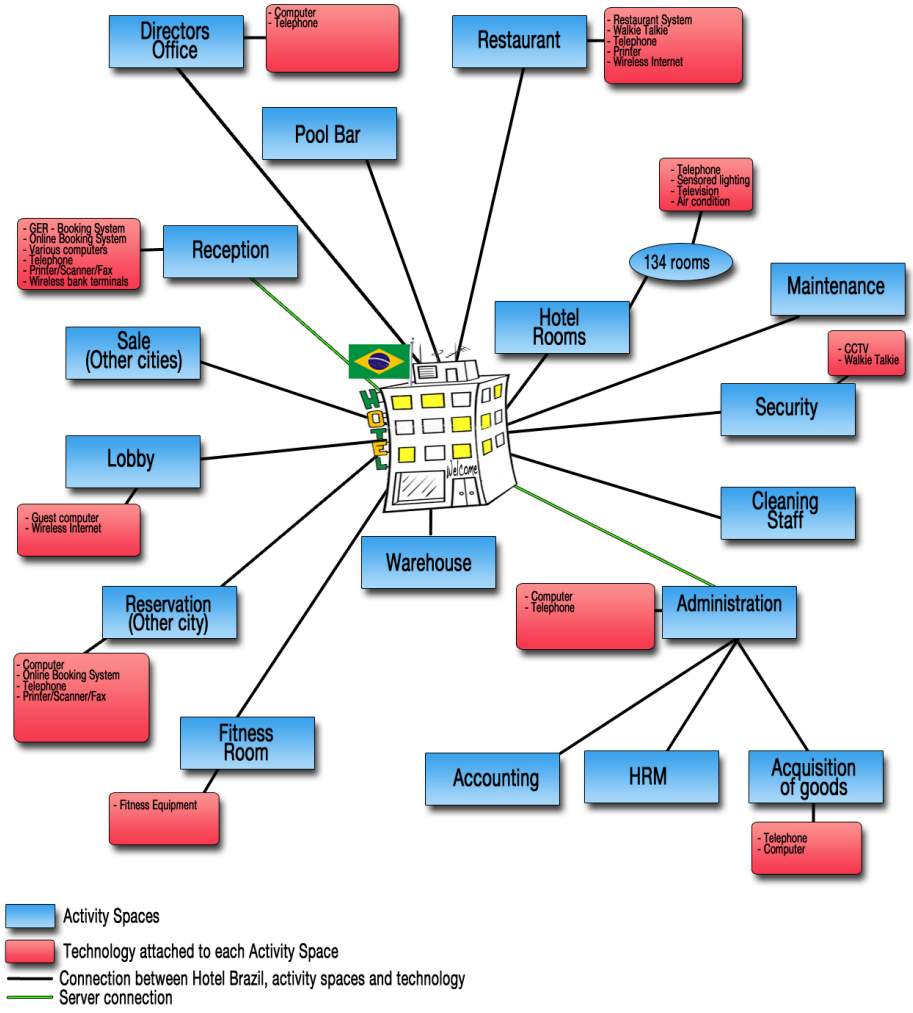


Figure 3: Activity Spaces - Hotel Brazil

5. Theory

Theory is first and foremost helpful as it allows us to have a common vocabulary of the things we observe in the world, as well as giving us frameworks for how we can compare them (Halverson 2002). This is important as to not get lost in translation regarding vocabulary, definitions and terms explaining what we study. Trying to depict what theory actually is, one can arguably discuss there to be many definitions. One this research feel is adequate and precise is:

> *"A set of interrelated constructs, definitions, and propositions that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining or predicting phenomena"* (Kerlinger 1973).

Based on this definition, one can see that related ideas have the possibility to elucidate or expect human experience on the grounds of data retrieved (DePoy and Gitlin 1998). It is a highly efficient aid when conducting a research as it provides the study with a foundation of thoroughly investigated concepts often based on observation and testing, and it allows the research in itself to be more effective, by being able to conduct adequate research. So, if well-proven theories and definitions already exist, why do we need to investigate new grounds? Albert Einstein ones said that "*New theories are first of all necessary when we encounter new facts which cannot be 'explained' by existing theories*" (Einstein and Seelig 1954). In this thesis technology-enhanced activity spaces will be put against, and used collectedly with already existing theories in order to reveal, elaborate and understand the subjective of research. Further,

> "*What a theory can warrant is not all that is necessary to make it useful. We need some way to compare and situate one setting against another in the natural history sense, and that will provide us with a taxonomy of field settings and their characteristics. From this we might build towards understanding phenomena, which in turn might become a better understanding of group work, if not a theory of it*" (Halverson 2002).

It is important to notice that theory alone is not able to describe occurrences; one (often) also needs to use it collectively with observations, testing, interviews and the like to get meaningful and relevant data. One also has to be particular when choosing a theoretical perspective, picking the one most relevant, comprehensible and applicable to the research conducted.

5.1. Research literature

Research areas that would seem relevant for my thesis are HCI topics within activity theory, contextual design, User-cented Design, participatory design, meta-design, appropriation and other relevant concepts on the field of organizational environments and activity space. The one given particular attention in this study is activity theory, as it will be used throughout the thesis to help describe various phenomena.

5.1.1. Activity theory

Activity theory is an interdisciplinary framework with a psychological approach based on cultural-historical psychology (Kaptelinin 2010) initiated by Vygotsky, Leont'ev and Luria (Engeström, Miettinen et al. 1999), that provides a description of the structure, development and context of human activity (Kaptelinin, Nardi et al. 1999). It seeks to understand how activity and consciousness can be unified, where consciousness is the product of an individual's interaction with people and artifacts in the context of everyday practical activity (Kaptelinin and Nardi 2006). Simplified, activity theory can be seen as a theoretical framework for understanding how and why subjects interact with the world.

5.1.1.1. Object-Orientedness

To give a brief description, the means of understanding how this interaction takes place and changes, is analysed trough the concept called an «activity». A very broad and unspecified view of this unit of analysis is that activity is the combination of subject(s) and object in interaction, as well as actions and operations (Nardi 1995a). "*A subject is a person or a group engaged in an activity. An object (in the sense of ``objective'') is held by the subject and motivates activity, giving it a specific direction*" (Nardi 1995a). The perception of what an objective truly is can be considered broad, said to encompass more or less any motivation that gives direction to the activity (Moran 2005).

Figure 4: Subject-Object relationship

Let us first have a look at the subject-object relationship (see Fig. 4). A common belief is that subjects constantly affect objects in the real world, but not necessarily the other way around. Activity theory emphasizes this to be an erroneous doctrine. A way to understand how the subject and object are interdependent is to consider a person working out in a gym. One can propose that the process of weightlifting is the direct result of physical strength, so the muscle mass determines whether or not a weight is being lifted. Looking at this from a different perspective, one can see that these two things really are cause-effect related. Consider that a person has been lifting weights for a period of time; the physical strength is then a consequence of the weights actually being lifted from previous workouts. This example is related to the physical aspect, but the same can be applied to the mental perspective:

> *"It is apparent, for instance, that a person's math skills are a result of previous experience: they have developed through solving math problems in the past. In other words, while it is true that a person's math abilities determine how the person solves math problems, it is also true that solving math problems determine the person's math abilities" (Kaptelinin 2012).*

In the case of the weightlifter the object is not only affected by the subject due to being lifted, it also has affected the subject by becoming stronger. The portrayal of the math example shows us that the solving of various math problems affects your mental capacity of solving the next. Activities are generative forces that transform both subjects and objects (Kaptelinin 2012), so they cannot be understood separately, as they are interdependent and constantly influencing each other. In this study this will be helpful in analyzing how individuals employ and transform tools in their ecology of artefacts, but also how they are affected by this use.

5.1.1.2. Hierarchical Structure of Activity

The broad definition of activity theory features a lot of relatively complicated matters, which all interrelate and is hard to understand in isolation. A way of further understanding the essence of

activity theory can be seen in the hierarchical structure of an activity. It is a way of displaying human activities, also called units of life, and is according to Leontiev organized into three main hierarchical layers (Activity – Action – Operation) (Kaptelinin 2012).

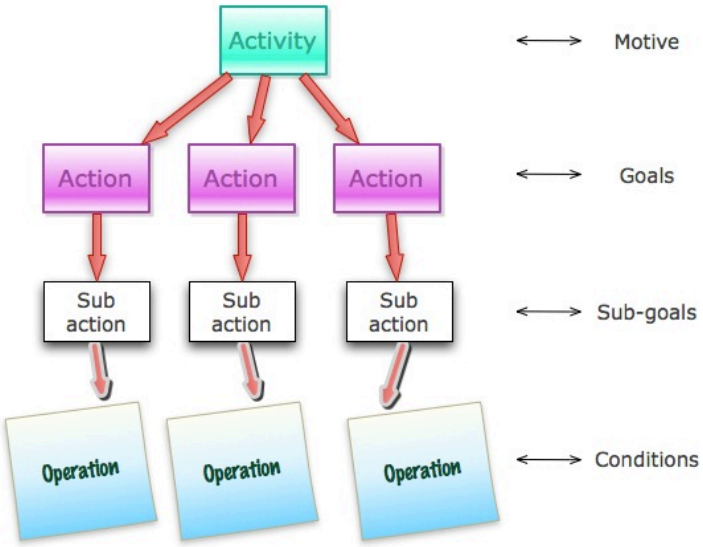


Figure 5: Hierarchical structure of activity

On the top of this hierarchy is the activity itself, and the motive is an object of activity. An object is not a necessarily a physical object, it can be basically anything. For instance the action of going to Footlocker can be motivated by a need for getting new sneakers, thus the object becomes the shoes – and the activity can be defined something like «obtaining new sneakers». But it can also be something non-physical, like praying because you want to go to heaven, thus the non-material reality of going to heaven becomes the object(ive). As a result one can see that an objective does not necessarily have to be graspable things that can be registered with our physical instruments, it also includes the aspect of socially and culturally defined properties (Kaptelinin 2012). These motives, however, does not automatically need to be conscious for the individual, as they may or may not be aware of them (Kaptelinin, Nardi et al. 1999). In order to accomplish your activity, you have to do certain actions (middle level of the hierarchy). Actions are conscious goal-directed processes (Nardi 1995a), like for instance reading a book (action) because you want to become a hotel manager (activity). Reading the book is a conscious action motivated by this goal, however it is just one of the different actions you have to do in order to accomplish the overall activity of being a hotel manager. Others include for example to attend different seminars and write reports. Actions can have unlimited amounts of sub-actions motivated by sub-goals, for instance entering the course and filling out applications. The last unit in the activity hierarchy that has to be done in order to fulfil an activity is «operations». Operations are unconscious automated actions, the things you do which are not motivated by a conscious goal, and simply adjust to situations. An action becomes an operation ones it is routinized, and no longer requires aware mental processing in order to be accomplished. Considering being a hotel manager, one example of an

operation is the actual walking he does, navigating through the building where the seminar is to be held, between people, desks etc. Walking is usually something done automatically, without necessarily being a conscious mental process. However, if something happens which interrupts this automation, for instance an elevator being out of order, and you having to reach the 5th floor, the operation gets attended to consciously so that you can find an alternative route around this obstruction. This is an example of how operations can become actions, as you now consciously have to make a decision whether to take the stairs or the like.

An interesting aspect is how humans act, being highly different from (most) animals. A characteristic feature distinguishing us from them is that we can accomplish our goals without necessarily having that specific motive in direct focus. Considering Leontiev´s canonical example of activity (Kaptelinin and Nardi 2006), the collective activity of hunting, one is able to see how this is executed and works in practice. In the olden days man had to hunt collectively in order to capture their prey; some had to scare the game away (a seemingly incomprehensible act does one not know the goal of the end state), while others waited hiding in the bushes charging the animals by surprise. This portrays that the activities we perform are embedded in a harder case of social organization of life, where the outcome is a direct result of the structure of individual activities. A reason for why humans achieve such success with these mental states, is because activities are carried out more successfully when the individual users have a given understanding surrounding the relationship between intermediate and ultimate outcomes (Kaptelinin and Nardi, 2006). For example: «*... using a system does not normally have its own purpose; its meaning is determined by a larger context of human activity carried out to accomplish things that are important regardless of the technology itself*» (Kaptelinin and Nardi, 2006). Many individuals within the hotels that have been studied may have the same objective (for example achieving excellent customer service), but may carry out actions not immediately directed towards this objective (Leont'ev 1974). One example can be the janitor providing cleaning equipment for the laundry room. Personnel then washing the sheets of each bed after use, have access to detergents allowing them to perform their duties. Them cleaning the sheets perfectly white, will allow the cleaning staff of each room to apply spotless well-smelling sheets to each room, which in turn will contribute in creating a pleasant atmosphere for the guests.

This aspect in activity theory might be helpful to analyse how actors can be affected by the realignment of processes and artifacts used. The activities, actions and operations may become significantly different when new procedures are introduced, and will affect actuators not only individually, but also socially.

5.1.1.3. Other aspects within Activity Theory

Mediation is said to be one of the primary traits that differ us from most animals (Kaptelinin 2012), as we deploy tools to accomplish our goals. What is highly interesting on the aspect of mediation, and the accomplishments of our goals, is that it is not considered something that

happens in isolation, but through multiple, interchangeable and supplementary artifacts (Bødker 2011). Further, how we actually use tools are based on a social knowledge that we accumulate over time, and will affect how we as individuals function mentally (Kaptelinin and Nardi 1997)

Internalization and externalization: Work that is being done on a computer by the everyday receptionist can be considered an externalisation, being the "*transformation of internal components of an activity into external ones*" (Kaptelinin 2012). Knowledge and skills on a given task will transform activities into something palpable giving meaning of some sort. A workers ability to visualize how for example a booking form should look like will immediately discover the mistake of entering numeric digits into a field containing names (is this allowed by the system). This might not seem like the most difficult example, but depicts how knowledge is used internally to impose semantics externally. Cognitive mental processing and implicit knowledge that each worker in some degree possesses is by mediating artifacts transformed into explicit and documented knowledge (Collins, Shukla et al. 2002).

Development referes to the fact that to be able to understand objects of study involves a profound comprehension of how they transform over time, both individually and collectively. Not only based on their own activities, but also others, can transmute and shape several activities, displaying that individuals are interdependent and that they develop over time. Activity theory underlines that study should not be conducted in a laboratory, rather formative experiments where one observers the developmental changes and is a active participator in the everyday life of the participants (Kaptelinin and Nardi 1997; Kaptelinin 2012).

5.1.1.4. Difference compared to other theories

Several theories exist within the field of HCI/CSCW with activity being the central theoretical construct (Moran 2005), such as situated action and distributed cognition (DCog), that are supposed to be conceptual tools aiding in the study of the phenomena of humans interacting with computers. Even though different, they all believe that in the understanding of work in organizations it is critical to understand practice and prosesses, and that actions and context are of utter importance (Hindmarsh and Heath 2007). Activity theory is still considered the approach with the most prevalent potential among these candidates (Kaptelinin 1995b), being the oldest and most developed (Nardi 1995a) canonical theory-base in HCI (Carroll 2009). One feature that is perhaps considered the most noticeable with activity theory contra the cognitive approach is that AT deems the computer a mediating tool which the human uses to interact with the world (Kaptelinin 1995a), while the cognitive approach more direct their analysis to the systems level rather than focusing on the people that affect and is a portion of the system (Nardi 1995a). Situated action sometimes concentrate singularly on representations in individuals´ heads, therefore failing to include the environment as something significantly shaping activity (Nardi 1995a).

One of the strong characteristics of activity theory is that it provides suitable names and descriptions for its theoretical constructs. What this basically mean is that is has a strong rhetorical advantage compared to other theories such as DCog (Halverson 2002) in being able to

communicate results to the possible reader. Another example is its strength of actually portraying solutions, explanation and evidence of some phenomena with the use of models and figures. Considering the comparison of the use of the analytical frameworks AT and DCog to perform a video analysis, performed by Baumer et al. (2011), one clearly see differences in its ease of use. While AT uses descriptions such as "Tools" and "Results", DCog use quite hard theoretical terms such as "rep state", "processing / type", etc. What therefore AT leaves for the reader is a solid yet comfortable understanding independent of the reader's theoretical background, allowing it to be a strong tool when conducting research. It is though important to notice that AT does not support predictive models that simply can be entered with data magically giving the results wanted. It is rather a framework that will help this research ask the right the questions, instead of offering ready-made answers (Kaptelinin 2012).

As mentioned in the section of the hierarchical structure of activity, all three levels in an activity can change roles, activities can become actions, actions may become activities and so on. This is opposed to other concepts such as GOMS (Nardi 1995a; Nardi 1995b; Kaptelinin, Nardi et al. 1999) being useful to analyse knowledge of how to do a task in terms of Goals, Operators, Methods, and Selection rules. This framework has been used in several variations, such as the Keystroke-Level Model, the original GOMS formulation, NGOMSL, and CPM-GOMS (Bonnie and David 1996). Some who used the Keystroke-level model by applying it to benchmark tasks were Roberts and Moran (1982), who used it for the following purpose:

> "This model predicts editing time by counting the number of physical and mental operations required to perform a task and by assigning a standard time to each operation. The operations counted include typing, pointing with the mouse, homing on the keyboard, mentally preparing for a group of physical operations, and waiting for system responses" (Roberts and Moran 1982).

The distinction then between activity theory (and situated action to some extent without elaborating on this further) and GOMS is that the former does not in any way envisage or explain the activity of the user, and the steps they have to perform in order to achieve their objective. This makes it more of a descriptive meta-theory than a predictive theory. The latter does not take into consideration that individuals constantly are inflicted by changing conditions, which in turn will affect the outcome and realign the actuators of an activity (Nardi 1995a). GOMS therefore neglects the fact that there exists a dynamic movement up and down the hierarchical level of activity (Kaptelinin, Nardi et al. 1999).

So why is activity theory relevant to my study? Computing technologies are used on a daily bases in many occupations, and are seen as artifacts mediating human activity (Baumer and Tomlinson 2011). When embracing the perspective and the implications AT has for design, one immediately appreciates its relevance to this study. AT does not necessarily see the need for any technological complexity, are only the human activities supported in a meaningful manner and

appropriate considering everyday context (Bødker and Klokmose 2011; Kaptelinin and Bannon 2011). This research is concerned with whether habitats and environments are considered, rather than introducing sophisticated technology that possibly will not concur with the way work is being done, it is seemingly fruitful to utilize in the evaluations. It also allows the study of how the introduction of new tools into an ecology of artefacts changes practices, and how new practices may change the use of these resources (Bødker and Klokmose 2011). Many of its terms and models will be used collectively to explain the nature of human activity, and how certain aspect, such as the introduction of new systems, might affect employees at the hotels studied.

5.1.1. Extrinsic VS Intrinsic

As this thesis will emphasize that one should focus on intrinsic transformation of human practices as opposed to extrinsic, it will be included as its own part in the theory section. One of the systems revealed at both the hotel in Norway and Brazil, after discussion with the hotel manager and receptionists, showed a clear indication of being a commercial off-the-shelf (COTS) product; a program that seemingly easily can interoperate with existing system components after simple instalments (Callender 2002). Further it was said that they did not have any conversations with the developers of this given program regarding the context of work, it was simply bought and installed. This reveals an extrinsic tendency, being practice transformations initiated by designers, and based on impending observations and study in general it was interesting to designate whether one of these methods actually are employed more regularly than the other, especially due to the current tendency of encouraging extrinsic over intrinsic practice transformation (Kaptelinin and Bannon 2011). The various pieces of technological equipment have not been implemented at once together, therefore not being homogeneously and seamlessly integrated. They have rather acquired bits and pieces of various resources, due to different demands over time.

When new species are introduced into an ecosystem it can result in devastating consequences. One example is the Cane Toad (Bufo marinus) introduced in the growing districts of Bundaberg, Mackay, and north-eastern Queensland of Australia in 1935 and 1936 (Covacevich and Archer 1975). It is a feral specie, being invasive in the sense that is puts threat to other native species of Australia, and it was introduced to control the population of cane beetles, eating and destroying sugar cane crops. After the introduction it put a severe treat to native vertebrates, as it was shown to be highly toxic when ingested. A seemingly well-reasoned solution to a problem turned out to have implications not initially imagined. Even though a highly drastic example, it can be relevant to the introduction of a new system (specie) into an ecosystem of technological artifacts interoperating in a common environment. Occasionally designers develop new systems and tools extrinsically that can cause difficulties not originally envisioned. Extrinsic practice development is probably the most normal form of system development and often it is performed by an outside company not always giving particular attention to the environment of an organisation, rather environments that are considered common within a field of work. An

iterative design process is often necessary (Bødker and Klokmose 2011), and if they are they following strict models such as the waterfall model, no or little validation of the system is performed to check how well it fits within an organisational habitat. Sometimes, applications therefore are developed that are working optimally (Cane toad eating beetles), but when you implement it into a context it does not fit well with other technologies (poisonous to other species in its new habitat). This was seen with an online course that had to be carried out by each employee at Hotel Norway after the hotel merger, which was referred to as E-learning. Employees quickly discovered that they were not able to complete it, without knowing the reason why. After causing frustration, one of the employees figured out that is was not working, as they were not able to perform it while using Citrix. Citrix is the system they have to be logged on to, to even be able to access the Internet. This being an online course, one can see how this causes problems to arise, and they therefore had to bring in an external computer in order for the employees to attend this course. The technology and online course in itself is fine, but when you put it in a context it does not function properly.

Even though intrinsic practice transformation is repeatedly mentioned as being favourable, one is not to exclude extrinsic from the equation, as products made by engineers themselves have influenced our lives a lot:

> "Consider the first automobile, the first telephone, the first television, the first microwave oven, the first personal computer. Did they come from design research (DR)? No, they did not. If you think about all the major innovations that have transformed society, and your personal experiences, none of them came from design research[2]" (Norman 2010)

Don Norman (2010) further mentions other products also originating without DR such as Google, Yahoo and Facebook. Large corporations such as Apple previously did user research, where they visited people in their homes, but when Steve Jobs arrived he fired all of his usability designers. "*And guess what the result is? Better products. Which has revolutionized the way we use machines*" (Norman 2010). Still, what is being emphasized in this thesis is that intrinsic practice transformation can show to be highly effective (often for small transformations of practice), as everything is done in-house and the things developed and implemented are supporting their specific needs. This can be done by un-costly, easily available and already familiar tools, demanding a limited technical infrastructure, enhancing practice without necessarily imposing too much strain or effort.

[2] DR being to include research into the process of design

5.1.2. Other theories, methods and techniques

Participatory design (PD) is a method that involves the user during a design process in order to improve the outcome of a computer system. Hornecker et a.l. (2006) note that user involvement from the beginning of a process (in terms of Participatory Design) is rare, and that designers should help users in designing "*these intrinsically complex and relatively unfamiliar systems*". The users act as empowered participants in the design process, said to correlate and affect quality, productivity and satisfaction in a positive manner (Schuler and Namioka 1993). It indicates clear tendencies of intrinsic practice transformation, as users themselves are affecting and guiding the design process (Kaptelinin and Bannon 2011). Not only are users themselves encouraged to influence products, it also underlines workplace democracy by letting them change the working conditions that are a direct result of computerization (Dourish 2006). Even though being highly influential in promoting users´ participation in a design process, and therefore underlining some aspect of intrinsic practice transformation, the problem with PD is that it leaves no room for an adaptation process after final implementation. Often difficulties not envisioned by neither designers nor users will be apparent after final instalment, which often need to be approached in some manner. In PD one of the main objectives is to produce new design solutions, with innovative being of central importance (Kaptelinin and Bannon 2011). This, together with the focus being on the designers and them aiding the users therefore serves the cause of extrinsic to a higher degree than intrinsic, something that to an extent is advised against in this study.

User-centered design (UCD) was introduced by Norman and Draper in 1986, and can in short be said to be "*the active involvement of users for a clear understanding of user and task requirements"* (Vredenburg, Mao et al. 2002). While users to a slight degree are a part of this process, by answering surveys and testing prototypes, they are not the initial designers of a system, therefore not being the main actors in their practice development. Therefore, seemingly a promising method UCD still shows some limitations. End-results based on UCD tend to be *generic* ones (and therefore extrinsic), in the sense that they can be applied to a wide number of specific contexts, as opposed to intrinsic being *situated*, idiosyncratic solutions (Kaptelinin and Bannon 2011), more suitable for the given assignment. Often, the solutions deriving from this work is based on an idea of what technological support designers feel that workers will need. It therefore differs from the standpoint in this research, promoting intrinsic over extrinsic practice transformation.

Meta-design is a method that allows end-user to be developers. The ones that have the "problems" should be the designers. Its basic thought is that it should encourage end-users to develop systems instead of simply using them, by creating tools that will motivate this behaviour on an everyday basis (Fischer, Giaccardi et al. 2004).

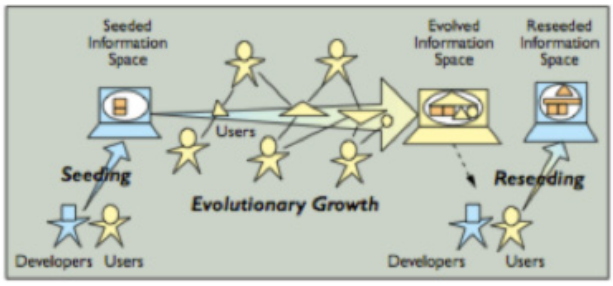


Figure 6: The seeding, evolutionary growth and reseeding process model (Fischer, Giaccardi et al. 2004)

Experts provide tools that novices can work on further, which will evolve into an information space that the expert can use further to modify the system, allowing a reseeding for users (see Fig. 6). In this sense, the user will feel some sort of ownership of the system, and less likely be confused with its use. Humans are in high degree active users; if something is uncertain, they will often try to solve the problem themselves, because they wish to understand (Bannon 1991). It is also shown that when we learn in this manner, we are more likely to expand from there, because you were not only told *how* to do a specific task and the way it works, but also *why*. This can also be seen in activity theory, showing the importance of *how* something is done. Still, what meta-design seem to provide is a mix of intrinsic and extrinsic practice transformation. "*The framework places intrinsic developments ("evolutionary growth") in the context of extrinsic transformations ("seeding" and "re-seeding")"* (Kaptelinin and Bannon 2011), therefore not being solely consentrated around the end-users, who rather provide an evolutionary growth that the developers can re-seed further.

Appropriation is a theory which has noticed that people often use systems and objects in manners not originally envisioned by the designer (Dix 2007). For example the use of e-mail is not solely used for its original purpose, to allow the distant communication between one, two or many individuals; now it is also used to send documents to one self, bookmarks etc, therefore acting as a storage of information. Often, users tend to search for opportunities that allow them to extend the functionality already given in a particular tool that they are accustomed to, rather than starting to learn a completely new tool. This because switching costs normally are considered high (Grudin, Tallarico et al. 2005). Among others, Dix (2007) has written a short but highly informative paper regarding this issue. He investigates an oxymoron, by looking at how one can design for appropriation, i.e. design for the unexpected. As this research experiences various system implementations, it was interesting to look at how appropriation played a part in extending and transforming some of the intended system use.

There exists some literature regarding *contextual design*, one of them by Karen Holtzblatt and Hugh Beyer (1997). They introduce a practical handbook for anybody who is trying to develop systems based on how their customers do their work. It is closely related to this paper, as it gives a further insight into what developers should take into consideration when building and implementing new technologies. In this study there will not be proposed any new

technologies *per se*, but will rather (try to) evaluate whether the designers of various systems have taken into the account the habitats in which the users of the systems are situated.

Early in my work I was given an unpublished version of an article by Victor Kaptelinin and Liam J. Bannon (2011). This paper focuses on the area of creating technology-enhanced activity spaces through intrinsic practice transofmration and served as a highly important basis of theory/point of view during the conduction of research.

5.2. Related work

In his article *"The context of work: Human-computer Interaction",* Kirsh (2001) investigates the more complex notion of context in our workplace with the help of distributed cognition. He looks at and suggests directions we have to push deeper into in order to understand how humans are coupled with their environments. Firstly he mentions that we must comprehend all the factors that influence people when they are interacting with rich information spaces. Secondly, based on the tasks individuals have to perform and the resources we deploy, we must reveal the complexities of the activity landscapes. Finally, the coordination of individual`s activities with their environment and with others should be recorded. The "problem" with Kirsh`s statements is that he feels no concern with moving an office from one location to another, therefore in a sense claiming that an environment not necessarily would have any particular significance. This article is also more related to specifically looking at offices, opposed to my research looking at the entire habitat of a hotel, yet it is still valid within the scope of this research. He takes on some of the similar notions as my study, but the main difference is that he does not build his theories and statements on empirical data, inspecting the reality of some sort, rather on his own personal views. What he lacks is any conclusions based on perceptible information, therefore not necessarily providing the similar foundation.

Wild has written an article entitled *Longing for service: Bringing the UCL Conception towards services research (2009*). Here he presents a framework called *the activity based framework for services* (ABFS), defining it as:

> *"Service activities are carried out within a services system. The system embraces the objects (both abstract and physical); the goals and values held by various individual and collective Actants. Acitivities are carried out by actants and artifacts (both IT and non IT) to affect the objects in a domain" (Wild 2010a).*

One can clearly see how this can correlate with activity theory´s view of goals, activities and so forth, elaborated earlier in the thesis. Services in this case is also consistently defined as activites, rather than the more traditional view such as artifacts and objects. Some of the views from this article correlates with TEAS, for example in terms of environment: one should not only focus on the immediate environment or activites, rather the wider habitat in which activities are executed (Wild 2010a).

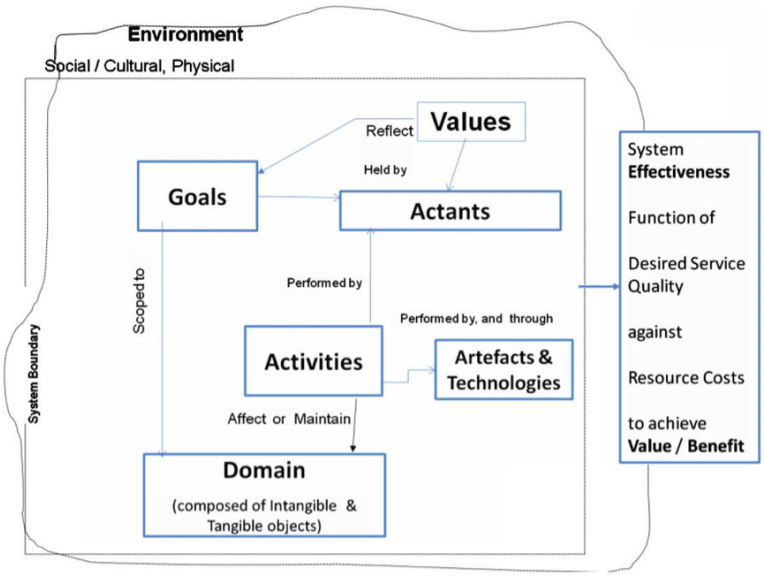


Figure 7: Activity-Based Framework for Services (ABFS) (Wild 2010a)

Still, if one consider Wild´s (2010) activity based framework for services (ABFS) (see Fig. 7), it is possible to claim that he does not take into consideration how artifacts and technologies are affected by and performed trough other technologies and artifacts, which has clearly shown to be the case in this study, for example the E-learning/Citrix example previously mentioned.

6. Method

To conduct research involves a systematic investigation of a given subject to establish and/or discover facts. In order to scrutinize a study in a thorough and well-planned manner, one needs a methodology to establish a list of procedures and rules to guide the process. How and which method(s) that are chosen for a study will be determined by what the research itself is trying to unveil. It is highly important to choose the method that is most appropriate in every situation, as this will gain the researcher the highest amount of reasonable and important information. When establishing where a study should be conducted, it is often important to identify that the research in it self should be carried out in a place normally perceived by the user, considering physical structures and social norms of the surroundings, rather than conducting the tests in a laboratory (Abowd and Mynatt 2000; Forlizzi 2007). Laboratory tests will not only contradict with the main purpose of field work, but it may also be difficult to see how the outcome of this process can be measured on other terms than a technical perspective and therefore comply with work practice (Bentley, Horstmann et al. 1997). As noted earlier, activity theory also underlines that study involving human beings should not be conducted in a laboratory, it rather puts the emphasize on formative experiments where one observers the developmental changes and is a active participator in the everyday life of the participants (Kaptelinin and Nardi 1997; Kaptelinin, Nardi

et al. 1999; Kaptelinin 2012) A reason for this is that the physical setting and social environments in which individuals interact is not simply a "backdrop", a context where interaction occurs (Ciolfi and Bannon 2005). It rather acts as a mediating tool, discouraging/encouraging some activities, highly influencing the actions that we perform and the experiences that we receive. Actual use situations of products and artifacts and the impact of use contexts is problematic to mimic in a laboratory (Bødker and Buur 2002), hence a real working situation will often seem reasonable.

6.1. Qualitative research

It is claimed that qualitative research often is used in situations were we want to understand more about certain environments and situations (Teif, Sakhnin et al. 2006). Further it is said that the stress of qualitative research is described through an epistemological position described as interpretivist;

> *"... the understanding of the social world [is assisted by] an examination of the interpretation of that world by its participants" (Bryman 2008).*

In other words, what a qualitative research suggest is that one could examine people's perceptions about their everyday social world in order to identify how they act in and perceive certain environments and situations. Considering these elements, it would seem reasonable to conduct my study with the use of a qualitative research method, as my research area is within the area of technology-enhanced environments and habitats, and activity theory being my main theoretical foundation throughout the study underlining this aspect. It will follow the guidelines of qualitative research suggested by Bryman (2008) as potrayed in Fig. 8.

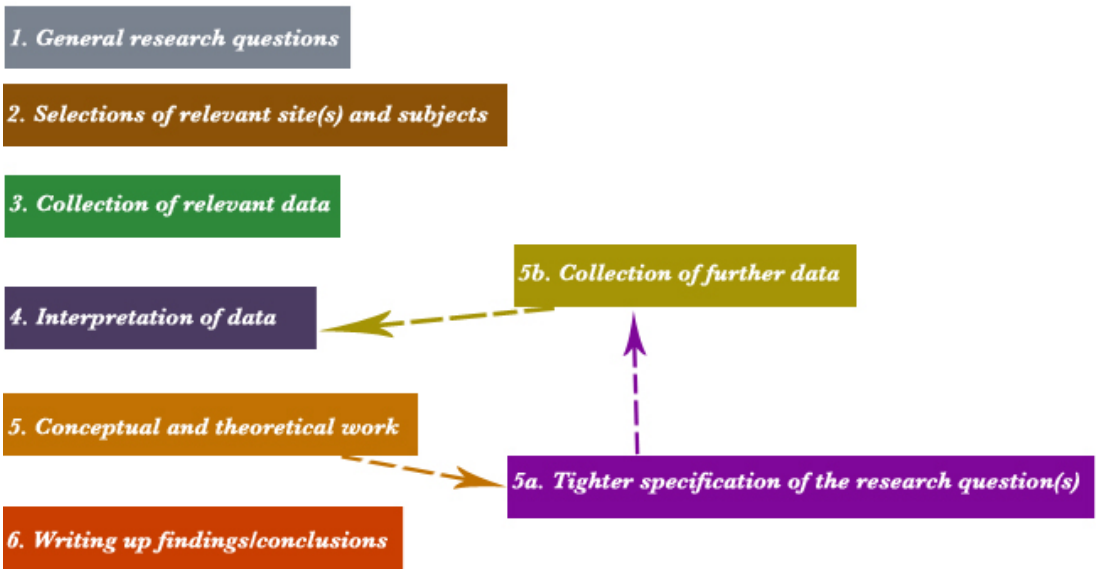


Figure 8: An outline of the main steps of qualitative research (Bryman 2008)

6.2. Case study

Case study research has over the years attained a status as being a viable method for conducting research (Yin 2004). A widely known definition and explanation of a case study is *"attempts to shed light on a phenomena by studying in-depth a single case example of the phenomena. The case can be an individual person, an event, a group, or an institution*" (Hirzalla 2006). It allows you to observe individuals and collect data in their natural environment (Yin 2004), therefore being the perfect match for my assignment. The research will be able to look at employees and guests during everyday interactions, as well as conducting interviews in a real-life context, being one of its strengths compared to other methods. This will also in turn hopefully allow the participants to think more about their work, hotel stay and concrete interview questions, instead of the setting in which they are situated.

The case study method is also said to be suitable when you are trying to answer either a descriptive question (what happened?) or an explanatory question (how or why did something happen?) (Yin 2004). As this paper has one of its aim at investigating *why* they might face problems with the introduction of technologies, and *how* they employ their solutions, it is clearly a reasonable method for investigating and eventually finding answers to my research questions.

6.2.1. Typical case

The main objective of a typical case is to understand an everyday commonplace situation. It intends to reveal the circumstances for why something is done often by an average person or institution (Yin 2003). Therefore, as opposed to the extreme or unique case, they are not chosen because they are unusual in any way (Bryman 2008), rather that they are supposed to represent an average or typical example within their category. Another criteria for selecting a typical case, is that one can examine the essential processes between individuals, therefore being able to evaluate the social aspect. As Bryman (2008) exemplifies: "*… a researcher may seek access to an organization because it is known to have implemented a new technology and he or she wants to know what the impact of that new technology has been".* This research was not specifically interested in *new* technologies, but is still valid within this case as it wishes to identify how various technologies may impact a company based on their suitability for the organizational environment. As one of the hotels actually implemented new systems and practices due to a merger during the study, this became highly interesting.

Further, this research wishes to identify two different cases, therefore being an embedded case study, with multiple units of study in their normal and common environment (Opdahl 2011).

6.3. Contextual interview

Since one of the things that this research wants to investigate is how the customers and employees perceive some of the diverse technologies at the hotel, it would seem relevant to

conduct small interviews. An example could be to ask guests what they would do, waking up in the middle of the night with the sudden craving of coffee, and how possible technologies would help them in acquiring the beverage. This paper wants to, among other things, discover what the costumers portray as meaningful and relevant, and it is therefore in these situations often encouraged to carry out qualitative interviews (Bryman 2008). This because qualitative interviews tend to be more agile in the fact that one can choose to focus on one part of the interview providing meaningful and pertinent information. Should one during the course of the conversation come across information that might seem highly valid for the evaluation, one could choose to examine this in depth further. This is as opposed to the standardized ways of a quantitative interview, systematically going through the questions without interruptions (Bryman 2008). The interviews will therefore be semi-structured, and one will hopefully get an insight into the empirical reality, making it able to develop a testable and valid theory (Eisenhardt 1989), without pigeon-holing the response of any participants. The study will of course not only interview guests, but also various employees at the different hotels.

6.4. Contextual inquiry

Contextual inquiry is a User-centerd design (UCD) ethnographic research method that lets a researcher examine how objects or systems interacts and operates, while also including the users and others in the organization in the equation dependent upon the work. The technique is said to foster participatory design (PD), by allowing the customers (in my case employees) to be active participants in design and understanding the current nature of work (Holtzblatt and Jones 1993). It is an approach that portrays the customer as the expert, and the interviewer as an apprentice, therefore allowing the interviewer to focus on the task of collecting relevant information (Beyer and Holtzblatt 1998). This means that the customer can shape the interviewer´s understanding of needs and current situation, without necessarily including a formal description of present working situation and/or what they need. The technique is divided into four main principles: context, partnership, interpretation, and focus, which all state some part of the interaction (Beyer and Holtzblatt 1998).

The whole idea of *context* is to go to the customer, or in my case the hotels to be studied, to examine through interactive observations what practice is being performed in the actual workplace. In looking at for example the reception, one can observe what activities that are being done, in which setting, with which technology, what actuators that are present etc. By doing so, the researcher will be left with *ongoing* instead of *summary* experience. Often actuators using cognitive schemes or institutional social norms are not adequately able to explain the coherence between events, or said in situated action terms: *"... the organization of situated action is an emergent property of moment-by-moment interactions between actors, and between actors and the environments of their action*" (Suchman 2007). Actions are executed in the context of a specific occurrence and depend essentially on its material and social circumstances. What this basically means is that workers tend to give an overall impression (summary) of a

system/technology/artifact, and some things that are good or bad about it, but not *how* or *why* they are so. This might be more easily available to the researcher if it is observed. That context is such a central part of this technique, clearly shows that it is coherent with an activity theory perspective (Beyer and Holtzblatt 1998; Notess 2005), also making it relevant for my study.

In *partnership* one can work together with the employees as a partner, still as the role of an apprentice, and let them demonstrate and teach you how they do their work. This will give you insight as a researcher into their everyday responsibilities, but also an understanding of how they do their work, what technologies they employ and so forth.

During the course of the contextual interview you make *interpretations* surrounding how the users work, what their objectives are etc. One should therefore try to share with the user your understanding of their work, so that both the interviewer and worker hopefully have the same comprehension regarding their task situation. Is something unclear, both actants therefore have the possibility to elaborate on matters that might be uncertain.

Lastly the contextual inquiry demands a *focus* of the case presented; one should know the concerns of the case analysed. Here it is also highly important that non-relevant issues are cut out of the equation.

Being a research method based on UCD and that promotes PD it might show some limitations as earlier mentioned. End-results based on UCD tend to be *generic* ones, in the sense that they can be applied to a wide number of specific contexts, as opposed to intrinsic being *situated*, idiosyncratic solutions (Kaptelinin and Bannon 2011). Often it is also finalized with the researcher presenting solutions to new problems, but as I may self will not serve as a designer in this study, rather investigate the practices performed, they can be useful tools in acquiring this information. It will therefore be used together with an approach that allows for users themselves to transform their environments; by being presented and supported by tools that poosibly can enhance practice. This transformation of practice was accomplished without me as a researcher being involved in the actual design and implementation of a strategy for technology-induced practice transformation.

Several models, such as the flow, sequence, cultural, artifact and physical model are also often used as a way of interpreting data. In this thesis other models will be used to examine the same fact, mostly based on activity theory.

6.4.1. Why Interviews *and* observations?

The activity performed by users, which is related to *why* something is done in activity theoretical means, can be difficult to address in interviews alone. Having observations as well as deploying interviews in field work might therefore be considered essential when trying to map the understating of the users´ background and related activity (Bødker and Klokmose 2011), as users not always explicitly can explain their every actions (Suchman, Blomberg et al. 1999). Abowd and Mynatt (2000) notices that without the use of observations, one would easily just get an overall picture of what users think they will do, or resources they imagine they will use. One example

was experienced during an interview with two of the receptionists in Hotel Brazil regarding which technologies they employed during a normal shift. None of them even mentioned the cellular phone, even though me noticing them at various times deploying this technology. As seen in (Hornecker, Halloran et al. 2006a), "*Curators [of a museum] taught us that they can only authentically tell stories when in the grounds*". The same was noted with the hotel staff in both Norway and Brazil; when talking about their working practice outside work a lot of activities and processes were forgotten. Observing them in their natural working environment one could clearly see activities not explicitly noted by the employees. One example was when I asked them whether or not paper still was extensively used during a normal work shift. One of them said that it was hardly ever used; yet the use of paper for writing down names and numbers, for fax etc. constantly was observed. The work that we do, and the technological and non-technical tools that we deploy become so habitual that we at times have problems with communicating how and what we do (Beyer and Holtzblatt 1999). Sometimes technologies are even such a big part of our daily lives, that we feel somewhat at one with these instruments (and maybe even incomplete without them). This is something referred to as a functional organ, which "*are functionally integrated, goal-oriented configurations of internal and external resources*" (Kaptelinin 1995a). What this basically means is that these tools function together with natural human abilities to perform certain activities more efficiently. A person without his glasses might sometimes feel lost, due to the better eyesight that this functional organ provides (Kaptelinin 1995b), still s/he might not explicitly notice using them, as they are so integrated into the context of her/his everyday life.

It is also to be noted that during the study a lot of field notes had to be taken, because some of the people being interviewed had problems with it being recorded. It was also prominent that in the cases where interviews were not recorded the interview objects seemed more relaxed, focusing more on the issues discussed.

6.5. Possible problems and challenges

When conducting a research there are always several pitfalls that one might encounter. These can contribute in making the research troublesome, and in worst-case scenario neither valid nor reliable. It is therefore important to map difficulties in advance as to not fall astray.

6.5.1. Subject understanding

Because of the fact that human beings, as opposed to objects in the natural sciences, can impose semantics to their environment, the evaluation has to be shaped accordingly. As a result, the researcher has to understand the social world pursuant to the people being evaluated (Bryman 2008). This can impose some practical problems that might induce some constraint regarding the validity[3] of the study´s outcome. One apparent problem could be that the researcher only will be

[3] Validity will be presented later in the thesis

able to see the world through the eyes of certain people, say with the same age, gender or educational background etc. Another could be the researchers bias, influencing the course and outcomes of the study. As a result of this, the study might become too subjective due to the researchers personal impression and relationship to the participants.

A related issue within this possible pit-fall is trust and relationship with individuals that will be a part of the study. Their willingness of interaction and feeling of trust can in high degree affect the outcome of replies and statements. By imposing, appearing to academic and/or (in the eyes of the participants) act superior might influence what information they wish to share (Beyer and Holtzblatt 1998). This could also make them uncertain regarding what interest I as a researcher could have in their work other than to evaluate it in terms of workers' competency and efficiency, also noted by others e.g. (Suchman, Blomberg et al. 1999). They might feel ashamed to reveal things they do not understand, act in a certain manner because of the fear of information being forwarded to management or others. One should therefore often try to show that you respect and acknowledge their skills (Hornecker, Halloran et al. 2006a), and at the same time underline that you are there for academic, learning and potential helping purposes only. One way to overcome some of these obstacles is in the partnership principle in contextual interview presented earlier. Further, throughout my study I tried my hardest to stay presuppositionless, basically meaning that I would not have any preliminary ideas to narrow the study, and always keep my eyes open. A minimum use of assumptions was undertaken, so that the majority of statements are based on empirical data.

6.5.2. Data Overload

Another thing also experienced by others using qualitative methods, is that "*it is extremely easy to fall prey to data overload*" (Duchenaut 2005). This basically means that you can get to much information that is unimportant, and therefore unnecessary for the study, holding up precious time. Often the people being interviewed will not have the same theoretical background and understanding of the subject being investigated, and will therefore probably sometimes focus on irrelevant matters. This is not the interviewees fault as they simply are trying to help, but could hold up a sustainable amount of time. Also, too much time can be spent on actually collecting data, instead of analysing it to reach a conclusion and present findings. There is no value in having tons of collected data, are they not considered and delivered properly. What has been done in this master thesis is to collect data early in the study (first six months), but also constantly evaluate and analyse the data as to find what might be interesting to investigate further. This has not only ensured the retrieval of pertinent and interesting information, but has also made sure that data overload has been (hopefully and somewhat) avoided.

6.5.3. Selection of Cases

As this study will be conducted in order to reveal some of the trends in the service industry, it is tempting to select cases that can be seen as typical within that specific activity. The first problem

is that only a few cases can hardly be seen as a representation of the vast amount of hotels that exist, therefore serving as a problem for the research's generalizability (Stake 1995). Would the research provide the same findings *ceteris paribus*? Researchers e.g. (Nardi 1995a) have attempted to explain how this even is possible, especially considering context being a highly important aspect that is ever-changing and dependent upon the particularities of specific situations. Putting this aside, consider these definitions of a hotel:

> *"A commercial establishment providing lodging, meals and other guest services. In general, to be called a hotel, an establishment must have a minimum of six letting bedrooms, at least three of which must have attached (ensuite) private bathroom facilities*" ("Hotel-definition" 2011), and
>
> "*An establishment that provides lodging and usually meals and other services for travellers and other paying guests*" ("Hotel" 2011).

And this of the hospitality industry:

> "*comprised of commercial organisations that specialise in providing accommodation and/or food, and/or drink through a voluntary human exchange, which is contemporaneous in nature and undertaken to enhance the mutual well being of the parties concerned*" (Slattery 2002).

It is troublesome to see how the majority of hotels can be excluded from these definitions, but it also opens up the possibility for being able to claim the generalizability of the research. Another aspect possibly increasing the generalizability was the selection of a diverse set of participants, not only being employers, but also guests. Interview objects ranging everywhere from hotel managers to receptionists, janitors and cleaning staff has hopefully insured the retrieval of pertinent information, as one get various points of view based on different levels in the organizational hierarchy.

Another difficulty in the selection is the actual access to explicit cases. Our time in the fieldwork is first and foremost limited, and one does therefore not have unlimited hours searching for the one most suited. When a case finally is selected as a candidate, some are reluctant to the idea of having unknown individuals "investigating" their hotel. Therefore, we often have to choose a case that actually is accessible (and cooperative), and will allow a comprehensive study to take place (Stake 1995). This can in turn also show to be problem-ridden, as depicted by Yin (2004):

> *"The case selection or screening goal is to avoid the scenario whereby, after having started the actual case study, the selected case turns out not to be viable or to represent an instance of something other than what you had intended to study*."

To start the search for new cases will here both me demotivating and time-consuming, not to think about the time already spent on possible irrelevant information.

Information asymmetry is a term primarily reserved within the field of economics and contract theory, but can also be somewhat related to this example. It refers to the fact that one part can have more or better information than the other, (potentially) causing problems to arise (Steigum 2004). If cases that know they will not be able to give enough support, or actually deny access during the course of the study, are chosen, it can create devastating problems. I was lucky enough to know both the managers at the hotel in Norway and the hotel in Brazil. They gave me a confirmation that I was granted access to their premises throughout my study, and was allowed to interview both guests and employees. Still, the hotel in Norway experienced a merger during my course of study, which was something I of course was not informed about before it was final, resulting in the replacement of many actors such as the hotel manager. After this substitution it was difficult for me to know whether or not I would be granted access to further conduction of study. Luckily, this turned out to not even being an issue; the new staff being equally helpful and aiding in the facilitation of my work.

6.5.4. Validity and reliability

When conducting a research, it is highly important to inspect the study´s reliability, the research question´s validity, in what degree the cases are representative and whether the static generalisation is justifiable. *Validity* is concerned with the outcome of the study, whether the integrity and assumptions stand ground (Bryman 2008). One is here interested in the conclusions of the research, and how the honesty of the outcome is secured. There has been given a more formal description depicting it as the "best available approximation to the truth or falsity of a given inference, proposition or conclusion" (Cook and Campbell 1979). *Reliability* is related to the consistency of the measurements taken, or the *"degree to which an instrument measures the same way each time it is used under the same condition with the same subjects" (Colosi 1997).* In the discussion section these facts will be discussed, and see if they have been assured during this study.

7. Results

The results in this section will look at how various individuals are supported by and use technology in various spaces in different sequences of time. It will further indicate various actors´ attitudes towards technology by looking at technologies that exist, their use of social media, why man labour still is highly important and their awareness of technologies that exist. After this discussion, two cases will be presented showing how individuals can be presented with tools and contemplate on their practice to enhance work-related activities. This will be the conversion of a paper-based cleaning staff roster into a Google Doc, and switching from a traditional fax machine to email as a technology for handling all types of communication with various suppliers. Further,

a “solution” to how various actors can be supported is suggested, and finally some cultural differences between Brazil and Norway will be provided.

7.1. Different Roles in Time and Space

To present my results there will first and foremost be presented an overview surrounding the extent to which various actors at the hotels use different technologies in both time and space. This involves actors such as receptionists, security staff, cleaning staff, but also guests staying at the hotels. To look at how all technologies are linked and coupled together, it might be important to look at the technology-enhanced activity space (TEAS), defined as:

> “*A spatially and temporally organized configuration of resources, including digital technologies, which enable an individual or a group to carry out one activity or several coordinated activities”* (Kaptelinin and Bannon 2011).

TEAS can be compared to, and seen as an adaption and elaboration of, the notion of an activity landscape, explained as "*… the result of a superposition of landscapes, each landscape with its own set of entry points, own set of values and own set of relevant resources*" (Kirsh 2001). As activity spaces normally are hard to individuate (Kirsh 2001) and are task-specific within a group of people, it might be difficult to adapt and define it to support their specific requirements (Wang and Haake 1997), especially regarding the fact that there often is a shift between individual and shared activities (Gutwin and Greenberg 2002). This section is provided in order to get a sense of how the various spaces are developed, and how they support the execution of tasks and accomplishment of goals by technology offered, and will therefore attend to research questions 1.1, 1.2, 1.3 and parts of 1.6.

7.1.1. Hotel Brazil

In the following figure, a simplified overview of Hotel Brazil is presented to give a feel of the environment described. Underneath the figure is a description of each area and technology attached.

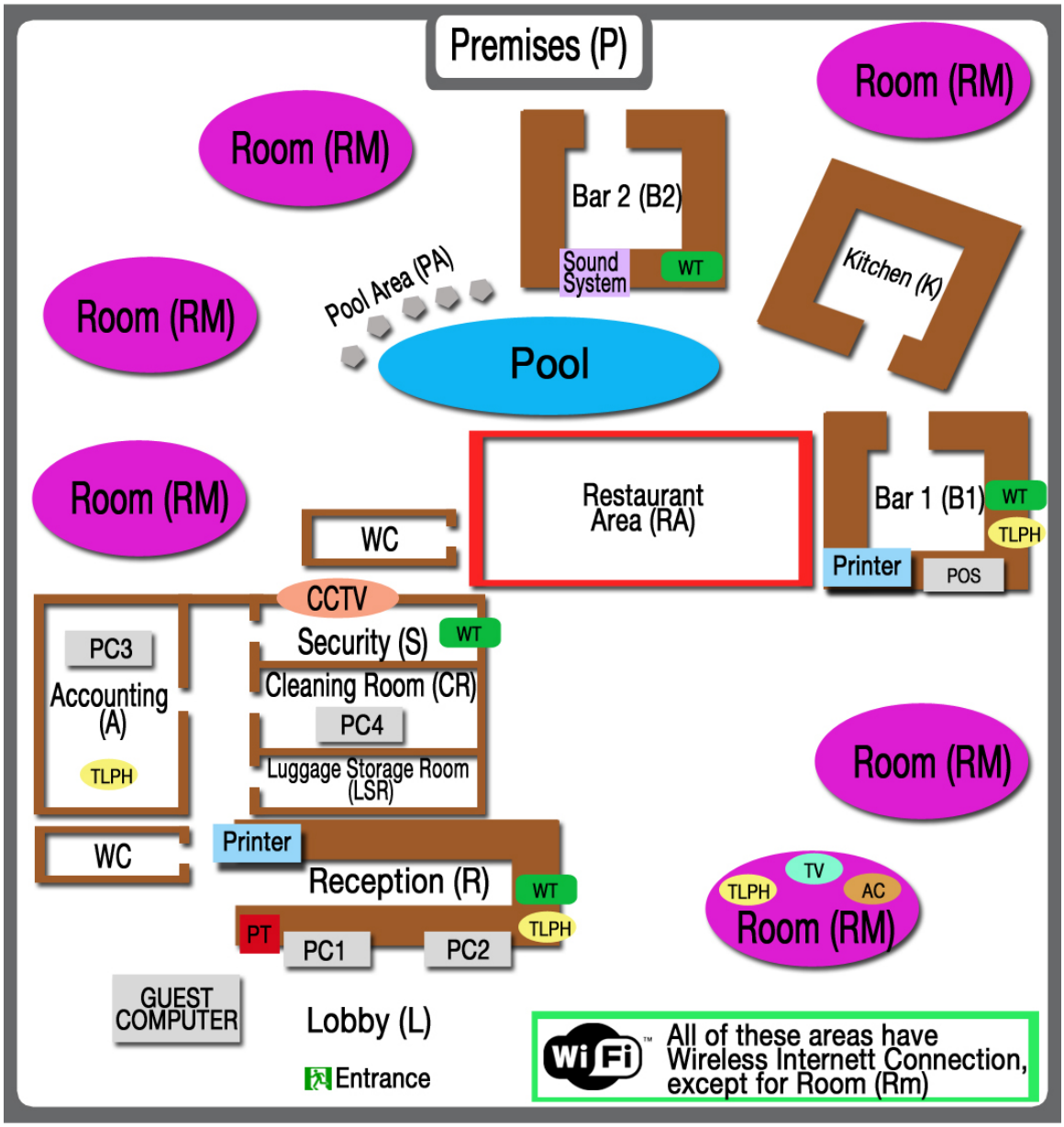


Figure 9: A simplified overview of Hotel Brazil and its activity spaces

Areas:

Reception (R): From 00:00 - 08:00 there is one person present. The rest of the time there are two individuals managing the reception.

Lobby (L): Is entered either through the Entrance or Premises (P)

WC: Toilets

Accounting (A): Has an accountant working from 08:00 - 16:00 Monday to Friday

Security (S): Has one security guard present at this room, as well as various at Premises (P) at all times.

Cleaning Room (CR): Head of cleaning ladies is present during the morning to hand out cleaning lists to the rest of the cleaning staff.

Luggage Storage Room (LSR): Guests that check out early, and leave in the afternoon are allowed to store their luggage before leaving

Room (RM): A hotel room. Can be everything from an apartment of 29m² to 153m². There are more than displayed in the model; this is just a simplified figure.

Restaurant Area (RA): Where guests are seated for drinks and beverages etc.

Bar 1 (B1): Has a staff of 9 individuals working from 06:00 - 23:00 at different shifts.

Kitchen (K): Has a staff of 6 individuals working from 06:00 - 23:00 at different shifts.

Bar 2 (B2): Has a staff of 2 individuals working from 11:00 - 23:00 at different shifts.

Pool Area (PA): Area with sunbeds where guests can relax around the pool

Premises (P): The total area of Hotel Brazil

^: Outside of hotel premises

Technology:

Guest computer: Stationary computer in Lobby with Internet connection

PC1 and PC2: Stationary computers with COTS software for booking etc. Has Internet connection

PC3: Stationary computer used by Accountant. Has Internet connection

PC4: Stationary computer used by cleaning staff. Has Internet connection

POS: Point of Sale system used to enter food and beverage orders. Has Internet connection

PT: Payment terminal used to make payments with credit cards.

WT: Walkie Talkie

TV: Television

AC: Air condition

Wi-Fi: the exchange of data wirelessly over a network (Internet)

TLPH: Telephone

In the following figure an overview is presented showing the extent to which each actor deploys technological resources in different spaces and time. The spaces are related to the areas in Fig. 9.

Role \ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in						L	L	L	L	L	L					
Unpacking						RM	RM	RM	RM	RM	RM					
Pool area						PA	PA	PA	PA	PA	PA					
Eating								RA	RA		RA					
Changing												RM	RM	RM		
Going out													^	^	^	
Sleeping	RM	RM													RM	RM
Guest (departing)																
Waking up, packing etc.		RM	RM	RM												
Breakfast		RA	RA	RA	RA											
Checking out				L	L	L										
Picking luggage											LSR	LSR	LSR	LSR		
Reception																
Receptionist shift 1	R	R														R
Receptionist shift 2			R	R	R	R	R	R	R	R						
Receptionist shift 3											R	R	R	R	R	
Cleaning personnel																
Receive list		CR	CR													
Find rooms			P	P	P	P	P	P	P							
Clean rooms			RM	RM	RM	RM	RM	RM	RM							
Update list										CR						
Restaurant																
Restaurant shift 1	RA/B1	RA/B1	RA/B1	RA/B1	RA/B1	RA/B1										
Restaurant shift 2							RA/B1	RA/B1	RA/B1	RA/B1	RA/B1	RA/B1				
Restaurant shift 3													RA/B1	RA/B1	RA/B1	
Kitchen																
Kitchen shift 1	K	K	K	K	K	K										
Kitchen shift 2							K	K	K	K	K	K				
Kitchen shift 3													K	K	K	
Bar 2																
Bar shift 1						B2	B2	B2	B2	B2	B2					
Bar shift 2												B2	B2	B2	B2	
Security																
Security shift 1	P/S	P/S	P/S													
Security shift 2				P/S	P/S	P/S	P/S	P/S	P/S	P/S	P/S					
Security shift 3												P/S	P/S	P/S	P/S	P/S

Use of resources*

- Very high
- High
- Medium
- Low
- Very Low

* Resources being technological artefacts. It is not necessarily related to number of resources used, but to which extent

Figure 10: The extent to which each role deploys various technological resources at both time and space

All these notes are based on extensive observations and interviews with various actors that were seen as important and relevant to the research, such as guests and several employees with different occupations at the hotel. It displays the average of different sequences shown by

various actors in both time and space. Some of the points in this section will be left in the attachments section, rather in the thesis itself. Only the most interesting points will be included.

Guest arriving

Check in

The most normal check-in hours for guests arriving at Hotel Brazil are between 11:00 and 16:00 in the hotel lobby. Of course, people tend to check in both before and after these hours, but based on the average these hours are seen as the most valid to include in the model. Based on various observations it is seen that guests hardly tend to use technologies while checking in. At most they might check their cellphones for booking details or make phone calls. This is still so non-frequently used, that in general the use of technological artifacts is seen as "Very Low".

Unpacking

What guests do while unpacking has not been observed, since most people tend to have a(n) (understandable) negative attitude towards someone unknown entering their hotel room. Still, questions have been asked and interviews performed to get a slight insight into this activity. What has been noted here is that guests unpacking often will try to see if there is Internet, either by the use of their laptop or cellular phone. Often they have had a long trip, and want to relax for some time with either reading an online newspaper or listening to some music (this varies from Spotify to YouTube). When finding that this is not offered, most say that they leave the hotel room quicker than what they would with Internet connection being present. What this basically means is that the activities performed by individuals are hindered due to the absence and the environmental lack of support of Internet connection in this space. The result is a Low usage of technological artifacts.

Pool area

Guests that do not go to the pool area normally head for the beach immediately. The beach is not included in the model, as I have no possibility to observe their use of technological resources, and also that this is outside of the hotel premises.
In the pool area guests go to relax on the various sun beds and chairs situated.

Figure 11: Pool area at Hotel Brazil

In this space Internet connection is present, so the use of technological artifacts such as laptops, digital tablets and cellular phones are more frequently deployed. Based on observations, one was able to see that the most frequent use of artifacts was between 11:00 - 13:00 and 15:00 - 17:00. This is believed to be the case due to the majority of guests attending the restaurant between 13:00 - 15:00. In that way, a guest could "*check my email and Facebook before I eat, and also some time after, not worrying about this while dining*" (translated). That the wireless Internet is close to the pool, and the laptop therefore so close to the water did not seem to bother any guests. There is also a lot of sun and lack of power outlets as one should not have high voltage close to water, and one can therefore discuss whether or not the is the most appropriate place. Due to the environmental conditions one would say it probably is not, but it is still the place where there is frequently most people. One is to suspect that due to the presence of Internet, the use of resources has risen from Very Low and Low to Medium.

Eating

When consuming food, a majority of guests are situated in the restaurant area. While eating, most guests are rarely seen using any resources. These are often left by the sun beds or brought in a backpack by their side. After asking guests the reason for this lack of use, they often mentioned the importance of etiquette while eating. For many it was considered rude to bring any technological artifacts to the table, as this was a place to relax and eat, not deploy these

instruments, especially considering that they were on holiday. It is therefore to be noticed that various individuals do not always relate to how the environment support various activities and technology use, but to morals and understanding of etiquette.

Changing

The activities of getting ready to go out (out here mostly referring to the city center and surrounding areas) are normally done in the hotel room. Once again guests are mentioning that due to the lack of Internet connection various technological instruments are less frequently employed. This due to not being able to read any online newspapers, receive emails and watch YouTube videos and the like. Men seems most bothered by this, pointing out that they spend half the time getting ready. Like one of the guests said: "*I always have to wait at least half an hour for my wife to get ready. It would be nice with some distraction instead of getting annoyed*", saying this with a smile, referring to being able to surf the Internet. Guests will still often turn on the television or their brought sound system to play music (the last with the use of either a laptop, digital tablet, mp3-player or the like). Another Dutch couple did not have any music except for Spotify on their laptop computer. This was not the premium version, therefore not allowing them to play offline. That the rooms did not have any Internet connection therefore did not permit them to play music while staying at the hotel room. And on the television they only played "*traditional Brazilian music, which I am not a big fan of yet*". This was a source of irritation and a big disappointment. For others it was not particularly troublesome that the rooms did not have any wireless Internet access, saying that "*the little work I actually do often just involves reading emails; this I can do on my phone while relaxing at the pool*" (translated). Further, another guest mentioned: "*even the use of Facebook on holiday is troublesome, as it involves me thinking*", here also with a smile.

The combined use of technological artifacts is therefore set to Low, as it generally is minimally used.

Guest departing

Breakfast

The breakfast is also served in the restaurant area from 07:00 – 11:00. All of these hours are seen as equal, due to the variation between weekdays and the weekend. People tend to eat earlier during weekdays, as people tend to go out drinking in the weekend, and an average is therefore set from the beginning to the end.

As previously noted during Eating, individuals dislike others use of technological instruments while dining, as it is seen as a breach of etiquette. Still, a high percentage of the guests around the breakfast table bring some sort of artifacts, either this is a laptop or cellular phone. When asking guests why this is so, they often reply that it is due to them not being able to be online for a while, therefore wanting to check emails, social media and the like. The use of resources therefore jumps from Very Low to medium, and one can easily, based on the comments of guests, relate

this to the opportunities that different environments provide regarding the use of artifacts. Laptops, cellular phones, digital tablets and the like can just as easily be deployed in their hotel room, and one would suspect much more comfortable. Still, due to them not being able to be online at these spaces, bring their instruments while eating, which earlier was seen as a breach of etiquette.

Checking out

The check out is always performed in the lobby between hotel guests and receptionists, and most frequently executed between 09:00 and 12:00.

Figure 12: Hotel reception

Normally one representative of the guests handles the check out (as the entire sum of food and beverages from the restaurant etc. is gathered on one bill). What is generally observed, is that the rest of the entourage tend to relax in one of the various sitting groups situated in the lobby, often employing some sort of technology, most frequently cellular phones or a laptop (as also seen in Fig. 12). The individual in charge of the checkout also often use a payment terminal, as this is the most normal manner of defraying the bill. In comparison to the check-in, the use of resources jumps from Very Low to Medium, in the same area performing somewhat the same actions. Some guests explain this by noticing that when they arrive at the hotel, they are eager at getting to the hotel room, pool, beach and the like. When checking out they normally are waiting to go back

home, and are often not in that much of a hurry. So the use of various technological artifacts is not only deployed differently at different technology enhanced activity spaces, but also at the same places with a variation of time and situation. The intensity of resources and activities are therefore different because of their needs and preferences changing. This happens due to the setting in which they are situated, showing that it is not always the space in it self that hinders and/or encourages use.

Reception

Receptionist shift 2

This is probably the work sequence of the reception that is most interesting considering how the use of resources differ throughout various stages of the day. From 08:00 – 09:00 the use of resources increase from Very Low to Low, as you have the occasional check-in or checkout, therefore involving a slight higher use of the booking system, payment terminals etc. compared to the hours before. Between 09:00 and 11:00 there is an incremental group of people checking out, but also some starting to check in. The deployment of various instruments will therefore naturally increase from Low to Medium to High. In the hours between 11:00 and 12:00 a Very High use of technology can be seen. This is related to often having a lot of guests checking in and checking out in this space of time. They also attend to other matters such as booking confirmations through email, telephone or their online booking system. These have to be updated into the GER system (which is their booking system situated in the reception) and the OBS (online booking system), so that the receptionists (and the booking agents in the other cities equally) are informed on the rooms available.

After the last checkout is finished (12:00), it is observed that the amount and time spent on resources somewhat drops a bit. Still, the answering of telephones, receiving of fax, updating of OBS and GER results in a resource use that qualifies to a High. This often last until 15:00, when an even higher use of resources (especially the use of the stationary computer) often appears. This is due to the receptionists claiming, and also been observered, to be receiving the majority of emails from the OBS between 15:00 and 17:00. This is at the same time as there are a lot of guests checking in, therefore resulting in a Very High use.

Further discussion - reception

In the next section some additional background information surrounding the reception will be provided. In the reception they have two stationary computers that handle all the bookings. There are two individuals at work at all times, that answer telephones, attend to bookings through drop-in, telephone, fax and e-mail, checkout and other matters of the hotel guests. The software used here is COTS software, simply bought and installed. It is a *generic* one, since it has been applied to many specific contexts, and not *specific* as it is not necessarily appropriate for their particular task at hand (Kaptelinin and Bannon 2011). They have payment terminals and

also a printer present, which is used with fax. There is also the online booking system that they have to attend to, explained underneath in more detail.

Online booking system

Apart from having the COTS software in the reception, they also have to handle another software. Due to the fact that the hotel manager runs a hotel in another city as well, they have a common booking system online. Everything plotted in here, also needs to be entered into the GER software. So the guest has five different booking possibilities that the receptionist has to attend to, as depicted in Fig. 13.

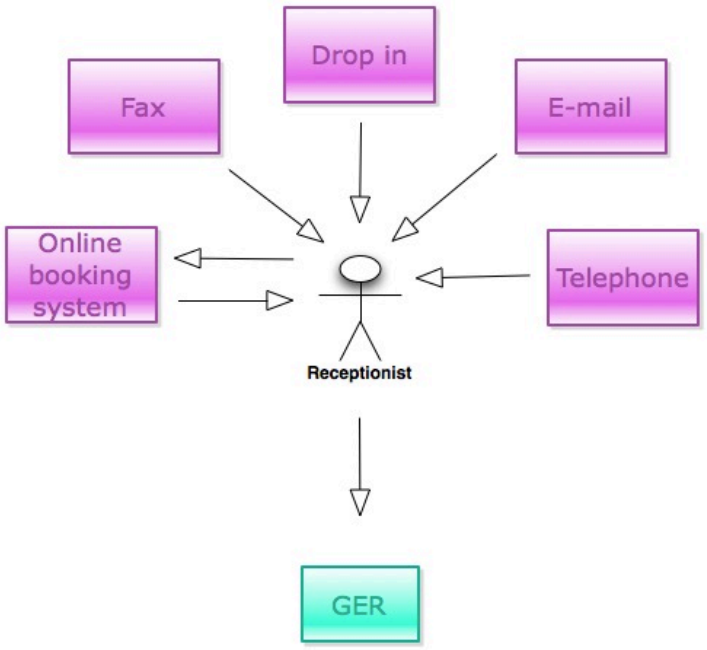


Figure 13: Different booking possibilities

The OBS is mostly being handled by the booking office in another city. Every time they make a new booking in this system, an email is sent to the reception, and then they manually have to put it into the GER. But if s/he (receptionist) receive a booking from somewhere else than the OBS (say through telephone or email), s/he has to both enter it into the GER and the OBS, so that number of rooms available also are presented for the booking agent in the other city. Another reason for this being done is the fact that the OBS creates all invoices, and it therefore at all times needs to be updated. They also have a webpage, and every time a booking is made by a guest through the website, an email is sent from the American company Travelclick to the booking office in the other city, which then later has to be attended to at Hotel Brazil. The entire process of booking, from the guest making one by any means available, to being finished into the system(s) is as follows:

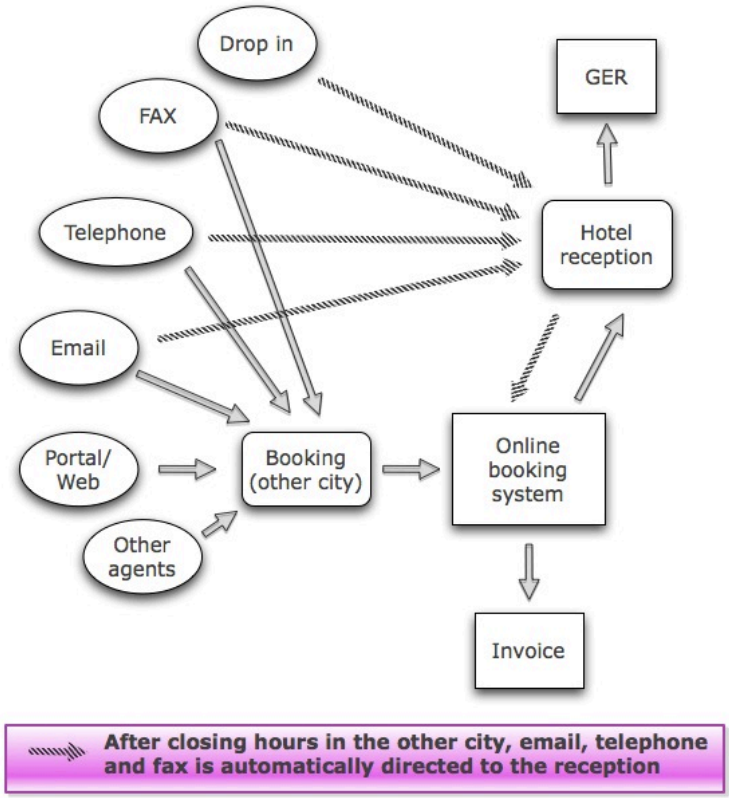


Figure 14: Process of booking

The current "problem" is that every booking entered by the guests into the webpage is being attended to by Travelclick, then manually being entered into the OBS by the booking office also has to be entered into the GER by the receptionist staff. This means extra work for the receptionist staff that already has been done by the guests, Travelclick and booking office. Redundancy of work is something that one should try to avoid, yet the hotel manager dismiss this as a problem, due to the staff having enough time to do it. There is so much time spent not having to interact with guests etc. that this action easily can be done by staff. This can be seen in comparison to the expenditure of man labour noted later in the thesis.

Restaurant

Restaurant shift 2

A low usage of technology is seen between 12:00 – 13:00. Still, in this period one can notice a higher use of their personal cell phone, than what is seen throughout the day. From around 13:00 there is an interesting increase of technology usage lasting until more or less 15:00. The reason for this is that the many people checking in and the ones eating breakfast early eat lunch around this period of time. Now the restaurant staff has to use the POS (point of sale) system situated in the restaurant, but also print out the bills that have to be handed to the receptionists and plotted into the GER system. At 15:00 the number of guests drop again, while at 16:00 you see an increase of guests for one hour. These are normally guests lying around the pool that order the

occasional food or beverage. At around 17:00 there are some random orders, but a Low usage of resources.

Further discussion - restaurant

In the bar there are three individuals working at all times. Here they have their own POS IT system that keeps account of all bills of the customers for the restaurant only, not being connected to any of the other IT systems situated. It has a "map" of the restaurant, and every table then receive their own check.

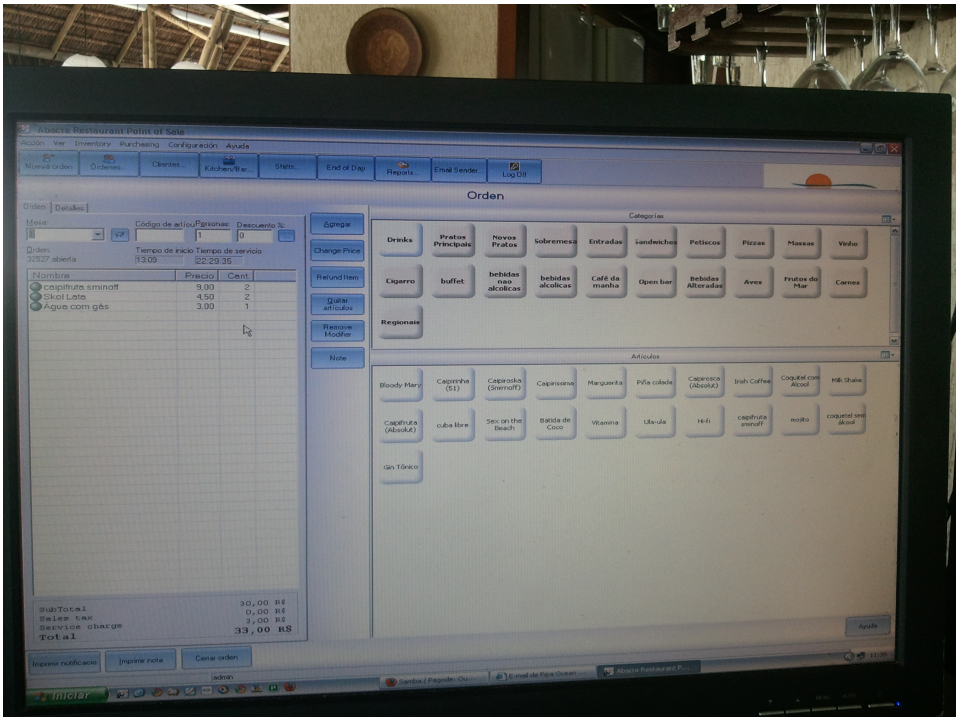


Figure 15: Restaurant POS system

These later have to be connected to a hotel room number, told by guests by showing their room key. Every time they receive a food order, they have to write it down on paper, and physically hand them to the kitchen. After, they have to enter this into to IT system (see Fig. 15). The IT system is not connected with the reception, so the final bill has to be handed to the reception manually after printing out the bill. The receptionists then put these orders on the bill for the guests in the GER, so that no exchange of physical money is performed. If there ever is any problems with the restaurant staff forgetting to deliver these bills, or writing the wrong room number or amount of food/beverages to the reception was according to the hotel manager difficult to say exactly, but he believed everything was working correctly.

Scenario – reception receiving room service order

I gave the receptionists a scenario to what would happen should a guest call and order food to the reception instead of the restaurant directly. They said that this happens at times, and is a bit troublesome for them. Since there is no IT communication between the restaurant and reception,

these orders also have to be delivered manually to the restaurant. Sometimes they use walkie-talkies, but most often these are just delivered by hand. Often the order is then first brought from the reception to the bar. Then the order has to be made in the IT system in restaurant, written on a piece of paper and then be delivered to the kitchen. Further the order has to be printed out and delivered from the bar to the reception to be put on the bill in the GER (going in circles – See Fig. 16a and 16b).

Should a guest order food in the bar around the pool; these are also handed manually to the restaurant, and similar activities are performed. The total options of activities in different time and space for a food order should therefore appear something like:

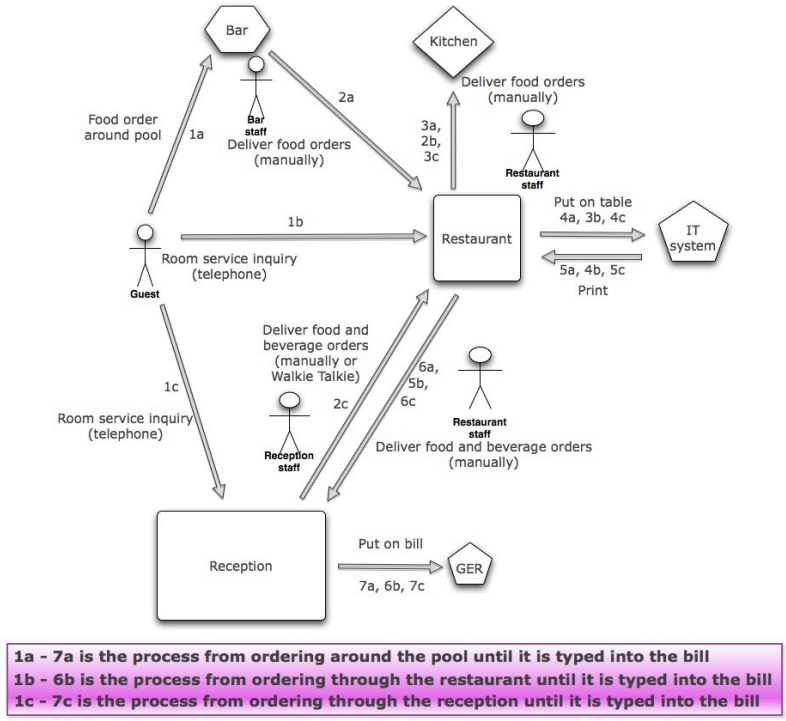


Figure 16a: Food order process overview

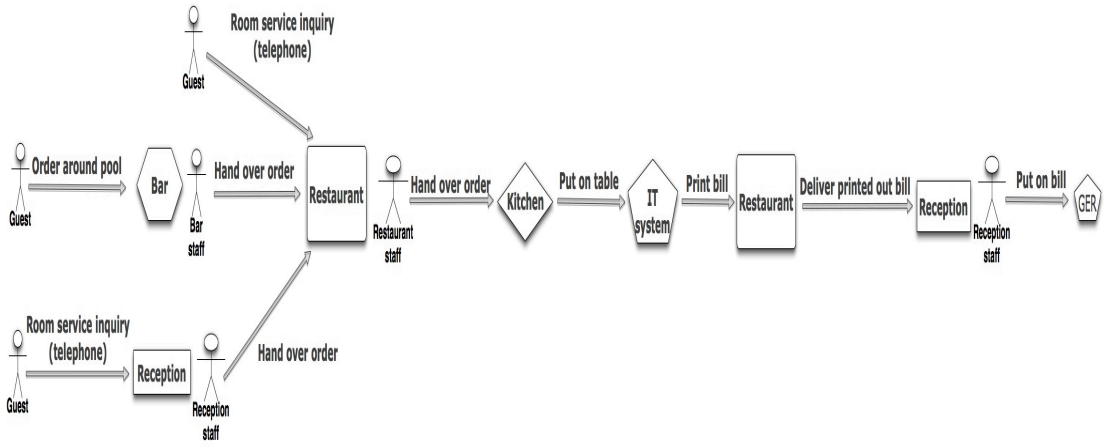


Figure 16b: Food order sequence

Considering the definition of TEAS and problem 1.1 and 1.2, it is easy to see that the technological artifacts are scoring low considering how to coordinate activities as they do not interact optimally. Normally the management of different activities by various actors is done manually by the individuals themselves, not the IT systems present. What would be optimal in the activity of ordering food, would be a joint system that could be used by guests, receptionists, restaurant and bar staff, that automatically would display orders in the kitchen. A guest ordering from the hotel room would then automatically show its room number, which then preferably automatically could be assigned to the bill. All the above actions of delivering food and beverage orders manually would then become obsolete, as one simply would have to enter the order into a system.

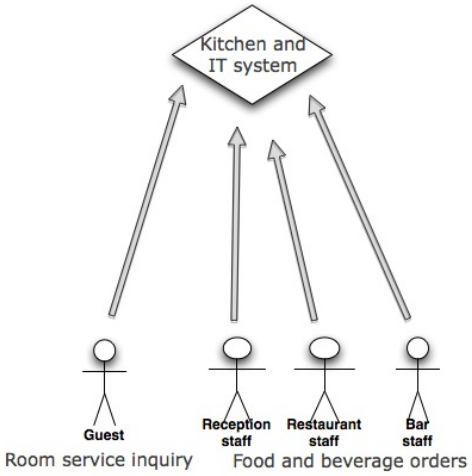


Figure 17: Possible enhancement of order

A system like this could also possibly cut the reception staff out of the equation in the ordering of food and beverages, as they no longer are needed for this specific activity. How this could be done is not a part of this thesis, and could be subject to future work. Still, no matter what system you employ, there will always be guests that prefer the "old fashioned" way, like for example ordering by telephone. This option still has to stay open, but a new system would probably enhance the opportunities of performing activities for the ones that choose to use it.

After talking to receptionist, bar and restaurant staff they seemed really optimistic about the idea, and said that it would ease much of their work. Still, they are a bit concerned that such a structure of flow of activities would possibly result in lesser people being hired (and in worst case scenario some being let of).

Security

Security shift 1, 2 and 3

In the security shifts, there is always one person present in the security room, while also various at the premises of the hotel. During the first two shifts, the personnel will often help with the carrying of bags, showing guests to their rooms etc. At the last shift they are more used to walk

around the premises to look for any unwanted individuals and the like. Still, the use of technological artifacts do not differ that much throughout the shifts. In general they use the CCTV to monitor the premises, and also Walkie Talkies to give each other feedback regarding the status of each security guard. It is noticed, and also through conversations with these guards, that the use of Walkie Talkie highly increases from around 20:00 until 06:00, as it then is dark, and has a higher possibility of people entering the premises without permission. During these hours a Medium deployment of technology is seen, while the rest of the time Low.

The use of CCTV at the hotel is very fixed, and can only be accessed at one particular venue, also noticed by others in different settings (Heath and Luff 1998). What Heath and Luff (1998) emphasize is that "*It is a strange irony that given the promise of new spaces and novel environments for collaboration, current technologies appear so rigid*", written 14 years ago. Further they mention that there is a need to be mobile, not only for the individual but also with the use of artifacts. CCTV is still a technology that often only allows one to monitor different spaces at one room, even though there are some options available (CCTVCameraPros 2010), using apps on your smartphone. These possibilities are still not available for the employees at the hotel, and should the security guard at the security room for one reason have to leave, for example to visit the bathroom, there will be no possibility for the other guards, situated throughout the premises to have a total overview. These activity spaces are not properly supported (problem 1.1), as it does not consider working practice and how they have to interoperate with the use of CCTV. They will now only have to rely on their own mobility and peripheral awareness (Heath and Luff 1998) to be able to monitor and evaluate the premises for possible intruders. Still, when one individual is present in the security room, they have no possibility to have a shared spatial environment, only audible access to each co-worker with the use of Walkie Talkies. This can cause problems with deictic references, which are "*the practice of pointing or gesturing to indicate a noun used in conversation [which is] a crucial part of the way we communicate in a shared space*" (Gutwin and Greenberg 2002). Words like "here," there," "this," or "that" will have no meaning do you not share the common visualized area, which can cause setbacks for the security staff.

7.1.2. Hotel Norway

All these notes are based on extensive observations and interviews with various actors at Hotel Norway that are seen as important to the research, such as guests and several employees with different occupations at the hotel. It is an aesthetic picture that displays the average of different sequences shown by various actors in both time and space. As weekdays, Saturday and Sunday show to be highly different in Norway, compared to Brazil, they have each gotten their own figure showing differents actors' use of technology in both time and space.

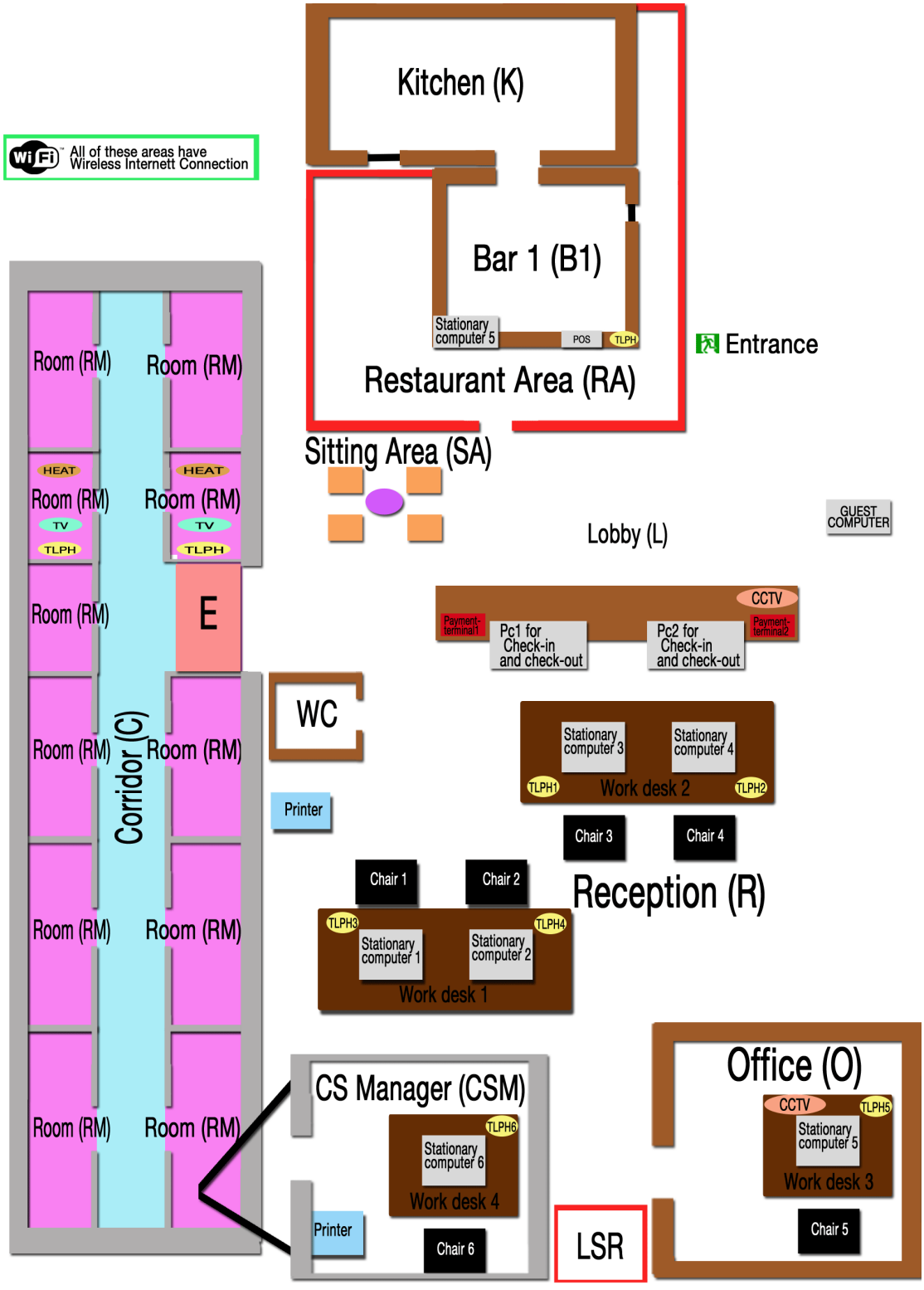


Figure 18: A simplified overview of Hotel Norway and its activity spaces

Areas:

Reception (R): From 23:00 - 07:00 there is one person present. The rest of the time there are two individuals managing the reception.

Lobby (L): Is entered either through the Entrance

WC: Toilets

CS Manager: Has one Cleaning Staff Manager working from 08:00 - 16:00 Monday to Friday

Luggage Storage Room (LSR): Guests that check out early, and leave in the afternoon are allowed to store their luggage before leaving

Room (RM): A hotel room. There are more than displayed in the model as there are many floors; this is just a simplified figure.

Restaurant Area (RA): Where guests are seated for drinks and beverages etc.

Bar 1 (B1): Has a staff of 2 individuals working from 15:00 - 03:00 at different shifts.

Kitchen (K): Has a staff of 2 individuals working from 06:00 - 13:00 at different shifts.

Sitting Area (SA): Small area with chairs and tables for guests to relax

^: Outside of hotel premises

Technology:

Guest computer: Stationary computer in Lobby with Internet connection

PC1 and PC2: Stationary computers with COTS software for booking etc.

Stationary Computer 1, 2, 3 and 4: Stationary computer used by receptionist for handling mail, COTS etc.

POS: Point of Sale system used to enter food and beverage orders.

Printer: handles faxes and printing

PT: Payment terminal used to make payments with credit cards.

TV: Television

AC: Air condition

Wi-Fi: the exchange of data wirelessly over a network (Internet)

TLPH: Telephone

7.1.2.1. Monday to Friday

Monday to Friday

Role ↓ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in											L	L	L	L		
Unpacking											RM	RM	RM	RM		
Eating													RA/^	RA/^	RA/^	
Sleeping	RM														RM	RM
Guest (departing)																
Waking up, packing etc.	RM	RM														
Breakfast		RA	RA													
Checking out			L	L												
Picking luggage										LSR	LSR	LSR	LSR			
Reception																
Receptionist shift 1		R	R	R	R	R	R	R	R	R						
Receptionist shift 2											R	R	R	R	R	
Receptionist shift 3	R															R
Cleaning personnel																
Receive list			R													
Find rooms			C	C	C	C	C	C	C	C						
Clean rooms			RM	RM	RM	RM	RM	RM	RM	RM						
Update minibar list			RM	RM	RM	RM	RM	RM	RM	RM						
Update maintenance list			RM	RM	RM	RM	RM	RM	RM	RM						
Hand over lists										CSM						
CS Manager																
Update list in system										CSM						
Bar																
Bar shift	B1										B1	B1	B1	B1	B1	B1
Kitchen																
Kitchen shift 1	K	K	K	K	K	K	K									

Use of resources*

Very high
High
Medium
Low
Very Low

Figure 19: The extent to which each role deploys various technological resources at both time and space – From Monday to Friday

Guest arriving

Check in

During the weekdays guest seems to most frequently arrive at between 16:00 and 20:00 o`clock. Commonly they are businessmen leaving for the hotel straight after work, explaining such a late arrival. Seemingly being used to staying at hotels, check-in is sorted in a quick manner, with them being "prepared" for this activity. They rapidly say their names when approaching the reception, wait a maximum of 20-30 seconds for the receptionist to find the booking, receive the key and leave for the room. Most often they travel alone, so that there are no one waiting, either in the lobby or sitting area present. Therefore, few resources are being used by guests, ending in a Very Low use of technological artifacts.

Unpacking

Unpacking is something that not has been observed at this hotel either, as people in general are reluctant to allow the entrance of unknown individuals, being a view shared by both guests in Norway and Brazil. This is still an interesting thing to notice, as one of the aspects of spaces is permission. How do you let authorised people in and prevent unauthorised? People organize their perception of the world with spaces they are allowed to enter and not, often because they know it "belongs" to others. We structure our environments, where we have a mix of public spaces, own spaces and private spaces. Individuals consider often spaces as something you can or cannot enter based on various criteria. Still, it is not fixed; people may often have different understandings and permission. Hotel rooms are entered by cleaning ladies, they have the right to enter by guests. It would be wrong of the hotel manager to suddenly enter, even though he has more authorization in general.

A majority of guests indicate that they at once unpack their laptop and access the wireless Internet present (even though the ones arriving very late leave to eat immediately). This is done to check their email and/or to finish/continue their work for the day. They want to complete as much work as possible, in order to leave the room and get something to eat. The occasional guest also mentions that various social media are visited, such as Facebook, LinkedIn, and Twitter. Since the guests normally deploy resources such as the laptop and cell phone with the use of Internet, the total use of resources here is set to Medium. This can be related to Hotel Brazil, where they do not have the possibility to deploy these resources in the same manner because of the lack of Internet. Some guests were asked regarding Internet in their rooms, and they would feel it to be totally out of the question to not be able to be online while staying. Since they are staying for work-related matters, they need to constantly check their email and connect to work related systems online, something that would not feel comfortable in the reception or dining area. In Hotel Brazil they do not necessarily have to access the Internet for work-related matters, and it was therefore not deemed to be equally important.

Guest departing

Breakfast

Considering that most guests staying during the weekdays are related to business, it is somewhat surprising that you do not see more laptops and mobile phones while eating. Most seem to enjoy their meal without the (possible) disturbance of technological artifacts. When asking why this is so, they mention that due to them checking what is seen as important five minutes ago in the hotel room, allow them to have these minutes of relaxation. The total deployment is therefore Low. What is interesting to notice here compared to Hotel Brazil is that business workers use this time during breakfast to relax, not to be disturbed by the use of any technology. The guests at Hotel Brazil on the other hand felt a need to deploy artifacts, due to them not being able to use these tools for quite some time. It might appear that they deploy fewer resources in Norway during breakfast as they have Internet present in their rooms. They do therefore not have the same need to access the Internet during eating.

Reception

Receptionist shift 1

Among the three shifts in the reception, this is the one with the most variation in degree of resources used throughout the different hours. From 07:00 to 08:00 it is pretty quiet, with the occasional checkout, check-in, telephone call and incoming email. In this period of time the use of resources is Low. It is pretty interesting to see how there is a rapid change in intensity of activities and deployment of resources. At around 08:00 o`clock more and more people start to check out, as well as incoming telephone call and emails skyrockets. Between 08:00 and 10:00 o`clock is noticed by receptionists as being the most "*intense during the day*" (translated), considering telephone and email use. Enquiries in this period of time are normally carried out by businesses on the behalf of their employees. With having the majority of checkouts in the same period, turns this into a Very High use of resources.

Between 10:00 and 12:00 the checkouts decline, together with the incoming telephone calls and emails. Resource use is therefore set to a Medium. From 12:00 until around 14:00 it is a bit quieter in the beginning, but elevates around the last hour, mainly characterized by telephone calls and emails, ending in a Very High use. Until around 16:00 o`clock the use starts dropping, ending the shift eventually at a Medium.

Receptionist shift 2

When the second shift starts, it is noticed that both verbal and written exchange of information is carried out by the overlapping shifts. This is to cover all activities and tasks that has not yet been accomplished by the first shift, and has to be taken care of. One is to notice that more is being done at the beginning of the second shift, than at the end of the first. This might have to do with workers tending to be more efficient at the start of the day. Also, at these hours you have more of the independent guests calling, making enquiries on their own behalf. This is done as well as they

have to check bookings handled by the online booking system of the chain, as well as the online booking website (quite similar to the processes of Hotel Brazil). These hours are considered the most frequent regarding check in, ending in them having to deploy a lot of technological resources in order to accomplish their goals. The resources used declines as the night turns darker, and at the end of the shift the deployments is considered Low.

Cleaning Personnel

The main activities handled by the cleaning staff are commonly seen as exploiting a minimum of technological artifacts. Before they used the TV at each room to write down each item taken from the minibar, automatically being put on the bill of the guest. This activity is now being done by the use of pen and paper, and later handed to the reception, creating extra work for the receptionists earlier handled by the cleaning personnel themselves. On the TV they were also able to see an overview of all rooms that had been checked out by guest, therefore being able to ignore the "Do not disturb"-sign that might still be hanging on the door. Now they have to knock or clean these rooms after the latest hour allowed for checkout: 14:00 o`clock.

Still, they deploy some technologies allowing them to accomplish their goals more effectively. Every part of the cleaning staff has their own internal cellular phone that they use to communicate with each other, the reception, restaurant, janitor and CS Manager. Should the reception ever wonder if a room has been cleaned, they could instantly call the personnel. Further, the cleaning staff is also able to enter a code for each room, on the hotel room telephone, indicating directly into the system that a room is ready.

The reason why the activities of updating the minibar and maintenance list are separated in Fig. 19 is because the registration of minibar before was done with the use of technology, and the maintenance with paper. Now they are both handled with the use of paper, being a setback in the automation of this process.

7.1.2.2. Saturday

Saturday

Role ↓ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in						L/SA	L/SA	L	L							
If room not ready							LSR	LSR	LSR							
Unpacking						RM	RM	RM	RM							
Sightseeing						^	^	^	^	^	^	^				
Changing											RM	RM	RM			
Eating													RA/^	RA/^	RA/^	
Sleeping	RM														RM	RM
Guest (departing)																
Waking up, packing etc.			RM	RM												
Breakfast				RA	RA											
Checking out						L										
Sightseeing						^	^	^	^	^	^	^				
Picking luggage										LSR	LSR	LSR	LSR			
Reception																
Receptionist shift 1		R	R	R	R	R	R	R	R	R						
Receptionist shift 2											R	R	R	R	R	
Receptionist shift 3	R															R
Cleaning personnel																
Receive list				R												
Find rooms				C	C	C	C	C	C	C	C					
Clean rooms				RM	RM	RM	RM	RM	RM	RM	RM					
Update minibar list				RM	RM	RM	RM	RM	RM	RM	RM					
Update maintenance list				RM	RM	RM	RM	RM	RM	RM	RM					
Hand over lists											CSM					
CS Manager																
Update list in system											CSM					
Bar	B1										B1	B1	B1	B1	B1	B1
Bar shift																
Kitchen																
Kitchen shift		K	K	K	K	K	K	K								

Use of resources*

Very high
High
Medium
Low
Very Low

Figure 20: The extent to which each role deploys various technological resources at both time and space - Saturday

Guest arriving

Check in

Being the weekend, one definitely sees a different pattern regarding the checking in of guests, not only in terms of time but also types of people. First of all, guests now are more characterized by tourists, families and/or couples wanting to see what this town has to offer in terms of sightseeing and the like. Second of all, they check in much earlier than what is the trend during the weekdays. Now they start arriving at 11:00, and the majority of guests checking in lasts until around 15:00. The first two hours can sometimes end up in them having to wait a short period of time before being able to enter their rooms. This is because they are normally not allowed to check in before 14:00 o`clock. Some therefore wait around in the Sitting Area situated, deploying tools such as the laptop computer and cellular phone, in 90 % of the cases asking for the username and password for Internet access. The last two hours check-in is normally considered a bit differently, as most rooms are ready for the guests to enter. This process is therefore then handled faster and without the specific use of resources.

Unpacking

Once entering their rooms and starting to unpack, most say they enter their laptop and go online. This is mostly to listen to music, check social media, read online newspapers or other personal matters. What is here interesting to note is that they use artifacts with Internet even though it is not related to work. Compared to Hotel Brazil, they are allowed to go online, and this possibility is frequently deployed. One is there to wonder if this should be implemented at Hotel Brazil as well.

Changing

After a day spending their time at various excursions and the like, most of the guests return to their rooms to take a shower, change clothes and get ready to go out and eat. In their rooms they will often once again check social media, read newspapers and other personal matters, as well as turn some music on (either on the TV or laptops).

Eating

The once eating at the hotel deploys few technological resources. When asking them the reason for this, they mention once again that they have been able to check the Internet in their room, therefore not feeling the same necessity. Comparing this to Brazil, neither mentions etiquette, rather the fact of having Internet in their rooms.

Guest departing

Breakfast

During breakfast few technological tools are deployed, only the occasional cellular phone use has been noticed. Once again artifacts are not being used during breakfast, as they had the possibility to use them beforehand.

Cleaning personnel

Find and Clean rooms

What is interesting here to notice, is that cleaning staff more frequently will be called on their internal mobile phones on a Saturday than during the weekdays. This has to do with guests coming to check in early, and the receptionists wanting to know whether the rooms are cleaned and ready. They also more actively have to look for rooms and ask for checked out guests, so that rooms can be ready when they arrive. As they no longer have the overview of checked out rooms available on the TVs, they actively have to approach (or the receptionists calls them) in order to reveal the rooms that can be entered and cleaned. The staff has mentioned that an overview definitely would be desireable, yet this has not been elaborated on further.

7.1.2.3. Sunday

Sunday

Role ↓ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in													L	L	L	
Unpacking													RM	RM	RM	
Eating													RA/^	RA/^	RA/^	
Sleeping	RM														RM	RM
Guest (departing)																
Waking up, packing etc.			RM	RM												
Breakfast				RA	RA											
Checking out						L										
Sightseeing						^	^	^	^	^	^	^				
Picking luggage										LSR	LSR	LSR	LSR			
Reception																
Receptionist shift 1		R	R	R	R	R	R	R	R	R						
Receptionist shift 2											R	R	R	R	R	
Receptionist shift 3	R															R
Cleaning personnel																
Receive list				R												
Find rooms				C	C	C	C	C	C	C	C					
Clean rooms				RM	RM	RM	RM	RM	RM	RM	RM					
Update minibar list				RM	RM	RM	RM	RM	RM	RM	RM					
Update maintenance list				RM	RM	RM	RM	RM	RM	RM	RM					
Hand over lists											CSM					
CS Manager																
Update list in system											CSM					
Bar																
Bar shift	B1										B1	B1	B1	B1	B1	B1
Kitchen																
Kitchen shift 1		K	K	K	K	K	K	K								

Figure 21: The extent to which each role deploys various technological resources at both time and space - Sunday

Guest arriving

Check in

Guests coming to check in on a Sunday normally arrive late, taking the last plane/bus/train from wherever they are departing. They are generally businessmen working the next day, therefore not needing to arrive early. This implies them coming to the hotel at around 18:00 o`clock, lasting a few hours. It is mostly a quick process, with them being prepared for the activity of checking in. Rarely any technological artifacts are seen used.

Unpacking

Being there for business purposes, most say that when they enter their rooms to unpack, they attend to some sort of work related matters. This either being emails, accessing work related systems online or other work, being a rule rather than the exception. Medium deployment of technology.

Eating

While eating, most say that they have done the work for the day at the hotel room, and does therefore not need to use their laptop and the like. Still, the occasional laptop and cellular phone use is observed, relating to both work and personal matters. Overall a Low deployment.

Figure 22: Restaurant area Hotel Norway

Notes

It is to be noted that this thesis covers the activities that normally are considered to take up the most time, and involves the use of technological artifacts. There is awareness of that other tasks do arise.

7.2. Attitudes Towards Technology

In todays society it is probably impossible to find an organisation that has not experienced problems related to implementing and exploiting the promised benefits of new technology (Heath and Luff 2000). Still, to be able to be competitive within such as competition-based industry, one has to be open for possibilities that can enhance the probability of attaining

meaningful goals. But how does different actuators feel about technology? After the course of this study, it is possible to believe that one can reveal some of the general attitudes towards technology in the hotel industry by different individuals. This involving hotel managers, as well as other related actors such as receptionists and guests. One could identify if they in any ways are positive or negative to technologies that already exist, and if they are conscious of any replacements, improvements or innovative possibilities. It will attend to part 1.5 of my research questions.

7.2.1. Technologies that exist

In Norway, one of the major costs while running a hotel is man labour (Hansen 2011). One is therefore constantly trying to find solutions to eradicate this expense, as seen with the hotel Xpress in Oslo. Opening in January 2011, it sought out to be a hotel bringing new thinking to life, being a pioneer on many aspects of hotel operation. All bookings are done online or through apps on your telephone, not being an innovation per se. What is different is that one cannot book through dialling a telephone number, as the reception is a computerised check-in system consisting of four computers (See Fig. 23). This resembles check-in systems widely used by different airline companies throughout the world, but is a novel tool within the hospitality industry (at the writing of this thesis). No receptionists are present, rather a "stage crew" that can help with everything from what venues to visit, events coming up, but also check-in should this be a problem. Their main tasks are therefore not to attend to the common responsibilities of a receptionist such as answering telephones and check in, but to help with all others matters related to the hotel, to make the guests feel as comfortable as possible in their stay.

Figure 23: Comfort Xpress´ hotel reception with a computerized check-in system.

Photograph: Olaf Furniss

Check-in is also possible through the use of your cellular phone, and this will also serve as your key when opening your hotel room (a plastic key can also be used if wanted). By calling a number received through SMS and placing the cellular phone on a sensor, a cryptic ring tone opens the room door. Checking out is also simply done by sending an SMS with the code "stopp" or "ut", not having to even visit the check-in/out counters. This check-in system using your cellular phone is a novel way of using the telephone, and they are the only one in the world currently using this technique (Hillveg 2011). Also, even though the technology itself is innovative, the customer only has to use tools already familiar, a fact being underlined and recommended by e.g. (Kaptelinin and Bannon 2011). There is no need for new downloads of apps or software or deploy technological advanced tools; a simple ring tone is the key to success. The technology-enhanced activity spaces are also supported by this innovation, in the sense that the cellular phone serves as a key not only to the hotel room, but also elevator and entrance.

7.2.2. Social media

Considering that there exist technologies such as the ones described above, how aware are the various actors of technologies that can be utilized? Already early in the study one was able see some attitudes. The manager of the hotel stated, among other things, that the use of social media, such as Facebook, was something hyped and overrated, not necessarily yielding the results promised. A statement presented without having any extensive use of the given communication and marketing technique, and not necessarily being aware of its possible benefits. Studies have shown that the use of social media, such as TripAdvisor.com, has the possibility to increase business revenue significantly for small hotels, and that "*Web 2.0 technologies creates forms of connectivity and accountability that may have profound consequences for organisations*" (Scott and Orlikowski 2010), such as the hotel in question. Had this been know beforehand, perhaps a different mind-set would appear.

The hotel in Brazil shows a similar attitude. They are present on various social media, such as Tripadvisor and Facebook, but have no extensive use of the tools. Social media provide large networking possibilities, often being free of charge that can allow a business to address numerous (possible) customers. The hotel in questions sent several mails to guests, asking their opinions surrounding their stay. Even though also considered a social media, the email client is according to guests asked in this study lesser deployed to attend to reviews compared to other tools such as Facebook and Tripadvisor. Many describe the former as being to formal, while the latter being a place were informal discussions and comments can be expressed. Being more present and visible on these formal resources, might enhance the possibility of receiving constructive criticism, as well as keep in touch with and create a network of guests.

7.2.3. The use of man labour

Machines in Norway (and also other parts of the world) are gradually taking over some tasks normally done by human beings, also slowly seen in the service industry, for example Hotel

Xpress. These appliances are in many cases not as flexible as a person, and is a relatively poor replacement for the mental capabilities of people in carrying out non-routine tasks (Dey, Fan et al. 2011), but their advantage is that they do not take any breaks, sick leave, holidays, argue with other staff or possibly try to slack as soon as nobody is watching, and always perform their effort in the same systemized and precise manner. Of course, machines have an initial disbursement that can be quite extensive, but apart from this one time expenditure there is only occasional maintenance and repair considerations. One also has the possibility of upgrading them, potentially making them more efficient. With the Technological singularity[4], a hypothesis claiming that the future will bring greater-than-human intelligence in technological artifacts, also said to be approaching, it will be interesting to see what the future will bring. One could therefore consider how man labour in Brazil sometimes is used for activities that could be performed by computers, such as the computerized check-in at Hotel Xpress. One of the reasons why one can imagine much of the operations going smoothly often without the use of technology enhanced artifacts, is due to the fact that man labour in Brazil still is considerably cheaper compared to other countries such as Norway. One is therefore able to hire extra individuals that can perform these actions, and the necessity for IT systems that would possibly optimize these processes is therefore not critically needed (even though it can cause some difficulties, as seen with the ordering of food at Hotel Brazil). This can clearly, as with the social media example presented above, be correlated with opportunity spaces, being spaces where "*there is no urgent problem to be solved, but much potential to augment and enhance practice in new ways*" (Hornecker, Halloran et al. 2006a). A given hotel might have many new possibilities in terms of their TEAS, but the employees and other members might not explicitly feel any need or have any clear requirements. Like the hotel manager said himself: "*it is so cheap to hire an extra individual, that this is not considered being an issue*" (translated). Still, during the last five years wages in Brazil have been raised by 50 % (Wikipedia 2012), as being a country in constant development. Everything is also pointing in the direction that this trend will continue (Propertyshowrooms 2011). Cheap labour that can perform tasks like running with orders and bills from the restaurant to the kitchen and reception as noted earlier, instead of having technological artifacts handling this operation, might therefore show to become troublesome. The minimum wage in Brazil is now (January 1st, 2012) 620 Real (approximately being equivalent to 340 Dollar or 1960 NOK per month) (Wikipedia 2012) and as pointed out constantly inclining. Having a lot of these "runners" that possibly could be substituted in some manner by technology might become too expensive. One can therefore suspect that systems to replace this sort of labour will be highly desirable in the future to come, and that their attitude towards technologies has to change, even the manager at Hotel Brazil claiming this fact. He mentions that he probably will have to change manpower with IT-systems

[4] For more about Technological Singularity, see Vinge, V. (1993). "The Coming Technological Singularity: How to Survive in the Post-Human Era." Retrieved November 9th, 2011, from http://www-rohan.sdsu.edu/faculty/vinge/misc/singularity.html.

in a few years, especially considering the fact that the minimum wage has risen with 50 percent the last five years only. Being updated on the field, he also mentions that in five years of time a lot of data exchange and flow probably will be much better in terms of structure, therefore being a better time to implement it. His views are also supported by others, saying that "The main resource of (the Brazilian) society in the future will be knowledge mediated by technology" (Souza, Baranauskas et al. 2008). A better structure and electronically linking various activity spaces might ease much of the work done (Halverson 2002).

IT has also been said to be a "*catalyst for new work practices aimed at increasing the quality, productivity, and flexibility in organizations*" (Dey, Fan et al. 2011), but one issue that has to be taken into consideration is that a more extensive use of computers and technology might lead to an organisational redesign and restructuring (Dey, Fan et al. 2011) which also demands a more skilled workforce what involves computational skills. Still, are tools that the users already are familiar with used, these issues do not necessarily need to be negative and affect the necessity for a staff being more skilled. This will be exemplified in e.g. the change of practice from fax to email and from paper to Google Doc presented in section 6.3.

7.2.4. Awareness of technology

Further, unveiling their (extent of) awareness for new or replacing technologies could help understand why something might be perceived negative or positive. This is also related to whether they even feel the need for new technologies, and in that case, if they know where to look, and whom to consult in order to receive guidance. Based on interviews by the actants in Hotel Norway, a basic impression was that they did not necessarily actively look for new technological artifacts, but rather compared themselves with what other hotels obtained. Also, alternatives could be highly effective in terms of actuators achieving their meaningful goals, but have a different "affective profile" (Wild 2010a); new options were (wrongly) seen as efficient but expensive, with costs exceeding potential benefits. An example was whether or not they were considering investing in an app (shorthand for application) for smartphones, allowing customers to book hotel rooms, get information about what to do in the given city etc. Their use had not been reflected upon as they automatically were thought to be too expensive, without knowing the actual price of investment. Their only point of reference was a pizza chain that had acquired the technology, which simply had claimed it to be "expensive". This section will attend to research question 1.5, whether they see the need for any new technologies.

7.2.4.1. New Hotel Manager

In the period between the writing of my project outline for the master thesis and the summer holiday, a large Norwegian hotel chain bought the hotel in Norway. This resulted in the change of both hotel manager and person in charge of technology. The new hotel manager had never visited the hotel before, and knew nothing of the routines and practices of this particular

company. Still, she had extensive experience within the service industry, having worked at several large hotels around the world in cities such as Shanghai and London. This study supports the view that one is not able to generalize human behaviour, and therefore agrees with the Product Ecology with that it

> "*seeks to find differences among individuals that help form patterns relative to product use and adoption. These include personal history, age, lifestage, gender, one's role in a situation at any given time, and one's role in a group*" (Forlizzi 2007).

Being approximately thirty years younger than the previous hotel manager, one quickly discoverers a different and more passionate view on technology. Without me comparing the two of them, she pointed out that a person working in the same place for ten years probably is more content with her/his working situation, being used to the working practises and knowing them by heart. This can (problematically) result in an attitude posing negativity to novel things. The proper term for this is Metathesiophobia, which every person suffer from to a certain extent; the fear of change. Most people are afraid of new things that may affect their daily routines, as this will cause consequences in some matter.

> "*Like with a doctor", she says*, "*who constantly needs to update his skills to be the best that he can be, so does the hotel industry. There are a lot of possibilities that can enhance practice, most of them are sadly not used*" (translated).

A spurious quote by Charles Darwin (Agence 2009) is that "*In the struggle for survival, the fittest win out at the expense of their rivals because they succeed in adapting themselves best to their environment".* Even though an unauthentic quote by this evolutionary mastermind, it impeccably describes an important aspect to this illustration. It can be seen by how well an individual is willing to adapt to their habitat by employing new solutions and artifacts, and therefore outdo their opponents. Further, artifacts are seen as species "*whose survival is determined by a dynamically unfolding interaction with other species in their shared natural environment*" (Kaptelinin and Bannon 2011). The individuals have to adapt by adapting their technology to new trends and possibilities, also by letting them interoperate.

By being able to compete and adapt in the ever-changing reality of running a hotel, she mentioned a lot of operations that potentially can improve the ways in which things are done. Many activities are currently done with the use paper, such as ordering of goods. She wanted there to be introduced a new digitalized system, with for example a spreadsheet in Excel to make this process more effective. Then the price for each good will be updated automatically, instead of them having a fixed price on a piece of paper. Cells will be calculated automatically, reducing the chance of human error and so forth. This shows that she has specified her needs with technologies that already exist, and that she does not necessarily need any novel tools to attend to her requirements. She has the possibility to perform an intrinsic practice transformation,

attending to her problems, deploying solutions to issues that have been self-articulated. By expressing the problems that are present, and identifying how they can be solved, will probably insure a result more attending to the subject of relevance. Another thing she mentioned, as also seen during one of my observations, a problem might arise if only two people are working in the reception and three or more telephones are ringing at the same time. She says that at different hotels she has visited, they have a system that tell the people ringing that the receptionists currently are busy, but that they will return their call as soon as they are available. A similar system is highly wanted, saying it will "*enhance customer satisfaction*" (translated). All of these issues were also present before the hotel merger, but were not explicitly noted by previous staff.

7.2.4.2. CS manager

As with the daily manager, the CS manager is also annoyed with the fact that many of the processes and tasks are supported by pieces of paper. For example banking accounts to different companies that they interoperate with, are set on a paper list. This means that she has to look through paper folders to find the relevant one. She would also prefer a digitalized system to replace the current activities done with paper, for example a system where she can type in "cleaning supply", and receive the proper banking account. This is not weird considering that paper as a resource is horrible at information management. To store it takes various filing cabinets, shelves and folders, and to share can be troublesome are you not closely situated (Sellen and Harper 2002). These changes have not yet been made, but are definitely something that is needed. The problem is that individuals are at times able to specify the changes needed, but they do not explicitly know what tools that might aid in them achieving their meaningful goals. Often there is also a problem related to whom they may contact in order to help them change the way they work. Further elaboration surrounding this issue will be presented in the next section.

7.3. Change of practice

Individuals are surrounded by diverse technologies creating an ecology of artefacts. The optimal solutions for employing interactive technologies have therefore lately, as mentioned earlier, been conceptualized and elaborated in HCI-literature. One claim surrounding this issue is that:

> «… an explicit objective of interaction design should be not only *helping designers create better artifacts*, but also *helping people themselves create better environments* for their work, learning, and leisure activities» (Kaptelinin and Bannon 2011).

This is further emphasized by the same authors depicting that "*because of the enormous selection of already developed IT- tools, users […] require technology experts' help in finding and customizing the tools they need"* (Kaptelinin and Bannon 2009). By considering and maintaining such a shift of innovation to users can show to be highly successful, as it gets easier for users to get precisely what they want by designing for their own activities and needs (Hippel 2005). The necessity for

concepts and models indicating how this actually could be done, by creating habitats rather than novel technological solutions, has been emphasized in several studies e.g. (Nardi and O`Day 1999; Kirsh 2001; Bannon 2005; Kaptelinin and Bannon 2011). How this could be executed in practice is discussable, yet there have been some explorations surrounding how one can design habitats with users in their natural environment (Hornecker, Halloran et al. 2006a; Hornecker, Halloran et al. 2006b), without elaborating on this further.

This section will not necessarily provide a conceptual tool for how employees should deal with technologies; it will rather show how actors at the hotels change their practices when they are provided with tools already available to them, but that they might not explicitly be aware of. Various effects due to the newborn practices were noted, which also will be discussed. Some of its findings and discussions are based on an article submitted for publication (Cabeza and Kaptelinin 2012). It will attend to research questions 2 and 2.2.

7.3.1. From fax to email

7.3.1.1. Actors

This part will generally be discussing one actor at the hotel; the cleaning staff manager (herafter referred to as the CS manager). The CS manager has responsibility for the round-the-clock-operations related to maintenance such as cleaning staff, supplier negotiation and cleaning supply inventory.

7.3.1.2. Previous practice

Another position except from the hotel manager that noticed a change of staff after the merger was the CS manager. During the thesis no observation and only a quick conversation was done with the previous CS manager, but several were conducted with the newly employed. During our conversations several problems that were present during different activities emerged. One was the (surprisingly) extensive use of fax, instead of getting this information by email. Correspondences from various business partners, such as suppliers, were received through fax, which involves everything from prices of cleaning supply that they use and what items that are available in stock, to various advertising offers. Being a CS manager, she is situated on the 2nd floor, and has to move down to the reception in order to retrieve the printed out faxes, not having a printer present in here office or nearby. This activity space is not enhanced properly with technology considering this particular activity, as they did not have the proper artifacts (in this case a printer/fax machine) to support the task in a proper manner (research question 1.1). But what can be easily seen, is that the technological objects available actually can support the activity of receiving information from any supplier, are the processes only handled somewhat different (See Fig. 24a and 24b).

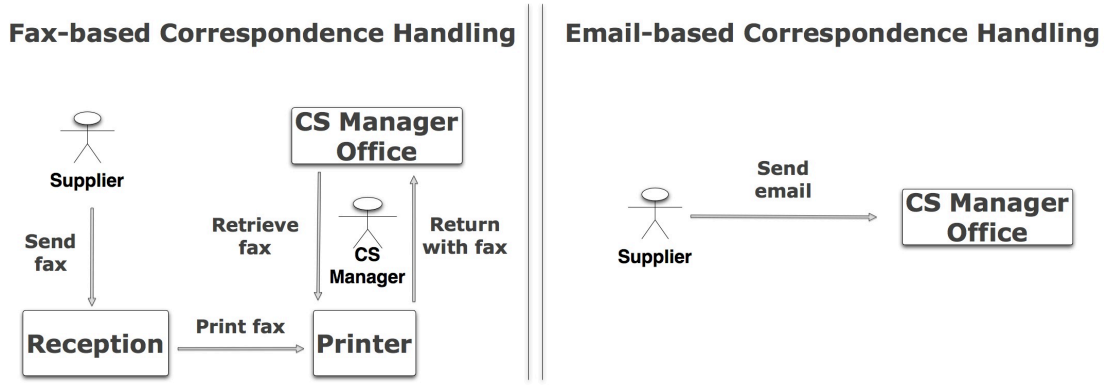


Figure 24a: Previous practice wit the use of fax. **Figure 24b: New practice with the use of email.**

7.3.1.3. The transformation of practice: from fax to email

The idea of changing the practice emerged during a conversation with me regarding the changes that were possible with how they were currently handled. The CS manager then expressed that she wanted an extensive transformation of the practice:

> "*If they (suppliers/other actors) send everything to us via email, we would not need to walk down to the first floor or buy a printer for the second floor, just simply use the computer of our working station" (translated).*

For her the use of fax and printing out of paper was totally incomprehensible, especially since she easily could receive it all on email. After my stay in Brazil for three months, she had actually transformed this practice to the one that we had discussed; from fax to email correspondence handling. This had not been an action realized due to the wishes of the management; rather she had executed this based on her own free will and effort. What she had done was to contact all business partners that would usually send her fax correspondences, and asked them to provide the same information through email (this, of course, demanded some effort from the suppliers´ end as well, but was gradually carried out). This has led to a significant change of practice, as she no longer has to spend time and energy on the actual retrieval of paper versions, and can now simply collect them at the click of a button. It is not only the faxes from customers that are sent to her by email; also many other related matters that previously were given to her in paper format, such as messages from colleagues. This is an example of intrinsic practice transformation; with her changing they way she works by her self with the resources that already are present. She did not need any new technologies, simply using the email client to exchange digital messages instead of correspondences in paper format.

7.3.1.4. Supra-situational activities

According to this study, the personalities and attitudes towards technologies and changing their practices may have deep impacts surrounding how they are actually, and possibly how

successfully, they are carried out. Former studies e.g. (Hedestig and Kaptelinin 2003) show that some individuals tend do things that are not necessarily needed or demanded of them, but that still can optimize their practices. These types of actions are called supra-situational activities, and can say a lot about an employee and them as an individual. This especially considering that the:

> "Ability to transcend the immediate requirements of a situation at hand and carry out supra-situational activities is considered a basic prerequisite for personal development, not limited to acquisition of knowledge and skills" (Hedestig and Kaptelinin 2003).

When an individual develops, often by applying solutions to an ad hoc problem that might arise (even though they can employ solutions before the problem emerges), they are more able to in depth "*understand, to reconcile, and to integrate different levels of performance and different approaches to problems by synthesizing zones of proximal development*" (Carroll 2012). When they understand the problems that they might be facing, they are more likely to be able to deploy solutions, like the example provided above.

Apart from this, supra-situational activities do not only assist an individual in their personal development, but also the organisation as a whole. Even though the initial time spent on these changes of practice was quite substantial, it will probably show to pay off in the long run. With the house economist also being an environment coordinator, she is constantly now trying to figure out how they can replace paper with digital formats. The hotel saves a lot of costs in terms of paper expenses, as it is said that paper holds somewhere around 20 percent of the total cost for office printing and commercial printing, and that activities related to the use of documents can be close to as much as 15 percent of a company`s annual revenue (Sellen and Harper 2002). Also the environment benefits from this change, as they are using less of this finite resource. Being a vital part of our ecosystem, organisations all over the world should device plans and methods for how to use less paper and preserve this precious source.

7.3.1.5. Social aspect

What still is interesting to notice in this case is that even though the CS manager now receives all of her faxes and other correspondences through email, she still has to do the occasional printing. A printer was given to her in December 2011, but in the middle of March 2012 it was still not properly installed. When asking why this was so, she mentions that she is not herself able to install it, and she had at occasions asked for the assistance with this process. She had never tried herself to install the printer, simply claiming this to be too difficult before trying. Still, there is also reason to believe that other factors are important in this, and other similar, instances. A further question was asked whether she regarded this as a *big* problem, especially considering that she had the tools and resources readily available. She then answered that the problem was not deemed to be that serious due to it only being the occasional printing. But what is interesting is the fact that she also mentions how this allows her to have impromptu conversations with her co-workers during this process, which was found to be a pleasant interruption. The "trouble" of

moving from the 2nd floor to the reception was not considered high, as she could socially interact with the people present in the reception. Theories, such as Maslow`s hierarchy of needs (Maslow 1954), underline this importance with the use of notations such as "belonging" in terms of friends, family and colleagues. This has to do with social needs, where one needs to feel included and as a part of a group, and also accepted by individuals such as co-workers. One cannot simply assume that human beings wish to optimise their processes on all expense; other factors often play a significant role. The social aspect in this case seems to outweigh the fact that she has the possibility to have a printer present on her floor (and the effort she has to perform in order to install it), based on the fact that she can interact with other employees. The social nature of human beings and their activities is emphasized in activity theory (Kaptelinin 1995a), having to do with the unity and inseparability of consciousness. The human mind emerges and can only be understood in the context of activity, and one also need to take into account how they interact with the world (Kaptelinin and Nardi 2006). How individuals intermingle can show highly valid when considering the "*complex phenomena of purposeful use of information technologies by individual and groups in social context*" (Kaptelinin 2010), and their likeliness or willingness to deploy these resources. Social computing, a trend that wish to include sociological understandings when dealing with interface design (Dourish 2001) is also concerned with social meaning between different actants. He mentions:

> "*The systems we use are embedded in systems of social meaning, fluid and negotiated between us and the other people around us. By incorporating understandings of how social practice emerges, we can build systems that fit more easily into the ways in which we work*" (Dourish 2001).

The instance of the CS manager having no problems with printing in the reception due to being able to converse with her colleagues is merely one of the vast examples that exist on this matter. The possibilities provided by the digital technology was not enough, she still saw the need for exploiting physical space and social interactions in work-related as well as personal matters. How this wish to socialize with others sometimes outplays other matters such as time and possible cost efficiency should be closely cogitated.

The outcome of this part of research was like Abowd and Mynatt (2000) to "*understand how everyday tasks can be better supported, and how they are altered by the introduction of ubiquitous technologies*", but also how these technologies affect the ecologies of artifacts. New tools are being deployed, and both the formal and informal communication with colleagues has been transformed. Even though it is possible to believe that there is potential in letting employees themselves create better environments for their work, learning, and leisure activities, one also has to consider how this new type of practice changes how other activities have to be performed (research question 2.2). Before, she heavily had to rely on different binders to categorize the different paper versions provided by the faxes, while she now has to do the same

categorization based on the possibilities provided by her email client. This last aspect has not been studied in this research, and might be a subject for future work.

7.3.1.6. Intrinsic practice transformation

What could be seen from this example is that the users herself initiated this change after expressing the transformation of practice that was needed. The benefits of her self changing and renewing the way she works can be seen in Fig. 25.

	Technology-enabled practice transformation	
	Extrinsic	**Intrinsic**
Initiated and accomplished mostly by	Designers	Users
Progression from the "source" to "target" practice	Discontinuous	Continuous
Effect of design on practice	Indirect	Direct
Abstraction level of design solutions	Generic designs	Idiosyncratic designs
Novelty of design solutions	Absolute	Relative
Scope og design solutions	Bound to a single technology	May involve different technologies

Figure 25: A comparison of extrinsic and intrinsic technology-enabled practice transformation (Kaptelinin and Bannon 2011).

The change of practice was accomplished by the user directly affected by the technology, without any intereference of designers, which foregrounds the centrality of users as designers of their own interactive environments. It can therefore be seen as a direct progression of the activities performed, which the actors can choose to continue and expand on further. The transformation from fax to email was not *discontinuous*, as she could herself decide if she wanted to develop or alter this practice additionally. The effect of the design practice was *direct*, as it immediately touched her handling of correspondences, by replacing fax with email as a tool for exchanging messages. Being initiated by the CS Manager has insured the development of an *idiosyncratic* design, by her directly affecting her problem as presented, instead of being *generic,* applying solutions applicable to similar instances with slight variations. Through this example it was also shown that no *absolute* novelty of design solutions was necessary, simply using her already familiarity with the email client. The novelty was rather *relative*, as it is new for the setting and context in which it is situated. In this example it is not shown how scope and design solutions not necessarily has to be bound to a single technology, rather involve several, but will be shown in the next example, where a combination of a spreadsheet and the web browser was deployed.

7.3.2. Roster

7.3.2.1. Actors

This part will generally be discussing two types of actors at the hotel; the CS manager discussed above and cleaning staff. The cleaning staff is responsible for washing designated areas of the hotel, keeping it in a general upkeep so that guests are met with a tidy and sanitary environment.

7.3.2.2. Previous practice

The roster for the cleaning staff was an A3 paper sheet containing an overview over which shifts each individual will have, over the course of three months (see Figure 26). The CS manager, as being the head of the cleaners, handled it and normally she simply filled in each employee in the days that were needed. If the employees had any request for how they wanted to work, they gave her written paper notes regarding their wishes, which she then took into consideration. There were three different paper copies of the roster, one at the CS manager's house, one in her office, and one in the cafeteria for the hotel employees. Usually the roster at the CS manager's office was changed first and served as a master copy, and the others were then modified accordingly. Regarding the cleaning staff, the shift information was clearly not ubiquitously available to them, as they did not have the possibility to access the roster from other locations such as their homes. If they for some reason should be uncertain about their shifts, they either had to visit their cafeteria, or call the person in charge of the roster (who either had to be at her office or at home to get access to the roster herself). Sometimes the staff was not able to work the shifts in which they were listed, so that two person's shifts had to be swapped. At one occasion two of the employees needed to change their shifts, and respective changes in the roster involved four people altogether (see Fig. 26). To make a shift change the staff called the manager and asked her whether the change was possible. The manager was not able to give a proper answer right away if she was not in the proximity of any of the lists. After actually getting access to the roster, she was able to see what employees were able to work that day and she called them to ask whether they were available. Subsequent to approval, the CS manager modified rosters in her office and home, while the cleaning staff themselves updated the remaining copy in the cafeteria. Therefore, if one change had to be made, a (marker) pen was used on all three copies at three different venues. A potential problem here was that ambiguity might arise, if something was written differently by different persons. But neither of the actors involved saw any problems with the way this process was handled, and were rather satisfied with it.

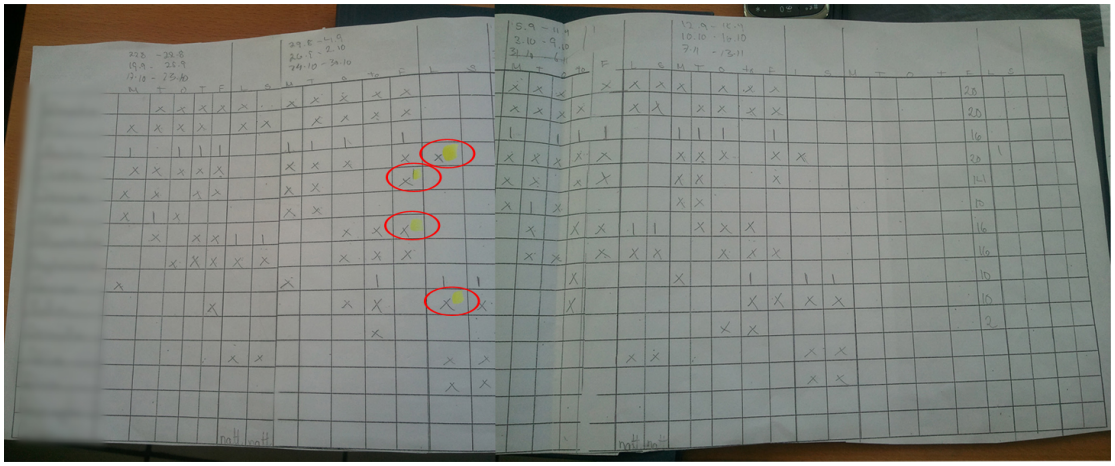
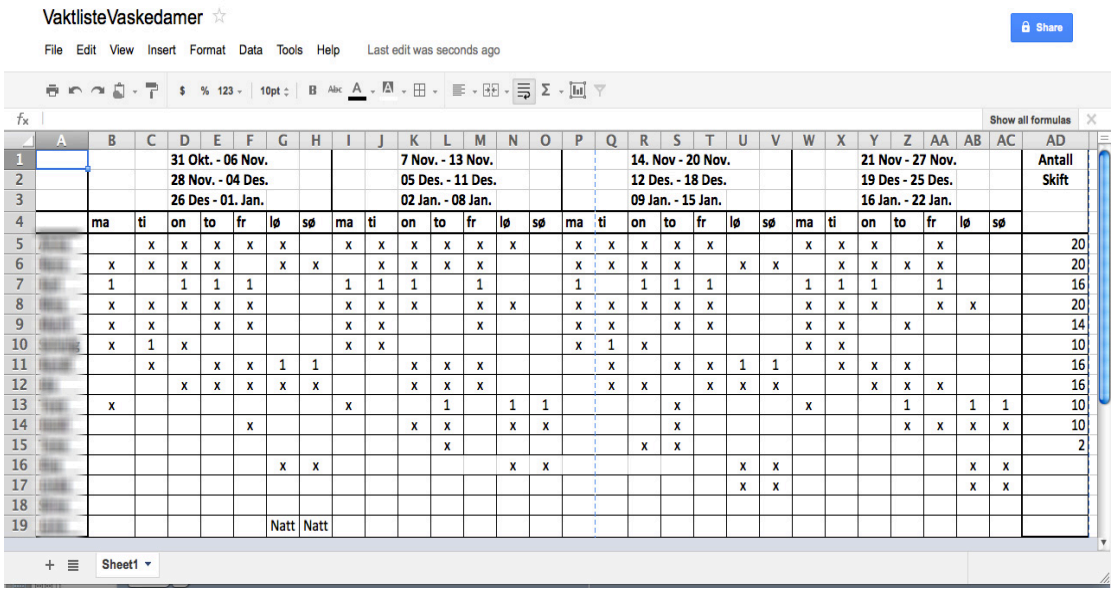


Figure 26: Roster in paper version situated at CS manager's office.

7.3.2.3. From paper to a Google Doc

As hotels have existed for generations, there have already been formulated effective practices for how it should be run. Hotels, like the two in this study, also often compare themselves with others, as to not fall behind, with technology as well as work practice. The problem here is that they often seem to compare the higher end issues, such as point of sale and booking systems, neglecting examples such as the one depicted above. So how can we be able to let individuals appropriate technologies and themselves develop new practices by encompassing new tools (Bødker 2011)? Sometimes, when clear improvements seem to be available, it can be wishful to be able to articulate for the individuals what needs and requirements that exist, and potentially which tools that best could suit particular activities (Kaptelinin and Bannon 2009), especially considering that a lot of available tools (sometimes un-costly or free) are unknown to the users. Here I pointed to Google Docs (GD) as a potential tool for managing the cleaning staff roster without necessarily showing her a system *fait accompli*, therefore trying to focus on, promote and encourage intrinsic practice transformation, which is "*initiated and accomplished by people (i.e. technology users) themselves*" (Kaptelinin and Bannon 2011). Essentially, Google Docs is a collection of office tools (such as Word and Excel) that are available online via a web browser, and that lets the users have constant access, anytime and anywhere. It allows an easy usable word processing tool based on a platform independent functionality. Instead of users not knowing whether a roster has been updated on every location, they can now simply access a GD document, and find the relevant roster, even from their laptop or home computer.



1				31 Okt. - 06 Nov.							7 Nov. - 13 Nov.							14. Nov - 20 Nov.									21 Nov - 27 Nov.				Antall
2				28 Nov. - 04 Des.							05 Des. - 11 Des.							12 Des. - 18 Des.									19 Des - 25 Des.				Skift
3				26 Des - 01. Jan.							02 Jan. - 08 Jan.							09 Jan. - 15 Jan.									16 Jan. - 22 Jan.				
4		ma	ti	on	to	fr	lø	sø	ma	ti	on	to	fr	lø	sø	ma	ti	on	to	fr	lø	sø	ma	ti	on	to	fr	lø	sø	
5			x	x	x	x	x		x	x	x	x	x	x		x	x	x	x	x			x	x	x		x			20
6		x	x	x	x		x	x		x	x	x	x			x	x	x	x		x	x		x	x	x	x			20
7		1		1	1	1			1	1	1		1			1		1	1	1			1	1	1		1			16
8		x	x	x	x	x			x	x	x		x	x		x	x	x	x	x			x	x	x		x	x		20
9		x	x		x	x			x	x			x			x	x		x	x			x	x		x				14
10		x	1	x					x	x						x	1	x					x	x						10
11			x		x	x	1	1			x	x	x				x		x	x	1	1		x	x	x				16
12				x	x	x	x	x			x	x	x				x	x		x	x	x			x	x	x				16
13		x							x			1		1	1				x				x			1		1	1	10
14						x					x	x		x	x				x							x	x	x	x	10
15												x						x	x											2
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19							Natt	Natt																						

Figure 27: Roster in Google Doc format available online.

A new roster, implemented as a Google Docs spreadsheet, was developed after I showed the CS manager how the system worked (See Fig. 27). It should be emphasized that the actual solution was designed and implemented by the CS manager herself. The new way of implementing the roster was developed in-house by using a relatively familiar tool (spreadsheet), accessed through another known tool, namely the web browser. No radically new technology per se had to be exploited, turning this into a smooth experience and effort. The CS manager made the new list almost an exact copy to the one previous used, only the novel roster being digital (see Fig. 26 and 27). After the process of changing the list from a tangible paper format, to a digital presentation in Google Docs, the roster was made available for the cleaning staff by providing a link to the GD document.

7.3.2.4. Opportunity spaces

These so-called non-professionals are provided with support for design methods and tools, and are hopefully able to create and transform their activity spaces. This can also be related to opportunity spaces, them seeing a problem, but not necessarily knowing how to fix it. Researchers (Hornecker, Halloran et al. 2006a; Hornecker, Halloran et al. 2006b) have tried with the help of e.g. participatory design to divulge needs that exist within a habitat, and co-design activities *in situ*.

> "*We discuss challenges for [Participatory Design] in [...] an opportunity space. Key amongst these are how to build a working relationship of value when there are no urgent requirements; how to understand and scope the space of opportunities; and how to leave users with new resources of value to them*" (Hornecker, Halloran et al. 2006a).

In this article they investigate how to reveal new issues and requirements, when there seemingly does not exist none. These are still explored in collaboration with the users, whereas it might be wishful for the users themselves to uncover what they need. That is why the CS manager was presented with this new tool, which she was able to freely explore, and benefit from some of the advantages that might exist. Based on the opportunities that possibly are present, it might therefore be wishful for interaction design and HCI to develop methods and tools for how they can benefit from the technologies that exist. In this manner users can express their requirements and find and explore "*available and promising interactive artifacts, their affordances, strengths, limitations, and compatibility*" (Kaptelinin and Bannon 2011).

7.3.2.5. The Human Activity System and Mental models

Before, the trend of developing computers was to make single-user applications that supported the one-to-one relationship between an individual and a computer (Bannon 1991; Grudin 1994), where the technology was considered first, applications second and the needs of the human beings last (Norman 2010). Now we also have to consider the aspect of designing computers that allows for people to work collaboratively and co-operatively, and how individuals interact with entire ecologies of artifacts. Employees often have work sessions and assignments that demand a shift between individual and interdependent (Gutwin and Greenberg 2002) as well as multiple activities operating simultaneously (Abowd and Mynatt 2000; Kirsh 2001; Moran 2005) being (sometimes) conflicting (Kuutti 1991), cognitive and in some way socio-cultural (Wild 2010a). Therefore, to simply build new technologies is not enough, we have to comprehend how people actually do their work, both in groups and organizations, and how the technology affects this aspect (Grudin 1994). One now has to consider the social aspect (Grudin 1994; Grudin 2002) as well as the physical environment in which people interact every day and relate this to the concern of design (Ciolfi and Bannon 2005).

This new roster had an initial objective: to make the process of writing the list easier for the CS manager. The Human Activity System (Engeström 1987) (which can be seen as an elaboration of the subject-object relationship discussed in the object-orientedness section previously) provides an overview of information about the factors that affect a specific activity. Based on the actions that have to be performed in order to achieve the overall outcome, several things contribute to and are influenced before its realisation. *Tools* are used that are seen as relevant to the activity, *rules* indicate allowance of accessibility and modification, a *community* may be a part of (and oppose or support) the activity and there might be a shared responsibility through the *division of labour*. The Human Activity Systems relevance to this example is therefore that the community (cleaning staff) is affected by the subject´s (CS Managers) objective of making a new roster available in digital format. One of the things that interfered and made this transformation of process difficult was the use of specific instruments (See Fig. 28).

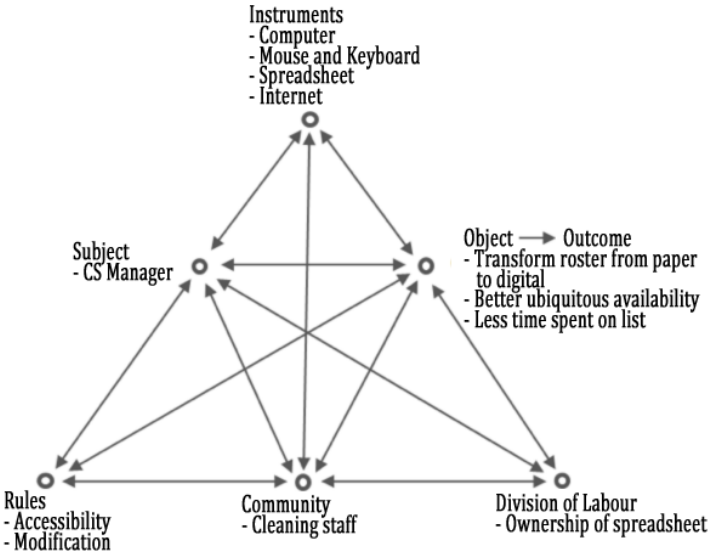

Figure 28: Activity system model, based on (Engeström 1987).

The new GD spreadsheet was, as earlier mentioned, developed after me showing how the system worked, and how they (potentially) could exploit much of this newfound technology, but eventually not used as initially thought. Some time after I left for Brazil in October, they implemented this new way of roster presentation in the hope that this would make the information more ubiquitously available. Still, when returning in January they had somewhat altered its use. Many of the cleaning staff is in their late fifties, early sixties, therefore having problems with the use of computers (i.e. the instruments guiding the object of process). What ended up being the result was that the ones actually knowing how to access the rosters online printed them out and made them available in the cafeteria. Any changes made online were therefore in the beginning not always changed on the physical one, creating some complications. After some time they therefore decided to having the online version available for the ones who found this easier, but also constantly update the one in the cafeteria when needed. Why such irregularities might occur is because everything built and implemented will affect all other related activities (Nardi and O`Day 1999), which is not always initially accounted for (Beyer and Holtzblatt 1998).

What could be seen here was that the new way of roster presentation was developed in-house by a relatively familiar tool (spreadsheet) and presented in another known tool namely the web browser. It can therefore be seen as an intrinsic practice transformation as such. For me presenting this opportunity and the one responsible for the roster implementing it, these two resources are common and easy to use. But the others also using it were not comfortable and happy with the change of practice. There had not been paid enough attention to the mental models of the community (employees) and how they do their work (Heath and Luff 1998), and what they felt comfortable with in terms of technology use, neither by me nor the writer of the list. These cognitive elements are personal, but are often shown to be shared within a group of people, especially if they have the same professional background, work experience and/or

regularly interaction (Orlikowski 1992). Often, if the technologies that they are faced with differ somewhat from the mental models that they possess, these tools can be considered inappropriate. Orlikowski (1992) mentions two points that affects how one can change the models of individuals, so that they will be able to understand and interact effectively with a novel tool; i) the kind and amount of product information communicated to them, and ii) the nature and form of training they receive on the product. Considering these elements, they were simply told that a new way of roster presentation was about to happen. She also explained them in some detail how the look of it was to be completely similar, only that it would be available online. They received some training with the one in charge showing them how they could enter the Google Docs sheet, and therefore be granted access to their working hours. Since neither one of these points were given sufficient attention, their existing technological frames saw no use (or at least a more difficult use) of deployment. Even though having problems with the usage, they came to a solution with having it available online, as well as printing it out. Them hanging it up also show how individuals deploy solutions to the difficulties that arise. In total it cannot be considered a total failure, as the writer no longer has to have two copies (one at the office and one at home), and the cleaning staff that actually use the computer for such use has the list readily available. Still, had more attentiveness been paid to the cleaning staff, and their technological frames, it might have turned out more successful.

7.3.2.6. Intrinsic practice transformation transforming availability

What is still interesting to see, also earlier mentioned, is that the actor using the technology, in this case the CS manager in charge of the list, carried out this practice transformation on her own. Why such a practice was seen as required, is because our technological landscape is dynamic and in constant evolvement, underlining the importance of mediating computational tools (Voida 2012). Still, no newfound technology per se had to be exploited, turning this into a gentle experience and effort.

> *"We believe that it is essential to play with technology, exploring different possibilities directly on hardware and software […]. Reusing existing technology is one of the best ways of tinkering. Getting cheap toys or old discarded equipment and hacking them to make them do something new is one of the best ways to get great results"* (Banzi 2008).

In this quote Banzi not only underlines the importance of appropriation, but also how seemingly "old" technologies can be modified into new areas of utilization. This is also something that is underlined by Kaptelinin and Bannon (2011), reflecting this view in its very title: "*Extending Interaction Design Beyond Product Innovation: Creating Technology-Enhanced Activity Spaces*". Not only do they wish, as with Banzi, to just modify singular products, they also desire to let workers themselves create their own activity spaces. Even though Weiser (1991) introduced the concept of ubiquitous computing twenty years ago, one can still see in this example that simple operations still were not supported by this paradigm in previous practice. After the change of

practice, the CS manager saved time; not only in how the list was written, but also in how it can be accessed (see Fig. 29). She is now encompassed with the roster, as it is interchangeably on multiple heterogeneous devices (Bødker and Klokmose 2011). Her activity space has been changed as the ubiquitous accessibility that it now permits allows the modification anytime anywhere as long as she has Internet and some sort of computational device present (this being a stationary computer, laptop, tablet, smartphone or the like). She has moved the availability away from the traditional paper presentation, breaking free from a localized tool in her office to rather using portable and mobile technological artifacts (according to the modalities of (Kristoffersen and Ljungberg 2000)). Her transformation has now led her to be more mobile, with the roster being embedded into tools surrounding her at a daily basis, not being limited to a paper version situated at three different locations.

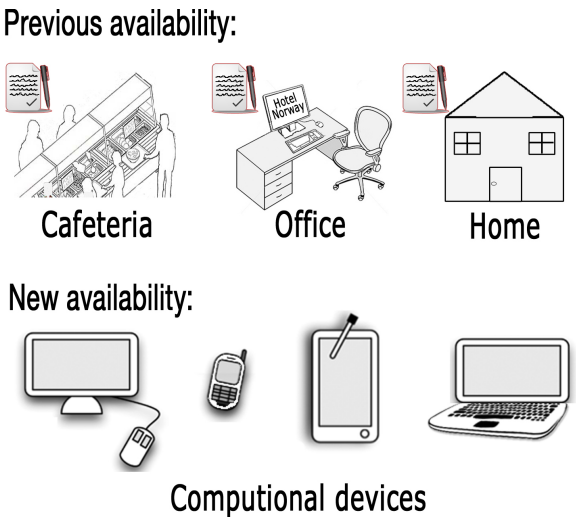

Figure 29: From previous to new roster availability

7.4. Solution: Hotel Interface?

After the introduction of the graphical user interface (GUI), developed at Xerox PARC in 1981, it changed the future regarding how personal computers and interactive systems should be designed (Johnson, Roberts et al. 1989). This also became an eye-opener for the everyday-user of a computer, as they easily were presented with the possibilities provided by such an artifact. Before the development of the GUI, computers were heavily reserved for expert users, as the novice individuals were seen as "idiots" due to their lack of programming, computational and technical skills (Bannon 1991). After, the options of the personal computer were more easily understandable and applicable, allowing novice users to exploit the rich opportunities of the personal computer as we know it. During this study it was interesting to see the need for such a "user interface", showing the interactive environment of the hotel. This could be an interface of some sort that possibly would act as a mediator, by more effectively revealing the potentials, affordances, technologies etc. that exist. This highly correlates with activity theory in how a computer should be a tool that the user acts *through* (Bødker and Klokmose 2011). Others have also noticed this fact, of using the computer as acting on other objects or with other subjects as a mediator, only that they revolved their concern around users within their own homes. They saw the need for the development of a "*flexible infrastructure that reduces the cost of introducing new devices and allows users to control and evolve their use within the home*" (Rodden, Crabtree et al. 2004). They further mention several infrastructures that address these issues, such as Jini (Waldo 1999), UpnP (Universal Plug and Play) and Cooltown (Cooltown), only that they are

meant for the developers, rather than the ones inhabiting the ubiquitous environment. What this basically means is that it promotes an extrinsic practice transformation, rather than an intrinsic. Instead of the developer exploiting this fact, it would me meaningful to let the technology users themselves address their issues and practical concerns. That is why Rodden, Crabtree et al. (2004) developed a tool that allowed the users to serve as designers, instead of engineers developing technologies that would seemingly meet the particular needs of an environment. Whomever the technology might affect could then be able to explore the options and tools that might be beneficial to their specific activity, or in my case the total activity spaces as a whole. Another important aspect noticed in their study showed that there was not necessarily need for any novel technologies to allow them to accomplish their meaningful goals, rather combining "old" technologies such as the TV or cellular phone, and allow them to interact together. Often appropriate instruments and systems are available, that possibly would enhance a specific activity, also being un-costly, or even free of charge. The problem is that everyday users simply do not always know where, and how to get a hold of them, and sometimes do not even know that they exist, explicitly proven in the example of the roster of cleaning staff as well as the practice transformation from fax to email at Hotel Norway. To be able to reveal the possibilities that are present would seem highly valuable. As the CS manager put it regarding the roster:

> "*I had never even heard of Google Docs, but it has made it easier for me to make and get access to the list" (translated).*

In this thesis it is not presented how such an interface or mediator actually could be developed and implemented, but could be subject to future work.

7.5. Cultural differences

Many studies e.g. (Yeo 1996; Marcus and Gould 2000; Marcus 2003; Walsh, Nurkka et al. 2010) have underlined the cultural aspects of globalization, how it affects user experience and how one has to take into consideration cultural characteristics when creating user interface design. This study will *not* go into depth regarding these issues, but will address some concerns. Due to the fact that this research was conducted in both Norway and Brazil, it is possible to think that cultural differences will be present, and that it can have consequences of some sort. When looking at the dissimilarities between the two countries it might be interesting to look at some features that might affect, and examples presenting, the ways individuals employ and use technology, how they solve problems, the reluctance/willingness of addressing issues to whomever in charge, how new artifacts and systems are chosen/not chosen, the awareness surrounding technology and so forth. It will attend to research question 1.3 and parts of 1.6.

7.5.1. Brazil vs. Norway – some cultural issues

In this section there will be provided some brief theory surrounding how values in the workplace are influenced by culture. It is based on a comprehensive study conducted by professor Geert Hofstede (2012).

One of the criterions he mentions is *Power distance*, which has some importance and relevance to this study as it depicts individuals' consensus surrounding power. It is defined as "*the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally*" (Hofstede 2012). What this basically signifies is whether employees accept that lower-rank individuals are not included or as much of a part in various decision processes, being both small and big.

According to Hofstede (2012), Norway has a low score on this dimension (31 out of 100), which means that the Norwegian style has characteristics such as equal rights, being independent and having a hierarchy for convenience only. Instead of power being solely controlled and executed by the higher rank members, it is rather decentralized where managers count on the experience of their team members; implicating that employees expect to be consulted in various decision-making matters. That control is concentrated among few individuals is disliked and the general attitude and approach towards managers are informal and on first name basis, creating a communication that is direct, participative and consensus orientated.

Norway and Brazil are equally far away from the mean (50), only at the opposite end of the scale. Brazil has a score of 69, which make them have a different view on how power should be dealt. They believe that hierarchy ought to be respected, and that subsequent levels of authority is tolerable; *ipso facto* that inequalities amongst people are acceptable. They agree upon that there is one head of the company (boss) who has the main responsibility, and to this person there should be communicated respect accordingly. Towards managers one does not necessarily approach on a first name basis, and as a direct result communication is often formal.

7.5.2. Willingness to address problems

As can be seen, Norway is a country that in general tends to have an organisational flat structure. What this basically means is that the division between actors such as the hotel manager and a hotel receptionist is not that obvious (this in terms of rank, not organisational tasks and duties of course). Conversations can therefore become more informal, and are carried out in a more relaxed manner. The organisational hierarchy in Brazil (also observed at the hotel in question) seems to be more influenced by a clear distribution of authority and rank, showing subsequent levels of power. In Brazil workers therefore tend to have a different approach to authority, and act in a more subservient manner. Issues are therefore sometimes reluctantly expressed due to this structural practice. Clear weaknesses or areas that visibly need some sort of change are not always articulated because they do not wish to identify flaws in their working environment, and/or receive reprimands. When discussing this with one of the receptionists, he pointed out:

"*If I see something is wrong, but is not that important, I do not always tell. I do not want them to think I did it*" (translated),

being related to both computers and other facilities in general, as it was not considered being in his line of work to point out errors. As a general experience, they were also often reluctant to suggest new technological tools, programs or the like (should they have some), this rather being the job and responsibility of the manager. This is clearly opposed to how workers in Norway address some of the same issues. Does one consider the new roster and the change of practice from fax to email in Hotel Norway; it was carried out on her own, without even consulting with or receiving approval from any of the management. The CS manager, not necessarily being considered a higher-rank member (according to Brazilian standards), still transformed her way of working resulting in a configuration of both practices and social interactions. Studies have shown (Lee and Lee 2007) that employees from western countries have a higher tendency to apply criticism and express problems compared to Asian countries. Whether or not this is applicable to Latin-American countries is hard to determine exactly, but it was clearly the case in this study performed. Westerners are known for being non-conformists, basically meaning that they do not simply adapt to a situation when they know problems exists. Rather, they will often find and criticize issues which they think are erroneous or lacking (Lee and Lee 2007). This might be related to ones attitude towards the environment and one's speech, but also a person's commitment to work. In Norway an affective commitment (Guzman, Joseph et al. 2007) was often noted, meaning that they stayed in their work because they wanted to and enjoyed their occupation. In Brazil on the other hand, this affective commitment is mixed with a continuance one. A continuance commitment means that they remain within the occupation and organization because they have to. Workers in Brazil do not have the same opportunities regarding the abundance of employment available, and they therefore often have to stay within a given profession due to other options not being that easily available. Considering these factors, it is understandable that they not that easily will direct criticism to certain products, situations or practices, especially are they considered sensitive. Other studies (Sambasivan, Cutrell et al. 2010) have shown, among other things, the extent to which technological artifacts are available to individuals in low-income communities, and how this affect how they are used. One would suspect that a high-income country such as Norway would be more ubiquitously surrounded by ICT (information and communications technology) in the comfort of their homes, work, educational centres and public venues. For example, every high-school student in Norway is given their own laptop when they start school, with additional courses aiding the facilitation of use. They are trained from a very early age to be able to exploit the richness that much of these technology-enhanced artifacts have to offer. In Brazil on the other hand "*there are public and private initiatives in the country to provide universal computer access, but most citizens still do not make full sense of the possibilities brought about by computers and the Internet*" (Souza, Baranauskas et al. 2008). One could therefore suspect that the general knowledge of what an interactive tool should be able to offer might be higher in Norway, due to the underlying awareness and understanding presented at an early age. This will then be carried into the

working life, and probably used as a way to evaluate certain aspect of a product. A survey conducted (Walsh, Nurkka et al. 2010) also showed that different actors from different countries (In this case USA, India, China, Denmark and UK) look very differently at the same technological artifact; a smartphone. The answers and statements differed among the countries, but were the same within the similar country. Culture affects how people perceive certain objects, but also their willingness to address problems.

7.5.2.1. Development of an Online Booking System (OBS)

Still, what has to be appreciated is that the employees (mainly receptionists) pointed out new functionality they wanted for the OBS used by receptionists in Brazil to enter bookings. The manager of the hotel had extensive talks with the staff as to what they needed in a system, that he took into consideration when developing it. After the implementation of the system he also made several changes to the system, once being noticed by staff. For example what type of information that should be entered, different options such as "need a baby bed", "need extra towels", a commentary field for how things should be invoiced etc. As he had no previous experience with running a hotel, and simply making the system, there where a lot of things he had not initially thought about, which the workers helped him reveal. That the employees actually noted what they needed in a system is probably due to them being active participants in the development, with the hotel manager asking them specifically to help with the development of tools and options to aid the process of their daily activities. Now they were able to be a part of creating something, an instrument helping some of their everyday actions, instead of noting flaws and shortcomings that potentially was not that easily fixable. This way of practice is unusual in countries with high power distance; therefore some aspects of this finding might deserve special attention. It was implemented four years ago, and none of the people working there then are still hired at the hotel. It was therefore not possible for me to ask staff about the implementation. The hotel manager though said that he had two days of extensive training, and that they were free to ask him whatever whenever if they had any problems after coaching. Since he had developed the system himself, he knew all about the configurations and potentials that it could provide. Not only did he say that staff reacted to this positively, he also himself got a good insight into what problems that existed, that he possibly could change and/or improve. A large survey conducted by (Ip, Leung et al. 2011) show that human resources being present for employees to receive guidance of use not only reforms ease of use, but might also strengthen perceived usefulness. These are in turn factors that affect important aspect surrounding hotel operation such as work performance, increased productivity and the completion of tasks rapidly. By him letting the employees know that he was accessible probably gave them a more relaxed sensation regarding the experience of receiving new processes and practices.

8. The introduction of new systems

This study will be contributory in understanding the problems that one part of the service industry might face by integrating interactive technologies. Hopefully it can reveal how both guests and employees are affected when diverse technologies not suited for the specific habitat are introduced (if they exist). It would be interesting to validate whether activity spaces are accounted for when introducing artifacts, or if it is neglected, not considered being a valid issue. This could become very helpful in understanding how the service industry (and possible others) can exploit the rich possibilities of various technologies in a manner most suitable for their specific purpose. The findings in this section are based on the interviews and observations of 11 participants during the course of three months. After a hotel merger in Norway some completely new systems were introduced that led to a lot of new activities and practices. The major ones are listed below. It will attend to research question 1.3 and 1.4.

8.1. The restaurant

This section will try to attend to the effects of certain technologies on human cognition from an activity theoretical perspective. It will take into account the following criteria:

> *"[It] would require identifying the variety of activities, as well as their respective objects within which the technologies are being employed (object-orientedness), the role and place of the technologies in the hierarchical structure of each of these activities (hierarchical structure), how the activities are being re-shaped by using the technologies as mediating means (mediation), and how transformations of external components of activity are related to corresponding changes of internal components (externalization and internalization). And all these phenomena should be analysed as they unfold over time (development)"* (Kaptelinin 2012).

After the change of owners, the restaurant has experienced extensive changes. Not only to how and what type of food that is served, suppliers they use, but most importantly how items are being ordered. Before, every order was done through telephone, where they found it easy to always get the right amount at the right time. They could also write down what items they needed, fax it, and receive the items the next day. Now they have to order through an online system, never used by either one of the employees, always at least two days in advance. As presented earlier, activity theory provides a canonical theoretical foundation to this study. One of the things it underlines is that individuals constantly are inflicted by changing conditions, which in turn will affect the outcome and realign the actuators of an activity (Nardi 1995a). These changing conditions sometimes arise due to small variations of work, but may also be a direct result of the change of practice. Consider the following example:

"... if one's mail program ceases to work, one continues to send mail by substituting another mailer, but it is now necessary to pay conscious attention to using an unfamiliar set of commands. Notice that here the object remains fixed, but goals, actions, and operations change as conditions change" (Nardi 1995a).

Let us look at how the ordering process at the hotel has changed:

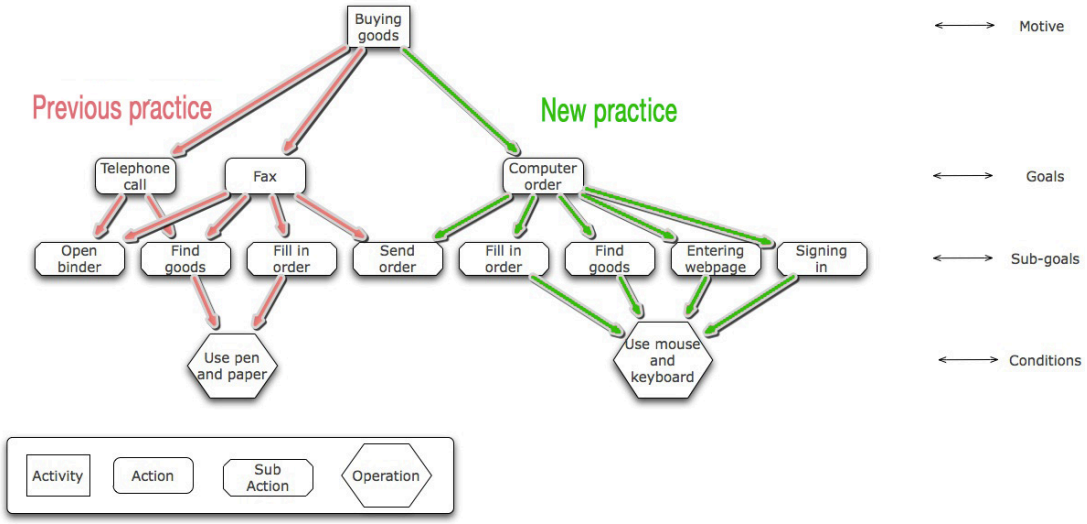

Figure 30: Hierarchical structure of activity - the ordering of goods

These are just some of the elements that are present in the activity of filling the inventory of the restaurant. One can clearly see that the object of this activity is the same, namely the ordering of goods (and receiving the correct amount at the right time), but actions, sub-actions and operations show to be extensively different. The re-shaping of activities is also so noticeable, that some training probably was appropriate in order to make this change of practice as efficient as possible. The person in charge of ordering was given one day of training, where she only watched how the system was used. She was not able to use it herself that day during training, and ask questions as she got along. No one else in the hotel knew how the new system worked, and she was therefore not able to ask anybody for help, just having to try and fail. This created some problems, for example using extensive time on simple orders, and them receiving the wrong amount of merchandize at the wrong time. This is probably cause-related due to the lack of training. One can see how this can cause problems, as opposed to the traning of the OBS system in Brazil, with not having human resources present for employees to receive guidance of use. Another problem is that studies, e.g. (Sambasivan, Cutrell et al. 2010), have notices that people normally ask individuals with the similar work tasks for help, rather than the ones being considered experts on the field. As nobody in her near proximity knew how to use the system, it created difficulties.

Most people would probably agree that the shift from using fax and telephone, to the use of online booking possibly is a step towards higher efficiency. Even myself would believe so. The

problem is that the person having to take on this newly structured responsibility is a person in her late 40s early 50s. The transformation of the external components did not comply with her internal components, therefore creating problems with the externalization and internalization of the process. She has been doing the same tasks for several years, and was content with her working conditions and duties. With the advent of this new practice and mediating tool several difficulties arose. First and foremost she did not see the need for the change, as the previous way of ordering according to her worked perfectly. Moreover, her computational skills was according to herself "limited", so not only did she have to spend time learning a new online booking system, but also some of the basic functions that involves computational use. As mentioned earlier, knowledge and skills on a given task will transform activities into something palpable giving meaning of some sort. With her having difficulties visualizing and utilizing the new booking system, created complications in using knowledge internally to impose semantics externally.
Further, after having to become somewhat acquainted and developing with the system she was still not too happy about the change:

"*It had so many functions that I did not need, and it really confused me*" (translated).

This portrays the new system as being *discontinuous* as it does not allow her to customize the functionality that she needs for her specific activity, it has rather a wide range of functionality that may serve for many contexes, not her *specific* one. The abstraction level of design solution can therefore easily be considered *generic*. Further, it is also *indirect* as the design of the booking system not affects their practice directly posterior to development, rather after they had deliberated and agreed upon its use. Finally it is bound to a single technology as it only can be used by the deployment of a computer. The extrinsic practice transformation that this technology easily reveals has shown a signifigant affect on the activity of ordering goods from their supplier. Before, she made a telephone call asking for exactly what she needed, and she got it the next day. Confusion with the new system led to them sometimes receiving the wrong amount of merchandise, such as one basket of grapes instead of one box with several baskets. Changing conditions can, according to activity theory, realign the constituents of an activity (Nardi 1995a), and the conditions and means by which they handle their activities get altered with the advent of new routines, set of commands and so forth. Even though the activity in itself, the ordering of goods, stayed the same after the new practice, the change of actions, sub actions and operations were so noticeable that it created difficulties. Since "*actions always take place as specific constellations of actions combined with a constellation of operations*" (Bødker and Klokmose 2011), one can see how this particular activity cause problems. As having limited experience with the use of computers in this manner, several operations that are normally considered unconscious by the everyday user for a computer, such as entering web pages and using the mouse and keyboard, were probably handled consciously. Therefore, many of her actions were moved up higher in the hierarchical structure of activity, attending to her operations intentionally, causing some strain of her activities that previously were done "automatically".

8.2. The reception

In the early phase of study (around August) I asked the receptionist staff some questions, mainly surrounding the advent of their new booking system, potentially routines etc. They believed that the transition was going to take place within two weeks, but this was still a bit uncertain and they knew minimally about the new system. They were told that they would receive two days of training along with an information meeting. All information had been generally lacking and hidden, most of it coming from the vice-president of the chain to the previous manager, and then forwarded to staff. The new system was going to be the same system as used by all other hotels within that chain, and once again it clearly shows tendencies of extrinsic practice transformation, as it is a COTS software, not for that specific environment and habitat. It is a *generic* one, since it has been applied to many different contexts, and not *specific* as it is not necessarily (time will tell) appropriate for their entire particular task at hand (Kaptelinin and Bannon 2011). As (Wild 2010a) emphasizes; "*Values are key aspect of scoping the other elements of a service system. The form of the service system can reflect the values held by its actants*", with values being presumed ideals that are worth striving for, and therefore represents preferences for ultimate end state (Pliskin, Romm et al. 1993). This is portrayed further by showing how different actors such as owners, staff and patrons have different values, and that comparing an expensive restaurant with a fast food joint without reference to values would seem pointless (Wild 2010a). This could be paralleled to the hotel getting a new system, and if values are being considered when they are receiving the same system as all the other hotels. How is this hotel compared to the values of the others in the same chain? Values of the ones working in an independent hotel for 5-10 years will probably be completely different to the ones being imposed by new routines. Especially since values not can be considered context free, that they are transformed through and influenced by actions within an environment. Consider a social system within any organisation, it is said to be "*a complex set of human relationships interacting with each other and with the outside world*", whereas a technical system is "*the infrastructure, processes and procedures of the organization*". Further you have a socio-technical system which is "*the integration of these systems where values are forged in the organization's daily decision making process*" (Pfohl 2006). To melt values into a system that not necessarily is developed for your own habitat can impose some difficulties, as the social system in some manner can conflict with the technical system, finally resulting in a socio-technical system not yielding all the benefits possible. Such a socio-technical system is highly important for the collaboration between various actors mediated by artifacts (Halverson 2002), and if working practice not is considered correctly, this can result in devastating and/or problematic outcomes (Orlikowski 1992; Pliskin, Romm et al. 1993; Bentley, Horstmann et al. 1997; Beyer and Holtzblatt 1998; Heath and Luff 1998; Suchman, Blomberg et al. 1999; Heath and Luff 2000). Orlikowski (1992) show how different elements such as mental models[5],

[5] Mental models is said to "play a central and unifying role in representing objects, states of affairs, sequences of events, the way the world is, and the social and psychological actions of daily life" Pliskin, N., T. Romm, et al. (1993). "Presumed

organizational structure and culture significantly influence the use of a groupware that is to be implemented. The system in her study was the well-known Lotus Notes, and was supposed to enhance and promote the collaboration between individuals. When individuals are interacting with other people, technological artifacts and the environment as a whole, they form

> "*internal, mental models of themselves and of the things with which they are interacting. These models provide predictive and explanatory power for understanding the interaction*" (Norman 1987).

Due to the fact that the employees did not wish to share information between colleagues, their mental models saw no appreciation and personal use of the system, therefore providing no incentive of its use. The organizational structure and culture was completely different from what the system could provide, and the implementation was therefore considered a total failure. This is a perfect example of how extrinsic practice transformation can go terribly wrong, even though the best intentions from both owners and designers. To often the developers themselves make assumptions about how they think users will use any system, often based on what they would like out of it or what the system could provide technically (Notess 2005), not considering in full depth the actual working activities. One could therefore imagine that an investigation of practice, culture and social structure of a given working environment always should be taken into consideration before implementing a system, which often is a problem with extrinsic practice transformation. Of course, it is not expected that by studying and observing these elements one can fully understand the organisational environment and every possible task or need (Dix 2007), still it should be paid careful attention. So how did the actual implementation turn out for the hotel in Norway?

8.2.1. System implementation

The actual system implementation was not executed until the middle of January. They had a three-days learning period held responsible by an outside person from the hotel chain. After some conversations with the receptionists, they did not seem overenthusiastic about the new system, and it is perfectly understandable that with the introduction of a new system there will be some sort of exertions. After the deployment of a tool for an extensive period of time, one will execute a performance that can be considered skilled. This implies that a person has the possibility to access their cognitive resources without imposing any excessive mental strain (Nardi 1995b), as they have gained experience and expertise on their given tasks. A novice on the

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Versus Actual Organizational Culture: Managerial Implications for Implementation of Information Systems." The Computer Journal **36**(2): 143-152.

other hand has to go to greater depths and deploy a more extensive conscious awareness in order attend to everyday tasks. As being mentioned before, an action first becomes an operation ones it is routinized, and no longer requires aware mental processing in order to be accomplished. This is because they have lesser cognitive resources available, that they will acquire once they get familiar and comfortable with the system at hand (Nardi 1995b). As consciousness is the product of an individual's interaction with people and artifacts in the context of everyday practical activity (Kaptelinin and Nardi 2006), the employees at Hotel Norway can therefore somewhat be considered novices with the introduction of the new system, and their cognitive abilities in the beginning somewhat limited. With them having to spend time and effort on actually getting to know the system, will probably result in other tasks being handled poorer. As one of the receptionists puts it:

> "*I felt like I did everything more efficiently before, as I did not have to think, I just did it. Now I even have to concentrate on which button to click*" (translated).

This was noted by the employees to be somewhat exaggerated, but it was simply to underline the fact that some effort had to be made.

It is also said that the more variation that exist in a team, considering mind sets, individual backgrounds etc., the chance of deploying novel tools and adapting to new situations increases (Carroll 2012). The receptionists seemed to have quite similar mind-sets regarding technologies, neither having a specific need for change. Upon the new system arrival, they were also equally displeased with the system, claiming it to bring fewer pros than cons. Being non-comformist, they rapidly pointed out errors or what they found lacking in the system. This seemingly shared mental model might have caused them collectively to use it less effectively than feasible. Further, Bødker and Klokmose (2011) provide an example of how old artifacts may influence how a new one is being employed. Their illustration is a tablet pc containing a map, as opposed to a tangible version in paper format. Due to learned handling or adaptive operational features of the paper format not being sufficiently implemented into the tablet pc, several difficulties arose, such as the measuring of distance (without elaborating on this further). Users become accustomed to certain tools after a period of deployment, and will often compare them to other tools in terms of their associated comparability. This was clearly seen at Hotel Norway, where they constantly were comparing the old system with the new, in terms of what it could provide.

8.2.2. Appropriation

Some studies have performed analysises´ that "*addresses the tension between users' goals in a given activity and their expectations toward technology, on one hand, and the assumptions of goals embodied in the artifact [...] on the other*" (Bødker and Klokmose 2011). My focus during this research was initially not to evaluate new technologies, but rather investigate how employees

use technologies that they are comfortable with, and used for a (extensive) period of time, relating to their familiarity with a given artifact. Still, when the new systems at Hotel Norway were introduced, it became highly interesting to evaluate what individuals expect from various tools. Often, these expectations were based on similar instruments that they had previously deployed, and the possibility these allowed. When discovering that the newly introduced tool not supported some of the functionality that they were used to, these problems needed to be addressed (research question 1.4).

Even though the new system in the reception was promised to the staff to be more in line with they way they did their work, some functionality with the newly implemented system seemed to be lacking according to employees´ preferences and needs. During observations I could see that several of the staff were creating a "booking" of a room, with no guests attached. It only had certain things that needed to be fixed, articles to be bought, tasks to be done and so forth. When asking what function this room served, they told it to be a central channel of communication between workers. In the old system this was a functionality included, which they used extensively, showing that the new system presented workflow incompatibilities. Now they created a room that does not exist physically within the hotel, but where they can simply see all messages, but also the shortcomings and lacking of the hotel noticed by staff, that needs attention. The fact that the new system not supported this function was not considered being a problem, even the new manager claiming to "*exploit the system to the fullest*" (translated). Since they had found a solution to a problem, they did not consider this to even be an issue, rather being proud of their accomplishment. And they had no reason not to be. This is a typical example of how individuals employ solutions to some of their problems, by using systems differently than intended, and how they use different workarounds to adapt to new work processes. This phenomenon is known as appropriation.

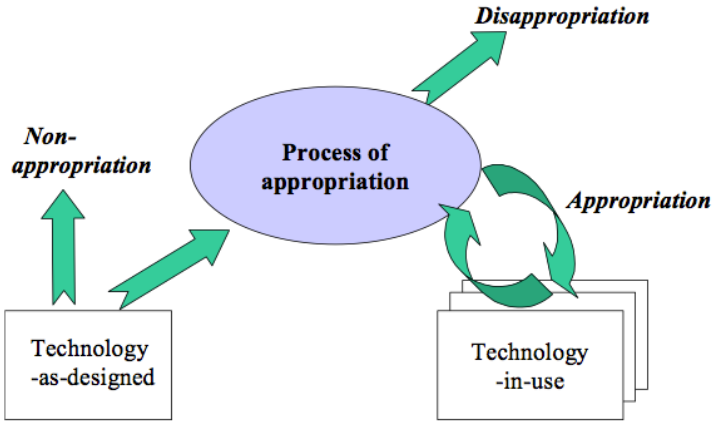

Figure 31: Technology Appropriation Model (Carroll, Howard et al. 2002)

Appropriation is a theme in ethnographies which has noticed that people often use systems and objects in manners not originally envisioned by the designer (Dix 2007). For example the use of e-mail is not solely used for its original purpose, to allow the distant communication between one, two or many individuals; now it is also used to send documents to one self and others, bookmarks etc., therefore acting as a storage of information. Often, users tend to search for

opportunities that allow them to extend the functionality already given in a particular tool as designed that they are accustomed to, rather than starting to learn a completely new tool, because switching costs normally are considered high (Grudin, Tallarico et al. 2005). Sometimes other solutions are not even present to allow them to perform a given task, and the investigation of possibilities is highly important. The process of appropriation then starts (see Fig. 31), to search for solutions to be deployed. This may either result in a disappropriation, where the new result is abandoned, or actual appropriation, where one extends the functionality of the technology in use. It is hard to believe that the developers had included this oxymoron in their development, to design for appropriation, i.e. design for the unexpected. Still, a solution was employed based on the ingeniousness of staff. Other studies e.g Park and Chen (2012) has also noticed this fact, only terming it as "the adaptation process". According to them such as process is highly necessary after a new system is implemented, and workers being met with a new technological system rollout, because technologies might have problems fitting directly with the user environment. One of the essential reasons for this is that user often are not a part of the original design process. This example therefore underlines how theories such as Participatory Design, End-user Development, meta-design and so forth might not be considered ideal solutions for employing interactive technologies into habitats, as they normally only includes the user at the beginning of the process, and neglects an adaption process to occur. Once again new methods within the area of HCI should be deliberated, as to support the execution of practice development initiated by users themselves.

9. Discussion

Previous work has been done, among them by Suchman (2007), to show that to study actual work practice is not only possible, but also fruitful. These types of studies have shown to have the possibility to impact conceptual matters in technological research, and for many it is even believed that to study cooperative work in the wild is a prerequisite to be able to develop computer technologies for human interaction (Schmidt, Wagner et al. 2009). This study did not have its mission to develop any new computer technologies *per se*, but will be contributory in portraying some of the problems and challenges that exist in the hotel industry related to technology and practices, but also the possibilities that potentially can enhance work-related activities. Throughout this study several findings were revelead, and some aspect deserves special attention.

1. The importance of Internet and how it allows various actors to attend to their goals in different activity spaces at Hotel Norway and Hotel Brazil respectively.
2. How the assemblies of artifacts and systems sometimes not are optimized to successfully achieve a common goal, due to being fragmented pieces with various capabilities and usability possibilities implemented by reason of ad hoc changes.

3. Cognitive and structural elements are important factors and implications when introducing new technology.
4. New conceptual foundations in HCI needs to be deliberated upon, as making individuals aware of tools and reflect upon their activities may potentially result in identifying useful technologies and alterations of practices in terms of intrinsic transformations.
5. One change of practice has an impact on the setting and other actuators as a whole.
6. Individuals´ personalities and attitudes toward technology have a significant correlation with people's willingness to deploy or actively look for new technologies.
7. Modifications in the ecology of artefacts will often occur in the alteration of practice.
8. Culture will often affect issues such as to address problems, suggest new technological tools and conform to new working practices.
9. Appropriation and an adaptation process will often appear after system implementation due to the lacking of the functionality provided and practice considered.
10. How the reliability and validity of the research hopefully was insured.

First, one is easily able to see that the most significant difference between Hotel Brazil and Hotel Norway is the formers lack of Internet in various technology-enhanced activity spaces. This provided some of the answers to research question 1.1, as guests not were properly supported in these activities, due to the limitations they were provided by the absence of Internet. Even though mostly tourists vacating, that do not necessarily have a deadline to catch associated with work-related matters, most had some difficulties with its absence. They were not allowed to access social media, read newspapers or access music services such as Spotify and Youtube. At certain times one even saw guests breaching what they considered proper etiquette, not to deploy technological artifacts while dining, due to the lacking of this technology. At Hotel Norway few tools were used during eating, as this time was rather used to relax. All Internet-related matters had been done in the hotel room beforehand, as to be able to enjoy their meal without any "disturbances". Also, when finding in Brazil that it is not offered, most say that they leave the hotel room quicker than what they would with Internet connection being present. What this basically means is that the activities performed by individuals are hindered due to the absence and the environmental lack of support of Internet connection in this activity space as not being enhanced properly by technology that is considered needed. One can contemplate whether this is something deliberately done by management, as guests will spend more time around the pool and restaurant area where they can buy food and beverages, without elaborating on this further. Still, the guests staying at Hotel Norway are in particular need of Internet, as it is used for work-related matters contra personal matters such as checking social media and the like. They therefore express a deeper need of this global system of interconnected computer networks. Still, what is seen with tourists vacating Hotel Norway during the weekends is that they use artifacts with Internet even though it is not related to work. Juxtaposed to Hotel Brazil, they are allowed to go online, and this possibility is frequently deployed. Further, the use of technological artifacts

is not only deployed differently by different actors and at different technology enhanced activity spaces, but also at the same places with a variation of time and situation. This was seen considering the use of laptops and cellular phones during check-in and checkout at Hotel Brazil. Two seemingly similar activities are considerably different compared to tool deployment. The intensity of resources and activities are therefore dissimilar because of their needs and preferences changing. This happens due to the setting in which they are situated, showing that it is not always the space in it self that hinders and/or encourages use, it is rather interchangeably in response to the context and conditions of use.

Second, redundancies of work are sometimes performed due to the bad (or lack of) linking between various artifacts, related to research questions 1.2 and parts of 1.1 and 1.6. As time goes by, several new demands arise that will involve the implementation of various new tools. These are often not linked, due to being ad hoc changes after various new necessities, and are seen as being quite similar across different cultures. One is able to see that receptionists in Hotel Norway are faced with the same redundancy of work as Hotel Brazil, due to systems not being interchangeably connected. They both have to attend to various sources of booking, such as their webpage, booking system of the chain, telephone, email, fax and drop-ins. At Hotel Brazil they also use man labour as a resolution to the issue of the systems in the reception, restaurant bar etc. not being properly connected, indicating that the TEAS do not support their working practice in this particular instance. One is to believe that the aspect of salary being considerably cheaper in this country, compared to others such as Norway, has some fault to blame. *Summa summarum*, the assemblies of artifacts and systems are not optimized to successfully achieve a common goal; they are rather developed and designed separately due to different needs. The cluster of systems and artifacts does not interoperate as effectively as one modular system designed for that specific habitat possibly could, as they are alterations made due to different new requirements. As opposed to a operating system of a personal computer, individuals working at the hotel are not able to create their own virtual workspace which can be adapted to how they structure or perform their activities (Kaptelinin 1996); rather they use fragmented pieces with various capabilities and usability possibilities. Systems that would more interchangeably interact might not only enhance practices and efficiency, but also the cost spent on each activity.

Third, cognitive and structural elements are important factors and implications when introducing new technology. It was therefore interesting to validate whether employees are enganged in any implementation process, if they face any problems with this introduction and their necessity for novel tools, as addressed in research questions 1.3, 1.4 and 1.5 respectively. Not only do these features affect the adoption, but also the understanding and early use of the technology (Orlikowski 1992). Throughout the study it was shown that mental models would affect how eager various individuals are on deploying new technologies. People are as noted earlier affected by the fear of change, and will also not always see the reason for new tools when the old ones are working (even though not optimally). The new system introduced at Hotel

Norway was for many of the employees considered forced upon them; they were not included in any part of the decision to change system, and the system implemented was the same as every other hotel of that chain has acquired. Wild (2010) mentions that an IT artifact or service that makes any transformation productively may still be considered a failure by the utilizer. One of the many factors for these criteria is over or under inclusion in decision-making, *prima facie* being a factor at this hotel. They felt that it in many ways did not comply with the way they work, and after many months of use they also considered the old system as undisguisedly superior. Having this point of view has probably elevated their disinclination of the system, and also affected their use, both in terms of efficiency and effectiveness. One of the main reasons why they disliked the new system was due to them being used with another system for many years. Their needs for new technologies are therefore not always considered high, are only their systems working (what they consider) properly. The new system therefore not taking into account how they previously did their work, created problems with its use. Not only did they have to do things differently, but it also lacked functionality that was extensively used by the old (discussed later considering appropriation). One can through this study therefore highly appreciate how practices should be considered with the introduction of new tools of some sort. Even though the system that was implemented in Hotel Norway was considered newer and better, the staff in general was not too happy with its arrival. The previous system was seen as superior, as it was complying better with the ways that actually do their work (or the ways they were used to). According to them they did not need any new technologies, as the old one was seen as adequate to their job. This said, they also mention things that are better with the new system juxtaposed with the old, still claiming this not to be enough. Before the merger they did not actively look for technologies, rather compared themselves with other hotels in the near proximity. They felt no compulsion of protruding in terms of technology, but they did not want to fall behind either. Now they no longer feel that they are that much in control, as with the arrival of the new chain, they are required to implement and use the systems that are expected of them. Before they felt more "special", being able to do things the way they wanted. Now, the employees feel that they do not decide their every practice and process in the same manner.

Fourth, many of the employees` awareness of technologies might in many cases be considered limited, as they do not actively look for new ones. Therefore, a use of several non-technical tools are often deployed, such as post-it notes, sheets of paper, pens, binders etc., being highly essential for a person to perform tasks effectively (Dix, Ramduny et al. 1998), but are supporting some activities that in theory should and/or could be undertaking by the more sophisticated tool; the computer (Heath and Luff 2000). Often the problem is that they do not know where to look, who to consult, or even which technologies that do exist that could possibly help them in improving their everyday activities. This study has therefore hopefully shown that workers´ access to guidance and tools can enhance practices in various ways, explicitly described in the Change of practice section. Often these instruments are un-costly or even free of charge, and can transform much of their everyday activities for the better. It is through this study possibility to

believe that the conceptual foundations of HCI not sufficiently aid in this process of transforming practice, being related to question 2.1. User-centered Design will not be suitable in the particular instances mentioned, as it involves the interference of designers in the entire process, which is not always necessary and optimal. Similarly, Participatory Design leaves no room for an adaptation process after final implementation. Often difficulties not envisioned by neither designers nor users will be apparent after final instalment, which often need to be approached in some manner. In PD one of the main objectives is to produce new design solutions, with innovative being of central importance, which through this study has been shown to not necessarily be utterly essential. This, together with the focus being on the designers and them aiding the users therefore serves the cause of extrinsic to a higher degree than intrinsic, something that to an extent is advised against in this study. Appropriation on the other hand emphasize the importance to search for opportunities that allows them to extend the functionality already given in a particular tool that they are accustomed to, seen with the email client, web browser and spreadsheet used by the practitioners. Are they executed by an intrinsic practice transformation, not only will the actors change their practices themselves, but also learn and transform the way they do their work in the manner they feel suitable, and develop from this effort. They will not be done due to what designers might consider important, but what they themselves find meaningful. Complying in many ways with the thought and implications of intrinsic practice transformation, appropriation can be considered highly interesting, but the problem is that it is a theory rather than a methodology for how users can alter their practices effectively. According to this study it is therefore seen as important and necessary to develop effective and efficient strategies for helping practitioners reflect upon their practices and identify potentially useful technologies. Further, during this study I helped reflect upon some changes that could be made, and the technological solutions that could be deployed, but the CS Manager herself devised the specific transformation. In result, her activity spaces has been changed as the ubiquitous accessibility that it now permits allows the modification anytime anywhere as long as she has Internet and some sort of computational device present. Her transformation has now led her to be more mobile, with the roster being embedded into tools surrounding her at a daily basis, not being limited to a paper version situated at three different locations. The particular strategies of appropriating the technologies and utilizing its use by the practitioner underline the importance of supporting intrinsic practice transformation. These findings also point to the value of letting employees reflect upon their practices, and therefore potentially identify useful technologies and alterations of practices. It is to believe that the conceptual foundations of HCI should further elaborate around this aspect, and provide guidance in analysis, evaluation, and technological support identifying how users themselves can serve as their own designers for their environments. Methods and tools for how they can benefit from the technologies that exist should be developed, so that users can express their requirements, find and explore "*available and promising interactive artifacts, their affordances, strengths, limitations, and compatibility*" (Kaptelinin and Bannon 2011). They might then be able to implement optimal solutions for how

they can deploy various (easily implemented) known technological solutions into their everyday practice.

Fifth, it might seem expedient to let workers themselves create better environments for their activies by providing them with tools, as mentioned in research question 2. It was interesting to provide the CS manager with the tool Google Docs to change they way the roster was written and provided to the cleaning staff, and also to discuss with her the possibilities of altering the way of receiving fax correspondences. In both cases it had effects on the setting of some sort due to her own change of practice, for example in the reconfiguration of social interactions between the practitioner and other people. This is something that also was explicitly indicated in the Human Activity System by Engeström (1987), showing that a subject's realisation of an object involves other parts of the community being affected, therefore other practices and social interactions being altered with the introduction of new tools (research question 2.2). In the instance of GD some complications occurred due to the mental models of cleaning staff not being considered properly, and them having problems with learning its use. According to activity theory, learning is not only related to how well individuals adapt to the tools that are introduced, rather how the collective practice in which they are embedded develops in either small or large transitions (Bødker and Klokmose 2011). Cognitive mental processing and implicit knowledge that each worker in some degree possesses is by mediating artifacts transformed into explicit and documented knowledge. But since the leap was for many of the employees considered to high, and the contradictions to previous practice conflicting with the internal processes, it created some difficulties. Still, after an adaptation process of its use, they came to an agreement that worked for all parts, and was considered more effective. In the case of the change from fax to email, new tools were deployed that transformed both the formal and informal communication with colleagues. This affected the social aspect, in her no longer being able to have impromptu conversations with her co-workers while receiving faxes. Not having a printer present on her floor still demanded her to move to the 1st floor to print out the occasional paper, which helped with this alteration of social interaction. One cannot simply assume that human beings wish to optimise their processes on all expense; other factors such as social interaction often play a significant role that needs to be evaluated and considered.

Sixth, the evidence from this study suggests that practitioners' personalities and attitudes toward technology and change can be a key factor in practice transformation. This is related to research question 1.5, and reveals that various individuals share a different view surrounding the necessity for novel tools. Some individuals tend to apply solutions to ad hoc problems, that are not necessarily needed or demanded of them, but that still can optimize their practices. These types of supra-situational activities can be significant for a person in transcending her/his requirements. What is also seen is that individuals will need some sort of technology skills, but often this does not need to surpass the ordinary. Well-known tools such as the web browser,

spreadsheets and email client were common and simple tools aiding in the transformation and improvement of various practices.

Seventh, considering the ecologies of artifacts (Bødker and Klokmose 2011), several changes were observed. In the case of the new roster, a paper list with the use of pen and paper became extinct, while the use of spreadsheet, mouse and keyboard on a computer prospered. In the case from fax to email the fax machine was replaced by the digital exchange of messages through the use of an email client. In the former, a new tool was introduced into the ecology, namely a Google Doc-based roster, while in the latter one could see a re-positioning of an already existing artifact, namely the computer. In these two examples one could therefore both see a transformation and a reconfiguration of the artifact ecology being executed successfully by the practitioners themselves.

Eighth, the implementation of the new systems in Hotel Norway resulted in the change of several practices throughout the hotel, being one of the concerns in research question 1.4. In this research the main focus on this matter was directed towards the restaurant and reception. The new online ordering system for the former lead to changing conditions, which in turn affected the outcome and realigned the actuators of the activity. This re-shaping of activities made her external components not comply with her internal components, therefore creating problems with the externalization and internalization of the process. Even though the activity in itself, the ordering of goods, stayed the same after the new practice, the change of actions, sub actions and operations were so noticeable that it created difficulties. Had sufficient training and consideration to the previous working practice been paid more attention, the transition might have shown more effective. Further, values in the workplace are as mentioned earlier highly influenced by culture, and it was therefore interesting to see how culture might affect issues such as to address problems, suggest new technological tools and conform to new working practices, as mentioned in research question 1.6. Often workers in Brazil do not wish to point out errors, as a slight fear of getting accused for any shortcomings, identified by one of the receptionists earlier in the thesis. To propose new tools is also not seen as being a part of their working responsibilities, hence it is rarely done. When a new system or new practices actually are implemented, Brazilians tend to be conformists, adapting to a situation even though they know problems might exists. Considering the new system implementation in the reception in Hotel Norway, one may therefore suspect that the difference in *power distance* (Hofstede 2012) would possibly result in another appreciation and/or deployment of a new system in Hotel Brazil. As they believe that it is the head of the company that has the main responsibility in most decision-making processes, they would probably in a lesser degree try to find errors and shortcomings in a new system, rather consider it a tool enhancing practice. It would be interesting to further elaborate whether they reckon a system more efficient, and therefore utilizing more of its use, yet this might be subject to future work.

Ninth, designers often tend to envision their systems as being directly implementable after being finalized. What has been seen in this study, and also others e.g. (Park and Chen 2012), is that an adaptation and end-user process often appears, addressing research question 1.4. During an adaptation process several issues might arise that does not conform to how they previously did their work, or how they wish to do their work. Aspects might therefore be appropriated through their system-in-use and its organizational context and practice. This was seen in the reception of Hotel Norway, were they had to adapt to a central channel of communication between colleagues lacking from the new system. Even though appropriation hardly can be seen as anything but positive, it is still deployed due to the lacking of opportunities in the already existing system. One can suspect that the extrinsic practice development may have some fault to blame, given that actual working activities not always are considered correctly (Bannon 1991). Had the practice of the hotel been investigated thoroughly, and a system being developed and implemented accordingly, this appropriation would be seen unnecessary. Of course, one cannot include every little detail and aspect, yet the consideration of a habitat will probably yield results more closely to how the workers actually organize their work. Further, it is shown that things have a tendency to dictate to a child what he or she must do: a door has a physical structure demanding it to be opened and closed, a staircase allows the child to run up and down, a bell has an outward facing appearance allowing it to be pressed and rung, still, in play the child often creates the structure and meaning of an object (Vygotsky 1978). Consider a child having nothing to play with but a twig. This physical object can be transformed into whatever the child sees suitable, for example a rocket engine or a human being, only hindered by its imagination. In the same manner will adults impose semantics to an object based on a situation or the things` area of utilization. A piece of paper can be considered a surface for inscription ones it is situated in an office. Still, when it is brought on a camping trip it can be used for kindling, and should therefore also be considered as such. Similarly, a screwdriver is typically used for handwork purposes, often when wanting to fasten a screw. But it can also be used as a tin can opener, are no other tools available. In the case of the receptionists, they used a booking of a hotel room, which for the designers had one purpose; to enter booking details, to a communicative tool used to reveal and display information that needed to be shared. One tool or resource can have several applicability possibilities and connotations attached, showing that one cannot determine its specific meaning and area of utilization. This not only dictates the importance of appropriation, but also the fact that environments in constant transformation are in need of new possibilities.

Tenth, the external and internal validity of my research was (hopefully) assured by selecting the methods and approaches relevant to the research questions, so that the problem at hand was answered in the best possible manner. Regarding interviews I, as mentioned, used a contextual inquiry as a basis. Following this guide step by step would expectantly assure the retrieval of pertinent information. This approach, and many of the same interview questions, was used at both cases to try to ensure the internal validity; the generalizability of the research between the two cases. This because the measurement methods during the course of study has stayed the

same, that hopefully has assured the variable of instrumentation. Further, the fact that I knew the managers at both hotels beforehand could raise questions regarding my validity and reliability in this study. This could also be correlated with whether or not they are randomly selected and therefore results not being applicable to other instances. As the hotels selected in both Norway and Brazil can be seen as typical, it can be assumed to be generalizable for other cases (although some problems surrounding this was noted earlier), and therefore represent the characteristics of the population. Also, there is reason to believe that knowing the managers will not have had any strong affect due to the study not in any way was supposed to uncover flaws and displaying them as negative aspects, rather to investigate how processes are being done. The results derived have therefore not been subject to "censorship" and alteration, as the findings would rather result in helpful and constructive suggestions, which they have claimed to benefit from. Also, keeping in mind the problems and challenges mentioned early in the thesis, such as having an understanding of subjects interview and observed, has hopefully insured reliability. By doing so the research has hopefully been presuppositionless, therefore eliminating bias and increasing the truthfulness of the study regarding the social phenomenon investigated. By using several methods, such as interviews, observations and recordings has optimistically assured more valid and reliable constructions of everyday practice. Finally, reactivity consequences such as the Hawthorne Effect (Adair 1984), with employees modifying their behavior due to being observed, has also possibly been prevented. This is because they always interacted in their natural setting considering physical structures and social norms of the surroundings. This research conducted formative experiments where I observered the developmental changes and was a active participator in the everyday life of the participants, and during the course of study they got accustomed to my presence, therefore claiming not to be affected by my stay.

10. Conclusion

In this work place study I investigated through an ethnographic research how various employees at two different hotels are supported by different technologies provided in their activity spaces. At Hotel Norway it was paid specific attention to the implementation of new systems in their work practice, and how this implicates several aspects of practice. One could see that many employees were not too happy with its advent, due to traning, technological expertise and mental models not being sufficiently considered. It was also investigated how users themselves can be provided with proper tools and contemplate on their work-related activities in order to transform certain parts of work effectively. The CS manager was provided with Google Docs, acting as a mediating tool changing the way the roster was written. The transformation was made exclusively by the user her self, and the overall outcome was considered successful (even though some issues were noted). The realignment of an already exisisting tool, the email client, allowed her to more effectively receive correspondances from suppliers and other relevant actors. Even though considered successful, features such as the social aspect played a role in how

surrounding practices were handled. At Hotel Brazil it was paid more attention to cultural differences, and how this affects various aspects of technology use. They tend to in a higher agree conform to new working practices, and not automatically focus on errors or lackings within the system. The lack of Internet in certain areas also created some problems, as actors were not always able to accomplish their meaningful goals effectively (or at all). It was also seen how the poor linking of various systems, such as the ones in the reception, bar and restaurant, often created redundancies or unneccesarily amounts of work. Still, due to man labour being considerably cheaper than in Norway, this was not seen as an issue. The findings in this research suggest that environments and practices should be paid cautious attention when implementing new technologies, but also that consideration should be directed at developing conceptual tools aiding the users in transforming their practices intrinsically. The conceptual foundations of HCI can be considered limited in providing users with the proper support of discovering and utilizing tools that can enhance their work-related activities. By bearing in mind and maintaining such a shift of innovation to users can show to be highly successful, as it gets easier for users to get precisely what they want by designing for their own activities and needs.

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13. Attachments

13.1. Roles in time and space – Hotel Brazil

In the following figure, a simplified overview of Hotel Brazil is presented to give a feel of the environment described. Underneath the figure is a description of each area and technology attached.

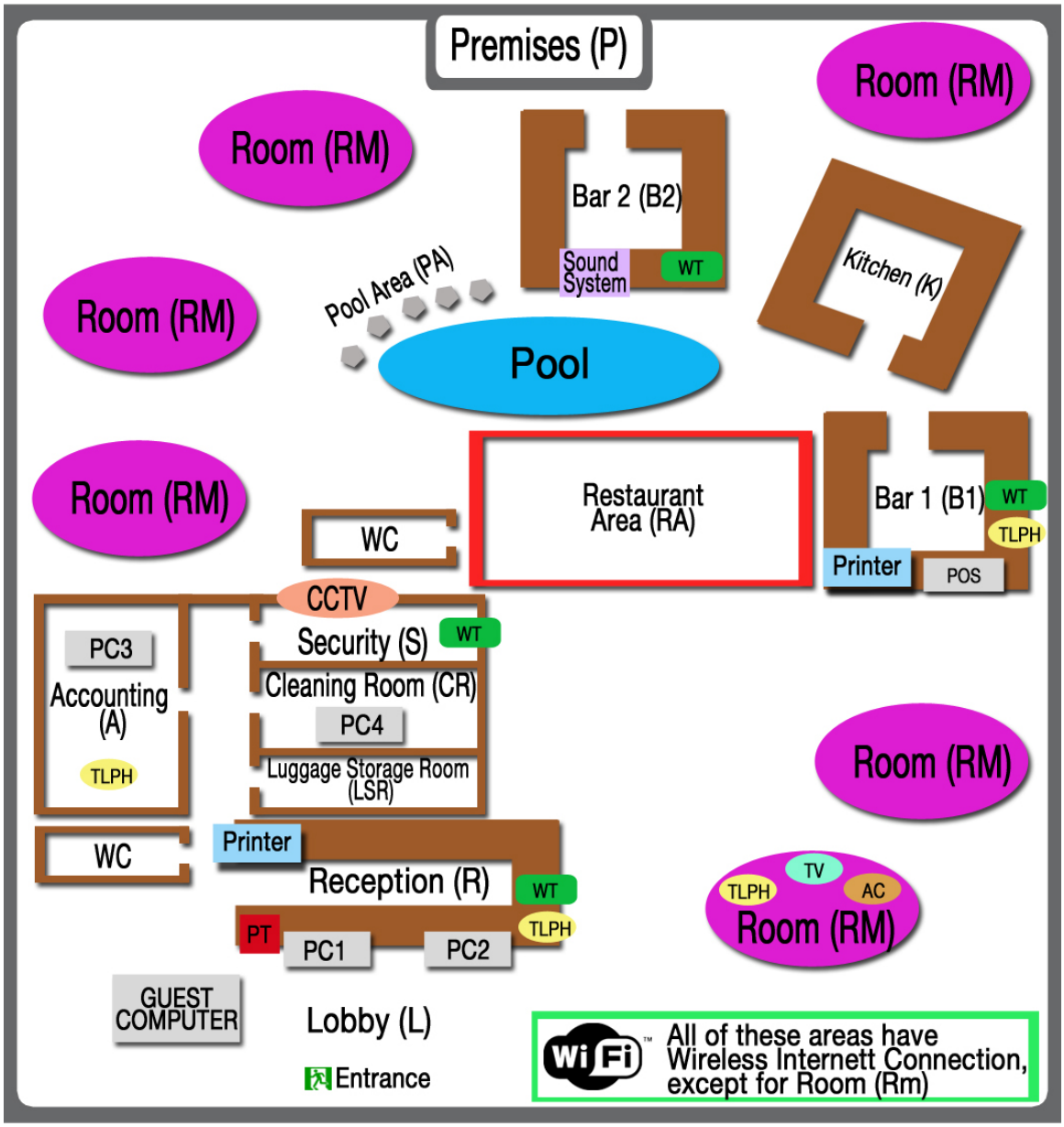


Figure 32: A simplified overview of Hotel Brazil

Areas:

Reception (R): From 00:00 - 08:00 there is one person present. The rest of the time there are two individuals managing the reception.

Lobby (L): Is entered either through the Entrance or Premises (P)

WC: Toilets

Accounting (A): Has an accountant working from 08:00 - 16:00 Monday to Friday

Security (S): Has one security guard present at this room, as well as various at Premises (P) at all times.

Cleaning Room (CR): Head of cleaning ladies is present during the morning to hand out cleaning lists to the rest of the cleaning staff.

Luggage Storage Room (LSR): Guests that check out early, and leave in the afternoon are allowed to store their luggage before leaving

Room (RM): A hotel room. Can be everything from an apartment of 29m² to 153m². There are more than displayed in the model; this is just a simplified figure.

Restaurant Area (RA): Where guests are seated for drinks and beverages etc.

Bar 1 (B1): Has a staff of 9 individuals working from 06:00 - 23:00 at different shifts.

Kitchen (K): Has a staff of 6 individuals working from 06:00 - 23:00 at different shifts.

Bar 2 (B2): Has a staff of 2 individuals working from 11:00 - 23:00 at different shifts.

Pool Area (PA): Area with sunbeds where guests can relax around the pool

Premises (P): The total area of Hotel Brazil

^: Outside of hotel premises

Technology:

Guest computer: Stationary computer in Lobby with Internet connection

PC1 and PC2: Stationary computers with COTS software for booking etc. Has Internet connection

PC3: Stationary computer used by Accountant. Has Internet connection

PC4: Stationary computer used by cleaning staff. Has Internet connection

POS: Point of Sale system used to enter food and beverage orders. Has Internet connection

PT: Payment terminal used to make payments with credit cards.

WT: Walkie Talkie

TV: Television

AC: Air condition

Wi-Fi: the exchange of data wirelessly over a network (Internet)

TLPH: Telephone

Role \ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in						L	L	L	L	L	L					
Unpacking						RM	RM	RM	RM	RM	RM					
Pool area						PA	PA	PA	PA	PA	PA					
Eating								RA	RA		RA					
Changing												RM	RM	RM		
Going out													^	^	^	
Sleeping	RM	RM													RM	RM
Guest (departing)																
Waking up, packing etc.		RM	RM	RM												
Breakfast		RA	RA	RA	RA											
Checking out				L	L	L										
Picking luggage											LSR	LSR	LSR	LSR		
Reception																
Receptionist shift 1	R	R														R
Receptionist shift 2			R	R	R	R	R	R	R	R						
Receptionist shift 3											R	R	R	R	R	
Cleaning personnel																
Receive list		CR	CR													
Find rooms			P	P	P	P	P	P	P							
Clean rooms			RM	RM	RM	RM	RM	RM	RM							
Update list										CR						
Restaurant																
Restaurant shift 1	RA/B1	RA/B1	RA/B1	RA/B1	RA/B1	RA/B1										
Restaurant shift 2							RA/B1	RA/B1	RA/B1	RA/B1	RA/B1	RA/B1				
Restaurant shift 3													RA/B1	RA/B1	RA/B1	
Kitchen																
Kitchen shift 1	K	K	K	K	K	K										
Kitchen shift 2							K	K	K	K	K	K				
Kitchen shift 3													K	K	K	
Bar 2																
Bar shift 1						B2	B2	B2	B2	B2	B2					
Bar shift 2												B2	B2	B2	B2	
Security																
Security shift 1	P/S	P/S	P/S													
Security shift 2				P/S	P/S	P/S	P/S	P/S	P/S	P/S	P/S					
Security shift 3												P/S	P/S	P/S	P/S	P/S

Use of resources*

- Very high
- High
- Medium
- Low
- Very Low

* Resources being technological artefacts. It is not necessarily related to number of resources used, but to which extent

Figure 33: The extent to which each role deploys various technological resources at both time and space

All these notes are based on extensive observations and interviews with various actors that were seen as important and relevant to the research, such as guests and several employees with different occupations at the hotel. It displays the average of different sequences shown by

various actors in both time and space.

Guest arriving

Check in

The most normal check-in hours for guests arriving at Hotel Brazil are between 11:00 and 16:00 in the hotel lobby. Of course, people tend to check in both before and after these hours, but based on the average these hours are seen as the most valid to include in the model. Based on various observations it is seen that guests hardly tend to use technologies while checking in. At most they might check their cellphones for booking details or make phone calls. This is still so non-frequently used, that in general the use of technological artifacts is seen as "Very Low".

Unpacking

What guests do while unpacking has not been observed, since most people tend to have a(n) (understandable) negative attitude towards someone unknown entering their hotel room. Still, questions have been asked and interviews performed to get a slight insight into this activity. What has been noted here is that guests unpacking often will try to see if there is Internet, either by the use of their laptop or cellular phone. Often they have had a long trip, and want to relax for some time with either reading an online newspaper or listening to some music (this varies from Spotify to YouTube). When finding that this is not offered, most say that they leave the hotel room quicker than what they would with Internet connection being present. What this basically means is that the activities performed by individuals are hindered due to the absence and the environmental lack of support of Internet connection in this space. The result is a Low usage of technological artifacts.

Pool area

Guests that do not go to the pool area normally head for the beach immediately. The beach is not included in the model, as I have no possibility to observe their use of technological resources, and also that this is outside of the hotel premises.

In the pool area guests go to relax on the various sun beds and chairs situated.

Figure 34: Pool area

Here Internet connection is present, so the use of technological artifacts such as laptop, digital tablets and cellular phones are more frequently deployed. Based on observations, one was able to see that the most frequent use of artifacts was between 11:00 - 13:00 and 15:00 - 17:00. This is believed to be the case due to the majority of guests attending the restaurant between 13:00 - 15:00. In that way, a guest could "*check my email and Facebook before I eat, and also some time after, not worrying about this while dining*" (translated). That the wireless Internet is close to the pool, and the laptop therefore so close to the water did not seem to bother any guests. There is also a lot of sun and lack of power outlets as one should not have high voltage close to water, and one can therefore discuss whether or not the is the most appropriate place. Due to the environmental conditions one would say it probably is not, but it is still the place where there is frequently most people. One is to suspect that due to the presence of Internet, the use of resources has risen from Very Low and Low to Medium.

Eating

When consuming food, a majority of guests are situated in the restaurant area. While eating, most guests are rarely seen using any resources. These are often left by the sun beds or brought in a backpack by their side. After asking guests the reason for this lack of use, they often mentioned the importance of etiquette while eating. For many it was considered rude to bring any technological artifacts to the table, as this was a place to relax and eat, not deploy these

instruments, especially considering that they were on holiday. It is therefore to be noticed that various individuals do not always relate to how the environment support various activities and technology use, but to morals and understanding of etiquette.

Changing

The activities of getting ready to go out (out here mostly referring to the city center and surrounding areas) are normally done in the hotel room. Once again guests are mentioning that due to the lack of Internet connection various technological instruments are less frequently employed. This due to not being able to read any online newspapers, receive emails and watch YouTube videos etc. Men seems most bothered by this, pointing out that they spend half the time getting ready. Like one of the guests said: "*I always have to wait at least half an hour for my wife to get ready. It would be nice with some distraction instead of getting annoyed*", saying this with a smile, referring to being able to surf the Internet. Guests will still often turn on the television or their brought sound system to play music (the last with the use of either a laptop, digital tablet, mp3-player or the like). Another couple did not have any music except for Spotify on their laptop computer. This was not the premium version, therefore not allowing them to play offline. That the rooms did not have any Internet connection therefore did not allow them to play music while staying at the hotel room. And on the television they only played "*traditional Brazilian music, which I am not a big fan of yet*". This was a source of irritation and a big disappointment. For others it was not particularly troublesome that the rooms did not have any wireless internet access, saying that "*the little work I actually do often just involves reading emails; this I can do on my cell phone while relaxing at the pool*" (translated). Further, another guest mentioned: "*even the use of Facebook on holiday is troublesome, as it involves me thinking*", here also with a smile.
The combined use of technological artifacts is therefore set to Low, as it generally is minimally used.

Some additional comments

Pool area, Eat, Changing and Going out can also be applicable to guests having stayed at the hotel for some while, not only arriving. It is also to be noted that the sequence of arriving at the hotel varies depending upon the hour and the day that the guest actually arrives:

Sequence 1

The most normal sequence for people checking in before approximately 13:30:
Arrive – check in – receive key – find and enter room – unpack – go to pool or beach (the most early arrivals more frequently leave for the beach) – go to room – leave for city center
But this sequence also varies a bit between weekdays (especially Monday to Wednesday/Thursday) and weekends. In the weekdays they usually tend to relax more around the pool on the sun beds. In the weekends the consummation of alcohol is higher, and the movement between the pool area and the bar/restaurant is therefore bigger.

Sequence 2

People arriving between approx. 13:30 and 16:30 will often go to the city center or relax around pool (the earliest arriving will still head for the beach). When asking why this is so, they normally say that when it is past 15:00-16:00 it is no use to go to the beach as it is too late, but that they sometimes can exploit the little sun that is left by the sunbeds.

Arrive – check in – receive key – find and enter room – unpack – go to pool or city center (some head for the beach) – return to room – leave for city center

Sequence 3

Individuals arriving between 16:30 and 18:30 will most often directly go to the city center. They mention that because the sun will set very soon (around 17:30), it is better to spend some hours in the street, before returning to the hotel and get ready to eat dinner.

Arrive – check in – receive key – find and enter room – unpack – go to city center - return to room – leave for city center

Sequence 4

The last sequence is guests arriving later than 18:30. They will often spend some time in their hotel room, getting ready to go out and eat dinner.

Arrive – check in – receive key – find and enter room – unpack – spend some time in room - go to city center

Going out

This involves visitants exiting the premises of the hotel, and will therefore not be included in the analysis of resource use.

Sleeping

Why sleeping has been added, when there seemingly is no use of resources, is because the air condition always is on while being asleep. The deployment of technology is still set to Very Low, as this is (normally) the only thing utilized, and turned on with a single click.

Guest departing

Waking up, packing etc.

When guests wake up, pack their bags (often a lot of the packaging has been done the night before) and so forth, they spend some time in their hotel room to get ready. This can be correlated to the Unpacking and Changing described earlier. Still, even less resources are here being used, as they rapidly get ready to eat breakfast. Normally a minimal of time is spent before heading for the restaurant area, and the general deployment of artifacts is set to Very Low.

Breakfast

The breakfast is also served in the restaurant area from 07:00 – 11:00. All of these hours are seen as equal, due to the variation between weekdays and the weekend. People tend to eat earlier during weekdays, as people tend to go out drinking in the weekend, and an average is therefore set from the beginning to the end.

As previously noted during Eating, individuals dislike others use of technological instruments while dining, as it is seen as a breach of etiquette. Still, a high percentage of the guests around the breakfast table bring some sort of artifacts, either this is a laptop or cellular phone. When asking guests why this is so, they often reply that it is due to them not being able to be online for a while, therefore wanting to check emails, social media and the like. The use of resources therefore jumps from Very Low to medium, and one can easily, based on the comments of guests, relate this to the opportunities that different environments provide regarding the use of artifacts. Laptops, cellular phones, digital tablets and the like can just as easily be deployed in their hotel room, and one would suspect much more comfortable. Still, due to them not being able to be online at these spaces, bring their instruments while eating, which earlier was seen as a breach of etiquette.

Some additional comments

Breakfast can also be applicable to guests having stayed at the hotel for some while, not only departing. This, together with Pool area, Eating, Changing, Going out and Sleeping from Guest arriving, can be seen as an activity sequence for visitants staying at the hotel.

Checking out

The check out is always performed in the lobby between hotel guests and receptionists, and most frequently executed between 09:00 and 12:00.

Figure 35: Hotel reception

Normally one representative of the guests handles the check out (as the entire sum of food and beverages from the restaurant etc. is gathered on one bill). What is generally observed, is that the rest of the entourage tend to relax in one of the various sitting groups situated in the lobby, often employing some sort of technology, most frequently cellular phones or a laptop (as also seen in Figure X). The individual in charge of the check out also often use a payment terminal, as this is the most normal manner of defraying the bill. In comparison to the check in, the use of resources jumps from Very Low to Medium, in the same area performing somewhat the same actions. Some guests explain this by noticing that when they arrive at the hotel, they are eager at getting to the hotel room, pool, beach and the like. When checking out they normally are waiting to go back home, and are often not in that much of a hurry. So the use of various technological artifacts is not only deployed differently at different technology enhanced activity spaces, but also at the same places with a variation of time and situation. The intensity of resources and activities are therefore different because of their needs and preferences changing. This happens due to the setting in which they are situated, showing that it is not always the space in it self that hinders or encourages use.

Picking luggage

As 12:00 is the latest one is allowed to check out, and guests tend to leave for their next destination posterior to this hour, the hotel offers a storage room for luggage. Guests that take

advantage of this service collect their baggage some hours later, most often between 16:00 and 20:00. There is no system, either paper written or computational that has an overview over which suitcase that belongs to which person, they are simply picked up. In the storage room for luggage, there has not yet been observed any use of technological artifacts, and the use of resources is therefore set to Very Low (and could be seen as absent). Internet is present at this location, but due to the action that is taking place (picking luggage), the time it takes (approximately 1 minute) and the size of the room (2x1 meters), the use of any resources in this activity space are not seen as necessary.

Reception

Receptionist shift 1

In the time between 00:00 – 08:00 there is only one receptionist present at the desk. The reason for this is that these hours in general involve the least amount of activities related to visitants. From 00:00 – 08:00 the use of resources is set to Very Low. Activities that are done with guest handling often involve handing out keys to individuals throughout the night as they return from the city center. Emails and the like are also seldom received and/or answered at night. Still, the stationary computer is used for other (often personal) matters, such as checking social media, reading online newspapers and so forth.

Receptionist shift 2

This is probably the work sequence that is most interesting considering how the use of resources differ throughout various stages of the day. From 08:00 – 09:00 the use of resources increase to Low, as you have the occasional check in or check out, therefore involving a slight higher use of the booking system, payment terminals etc. compared to the hours before. Between 09:00 and 11:00 there is an incremental group of people checking out, but also some starting to check in. The deployment of various instruments will therefore naturally increase from Low to Medium to High. In the hours between 11:00 and 12:00 a Very High use of technology can be seen. This is related to often having a lot of guests checking in and checking out in this space of time. They also attend to other matter such as booking confirmations through emails, telephone or their online booking system. These have to be updated into the GER system (and the online booking system,) so that the receptionists (and the booking agents in the other cities equally) are informed on the rooms available.

After the last check out is finished (12:00), it is observed that the amount and time spent on resources somewhat drops a bit. Still, the answering of telephones, receiving of fax, updating of OBS and GER results in a resource use that qualifies to a High. This often last until 15:00, when an even higher use of resources (especially the use of the stationary computer) often appears. This is due to the receptionists claiming to be receiving the majority of emails from the OBS between

15:00 and 17:00. This is at the same time as there are a lot of guests checking in, therefore resulting in a Very High use.

Receptionist shift 3

As previously noted, most of the emails from the OBS last until 17:00. In this space of time you also still have guests checking in, resulting in an extensive use of the stationary computer and sometimes the printer. After 17:00 the use of various technological instruments decrements almost hour by hour from a Very High, to High, to Medium, and finally a Low at 20:00. The reason for this is that there are no checkouts, and the number of check-ins, mails and other booking related matters drops considerably. As the hours pass, their main responsibilities surround actions that do not necessarily involve deploying technological artifacts, such as the handing out of and receiving keys.

Cleaning personnel

Receive list

Before the cleaning personnel can start any cleaning of rooms, they receive their individual list with an overview of the hotel rooms. These are either handed out at 07:00 or 08:00 every day. They are also filled in everyday to keep an overview of rooms cleaned, but also occasional damages in hotel rooms (such as air conditioning not working) etc. Resource use it set to Medium, as they have to use the stationary computer as well as print out the lists.

Find and Clean rooms

During these sequences few technological resources are used. There is still the occasional use of walkie-talkie, e.g. the receptionist may call to see if rooms are available for check in etc. Still, the use of technological resources is set to Low.

Update list

Updates in the computer what rooms that have flaws etc. Not only does these paper artifacts record the details about each and every room; they also help coordinate the activities between different actants such as cleaning staff, janitor, electricians etc. after being updated in the hotel system. "*The advantages of paper, [is] the simple yet critical fact that the record is handlable, manipulable, portable, dismantlable and can easily be reordered and reassemble for particular purposes*" (Heath and Luff 1998). Even though these paper sheets are an old, and probably consider by many an outdated resource, their mobility serve as highly important for the execution of their every tasks.

Restaurant

Restaurant shift 1

The first shift in the restaurant starts at 06:00. In the hour between 06:00 and 07:00 they do not deploy any technological artifacts, as they are preparing the restaurant for the breakfast that starts at 07:00. During the breakfast (07:00 – 11:00) one can see the occasional use of the POS system situated in Bar 1. As the breakfast already is set, there is no order of food, but still the occasional order of drinks beside from juice and water (that is free) is noted, resulting in a Low use of resources. After the breakfast is finished, there are hardly any visiting the restaurant for one hour or so, therefore ending this shift in a Very Low usage.

Restaurant shift 2

The same Low usage is also seen from 12:00 – 13:00. Still, in this period one can notice a higher use of their personal cell phone, than what is seen throughout the day. From around 13:00 there is an interesting increase of technology usage lasting until more or less 15:00. The reason for this is that the many people checking in and the ones eating breakfast early eat lunch around this period of time. Now the restaurant staff has to use the POS system, but also print out the bills that have to be handed to the receptionists and plotted into the GER system. At 15:00 the number of guests drop again, while at 16:00 you see an increase of guests for one hour. This is mostly guests lying around the pool that order the occasional food or beverage. At around 17:00 there are some random orders, but a Low usage of resources.

Restaurant shift 3

The low usage of technological artifacts most often continues throughout the day. Even though the bills are printed out at the end of the day and handed to the reception, at around 20:00, until the shift finishes at 23:00, the deployment is Very Low.

Kitchen

Kitchen shift 1, 2 and 3

The kitchen shifts never use any technological artifacts related to their work. They simply receive written orders on a piece of paper from the restaurant staff. Their use is therefore almost constantly set du a Very Low.

Bar 2

Bar shift 1 and 2

The employees in Bar 2 almost never deploy any technological artifacts. At the beginning of their shift they turn on the sound system which they never touch until they turn it of at night. The

occasional use of walkie talkie is also noticed, but is so rare that it cannot be included in the model. The total sum of use is therefore set to Very Low.

Security

Security shift 1, 2 and 3

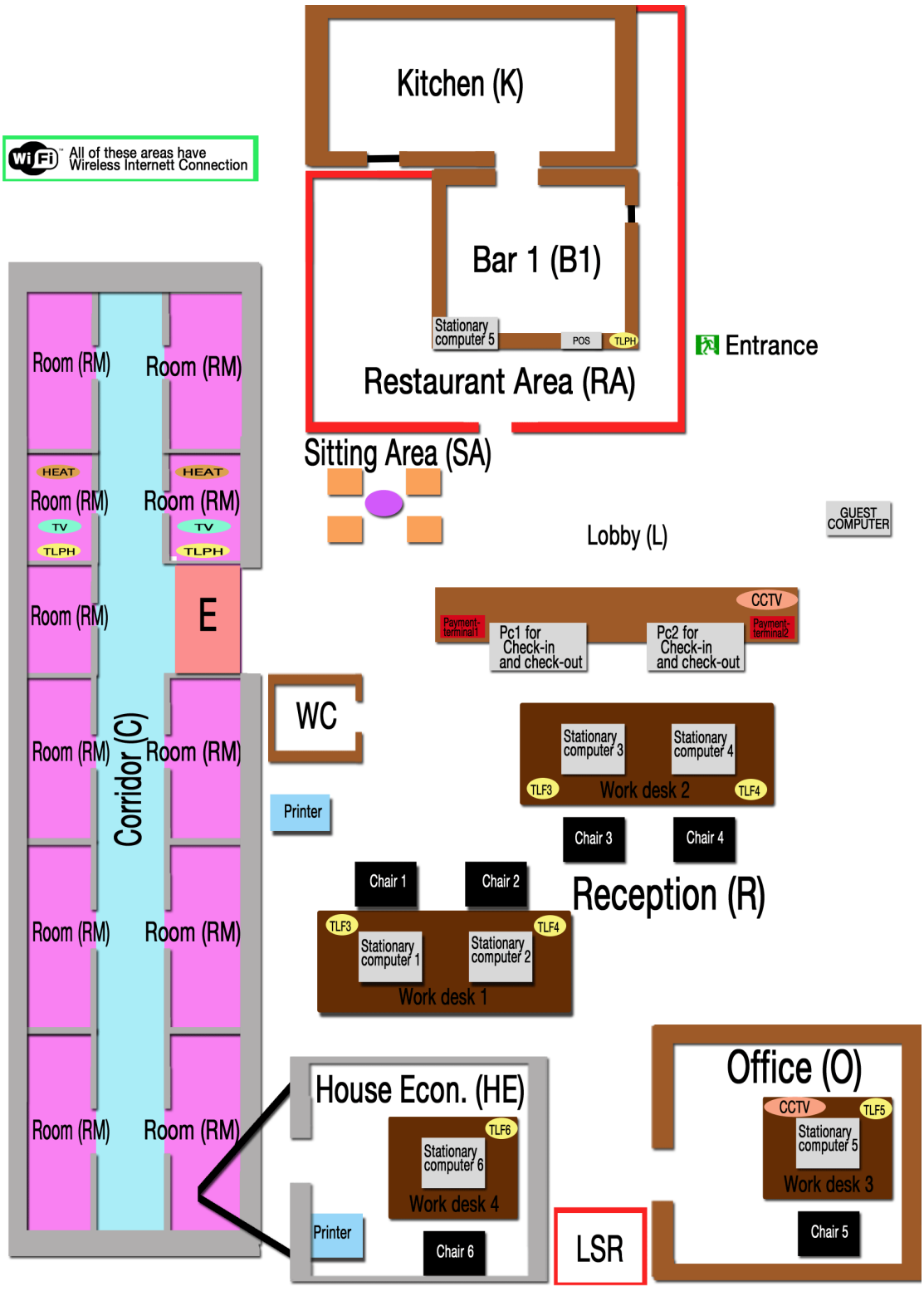
In the security shifts, there is always one person present in the security room, while also various at the premises of the hotel. During the first two shifts, the personnel will often help with the carrying of bags, showing guests to their rooms etc. At the last shift they are more used to walk around the premises to look for any unwanted individuals and the like. Still, the use of technological artifacts do not differ that much throughout the shifts. In general they use the CCTV to monitor the premises, and also Walkie Talkies to give each other feedback regarding the status of each security guard. It is noticed, and also through conversations with these guards, that the use of Walkie Talkie highly increases from around 20:00 until 06:00, as it then is dark, and has a higher possibility of people entering the premises without permission. During these hours a Medium deployment of technology is seen, while the rest of the time Low.

The use of CCTV at the hotel is very fixed, and can only be accessed at one particular venue, also noticed by others (Heath and Luff 1998) in different settings. What Heath and Luff (1998) emphasize is that "*It is a strange irony that given the promise of new spaces and novel environments for collaboration, current technologies appear so rigid*", written 14 years ago. CCTV is still a technology that often only allows one to monitor different spaces at one room, even though there are some options available (CCTVCameraPros 2010), using apps on your smartphone. These possibilities are still not available for the employees at the hotel, and should the security guard at the security room for one reason have to leave, for example to visit the bathroom, there will be no possibility for the other guards, situated throughout the premises to have a total overview. They will only have to rely on their own mobility and peripheral awareness (Heath and Luff 1998) to be able to monitor and evaluate the premises for possible intruders. Still, when one individual is present in the security room, they have no possibility to have a shared spatial environment, only audible access to each co-worker with the use of Walkie Talkies. This can cause problems with deictic references, which are "*the practice of pointing or gesturing to indicate a noun used in conversation [which is] a crucial part of the way we communicate in a shared space*" (Gutwin and Greenberg 2002). Words like "here," there," "this," or "that" will have no meaning no you not share the common visualized area, which can cause setbacks for the security staff.

13.2. Roles in time and space – Hotel Norway

All these notes are based on extensive observations and interviews with various actors at Hotel Norway that are seen as important to the research, such as guests and several employees with

different occupations at the hotel. It is an aesthetic picture that displays the average of different sequences shown by various actors in both time and space.



Monday to Friday

Monday to Friday

Role ↓ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in											L	L	L	L		
Unpacking											RM	RM	RM	RM		
Eating													RA/^	RA/^	RA/^	
Sleeping	RM														RM	RM
Guest (departing)																
Waking up, packing etc.	RM	RM														
Breakfast		RA	RA													
Checking out			L	L												
Picking luggage										LSR	LSR	LSR	LSR			
Reception																
Receptionist shift 1		R	R	R	R	R	R	R	R	R						
Receptionist shift 2											R	R	R	R	R	
Receptionist shift 3	R															R
Cleaning personnel																
Receive list			R													
Find rooms			C	C	C	C	C	C	C	C						
Clean rooms			RM	RM	RM	RM	RM	RM	RM	RM						
Update minibar list			RM	RM	RM	RM	RM	RM	RM	RM						
Update maintenance list			RM	RM	RM	RM	RM	RM	RM	RM						
Hand over lists										HE						
CS Manager																
Update list in system										HE						
Bar																
Bar shift	B1										B1	B1	B1	B1	B1	B1
Kitchen																
Kitchen shift 1	K	K	K	K	K	K	K									

Use of resources*

	Very high
	High
	Medium
	Low
	Very Low

Guest arriving

Check in

During the weekdays guest seems to most frequently arrive at between 16:00 and 20:00 o`clock. Commonly they are businessmen leaving for the hotel straight after work, explaining such a late arrival. Seemingly being used to staying at hotels, check in is sorted in a quick manner, with them being "prepared" for this activity. They quickly say their names when approaching the reception, wait a maximum of 30 seconds for the receptionist to find the booking, receive the key and leave for the room. Most often they travel alone, so that there are no one waiting, either in the lobby or sitting area present. Therefore, few resources are being used by guests, ending in a Very Low use of technological artifacts.

Unpacking

Unpacking is something that not has been observed at this hotel either, as people in general are reluctant to allow the entrance of unknown individuals, being a view shared by both guests in Norway and Brazil. This is still an interesting thing to notice, as one of the aspects of spaces is permission. How do you let authorised people in and prevent unauthorised? People organize their perception of the world with spaces they are allowed to enter and not, often because they know it "belongs" to others. We structure our environments, where we have a mix of public spaces, own spaces and private spaces. Individuals consider often spaces as something you can or cannot enter based on various criteria. Still, it is not fixed; people may often have different understandings and permission. Hotel rooms are entered by cleaning ladies, they have the right to enter by guests. It would be wrong of the hotel manager to suddenly enter, even though he has more authorization in general.

A majority of guests indicate that they at once unpack their laptop and access the wireless Internet present (even though the ones arriving very late leave to eat immediately). This is done to check their email and/or to finish/continue their work for the day. They want to complete as much work as possible, in order to leave the room and get something to eat. The occasional guest also mentions that various social media are visited, such as Facebook, LinkedIn, and Twitter etc. Since the guests normally deploy resources such as the laptop and cell phone with the use of Internet, the total use of resources here is set to Medium. This can be related to Hotel Brazil, where they do not have the possibility to deploy these resources in the same manner because of the lack of Internet. Some guests were asked regarding Internet in their rooms. They would feel it to be totally out of the question to not be able to be online while staying. Since they are staying for work related matters, they need to constantly check their email and connect to work related systems online. This would not feel comfortable in the reception or dining area. In Hotel Brazil they do not necessarily have to access the Internet for working-related matters, and it was therefore not deemed to be equally important.

Eating

Hotel Norway has a buffet every day from 18:00 to 21:00, which is included in the price. They have various hot dishes that are being announced on the reception counter, as well as salads, bread and fruit. Most guests seem to take advantage of this offer, and therefore eat in the restaurant area of the hotel (some still leave to eat at one of the various restaurant situated in the city). Few artifacts are seen deployed during this sequence, maybe the infrequent phone call and the like. Laptops are never brought, left safely in their hotel rooms. A total use of resources here is therefore set to Low.

Sleeping

Even though most do not use any technology actively while sleeping, there is often a heating system present. It is therefore included in the model. Still, the use is Very Low.

Guest departing

Waking up, packing etc.

When getting ready to leave the hotel they have some sort of artifact use, either the laptop, tablet, cellular phone and the like. This is though noted as being the quick check of email or reading of newspapers online. The use is set to Low as it far from being considered the main activity.

Breakfast

Considering that most guests staying during the weekdays are related to business, it is somewhat surprising that you do not see more laptops and mobile phones while eating. Most seem to enjoy their meal without the (possible) disturbance of technological artifacts. When asking why this is so, they mention that due to them checking what is seen as important five minutes ago in the hotel room, allow them to have these minutes of relaxation. The total deployment is Low.

Checking out

As noted earlier, most of the guests at Hotel Norway travel alone. One will therefore most often not have anybody waiting with them while checking out. It is a quick process, where guests hardly ever are seen using any technological resources, and therefore showing a Very Low use.

Reception

Receptionist shift 1

Among the three shifts in the reception, this is the one with the most variation in degree of resources used throughout the different hours. From 07:00 to 08:00 it is pretty quiet, with the occasional check out, check in, telephone call and incoming email. In this period of time the use of resources is Low. It is pretty interesting to see how there is a rapid change in intensity of activities and deployment of resources. At around 08:00 o`clock more and more people start to

check out, as well as incoming telephone call and emails skyrockets. Between 08:00 and 10:00 o`clock is noticed by receptionists as being the most "intense during the day", considering telephone and email use. Enquiries in this period of time are normally carried out by businesses on the behalf of their employees. With having the majority of checkouts in the same period, turns this into a Very High use of resources.

Between 10:00 and 12:00 the checkouts decline, together with the incoming telephone calls and emails. Resource use is therefore set to a Medium. From 12:00 until around 14:00 it is a bit quieter in the beginning, but elevates around the last hour, mainly characterized my telephone calls and emails, ending in a Very High use. Until around 16:00 o`clock the use starts dropping, ending the shift eventually at a Medium.

Receptionist shift 2

When the second shift starts, it is noticed that both verbal and written exchange of information is carried out by the overlapping shifts. This is to cover all activities and tasks that has not yet been accomplished by the first shift, and has to be taken care of. One is to notice that more is being done at the beginning of the second shift, than at the end of the first. This might have to do with workers tending to be more efficient at the start of the day References? Also, at these hours you have more of the independent guests calling, making enquiries on the own behalf. This is done as well as they have to check bookings handles by the online booking system of the chain, as well as the online booking website. On top of this these hours are considered the most frequent regarding check in, ending in them having to deploy a lot of technological resources in order to accomplish their goals. The resources used declines as the night turns darker, and at the end of the shift the deployments is considered Low.

Receptionist shift 3

As this is the night shift, resource use relevant to their work is generally Very Low. They notice though that they use computers for personal use, such as social media, online newspapers and the like.

Cleaning Personnel

The main activities handled by the cleaning staff are commonly seen as exploiting a minimum of technological artifacts. Before they used the TV at each room to write down each item taken, automatically being put on the bill of the guest. This activity is now being done by the use of pen and paper, and later handed to the reception, creating extra work for the receptionists earlier handled by the cleaning personnel. On the TV they were also able to see an overview of all rooms that had been checked out by guest, therefore being able to ignore the "Do not disturb"-sign that might still be hanging on the door. Now they have to knock or clean these rooms after the latest hour allowed for checkout; 14:00 o`clock.

Still, they deploy some technologies allowing them to accomplish their goals more effectively. Every part of the cleaning staff has their own internal cellular phone that they use to

communicate with each other, the reception, restaurant, janitor and CS Manager. Should the reception ever wonder if a room has been cleaned, they can instantly call the personnel. Further, the cleaning staff is also able to enter a coder for each room, on the hotel room telephone, indicating directly into the system that a room is ready.
The reason why the activities of updating the minibar and maintenance list are separated is because the registration of minibar before was done with the use of technology, and the maintenance with paper. Now they are both handled with the use of paper, being a setback in the automation of this process.

CS Manager

The CS Manager has various other activities, in this theses only one is being considered. After the cleaning personnel have noted all possible flaws and shortcomings at the hotel rooms, she updates this in the hotel system with the use of a computer. This activity is set to a Medium.

Bar

The bar has only one shift, which is generally quiet until around 22:00-23:00 o`clock. Then they have to start more extensively to use the POS system situated. The guests are able to directly put the items consumed on their bill, pay by cash or credit card. A total use of resources is therefore set to Medium.

Kitchen shift

The kitchen shift shows no extensive use of technological tools, as they are responsible for setting up the morning breakfast. Resources use: Very Low.

Saturday

Saturday

Role ↓ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in						L/SA	L/SA	L	L							
If room not ready							LSR	LSR	LSR							
Unpacking						RM	RM	RM	RM							
Sightseeing						^	^	^	^	^	^	^				
Changing											RM	RM	RM			
Eating													RA/^	RA/^	RA/^	
Sleeping	RM														RM	RM
Guest (departing)																
Waking up, packing etc.			RM	RM												
Breakfast				RA	RA											
Checking out						L										
Sightseeing						^	^	^	^	^	^	^				
Picking luggage										LSR	LSR	LSR	LSR			
Reception																
Receptionist shift 1		R	R	R	R	R	R	R	R	R						
Receptionist shift 2											R	R	R	R	R	
Receptionist shift 3	R															R
Cleaning personnel																
Receive list				R												
Find rooms				C	C	C	C	C	C	C	C					
Clean rooms				RM	RM	RM	RM	RM	RM	RM	RM					
Update minibar list				RM	RM	RM	RM	RM	RM	RM	RM					
Update maintenance list				RM	RM	RM	RM	RM	RM	RM	RM					
Hand over lists											HE					
CS Manager																
Update list in system											HE					
Bar	B1										B1	B1	B1	B1	B1	B1
Bar shift																
Kitchen																
Kitchen shift		K	K	K	K	K	K	K								

Use of resources*

	Very high
	High
	Medium
	Low
	Very Low

Guest arriving

Check in

Being the weekend, one definitely sees a different pattern regarding the checking in of guests, not only in terms of time but also types of people. First of all, guests now are more characterized by tourists, families and/or couples wanting to see what this town has to offer in terms of sightseeing and the like. Second of all, they check in much earlier than what is the trend during the weekdays. Now they start arriving at 11, and the majority of guests checking in lasts until around 15:00. The first two hours can sometimes end up in them having to wait a short period of time before being able to enter their rooms. This is because they are normally not allowed to check in before 14:00 o`clock. Some therefore wait around in the Sitting Area situated, deploying tools such as the laptop computer and cellular phone, in 90 % of the cases asking for the username and password for the Internet. The last two hours check in is normally considered a bit differently, as most rooms are ready for the guests to enter. This process is therefore then handled faster and without the specific use of resources.

If room not ready

As noted, some guests decide to wait in the Sitting Area before being able to enter their room. Others decide to leave their bags in the Luggage Storage Room, leave for the city centre, and later pick up their baggage and head for the room. This still does not involve any use of technological artifacts.

Unpacking

Once entering their rooms and starting to unpack, most say they enter their laptop and go online. This is mostly to check social media, read online newspapers or other personal matters. Some also turn on the TV quickly. Note here that they use it even though it is not related to work!

Sightseeing

This activity does not allow me to observe, and is also not a part of the hotel premises. It is though added to show activities causing them not to be at the hotel.

Changing

After a day doing various excursions and the like, most of the guests return to their rooms to take a shower, change clothes and get ready to go out and eat. In their rooms they will often once again check social media, read newspapers and other personal matters, as well as turn some music on (either on the TV or laptops).

Eating

The once eating at the hotel deploys few technological resources. When asking them the reason for this, they mention that they have been able to check the Internet in their room, therefore not feeling the same necessity. Neither one mentions etiquette, compared to Brazil, rather the fact of having Internet in their rooms.

Sleeping

Even though most do not use any technology actively while sleeping, there is often a heating system present. It is therefore included in the model. Still, the use is Very Low.

Guest departing

Waking up, packing etc.

Waking up and getting ready to eat breakfast and check out is done a bit later than during the weekdays. They also mention that they do not hurry that much getting ready, as they normally have plenty of time. The majority mention that they will deploy some artifacts in some manner, similar to what has been noticed earlier. Here the use could be set to either Low or Medium.

Breakfast

During breakfast few technological tools are deployed, only the occasional cellular phone use has been noticed.

Checking out

As the majority of guests check out around the same time, between 11:00 and 12:00 o`clock, guests sometimes have to wait their turn. This also collides with the time some try to check in. The result of this is that they use laptops and cellular phones as a pastime while waiting, and the deployment is therefore set to a Low instead of a Very Low.

Sightseeing

This activity does not allow me to observe, and is also not a part of the hotel premises. It is though added to show activities causing them not to be at the hotel. Normally this is done after checking out, so they do not have the opportunity to keep their things in their room. The luggage will therefore be put in the luggage storage room.

Picking Luggage

The ones actually deciding to keep their baggage in the luggage storage room, will return somewhere between 15:00 and 19:00 o`clock, returning after walking in the city centre, doing excursions etc.

Reception

Receptionist shift 1

This shift starts very easy, with few things imbuing the work activities. From around 08:00 to 11:00 you have the occasional check out, emails and telephone calls. At approximately 11:00 o`clock however you start to notice an elevation of checkouts, but also guests wanting to check in. Receptionists now have to operate the computers with checking in and out, handling payments with payment terminals, as well as attend to matters with incoming calls and emails. One can see that activities are highly different in terms of effort, and that more resources have to be used. From around 14:00 it starts declining, and this lasts until 16:00, being the start of the second shift.

Receptionist shift 2

This shift starts equal to the shift in the weekdays, with both verbal and written exchange of information carried out by the overlapping shifts. It is also noticed that there is more being done at the beginning of this shift, than at the end of the first. Computers are at a higher degree used, often to check bookings that might have arrived from either the chains own online booking system or through their webpage. The most intensity of these tasks last until around 19:00, where the rest of the day will continue to be slower and slower.

Receptionist shift 3

As this is the night shift, resource use relevant to their work is generally Very Low. They notice though that they use computers for personal use, such as social media, online newspapers and the like.

Cleaning personnel

Receive list

The same as weekdays.

Find and Clean rooms

What is interesting here to notice, is that cleaning staff more frequently will be called on their internal mobile phones on a Saturday than during the weekdays. This has to do with guests coming to check in early, and the receptionists wanting to know whether the rooms are cleaned and ready. They also more actively have to look for rooms and ask for checked out guests, so that rooms can be ready when they arrive. As they no longer have the overview of checked out rooms available on the TVs, they actively have to approach (or the receptionists calls them) in order to reveal the rooms that can be entered and cleaned.

Update minibar list, Update maintenance list and hand over list is generally handled in the same manner as the weekdays.

CS Manager

Update list in system

Same as the weekdays

Bar

Bar shift

The bar shift start at 16:00, but does not show to deploy that many technological resources until around 22:00. Before this the supper is served which does not necessarily imply this use. The rest of the shift is (somewhat surprisingly) equally busy as most of the weekdays.

Kitchen

Kitchen shift

Same as weekdays, only starting a bit later.

Sunday

Sunday

Role ↓ Time →	…	7	8	9	10	11	12	13	14	15	16	17	18	19	…	24
Guest (arriving)																
Check in													L	L	L	
Unpacking													RM	RM	RM	
Eating													RA/^	RA/^	RA/^	
Sleeping	RM														RM	RM
Guest (departing)																
Waking up, packing etc.			RM	RM												
Breakfast				RA	RA											
Checking out						L										
Sightseeing						^	^	^	^	^	^	^				
Picking luggage										LSR	LSR	LSR	LSR			
Reception																
Receptionist shift 1		R	R	R	R	R	R	R	R	R						
Receptionist shift 2											R	R	R	R	R	
Receptionist shift 3	R															R
Cleaning personnel																
Receive list				R												
Find rooms				C	C	C	C	C	C	C	C					
Clean rooms				RM	RM	RM	RM	RM	RM	RM	RM					
Update minibar list				RM	RM	RM	RM	RM	RM	RM	RM					
Update maintenance list				RM	RM	RM	RM	RM	RM	RM	RM					
Hand over lists											HE					
CS Manager																
Update list in system											HE					
Bar																
Bar shift	B1										B1	B1	B1	B1	B1	B1
Kitchen																
Kitchen shift 1		K	K	K	K	K	K	K								

Use of resources*

	Very high
	High
	Medium
	Low
	Very Low

Guest arriving

Check in

Guests coming to check in on a Sunday normally arrive late, taking the last plane/bus/train from wherever they are departing. They are generally businessmen working the next day, therefore not needing to arrive early. This implies them coming to the hotel at around 18:00 o`clock, lasting a few hours. It is mostly a quick process, with them being prepared for the activity of checking in. Rarely and technological artifacts are seen used.

Unpacking

Being there for business purposes, most say that when they enter their rooms to unpack, they attend to some sort of work related matters. This either being emails, accessing work related systems online or other work, being a rule rather than the exception. Medium deployment.

Eating

While eating, most say that they have done the work for the day at the hotel room, and does therefore not need to use their laptop and the like. Still, the occasional laptop and cellular phone use is observed, relating to both work and personal matters. Overall a Low deployment.

Sleeping

Even though most do not use any technology actively while sleeping, there is often a heating system present. It is therefore included in the model. Still, the use is Very Low.

Guest departing

Is generally considered the same as on Saturday.

Reception

Receptionist shift 1

The shift on Sunday is usually equal to Saturday until around 11. Then you have people checking out, but normally few guests coming to check in. This involves lesser deployment of the computers for checking in purposes, but they still have to attend to other matters such as emails and telephone. After checking out is finished, they become less busy, declining until around 18:00.

Receptionist shift 2

18:00 is the time check-in start, therefore having some more activities to attend to. The use of resources therefore rises slightly.

Receptionist shift 3

As this is the night shift, resource use relevant to their work is generally Very Low. They notice though that they use computers for personal use, such as social media, online newspapers and the like.

Cleaning personnel

Is generally considered the same as on Monday to Sunday. The main difference is that they deploy a bit more technology to be able to find out which rooms that are ready to be cleaned, as guests now check out later.

CS Manager

Update list in system

Same as the Saturday and weekdays

Bar

Bar shift

Same as the Saturday and weekdays

Kitchen

Kitchen shift

Same as Saturday, only starting a bit later.

Notes:

It is to be noted that this thesis covers the activities that normally are considered to take up the most time, and involves the use of technological artifacts. There is awareness of that other tasks do arise.

13.3. Activity space Hotel Norway - Sketch