

IT-ENABLED PERFORMATIVE SPACES IN GENDER SEGREGATED WORK

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Thesis submitted to the University of Nottingham
for the degree of Doctor of Philosophy

JULY 2015

ABSTRACT

This thesis investigates the use of ICT in Saudi Arabia to support collaboration between segregated genders. It attempts to understand the emerging technology practices of workers in higher education institutions, which are aimed at bridging the culturally imposed spatial divide between men and women in the workplace. In examining the gender-segregated context, the study also looks into the consequent organisational and structural changes resulting from technology use. This includes evaluating new practices in terms of progressive change, and how this specifically relates to the work experiences of women as a subordinated and marginalised group.

Furthermore, the study uses the Saudi context as a vehicle to explore IS discussions regarding the human and material/technical aspects of agency in technology use, and the role attributed to each in theoretical perspectives on organisation. Prior research has extended Giddens' (1984) structuration theory to incorporate material agency as part of a social-technical ensemble. Yet the ways in which physical-digital spaces contextualise interactions and structure work practices are under explored. Thus, the study develops a conceptual model that extends concepts of 'locale' and 'regionalisation' from structuration theory to the IS field, and defines 'technical settings of interaction' constituted by human and material agencies.

The research presented in this study uses a single case design, and collects data by conducting interviews and non-participant observation at Umm Al-Qura University (UQU) in Makkah. The case of gender segregated work in Saudi is used to illustrate the performativity of digital spaces, and demonstrates how workers use technical configurations of ICTs to create zones of interaction that can challenge existing cultural norms, or hinder progressive change. Finally, the study finds that attending to Giddens' focus on time-space not only adds an additional level of analysis to technology studies, but also shows the potential of structural research in contributing to sociomaterial discussions on materiality.

PUBLICATIONS

List of publications related to this thesis

ALOTAIBI, A. & KUK, G. 2011. Gender-Segregated Work in Saudi Arabia: A Structural Perspective on Technology and Cultural Change. *Proceedings of the 32th International Conference on Information Systems*. Shanghai.

ALOTAIBI, A. & KUK, G. 2013. IT-Enabled Performative Spaces in Gender Segregated Work. *Proceedings of the 34th International Conference on Information Systems*. Milan.

ACKNOWLEDGMENTS

I would like to acknowledge the contribution of the many people who have helped and supported me in the completion of this thesis.

I would like to express my sincere appreciation to my supervisor, Dr. George Kuk, whom it has been a privilege to work closely with. I am grateful for his inspiration, encouragement, and valuable feedback throughout the journey of my PhD. I would also like to thank my second supervisor, Professor David Wastell, for his thoughtful guidance and constructive suggestions during the writing of this thesis.

I would like to thank Umm Al-Qura University administration for allowing me to conduct this research, and to the UQU faculty members and workers who participated in the study. Special thanks also go to the Saudi Cultural Bureau in London, and to Dr. Ahmad AlGhamdi and Dr. Ahmad Bargawi from the sponsorship division at UQU.

My deepest gratitude is extended to my parents, Abdullah and Jawaher, for their love, endless support, and for encouraging me to pursue this research. I am especially grateful to my brother and sisters, Sami, Manal, Naseem, Nada and my sister in law Fatimah; who have supported me over the years. I am indebted to my friends: Taghreed Al-Ghaith, Latifa AlAbdulkarim and Huda Shaheen, for their encouragement and moral support; and to all my friends and colleagues in Makkah for assisting me during the field research. Finally, my love goes out to my nieces and nephews, Saud, Khawla, Abdullah, Ahmad, and Khuzama; I am grateful to have you in my life.

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CHAPTER 1

Introduction

1.1 Overview

This thesis examines the use of information and communication technologies (ICTs) and the consequences of technology-based initiatives on gender-segregated work. Specifically, it investigates collaborative IT practices among genders in Saudi Arabia, in an attempt to understand changes to gender work norms and the marginalisation of women in the country. It also uses the Saudi context to explore longstanding IS topics regarding both the human and technical aspects of ICT use and the role attributed to each in theoretical accounts on organisational change.

The following sections provide a panoramic view of the thesis. Section 1.2 describes the research background, purpose, and research questions. Section 1.3 presents the theoretical framework and research design guiding the study, and the significance of the study both practical and theoretical. Finally, section 1.4 provides an overview of the thesis structure by offering a brief summary of the content found in each chapter.

1.2 Research Background and Purpose

The social consequences of technology are perhaps one of the most significant markers of our time. In dealing with social challenges, technological innovation has become a precursor to change initiatives led by governments, organisations, and special interest groups. The continuous advances in ICTs witnessed over the past few decades, and their growing importance and ubiquity, has inevitably led researchers to ponder the social aspects of technology use, and the relationship between technology, society and change. Attempts to understand the mechanics of change, and the

interaction between humans and technology, are among the more prominent issues taken up in sociological research on technology and management. These lines of inquiry have, over the years, resulted in a number of competing, and often polarizing, points of view. Earlier tendencies towards technological determinism paved the way for social constructivism SCOT (Pinch and Bijker, 1984, MacKenzie and Wajcman, 1985, Latour, 1988, Law, 1992), which has been invaluable in understanding enrolment processes, wherein social groups attempt to gain support for technological projects, and shape usage through collective negotiations. The structurational school of thought, which draws on Structuration Theory (ST) (Giddens, 1979, 1984) has also been highly influential in the IS field. Empirical research and engagement with the theory has led to the development of IS specific structurational models (DeSanctis and Poole, 1994, Orlikowski, 1992, Orlikowski, 2000), and generated a large volume of studies noted for their dynamic view of technology at work (Jones and Karsten, 2008).

These studies, in their attempts to counter the rampant technological determinism dominating IS research, inadvertently replaced this with varying forms of social determinism (the social shaping of technology, SCOT, and ST), or overly ambitious accounts that present conflating accounts of human and non-human agency (ANT). The preoccupation with finding a middle ground between technological and social determinism has in effect overshadowed the need to adequately theorise agency. Consequently, this has left the IS field with critical insufficiencies, which have been characterised by Rose et al. (2005) as the 'problem of agency'. The authors point out that, theoretical clarity regarding agency is needed even within the more balanced views of structuration theory and actor network theory. To address these concerns, the authors call for a reworking of these theories; one that can incorporate technical/machine agency (for structurational research); or can differentiate between human and non-human agency without the need to equate them (for ANT).

The aforementioned discussions on agency set the wheels in motion to explore new avenues that would later highlight a second shortcoming in management research: the field's treatment, or lack thereof, of materiality (Orlikowski and Scott, 2008). This limitation is the subject of on-going research, in the strand of literature known as sociomateriality. Orlikowski (2007) summarises the problems in existing literature, arguing that materiality, an inseparable part of organisational practices, is inadequately represented in technology studies. This has been done by either ignoring

technology altogether, downplaying its importance or treating it as a temporary episodic occurrence. The root of the problem is seen to be the prevalence of an ontology of separation, which considers materiality/technology to be separate from human action. Drawing on influences from research on sociomaterial assemblages (Callon, 1986, Pickering, 1995, Suchman, 2007), Orlikowski and Scott (2008) promote a new approach that hinges on a relational ontology between technologies and humans, deeming them inherently inseparable. This ontology predicates that “[h]umans/organizations and technology are assumed to exist only through their temporally emergent constitutive entanglement” (2008, p.457). Sociomateriality also presents as a central idea Barad’s (2003) notion of performativity, as a way to describe the agencies enacted through sociomaterial assemblages. To better understand this concept, it is useful to contemplate how it has been linked with discourse¹. For example, the scientific knowledge found in a specific discipline—its discourse—is said to be performative “if it contributes to the construction of the reality that it describes” (Callon, 2006, p.7). As such, the sociomaterial concepts of entanglement and performativity are presented as a way forward, to help acknowledge the role of materiality, and to better understand the mechanisms underlying agency.

The previous discussion recounts the limitations of management research that guide this study’s focus on technology practices at work and in wider society. The need to address the role of both human and material/technological agencies in these practices is the first of two broad themes examined by this study. The second theme explores the case of gender-segregated work in Saudi Arabia, and highlights the issues that emerge from the meshing of work, culture, and technology. In Saudi, segregation is practiced due to a mixture of cultural and religious norms². Interactions between unrelated genders are largely circumscribed, as each gender is confined to their

¹ Barad (2003) provides a useful definition of the Foucauldian notion of discourse: “Discourse is not a synonym for language. Discourse does not refer to linguistic or signifying systems, grammars, speech acts, or conversations. To think of discourse as mere spoken or written words forming descriptive statements is to enact the mistake of representationalist thinking. Discourse is not what is said; it is that which constrains and enables what can be said. Discursive practices define what counts as meaningful statements” (Barad, 2003, p. 819).

² At the root of these norms lies the notion that a woman should not be seen by, or interact with men other than close relatives. Any interaction that does occur is done from behind religious attire for women, usually a veil and face cover. In Saudi, this is seen as adhering to Islamic teachings; however, the practices of other Islamic countries differ considerably. It could be said that this conditioned interaction is a more “Saudi” specific application of religious teachings, which is based on Wahhabism, a strict interpretation of Islamic laws. For more on Saudi Wahhabism and the gender segregation debate, see (Meijer, 2010).

respective social and public spheres (Pharaon, 2004). This separation permeates all areas of life including the workplace, and we find that men and women work in separate facilities, both in the public and private sector (Baki, 2004, Meijer, 2010a). Organisational units typically consist of two counterpart branches, and systematically impose a male-dominant hierarchical structure³. Ironically, this structure entails a high degree of coordination between genders, and thus necessitates mediated communication.

Before the advent of the Internet and advanced network technologies, work related communication between genders was carried out through letters, telephone calls, faxes, and closed circuit TV (CCTV) meetings⁴. However, the late '90s brought about new practices following the wide dispersal of ICTs (Al-Saggaf and Weckert, 2004), which are now used to alleviate the complications of separate work environments, through inducing formal and informal interactions via email, groupware, video-conferencing (VC), and instant messaging (IM). Due to the wide-ranging predilections toward gender communication held by various ideological groups in Saudi, these practices need to be understood within their specific socio-historic context. The different social groups use ICTs to varying degrees, yet they differ based on the cultural/religious values they attach to such practices. These views can be illustrated through the conservative-moderate-liberal typology, which reflects the prevailing ideologies existing in Saudi, and represents widely held classifications of cultural views. The first group, the *conservatives*, adhere to extreme religious doctrines that oppose "gender mixing"⁵, and dictate that communication is carried out by formal (traditional) channels, preferably letters and email. This is due to growing fears that technology may encourage inappropriate gender-mixing, and has led to an antagonism towards new communication media. This view is found mostly among the more extreme conservatives, who now advocate supervision of females when interacting

³ This organisational structure reflects "the male-dominated power structure of the state" (Pharaon, 2004, p. 364), and is enforced due to religious beliefs forbidding the dominion of women over men. Consequently, this has led to the institutionalisation of female subordination in government sectors (political, educational, legislative etc.); and thus limits female leadership to having jurisdiction over females only.

⁴ Note that the physical layout for these meetings is an audio/video transmission from the male side, with audio only from the female side.

⁵ Gender-mixing, or "Ikhtilāt" (Arabic word meaning mixing) is used to describe face to face encounters between unrelated members of the opposite sex. Mixing is considered to be a social taboo in Saudi, and the term is loosely used to refer to informal association between genders. The taboo also extends to mediated forms of communication, such as ICTs, especially if this involves unmonitored (one-on-one) interaction.

through social media or IM, either in the public or private spheres (Al Lily, 2011). The second group, *the moderates*, may have some reservations about ICTs, but pragmatically, will still use them if they consider this beneficial for their work. In their view, genders can communicate with any medium, as long as this remains culturally appropriate. Lastly, *the liberals* encourage communication and interpersonal relations between genders, and attach no negative views to gender-mixing. This group promotes using a wide range of mediums in addition to face-to-face communication. Liberals are the change advocates and the technology enthusiasts. The previous views should be taken as rough generalisations, as the three groups exhibit diverse behaviour depending on a complexity of factors, such as personal preferences and the context of use (public/private, and formal/informal). However, there exist widely agreed upon trends that are understood to be culturally appropriate and adhered to by all. For example, in publicly visible interactions, the three groups encourage mixed-gender VC meetings because they are publically monitored; whereas dyadic instant messaging is discouraged by conservatives due to the lack of third party supervision.

The case of Saudi gender-segregated work raises a number of issues with significant implications for both IS theory and practice. It provides an opportunity to shift away from the western-centric focus, and examine the technology practices of a diverse national culture. The rapid changes in Internet and networking technologies necessitates a fresh look at how different countries adapt ICTs to suit their local needs. While extensive IS research has been carried out to quantify and compare usage patterns across geographical and socio-cultural contexts, very few studies investigate ICT's impact on cultural values and norms (Leidner and Kayworth, 2006). The studies that have explored this examine only macro level themes (Madon, 1992, cited in Leidner and Kayworth 2006) or conduct cross-cultural comparisons (Walsham, 2002); rarely looking at micro level changes occurring in a specific culture.

The interplay between complex social arrangements, ideological beliefs, and norms existing in Saudi provides a unique setting to study technology use in organisations. By using culture as a focal point in a context of distributed workspaces based on gender, two areas for exploration emerge: the first relating to gender and technology use; the second to spatialities and mediated communication. Gender has been found to be significantly neglected in IS research, and the topic is both understudied and under-theorised despite its importance to the field (Wilson, 2002, Adam et al., 2004, Adam

et al., 2006). Adam et al. (2006) highlight the inadequacies in IS gender research, as is evident in the scarcity of publications on the topic in high ranking IS journals, and the over engagement in quantifying gender differences in articles that do address the issue. The authors point out that the focus on gender differences reinforces existing stereotypes, and diverts attention from the persistent inequalities between men and women in the IT field. The research on gender and technology can be insightful in this regard, as noted by Wajcman (2006), who finds that an intersection between the sociology of technology and the sociology of work has “rich and exciting possibilities” to inform our understanding of technology and power relations (p. 782). A deeper understanding of gender is critical to the IS context, in that “the process of technological change is integral to the renegotiation of gender power relations” (p. 781). Thus, the Saudi context is seen as useful in highlighting these issues, and has the potential to contribute to feminist studies and research on gender and technology, given their tendency to neglect global perspectives (Wajcman, 2007). This is evident in the call for research that is “more attuned to how different groups of women users creatively respond to and assimilate numerous ICTs in diverse real-world locations” (Wajcman, 2007, p. 295).

While the potential issues regarding gender and Saudi are endless, the current study’s main concern is with ICT collaboration between segregated genders, and whether there has been progressive change as a result of technology initiatives. Middle Eastern and Arab countries are certainly not foreign to the power of such initiatives. In the past decade alone, these countries have become frontrunners in reaping the benefits of technology, markedly in the democratization realm by increasing the influence of the public sphere, and as implicated in movements that advocate cultural progression in relation to gender politics (Murphy, 2006, Wheeler, 2006). The operative word here is progression. Gender-segregation—enforced as one of the central doctrines of Saudi Wahhabism—has long been considered a hindrance by Saudi liberals in their on-going clashes with the conservative sect. These clashes have largely been fixated on the topic of segregation, as noted by Meijer (2010a) in “The Gender Segregation (*ikhtilāt*) Debate in Saudi Arabia”. He highlights liberal resentments toward Wahhabi doctrines are due to the belief that they are becoming a force for cultural isolationism:

“For many liberal Saudi intellectuals, Wahhabism has an ambivalent relationship with violence, hampers social and

economic development and is an impediment to the necessary openness towards both the Western world but also to major parts of the Islamic world which regards Wahhabism as intolerant” (Meijer, 2010a, p. 3).

For Saudi workers, the complications of organisational segregation and the consequent disjointed practices are undoubtedly felt by both sexes (Baki, 2004), and has been closely documented in the field of education (Al-Kahtani et al., 2005, Hamdan, 2005). Yet the undesired repercussions and weight of impediment lays mostly upon female workers. In many of the Arab Gulf States (including Saudi), segregation has been found to perpetuate female workplace inequality, as the “spatial organizing structure in itself limits career choices for women”, and has been linked to limited training opportunities (Metcalf, 2008, p. 89). It has also been found to restrict women’s access to information centers and public Internet facilities that accommodate those with none or limited private access to ICTs (Hafkin, 2005). Unfortunately, the conservative power structure turns a blind eye to these inequalities, upholding the view that segregation is a means to protect women, and is just as much a cultural priority as it is a religious one. Consequently, women are left to endure the isolating effects of this strict practice: “Saudi society is divided into public and private worlds, men being concerned with the outdoor realm and women with what happens indoors” (Al Lily, 2011, p.120).

The previous is intended to emphasise the institutionalisation of both female isolation and subordination in Saudi organisations, which provides a basis for the contention that women are a marginalized group in the Saudi workforce. As things stand today, the administrative hierarchies in Saudi represent a male hegemony, which is overtly exclusionary of women, and prevents them from reaching positions of power (Hijazi, 2014). In addition, and what makes the “issue of women” a truly critical problem that has perplexed activists for decades, is its permanent entanglement in the socio-political tug of war between conservatives and liberals in the country (Meijer, 2010b).

The fact that the continued subservience of women represents the intersection of agendas of the country’s governing bodies and conservative groups makes attempts at resistance all the more difficult. Social theorists and philosophers, most notably Foucault (1979, Gerrie, 2003), have observed that the key to the quandaries of

subjugated groups lies in understanding that which is intrinsic to all power structures. In any given socio-historic context, the notion of absolute power in the hands of a select few is perceived as illusory, and instead is seen to reside in the entire social structure itself. The powerful and the powerless all have roles to play, with domination being sustained just as much by the acts of the powerless, as they are by the powerful. "The trick, therefore, according to Foucault, is to stop relying solely on the tactic of looking for ways to resist power (especially in the form of tangible authority figures) and instead concentrate on recognizing the expansive and pervasive "structures" through which power is actually transferred ... so as to achieve an ethically necessary "reversal of power" rather than simply an augmentation of power" (Gerrie, 2003, p.3).

These views on finding alternate means to counteract and weaken authority are very befitting for the case of Saudi workers in their use of technology to attempt to turn the wheels of change in the opposite direction. The increase in ICT collaboration between genders is seen here as part of these attempts; both as a means to improve and integrate practices among genders, and as a means to empower women. Thus, the precise nature of such attempts, and whether they have succeeded in bringing about progressive change, is the first topic for exploration in this study.

The second issue emerging from the Saudi context relates to the temporal and spatial implications of segregation—the specific distributed modes of work—and how this relates to alternate communication spaces facilitated by ICTs. Previous studies such as (Newell et al., 2002) examine distributed work as part of new organisational designs, which promote knowledge sharing by creating collaborative alliances within the same organisation but across different functions or geographic locations, or with outside organisations, such as global or outsourcing partners. These studies focus specifically on the structural realignments that occur as a result of using ICT knowledge management tools, such as local networks or intranets, data warehousing, and groupware, and find that these tools have been linked to decentralization and flatter hierarchies. Research on virtual work teams has evolved from early work that centered on building interpersonal relationships and the variables that enhance trust building, such as media richness and the ability to relay complex social cues (Jarvenpaa and Leidner, 1998); to the study of gender based differences in team member's perceptions of other team members or the mediating technology (Martins et al., 2004);

and finally to the management processes and criteria necessary to build successful virtual teams (Hertel et al., 2005).

The context of interactions has also been recognized as significant in the study of virtual teams and distributed work. For example, Ngwenyama and Lee (1997) present an alternative to the media richness perspective, and find that a shared organisational context enriches mediated communication, and provides meaning to help interpret interactions, and guides future actions. Context has also been used to differentiate the type of interactions occurring within the same medium, but in various contextualized zones. In their study on Lotus Notes, Hayes and Walsham (2000) find that the character of interactions in discussion databases differed depending on the level of visibility they provide for upper management, resulting in either safe or political enclaves. This observation is important as it departs from Ngwenyama and Lee (1997), bringing attention to the context of the new interaction space in the medium, and integrates the notion of the virtual context with the already existing organisational context, instead of treating the two as separate. Both studies, however, emphasize the role of human agency in creating this new context, and give limited attention to technology's role.

The case of gender-segregated work in Saudi higher education institutions provides an opportunity to address the aforementioned limitations in existing literature. The chosen research site for this study, Umm Al-Qura University (UQU) in Makkah, is a governmental university based in the western region of Saudi. The research setting is seen as particularly suitable to explore issues related to culture, ICTs, and organisational change. It is also appropriate due to its relevance for the researcher, a Saudi female who has over (8) years experience at the university under study, and has held administrative roles, including vice supervisor of the ITC (female branch) for (5) years. This work experience as both a university employee and a female deputy manager has been one of the main motivations to undertake this research. It has given the researcher deep insights into the research topic, and first-hand accounts of events during the implementation of large-scale ICT projects in the late 90's, such as the fiber optic infrastructure for LAN, and an extensive infrastructure for Tandberg video conferencing technology. This insider's perspective also includes experiences of the challenges facing female workers as a marginalised group.

Accordingly, the main objective of the study is to investigate the use of collaborative technologies among workers in Saudi higher education organisations; and to understand how and why ICT use is changing work practices among genders in segregated work environments. Furthermore, two main research questions and six sub-questions are identified:

1. What are the experiences of Saudi workers using ICTs to collaborate with the physically segregated opposite gender? What changes have they experienced over time?
 - a. What are some of the IT practices that support collaboration among segregated genders?
 - b. How does collaboration through ICTs differ from previous modes of work? What changes have been experienced in work practices and gender norms?
 - c. How can we evaluate ICT use and segregation in terms of progressive change?
 - d. What are the experiences of women as a subordinated group with ICT collaboration? Has there been any change in their status?
2. What aspects of these technologies in practice account for changes in gender work norms?
 - a. How do ICTs enable new and distinct modes of collaboration in segregated environments?
 - b. How do these new modes bring about change?

Based on the above, an appropriate theoretical framework and research design was chosen, and is detailed in the following section.

1.3 Theoretical Framework and Research Design

The Saudi context provides an opportunity to theorise the implications of ICT work in complex social arrangements. Technology use as a means to bridge distributed environments has invoked a wide range of IS studies that examine technical capabilities, increased efficiency of work, and social aspects of technology. In the

current study, the starting point was all of the previous. Prior to the pilot study, the following relevant areas of literature are selected and reviewed: technology and organisational change; structurational research; gender and technology/IS studies; cultural studies on gender-segregation and ICT. It was found that structurational IS literature, particularly Orlikowski's Practice Lens (the duality of technology) (1992, 2000), is useful in addressing the first research question, as it provides a practice based perspective on technology in the workplace. A structurational lens is also appropriate due to the dynamic view of culture and work it can provide, and is useful in highlighting struggles among social groups and change processes resulting from ICT use (Walsham, 2002). As the research progressed, and after conducting the preliminary analysis of collected data, structuration theory's (Giddens, 1984) emphasis on temporal and spatial aspects of human interactions helped guide to a new and relevant focus that could provide insights on the second research question regarding agency. This new direction centres on the emergence of technical settings or 'spaces' in which virtual interactions take place, the character of behaviour enacted in them, and the consequent shifts in power dynamics within organisations.

This examination also necessitates delving into socio-technical perspectives on agency. And while ST is most suitable for understanding the agency of humans, its potential for understanding technical agency is limited (Rose et al., 2005). Thus, to develop a theoretical framework that can attend to both, the study follows suggestions from IS discussions on agency, specifically the double dance of agency model (Jones, 1999, Rose and Jones, 2005), to rework Giddens' concept of structure to include a pre-existing material institutional context—represented in ICTs as the material properties of the technology—of which agency may be exerted. The framework then extends concepts of 'locale' and 'regionalisation' from structuration theory to IS research, and defines 'technical settings of interaction' constituted by human and material agencies. To better understand agency in socio-technical ensembles, the study incorporates concepts from studies on sociomateriality and performativity. The field of human geography in particular has a useful and relevant engagement with 'performativity', using the concept to understand the emergence of geographical spaces of interaction, which result in new discourses that can compete with and challenge existing dominant discourses (Gregson and Rose, 2000). Table 1-1 summarises the building blocks of the theoretical framework, as well as the main

concepts and insights from various theoretical strands and their relatedness to the current study. Structural IS research, structuration theory, and sociomaterial literature shape the interpretive framework adopted in this research. The practice lens (Orlikowski, 2000) and structuration theory (Giddens, 1984) are the main interpretive perspectives. Sociomaterial concepts (Butler, 1993, Butler, 1999, Callon, 2006, Barad, 2003, Orlikowski and Scott, 2008) and the double dance of agency model (Rose and Jones, 2005) are utilized to support the interpretation process, and operationalise a socio-technical view of agency that is consistent with structuration theory.

	Theoretical Framework	Implications for the Study
Main Theories	IS Structural Research: The Practice Lens (Orlikowski, 2000)	<ul style="list-style-type: none"> - Descriptive tool to understand technologies in practice. - Useful in highlighting change processes.
	Structuration Theory: (Giddens, 1984)	<ul style="list-style-type: none"> - Conceptualisations of time-space, that define 'regionalisation' as the constitution of contextual settings of interaction within 'locales', and how this is implicated in the structuring of social practices.
Supporting	Socio-Theoretic Accounts of Agency: Double Dance of Agency (Jones, 1999, Rose and Jones, 2005), Agency and IS (Rose et al., 2005)	<ul style="list-style-type: none"> - Highlights problems of agency in IS studies. - Suggests a way forward to incorporate an understanding of technical agency in structural IS research.
	Sociomaterial Concepts: (Butler, 1993,1999), (Callon, 2006), (Barad, 2003), (Orlikowski and Scott, 2008)	<ul style="list-style-type: none"> - Highlights the under-theorisation of materiality - Draws on performance/performativity studies. - Performativity is seen as a means to operationalise technical agency.

Table 1-1: Theoretical strands of research and implications for current study

The philosophical underpinnings guiding the methodology of this research are informed by the interpretivist paradigm, which is dedicated to the study of social phenomena situated in their socio-historic contexts to arrive at culturally rooted meanings and understandings of the social world (Crotty, 1998, Walsham, 2006). While interpretivism is considered the main approach adopted by this study, a feminist

standpoint is also taken. The study follows the rich tradition of feminist research that adopts methodologies derived from their respective disciplines, but also incorporates feminist views that have at their core equality and emancipation as a primary ideal.

The chosen research design for this study is a single-case study, which adopts qualitative methods of data collection and analysis. The purpose of the study is twofold. Firstly, it investigates the use of ICT to support conjunctive work between segregated genders in Saudi, in an attempt to gain an understanding of new and emerging practices, changes in work norms between genders, and changes to the status of women in particular. Secondly, it explores the technological media in use, and in a specific socio-historic context, to understand how and why technology use can bring about organisational change. To examine the real-world phenomenon of ICT in gender-segregated work, a Saudi governmental university, Umm Al-Qura in Makkah, was chosen for the case study. The case-based approach examines technology use at the university as a whole (main case), and cases of cross-gender work teams that use technology (embedded cases). The choice of a single-case study is due to a number of reasons. The organisation under study is one of the more prominent, early-established universities in Saudi, and is seen as a representative case of higher education institutions in the country⁶ (Yin, 2003). Also, the exploratory nature of the case study necessitates extensive data collection and analysis to gain an in-depth understanding of the research problem, thus a single-case is seen as practical as well. The choice of this specific university is due to convenience of researcher and ease of access, given that the researcher is employed by, and has several years work experience, at UQU.

The study uses ethnographic methods, including interviews and non-participant observation. Participant for the study ranged from deans, heads of administrations/academic departments, managers, academic staff, employees and students. To conduct the field work, the researcher, being a female, was restricted to

⁶ The chosen university is representative of a large majority of Saudi universities, however there are a few exceptions at both the liberal and conservative extremes. For example, the recently established King Abdullah University of Science and Technology (KAUST) is a co-educational university with a mixed-gender campus—the first of its kind in Saudi (Islam, 2014). The university, largely seen as an experiment in gender equality, emphasizes equal opportunity for both genders. KAUST applies a western approach to gender-mixing and education, and does not regulate interactions between genders, nor does it enforce a female dress code. KAUST has also received criticism from conservative scholars, and is seen as a form of cultural invasion from the west.

the female campus, wherein she observed women collaborating with the male side, either by conducting office work or participating in video-conferencing meetings. Accordingly, interviews were face-to-face with the exception of male participants, which were by telephone. Analysis was conducted in 2 stages. First, the interview and observation data was analysed to understand the technologies in practice for each team, with a focus on change in comparison with previous practices. In this stage, the ICTs and applications used by each team were identified. In the second stage, data was re-examined to arrive at a set of recurring concepts and themes, derived either from the literature or from the data. Data was then codified by the researcher to develop descriptive accounts for, and compare between, each similar set of technologies in practice (Rubin and Rubin, 2005).

The study uses a “loose inductively oriented” research design, and is guided by theory throughout the different stages of research (Willis, 2007, p. 152). It also benefits from the FMA approach adopted by Al-Ghaith (2013) in that it examines a broad range of contextual and interpretive literature as a starting point, and later uses this framework to interpret and describe empirically derived themes formulated from an examination of the data. The contextual literature consists of studies on ICT mediated boundary crossing; gender and technology; gender and IS; and middle eastern/cultural studies on ICT in gender-segregated work. The interpretive literature consists of the research comprising the theoretical framework, namely structurational IS models, structuration theory, socio-theoretic accounts of agency, and sociomaterial studies. Figure 1-1 illustrates the research framework adopted to address the research questions put forward by this study.

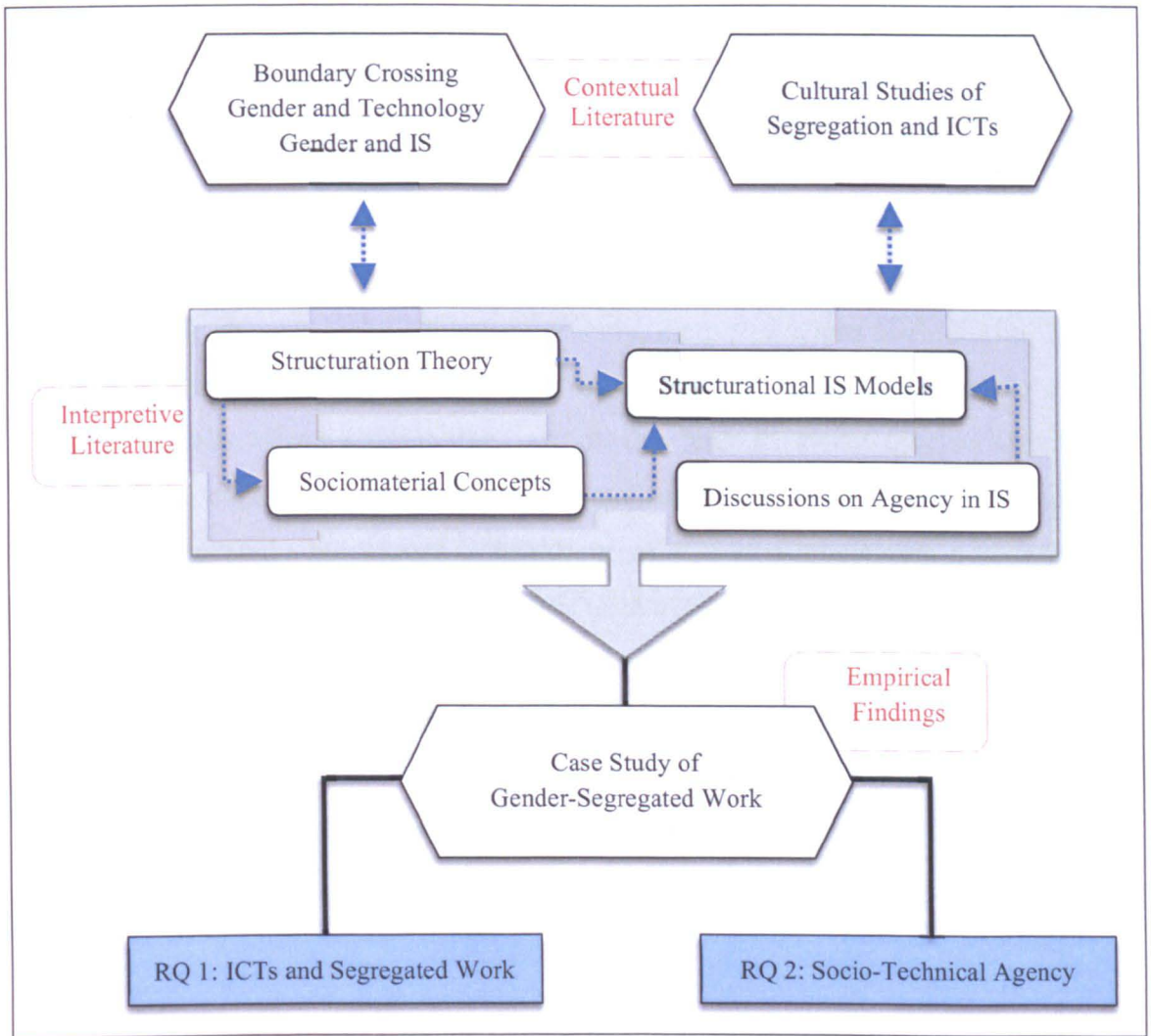


Figure 1-1: Research framework based on inductively oriented design

Furthermore, this research is significant both theoretically and practically. Practically, the study provides an evaluation of current ICT practices as utilised by distributed workers in the Saudi gender-segregated context. The evaluation examines as a main priority the status of women before and after the diffusion of ICT, in terms of equal opportunities and inclusiveness. Both the ministry of higher education and the ministry of work have expressed their on-going concern to improve women’s work status, and could thus benefit from the insights and recommendations related to policy. The evaluation details usage trends and the role of technology in bringing about wider collaboration between genders, and can be of benefit to those seeking to understand best practices and the complexities related to gender-segregated work. It also establishes the basis for a re-evaluation of segregation policies, given the ill effects this has on the female workforce and the country’s economy as a whole

(Lippman, 2013). Also, the study presents an account of technology practices aimed at bridging culturally imposed gender boundaries; and in so doing, it contributes to gender and technology, and IS cultural research.

The theoretical significance includes contributions to a number of research streams, which are either used to shed light on the Saudi context, or employ the Saudi case as a means to explore socio-technical agency. Firstly, the practice lens (Orlikowski, 2000), utilised to examine technology practices in segregated work, is applied to a new context, thereby demonstrating the use of the lens to study diverse structures. Secondly, the culturally infused distributed modes of work in Saudi provide a unique opportunity to study the spatial implications of ICT communication and how this relates to agency. The segregated context is used to explore Giddens (1984) discussion on the regionalisation of time-space, and contributes to IS research by demonstrating the utility and viability of extending this view to digitally mediated environments. Thirdly, the study examines the concept of regionalisation paired with performative views, to develop a conceptual model that elucidates the emergence of ICT spaces, their contextualising effects, and how this relates to social change.

1.4 Thesis Structure

This section provides an overview of the thesis structure, and summarises the content found in each chapter. The thesis consists of eight chapters. Chapter 1, the introduction, lays out the groundwork for the study. It outlines the background and motivation for undertaking the research project, and situates the problem of the research within existing strands of literature. The chapter also describes the theoretical framework and research design guiding the study, and the significance of the study for both theory and practice.

Chapter 2 reviews literature from four strands of research that are used to inform the current study. These are: literature on technology and organisational change, which includes the sociological theories they stem from; research on ICT mediated boundary crossing; gender and technology studies; and middle east cultural studies on ICT and gender-segregation.

Chapter 3 provides the research design and methodology adopted by this study. It describes the philosophical underpinnings underlying the interpretivist methodology and the feminist standpoint. The chapter also presents data collection procedures for the pilot and main data collection stages, as well as the method of analysis of the empirical data.

Chapters 4 and 5 represent the empirical part of the thesis. Chapter 4 provides a background to the case study and organisation where the fieldwork was carried out. It also provides a retrospective glimpse into some of the experiences of the Saudi researcher during her work at UQU, prior to undertaking this research. This includes relaying a number of narrative accounts that can provide insights into the experiences that have shaped the researcher's outlook on the topic. Chapter 5 presents the three main cases of ICT mixed-gender work examined at UQU, which are: Case 1- instant messaging ad-hoc system; Case 2- Oracle task tracking system; and Case 3- video-conferencing meetings and events.

Chapters 6 and 7 present an analysis of the data and discussion of the findings in light of the theoretical framework and research questions. Chapter 6 addresses the first research question by describing the experiences of Saudi workers using ICTs in segregated work, and the changes they have experienced over time. The chapter also includes an evaluation of the technology practices described, in terms of improving the status of women in the Saudi segregated context. Chapter 7 addresses the second research question, and explores the socio-technical aspects of technology use in the segregated context, which can account for changes in work practices. This is done by outlining the emerging conceptual model of the study, which describes the notion of performatively regionalised technical settings of interaction. The chapter exemplifies the conceptual model by applying it to examples from the case study, and also provides a further discussion and elaboration on the model.

Finally, Chapter 8 provides a synopsis of the research, and the major findings as they relate to the research questions. It outlines the original contributions to theory and practice. Also, the chapter presents recommendations/directions for future research, and the limitations of the study.

CHAPTER 2

Literature Review

2.1 Introduction

As described in Chapter 1, the main focus of this research is to investigate the use of ICT among workers in Saudi, in an attempt to understand the changes occurring in mixed-gender collaborative practices, and how this relates to the marginalisation of female workers. By examining technology use in the Saudi context, the study also explores IS topics regarding socio-technical systems, to understand the mechanisms involved in change processes, and why specific technology practices are associated with social change.

To explore these issues, this chapter reviews the relevant interpretive and contextual literature highlighted by the research framework in Chapter 1. The interpretive literature reviewed in section 2.2 includes a number of prominent theoretical perspectives on technology and organisational change. It examines early organisational research, and social constructivist theories, but mainly focuses on structuration theory, structural IS research, and sociomaterial literature.

The contextual literature examines a number of strands of research that are relevant to the context of ICT gender-segregated work. This context necessitates delving into studies that examine technology use as it relates to gender, and the underlying power dynamics involved particularly with regards to marginalised and subordinate groups. For this purpose, the literature on organisational boundary crossing is examined in section 2.3, and is found to be important in that it illustrates the socio-political aspects of ICT use, and how this relates to asymmetrical power structures. The gender and technology literature reviewed in section 2.4 is also equally important. It highlights the concerns of feminist research regarding the exclusion of women in IT fields, and their views on the emancipatory potentials of technology. These studies encompass a wide range of feminist views, and examine both western and Saudi feminist

movements. The review of these studies is also intended to provide background for, and exemplify research approaches that examine gender and technology, and gender and IS. The Saudi context is elaborated on in section 2.5, by reviewing literature on technology and gender-segregated work. The chosen studies are intended to provide background on ICT use in the Middle East, and the main concerns of previous research on the topic. It is also intended to illustrate some of the meanings attached to mixed-gender communication and ICT. Finally, section 2.6 provides a summary of the main findings of the review, outlining the key literature and its significance for the current study.

2.2 Perspectives on Technology and Organisations

Over the past three decades, management research has developed a number of perspectives on technology in organisations. Much of these perspectives originate from sociological research on technology in modern society. These studies stress the role of human action in shaping technologies and how they are used. Prior to this, technological determinism was prevalent in socio-technical research. This view considers technology to be the sole driver of social change, without taking into consideration the power of human agency. In early management research, determinism manifested into a number of theories on organisational behaviour and change. These theories generally found that the choice of technologies played a vital role in organisational success, and that its implementation would bring about inevitable and predictable change (Orlikowski, 1996). This form of determinism would come to be known as the technological imperative.

McLoughlin (1999) provides some examples of this thought, which is seen to have become widespread after the industrial revolution of the 21st century, and the mechanization of work. Management practice was prone to view workers as a “mechanical”, composite part of the organisational machine. This view, while promoting efficiency of work practices, was critiqued for de-humanising workers. Consequently, contingency theory emerged as a more humanistic approach, propagating the idea that the well-being of workers was a significant factor in the success of the organisation. This well-being was seen to be contingent on technology,

with the behaviour of the organisation and its members being determined by the technological environment. While providing key insights on the importance of adapting work practices to technological factors, still, the view is considered inherently deterministic. The contingency view dominated organisational research throughout the 1960's, but was later subjected to criticism for its overlooking the decision making process, the role of key stakeholders, and organisational politics in determining outcomes of initiatives. Criticism came from strategic choice proponents, who found that technology was one of many factors needing to be addressed in a business strategy. In this view, the determinants of success were seen to be the organisational politics and decisions regarding these factors. The strategic choice model helped change the previous image of managers from passive organisational actors to "creative mediators" (p.77), thereby offering a softer form of determinism. McLoughlin finds that, beginning in the early 70's, the more obvious forms of determinism have since been recognized and avoided in management research, but the more subtle forms still remain.

However, a major shift occurred when organisational research began using and developing IS versions of sociological theories. This was termed "the turn to technology" in the sociology of science (Woolgar, 1991). The following sections examine the prominent theories that are relevant to the current research, and their application in the IS field.

2.2.1 Social Studies of Technology (SST): A Constructivist Perspective

Beginning in the early 1980's, research on the sociology of scientific facts was used to develop theories on the social shaping of technological artifacts. These theories have since transformed perceptions on technology and society, and advanced a view of the technological artifact as being part of what we call social. They have been widely adapted and used in numerous fields of research, including IS management studies. The following outlines the two main theories in the constructivist perspective: social construction of technology, and actor-network theory.

Social Construction of Technology (SCOT)

SCOT is a sociological theory developed by Trevor Pinch and Wiebe Bijker (1984) that examines the role of users and social groups in the development of a

technological artifact. As a critique of the technological determinism of the time, SCOT argues that society is what drives technological change, and not vice versa. In the early design stages of a technology, development is influenced by “relevant social groups” that attach a shared set of meanings to the technology. A key concept in SCOT is interpretive flexibility, which describes how different social groups ascribe different meanings to the same artefact. This flexibility is what accounts for the numerous developmental paths of the same technology. After a new technology is introduced, it becomes entangled in social negotiations, and is consequently redesigned to fulfil the needs and expectations of numerous, often-competing, social groups. SCOT maintains that interpretive flexibility does not go on indefinitely; and that the technology will reach a state of closure and stabilization. What differentiates SCOT from previous models is that it examines failed developmental paths along with successful ones. Hence, the process of innovation is not described with a linear model of (research-development-use), but with a multi-directional model that examines the problems encountered during the development of the technology.

Actor-Network Theory (ANT)

ANT was developed by sociologists Michel Callon, Bruno Latour, and John Law. It observes the workings of social life as that of a heterogeneous network, in which humans and non-humans (such as animals, objects, technologies, and ideas) possess agency to affect change in the network and overall society (Callon, 1986, Law, 1992). ANT proponents, such as Law, acknowledge that this is a radical claim:

“[T]he argument is that the stuff of the social isn't simply human. It is all these other materials too. Indeed, the argument is that we wouldn't have a society at all if it weren't for the heterogeneity of the networks of the social. So in this view the task of sociology is to characterise these networks in their heterogeneity, and explore how it is that they come to be patterned to generate effects like organisations, inequality and power” (Law, 1992, p.2-3).

Therefore, in the case of people and technology, ANT rejects the view that separates the two, as the social and the technical are seen to be mutually shaped.

With regard to empirical studies, an actor-network analysis is mainly concerned with deconstructing social networks in an effort to understand how they materialise and overcome inner conflict. Its interest is in how single actors—or “actants”—come to represent the network as a whole, what is known as punctualisation or translation. Another key concept in ANT is the notion of a “script” that is played out by either human or nonhuman actors. An example of this is a computer program that is designed with a specific user in mind, and with a predetermined set of uses and allowed inputs. This program is seen to be “inscribed” by its developers with a set of behaviours to be carried out by the user (Johnson [Latour], 1995)⁷.

SCOT and ANT perspectives have become widespread in IS research, and are used to examine the mutual shaping of technology and organisations. From SCOT, IS research has benefited most from concepts of ‘interpretive flexibility’ and ‘relevant social groups’. These have been used to examine how organisational actors play a vital role in the development and use of an IS system. ANT, on the other hand, has been used extensively in analysing technological innovations and projects, particularly when these projects involve actors and networks with competing interests. The concept of inscription has been particularly useful, and has been used to examine the intent of designers and implementers of an IS system. Yet, some of these concepts have also been seen as problematic. Structuralist researchers have raised convincing arguments regarding the inadequacy of the concepts of stabilization and inscription (Orlikowski, 2000). Moreover, gender and technology studies point to SCOTs focus on the development stage of a technology, and ANTs pre-occupation with grand projects led by male heroes (Wajcman, 2000). These problems are discussed throughout the literature review. However, an additional criticism remains regarding the issue of agency. The use of ANT in IS studies has been critiqued for implying a symmetric view of agency while actually focusing on human actions only (Rose et al., 2005). Scholars using this approach are encouraged to actually “say how the computer actants act, and what the consequences of these actions are”, or consider re-theorising ANT to better address this issue (p.147).

⁷ It should be noted that Bruno Latour often writes under the pseudonym of Jim Johnson.

2.2.2 The Structural Perspective

Structuration Theory (ST), developed by Anthony Giddens (1979, 1984), is one of the more prominent sociological theories drawn upon in IS research. While the theory has relatively very little to say about technology, as it is “a general theory of social organization”; still, it is seen as one of the most influential theories in the IS field (Jones and Karsten, 2008, p.129). The following sections examine the main tenets of structuration theory, IS specific models, and the literature relevant to this study that draws on ST.

Structuration Theory

ST is a theory that describes social life; and the constitution, inner workings, and endurance or mutability of societies. In this view, social analysis is undertaken by examining social systems, social structures, and the process of structuration. Social systems are seen as social practices that are recursively reproduced by individual and/or collective actors in a social group. Structures, which are properties of social systems, are defined as the rules and resources that actors reflexively draw upon in their social practices. In other words, actors draw upon the stocks of knowledge that determine how they conduct themselves as members of this social system, and draw upon the resources that enable them to take action within this system.

The central principle of ST, and perhaps the most significant, is the duality of structure—and consequently the duality of social life—in which structure and human agency are mutually constituted. Human action is seen to create the very structures that enable and constrain this action, while structures are dynamically created and sustained by these very actions. The duality of structure implies that “the structural properties of social systems are both medium and outcome of the practices they recursively organize” (Giddens, 1984, p.25). In this way, ST provides a link between the role of individual actors in the overall construction of society.

The dynamic process of producing and reproducing social systems is defined as structuration. This ongoing structuration of systems by actors, who engage in these reciprocal practices, results in integration. Giddens differentiates between the integration of individual actors and collectives: social integration is seen as resulting from reciprocity between individuals in moments of co-presence, whereas system

integration is between actors or collective groups across time-space. ST links this with institutions, and sees the institutionalisation process as the routinization and constant reproduction of these reciprocal practices (Karsten, 2003). The strongest institutions are those that have endured longer historical periods, and are “widespread...across a range of interactions” (Giddens, 1979, p.65).

Giddens provides a “more concrete form to the duality of structure”(1979, p.81), by describing the dimensions or ‘modalities’ of structuration: facilities, norms, and interpretive schemes. Orlikowski (2000) clarifies this by explaining that social structures are not enacted in a vacuum, but rather involve drawing upon and using these modalities, which manifest cognitively (internally) as schemas or norms, or physically (externally) as facilities. It is stressed, however, that structures are a “virtual order”, and therefore do not exist in time-space, except in the moments of their instantiation, either as social “practices and as memory traces orienting the conduct of knowledgeable human agents” (Giddens, 1984, p.17). This is taken to mean that structures, i.e. rules and resources, do not exist unless they are routinely mobilized by human action (Orlikowski, 2000).

A central idea in structuration theory is the manner in which it incorporates time-space into social theory. For Giddens, this highlights “the practical character of daily activities”, along with the physical constraints on members of society, all of which contribute to the structuring of social conduct (Giddens, 1984, p. 116). While this view has its roots in time-geography studies, ST moves beyond the idea that time-space serves only as a constraint, emphasising how it also contextualises interaction, and is implicated in the generation and distribution of power.

A significant aspect of Giddens’ theorising on time-space is related to the regionalisation of interactions. In structuration theory, much emphasis is put on locales as providing backdrops for, and setting the tone of interactions. Interaction settings are seen as contextual; they are regionalised based on different zonings of time-space:

“[A] private house is a locale which is a ‘station’ for a large cluster of interactions in the course of a typical day. Houses in contemporary societies are regionalized into floors, halls and

rooms. But the various rooms of the house are zoned differently in time as well as space. The rooms downstairs are characteristically used most in daylight hours, while bedrooms are where individuals 'retire to' at night" (Giddens, 1984, p.119).

To better illustrate the concept of regionalisation, Giddens proffers the different modes in which time-space is regionalised: form, duration, span, and character. Form refers to the boundaries of the interaction zones within a locale; the "physical or symbolic markers" (p. 121) that separate one region from another. Duration refers to the length of time the interaction occurs in. Span refers to the institutionalisation of a region, whether it "extends widely in space and deeply in time" or if it is a recently constituted interaction setting (p. 122). Finally, the character of regionalisation refers to the structuring of time-space locales within social systems, i.e. the contextuality of the setting in terms of the modes of behaviour and relations enacted within it.

To elaborate on how regionalisation is implicated in the structuring of social practices, Giddens draws on and critiques the work of Goffman (1959). Goffman's dramaturgy analogy is well suited for this, as it explores the different manifestations of self, and relates human social behaviour to actors playing a role to different audiences in theatrical performances. In everyday life, the self is seen to be constructed and maintained by the actor to gain acceptance from others. The concepts of front and back stage are used in the analogy to illustrate modes of self that are meant to be witnessed by others (front stage), and the real self that is generally hidden from view (back stage). Giddens finds that this aspect of dramaturgy analysis portrays people as fake, and prefers to view discrepancies in behaviour as alternations between autonomous and normative modes of behaviour. He reconceptualises interactions as occurring with various levels of presence-availability, in contextual zonings of time-space, and in front and back regions.

Giddens suggests that the modes of regionalisation within an interaction setting—its character, form, duration, and span—are revelatory of power dynamics and struggles in the social system operating within the setting. These modes, which characterise the front and back regions of locales, are also seen as significant to the dialectic of

control. This dialectic finds that, existing within the structural properties of a system of dominance are the very means by which the subordinated can regain power:

“All forms of dependence offer some resources whereby those who are subordinate can influence the activities of their superiors. This is what I call the dialectic of control” (Giddens, 1984, p.16).

Giddens finds that back regions are among the more critical resources implicated in the balancing of power between dominant and subordinate groups. He goes on to elaborate that in situations where normative behaviour is adhered to—for reasons such as strictly enforced rules or surveillance by dominating groups—the subordinated can use back regions as a resource to regain some control.

IS Specific Models of Structuration Theory

The strong potential to use structuration theory to shed light on IS has been realized by a number of IS researchers. The theory has been utilised to examine technology use in organisations, as well as the emerging social structures and change associated with this use. In order to incorporate a structurational analysis in IS studies, and to address technological issues lacking in the original theory, two IS models were developed: adaptive structuration theory, and the duality of technology (Jones and Karsten, 2008). The following provides a brief description of these models:

1. Adaptive Structuration Theory (AST)

AST was developed mainly by DeSanctis and Poole (1994), and sought to address the complexity of using advanced technologies in organisations. AST’s analysis of system use includes examining the existing social structures within the organisation, and the structures that emerge once technology is implemented. Structures in organisations are seen as “templates for planning and accomplishing tasks” and are incorporated “into the technology” either as exact replicas or as modified versions (1994, p.125). The inspiration to develop AST was, perhaps, the advent of new forms of technologies at the time, such as collaborative systems and group decision support systems (GDSS). Unlike preceding technologies, such as spreadsheets and word processing, the new

technologies were seen to foster complex levels of social interactions, and thereby entailed a greater level of social analysis.

In AST, the structural analysis of information systems involves examining the systems structural features, and the spirit of the feature set. The structural features are the rules and resources, i.e. the “capabilities” provided by the system. The spirit is the “general intent with regard to values and goals underlying a given set” (p.126), and can be described as the designer’s/implementer’s vision behind using the system. AST presents a framework for understanding and evaluating system use, to determine whether this use is in compliance with the spirit of the system, and whether full capabilities are realised. This is done by examining the ‘appropriation’ of the technology, which is the “equivalent to Giddens’s modalities of structuration” and represents the more visible aspects of technology use, in terms of facilities, norms, and interpretive schemes (Jones and Karsten, 2008, p.141).

2. The Duality of Technology

The duality of technology model (later “the practice lens”) represents the evolvement of Wanda Orlikowski’s (1992, 2000) views on technology use in organisations. Her earlier writings sought to reconceptualise existing models of technology’s role, that were either “overly deterministic or unduly voluntaristic” (1992, p.403). By employing ST, she claims to present a non-dualistic account of technology and organisations, in which technology enables and constrains human action, while human action simultaneously shapes and draws upon this technology in interaction. This account also incorporates SCOT’s concept of interpretive flexibility, as technology is seen to be modifiable by users throughout its various stages of design, development and use. In this early model, and similar to AST, social structures are seen to be embedded within the technology. In this sense, “technology embodies and hence is an instantiation of some of the rules and resources constituting the structure of an organisation” (p.405). Orlikowski (2000) later finds this claim to be problematic, as it portrays structures as being material, and therefore at odds with Giddens assertion that structures are virtual, existing only in their instantiation in human action. She then augments her IS structural perspective, viewing social structures as being emergent from people’s recurrent interaction with the technology. Orlikowski explains that notions of embodiment are a clear influence of social constructivist

thought, and their concept of inscription. She also finds issue with another constructivist influence: the stabilization of technology. This concept, when applied to information systems, implies that they become static and unchanging after development, when empirical evidence points to the contrary. Instead, she develops a practice lens to understand technology use, in which “technologies-in-practice” continue to be modified by users. For analytic purposes, this lens acknowledges periods of ‘stabilized-for-now’ (Schryer, 1993, as cited in Orlikowski 2000), but stresses that technology can never be considered fully stabilized. The practice lens also finds that the recursive and continued use of a technology is linked to organisational change:

“Over time, through repeated reinforcement by the community of users, such technologies-in-practice may become reified and institutionalized, at which point they become treated as predetermined and firm prescriptions for social action, and as such, may impede change” (2000, p.411).

In the practice lens, the term “technology-in-practice” (TIP) is similar to AST’s appropriation concept, wherein the structural properties (i.e. facilities, norms, and interpretive schemes) utilised by a particular user group are examined to understand their views and application of the technology. However, the term appropriation is replaced with ‘enactment’, so as not to convey that structures are contained within the technology. In addition, the lens prescribes examining the other social structures enacted alongside the technology-in-practice, but examines them as backgrounded and not central structures in the analysis.

Structuration Theory in IS and Management Research

In their comprehensive review, Jones and Karsten (2008) point to the substantial body of structuration studies that have emerged over the past two decades, and explain the appeal behind ST for IS researchers. These studies have mainly been concerned with the more social aspects of system use, using ST to examine ICTs in a multitude of contexts. ST is seen to be particularly alluring because of its dynamic nature, which is useful for examining ‘technology and change’ from a practice perspective.

In addition, these studies have sought to provide empirical evidence to confirm that structuration is possible through technology (Boland and Tenkasi, 1995, Hayes, 2001, Karsten, 2003). A concept often used to demonstrate this is Giddens' depiction of time-space distanciation, i.e. the existence of social systems, and their endurance, beyond the time and place of interaction, or the "stretching of social systems across time-space" (Giddens, 1984, p.377). ICTs are shown to provide a disembedding mechanism that "allow[s] for social relations to be 'lifted out' of their traditional locale and 'rearticulated' across indefinite tracks of time and space" (Hayes, 2001, p.81).

A number of organisational studies are worth mentioning here, either to exemplify ST's usefulness in the management and IS context, or due to their relevance to the current research. The first is Karsten (2003), which uses ST to examine how ICTs are implicated in the interdependence of work relationships and work tasks. Interdependence is defined as the construction and reconstruction of social practices, which result in the mutual dependency of individuals or groups. The study draws on Giddens' work to develop four aspects of interdependence construction: social integration, time-space distanciation, institutionalization, and system integration. By using these four aspects, the study exemplifies how ICTs can play a role in creating interdependence among organisational actors. The situatedness of mediated communication is found to provide an alternative means for social integration, as it is seen to simulate the co-presence of the actors. The persistence of this integration, and its endurance across time-space, is enhanced by information storage and shared archives in ICT. These archives are seen to be drawn on to inform future practices, resulting in their reproduction and institutionalisation.

The second study, Feldman (2004), examines organisational routines and how they are linked to resourcing and the enactment of schemas. Routines are seen to embody a duality of structure and agency; the structural (ostensive) part being the abstract, legitimating idea of the routine; and the agency (performative) part being its actual enactment in a specific context (Feldman and Pentland, 2003). Through a longitudinal case study, Feldman builds on Giddens' concepts of schemas and resources, and demonstrates their cyclical relationship. With resources being considered "a source of power in social interactions (Sewell, 1992, as quoted in Feldman 2004, p.296), it is

shown that they enable the enactment of various schemas. These resources may be attained through the process of resourcing, which is defined as:

“the creation in practice of assets such as people, time, money, knowledge, or skill; and qualities of relationships such as trust, authority, or complementarity such that they enable actors to enact schemas. Thus, children must be turned into students to enable teachers to enact teaching schemas. And the types of students that are created influence what particular teaching schemas can be enacted” (Feldman, 2004, p.296).

Most interestingly, the study exemplifies how a change in the resources available to a particular group can hamper the enactment of existing schemas, or it can result in new schemas that act as additional resources, thus, the cyclical relationship.

The third study is Walsham (2002), which examines cultural issues with a structurational lens. He argues that ST “provides a deeper examination of cross-cultural working and IS than is found in the current literature”, particularly because it enables a thorough examination of conflict and contradiction (p.359). He also points to the significance of viewing IS systems as exhibiting structural properties (i.e. schemes, facilities, norms), as this provides a conceptualisation of IS as a means to provide meaning, legitimation, and power.

It can be concluded that ST has been used to provide invaluable insights in studies on change, culture, work relations, and power. However, this use is not without problems. ST’s abstractness, its under-theorising of technological issues, and its lack of guidance for empirical research are often cited as barriers to its use (Jones and Karsten, 2008, Walsham, 2002). More importantly are the problematics for IS research regarding ST’s concept of agency. Rose et al. (2005) argue that, while ST is often perceived as a non-deterministic account of the social and technical, in actuality it has “leanings” towards social determinism. In their view, this is considered a critical problem that needs to either be resolved or better theorised to enable a socio-technical understanding of agency. (See Chapter 6, section 6.4.2 The Constitution of Regionalised Technical Settings, for a more thorough discussion on the problem of agency and ST).

2.2.3 Sociomateriality

Recent IS discussions have highlighted the paucity of research dealing with the materiality of organisational practices, and have led to the emergence of a new strand of research known as sociomateriality. The interest in materiality was not entirely non-existent, as there had been notable accounts relating to this since the mid-1980s —such as the affordances literature, and inscription accounts from ANT (Jarzabkowski and Pinch, 2013). However, the more recent turn to materiality in IS research was perhaps propelled by a shift in other fields, such as the science/physics based studies of Barad (2003). Consequently, discussions on the lack of clear theoretical views of materiality and technical agency served as a foundation for sociomaterial research (Rose and Jones, 2005, Rose et al., 2005, Orlikowski, 2007, Orlikowski and Scott, 2008).

The main contention of early sociomaterial studies is the inadequate representation of the material aspects of technology practices in organisational research. Orlikowski (2007) argues that, while the reality of organisational life is engulfed by, and inseparable from, material phenomena; the material aspects of practice have been largely neglected. For IS research, a disregard of materiality has led to perspectives in which technology fades into the background, and becomes “missing in action” (Orlikowski and Scott, 2008, p.434). This excludes a few perspectives which have a long tradition of engaging with materiality, and maintain a relational ontology that rejects notions that separate technology from human action (Callon, 1986, Latour, 1988). Orlikowski and Scott (2008) articulate the new sociomaterial approach by stressing this inseparability, and present a view of technology practices as “temporally emergent constitutive entanglement[s]” (2008, p.457) between humans and technology.

The calls by Orlikowski and Scott (2008) to redirect IS research to a material focus “has fostered an entire stream of new research based on a so-called relational ontology”, which is promising both methodologically and empirically (Cecez-Kecmanovic et al., 2014, p. 809). Theoretically, this strand of research has mainly been built on agential realist foundations, stemming from the work of Karen Barad (2003), which has gained prominence in the sociomaterial literature (Leonardi, 2013). Barad’s agential realist account is posthumanist, as it:

“[C]alls into question the givenness of the differential categories of “human” and “nonhuman,” examining the practices through which these differential boundaries are stabilized and destabilized (Barad, 2003, p. 808).

In her view, the world is not comprised of “words and things”, nor subjects and objects, but rather phenomena. Her anti-representationalism goes further than that of Foucault (1972), whom she draws on, as she points out that his account still retains traces of representational thought. His narrative gives prominence to discourse and disciplinary practices over the materiality of bodies, in the formation of subjects/identities. Barad’s reworking of Foucauldian analysis involves demonstrating how the body’s “very materiality plays an active role in the workings of power” (Barad, 2003, p. 809). For this purpose, she promotes a relational ontology, and the inseparability of material and discursive practices implicated in the materialization of phenomena. As for agency, this too is inseparable from phenomena, i.e. it is only discerned from within “intra-acting ‘components’” :

“The notion of *intra- action* (in contrast to the usual “interaction,” which presumes the prior existence of independent entities/relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the “components” of phenomena become determinate and that particular embodied concepts become meaningful” (Barad, 2003, p. 815, author’s emphasis).

This means that agency emerges from enactment, and is not a property of any of the components of the phenomena (material or discursive).

Barad’s research emerges from the hard sciences, as she draws on the work of physicist Niels Bohr, and illustrates her view through the practices of knowledge production, particularly laboratory experiments conducted with the use of apparatuses. In this view, an apparatus is seen as an inseparable part of the phenomena it measures. It does not impose anything on, or inscribe materiality, but rather it intra-acts with it, enacting an agential cut, that draws specific boundaries between the apparatus and the phenomena. The outcome of this intra-action is not determined by any one component

(apparatus or material phenomena), but by both in a “congealing of agency” (Barad, 2003, p. 822).

Barad draws attention to possible comparisons between Foucault’s conceptualisation of discursive practices and Bohr’s apparatuses. Both are seen as the local material conditions that enable and constrain knowledge practices. However, Foucault’s account is one that considers materiality separate from, and passive to, discourse. Barad’s modification of the concept is based on Bohr’s epistemological shift:

“[D]iscursive practices are specific material (re)configurings of the world through which local determinations of boundaries, properties, and meanings are differentially enacted. That is, discursive practices are ongoing agential intra-actions of the world through which local determinacy is enacted within the phenomena produced. Discursive practices are causal intra-actions” (Barad, 2003, p. 820,821; author’s emphasis).

Barad’s view has generated wide philosophical discussions in sociomaterial research. While this is seen as beneficial, recent studies also highlight a number of problems arising from applying agential realist conceptualisations to empirical data, and point to the viability of using critical realism as a lens to overcome the associated impracticalities. For example, Leonardi (2013) points out that Barad’s epistemological position on the inseparability of the material from the social limits the ability to empirically operationalize materiality/technology, and places the focus of research on “what things are” (p.66). The critical realist premise that the social and the material are separate but “become ‘sociomaterial’ as people imbricate social and material agencies” shifts this focus from what, to why things come to be (p.74).

An important concept in sociomateriality is the notion of performativity, which is used to examine the agency of socio-technical entanglements. Given the significance of the concept to the current research, the remainder of this section will outline various theorisations of performativity. The term ‘performativity’ has been used in humanities and social sciences since the 1950s, and has been gaining importance over the last two decades in fields such as STS (Science, Technology, Society) (Lamontagne, 2012),

gender and identity construction, and economics. It has also been employed differently within different fields. For Judith Butler (1999, 1993), performativity is used to illustrate the prescriptive nature of discursive practices on gender construction. She argues that a person's gender is not pre-given or fixed, but rather performed. This performance is seen to replicate or cite dominant discourses and accepted gender norms, and is performative because it acts as a signification and enactment of gender (Gregson and Rose, 2000):

“[P]erformativity must be understood not as a singular or deliberate “act”, but, rather, as the reiterative and citational practice by which discourse produces the effects that it names” (Butler, 1993, p. 2).

Butler's conceptualisation of performativity has at its roots both linguistic and political influences, as she draws on J.L. Austin's (1975) work on performative utterances (Gregson and Rose, 2000), as well as Foucault's (1979) views on the normalising effects of disciplinary power. To better grasp this concept, a simpler, more basic definition can be inferred from the following excerpt, where she distinguishes between performance and performativity:

“To say that gender is performative is a little different because for something to be performative means that *it produces a series of effects*. We act and walk and speak and talk in ways that consolidate an impression of being a man or being a woman” (Butler, 2011, emphasis added).

In other words, performativity is not the mere performance of gender. Rather, it is the effect that a given culture's “doing” of gender has on its collective psyche. Through repetition, this specific performance comes to signify and re-inscribe gender, in a way that conforms to this culture's discourse.

As influential as Butler's ideas have remained, her theory of performativity has received much criticism. Her ontological view of the social agent has been noted to be abstract, and therefore neglectful of any contextual, reflexive agency (Nelson, 1999). This limited role attributed to the social agent, and consequently to materiality, has also been critiqued by Barad, leading her to suggest a modification of Butler's view of

performativity from “iterative citationality”, defining it instead as “iterative intra-activity” (Barad, 2003, p. 828).

Michel Callon (2006) finds that the denial of the role of materiality in Butler’s work is a result of linking performance to performativity, and has led Butler and others to these “culturalist excesses” in which the corporeality of the body is not considered as part of the social (p. 24). Callon’s interest is in the performativity of scientific knowledge. He explores this mainly in relation to economics theories and models, which are postulated to mould the financial markets they describe. He finds that, a discourse is said to be performative “if it contributes to the construction of the reality that it describes” (p. 7). In developing his concept of performativity (or performance), he relates the notion of interiority/exteriority, as opposed to the truth/non-truth paradigm. He finds that science, discourse and texts in general, are often actively involved in the process of actualizing their worldviews into existence. These texts are considered just as much a part of the worlds they help constitute, as are material and natural elements. They performatively constitute these worlds. The example of a mechanical device and its operating instructions (manual) is very illustrative in this regard (Akrich, 1992as cited in Callon 2006). An instructions manual is part of the device, in the sense that the device’s functionality and comprehensibility is dependant on it. It provides a course of action that actualizes the device, and helps it reach its potential to work.

The semiotic dimension of Callon’s understanding of performativity is illustrated in the previous example. However, there are also ANT influences. Both the material and discursive are seen to form socio-technical ensembles or agencements⁸:

“*Agencement* has the same root as agency: *agencements* are arrangements endowed with the capacity of acting in different ways depending on their configuration. This means that there is nothing left outside *agencements*: there is no need for further explanation, because the construction of its meaning is

⁸ Callon clarifies the meaning of the term proposed by Deleuze and Guattari (1998): “The term *agencement* is a French word that has no exact English counterpart. In French its meaning is very close to “arrangement” (or “assemblage”). It conveys the idea of a combination of heterogeneous elements that have been carefully adjusted one another. But arrangements (as well as assemblages) could imply a sort of divide between human agents (those who arrange or assemble) and things that have been arranged” (Callon, 2006: p. 13).

part of an *agencement*” (Callon, 2006, p. 13, author’s emphasis).

Performativity, then, in his view, is seen as the power inherent within a heterogeneous ensemble, which acts autonomously and with no need for exterior intervention.

Callon differentiates between a number of modes of performativity, which taken as a whole, are seen to comprise different facets of the concept. This does a great deal towards demystifying its meaning:

“[T]he notion of performativity cannot be reduced to a mysterious mechanism (the “Fiat lux et lux fit” of the Old Testament) which would cause the reality to which the statement refers to exist, without an addition of forces” (Callon, 2006, p. 21).

In these modes, discourse is seen to be actualized into a reality by acting as a self-fulfilling prophesy; a prescription; or a physical expression of this reality. In the first mode, prophesy, discourse is actualized because of the belief systems of the actors involved, who act upon statements they regard as truths, thereby bringing (feasible) statements into being. Prescription, while being similar to prophesy, involves mediated mechanisms, such as institutional practices that instil and help articulate discourse into reality. Finally, expression is the physical manifestation of statements, which acts to both symbolise and re-inscribe discourse. In describing these modes, Callon stresses that his notion of performativity must consist of the inseparable *agencements* of the discursive and the material.

2.3 ICT Mediated Boundary Crossing

IS research has long been interested in ICT in the workplace, and how it is implicated in the crossing of organisational boundaries. Recent studies examine this theme in relation to collaborative work, knowledge transfer, and organisational culture. Boundary crossing is defined as “communicating nonhierarchically, that is, laterally, at the same level of the authority structure, and ‘diagonally’, vertically outside the

chain of command” (Wilson, 1992, as cited in Hinds and Kiesler, 1995). Today ICT work practices are often implicated in some form of boundary crossing. They are seen to provide leverage for increased communication and boundless interaction; a “boundlessness” that allows for “local relations to be lifted out of their local context of interaction and ‘stretched’ across functional, geographic, and temporal boundaries” (Hayes, 2001, p.90).

It can be said that research indicating various forms of boundary crossing accelerated in the mid 90’s, when technologies such as email and the Internet became widespread. For example, Kraut and Attewell (1997) conducted a study on email communication in a global corporation, and examined its influence on the distribution of information, particularly among peripheral workers (such as employees in distant geographic locations, night-shift workers, or lower status employees). Contrary to previous research, this study found that while email generally increased knowledge within the organisation, it did not especially aid peripheral workers.

The literature on groupware technologies is important in understanding the implications of boundary crossing. Studies by Hayes (2000, 2001) are extensive in this regard. He presents a socio-political analysis of knowledge work through groupware, and examines both the opportunities and limitations that arise from working across boundaries. Hayes (2001) examines how the implementation of Lotus Notes in the UK selling division of a multi-national pharmaceutical company enabled the crossing of functional, geographic, and temporal boundaries. The use of Notes facilitated increased cross-functional discussions, awareness on information previously difficult to share within and between functions, and aided in overcoming obstacles such as the different working hours of employees. However, challenges were also noted, as employees reported difficulties in expressing their “local” experiences to employees from different functions. The discursive aspects of their activities were seen to be difficult to comprehend without background in their specific fields. And while the crossing of temporal boundaries had positive effects, difficulties arose from the delay in response time due to asynchronous modes of work.

In a subsequent study, Hayes (2008) explores the implementation of a collaborative workflow system in a high-technology optronics company. While the initial intention of implementing the system was to increase cross-functional communication and

accountability, the study demonstrates how the system was used by certain functional groups to exert control over other groups. The dominating group used the system to dictate conditions for co-operation. They also restricted cross-functional communication to information relayed through the system or formal meetings. This, coupled with the increase in the visibility of worker's through system monitoring, led to the conformity of the other group. The study also suggests that due to the manner in which ICTs are used to formalize communication, they may be "interlinked with restricting access to the bodies of knowledge of employees in other institutions" (Hayes, 2008, p.262). Thus, the studies illustrates the ways in which ICT can become enmeshed with struggles among competing groups, and can be capitalized by dominant groups to assert their power.

Other studies, such as Chauhan and Bontis (2004), point to empirical evidence on the difficulties that could be encountered from using groupware, and question the notion that it ensures enhanced organisational learning. While they assert that groupware provides a powerful means to disseminate and codify knowledge, they are also seen to entail a great deal of time and effort, such as time spent on training, or the time needed to access shared databases and participate. Without the appropriate incentives and resources, members of an organisation often revert to other better known communication methods and reject IS systems.

The widespread diffusion of ICTs in the workplace also led researchers to question the ability of these tools to support democracy in organisations, and act as "equalisers" in terms of providing equal access to communication. Early research, such as Kiesler and Sproull (1992) tended to view technology as being inherently capable of overcoming organisational barriers simply because it enables communication and is consistent with western democracy (Sproull and Kiesler, 1991, as cited in Mantovani, 1994). This view is challenged by subsequent studies which argue that democratization is not dependant on technology alone, but rather on organisational culture, individual actors, and local circumstances (Mantovani, 1994).

Not surprisingly, the Internet has gained attention in this regard, with numerous studies indicating its potential to leverage power in organisations for the benefit of stakeholders, such as activists, that have generally been considered powerless (Coombs, 1998, Gurak, 1999).

“[T]he current Internet structure flattens hierarchies, allowing people to correspond with each other regardless of corporate position or rank. ... Even within online communities themselves, hierarchy is often flattened, especially in the non-moderated conferences and newsgroups where there are no official gatekeeping structures in place. The current shape of the Internet seems to thus offer the potential for expressions from the *vox populi*” (Gurak, 1999, p.259).

Yet this potential is not without problems. Activists that communicate online, particularly in discussion forums, may not challenge information relayed to them because it “appeal[s] to their shared values” and community ethos (Gurak, 1999, p.255). The speed of delivery and the ability to reach a comparatively larger audience, can lead to the rapid spread of rumours and inaccurate information. This has led public relations researchers to describe the internet as a potent tool for publicising discontent, and they warn of the devastating impact a “cybersmear campaign” can have on a company’s reputation (Casarez, 2002).

2.4 Gender and Technology Studies

The following sections examine previous literature on gender and technology. As will become evident, this literature has been strongly influenced by western feminist thought, with its progression mirroring the preoccupations of the various strands of feminism in the past few decades. The literature includes feminist constructivist studies of technological artifacts, and management research on gender and IS. The following also examines the Saudi feminist movement, and how it has recently become more visible in light of the advances in communication technology.

2.4.1 Early Feminist Research

The research on gender and technology has evolved extensively during the past few decades, and has been heavily influenced by feminist movements. Judy Wajcman (2000, 2007) traces the progression of this research within the social studies of science

and technology, and examines the approaches to the gender technology relationship by different schools of feminist thought. These studies set out to examine how technology impacts women's lives and gender relations. Beginning in the 1970s and 1980s, liberal feminism was concerned with women's limited access to the fields of science and technology in academia and work. Its focus was on providing equal opportunities through social and legal reform. For liberal feminists, the issue of inequality was structural, and could be remedied by socialising and educating women.

Wajcman explains that, counter to this view, socialist and radical feminists questioned the very nature of technoscience, and found the manner in which gender was "embedded" in technological artifacts to be problematic. Technologies were not seen as gender neutral but "inherently masculine and antithetical to womanhood" (Lohan, 2000b, p. 901). These feminisms viewed reproductive and industrial technologies as mechanisms of a patriarchal society used to exploit women. For socialist feminists, the concern was with how industrial work and the division of labour represented a sexual hierarchy. They argued that industrial technology was designed with gendered connotations in mind. Women were continuously excluded from highly skilled technical jobs such as engineering, and instead given menial work in manufactories and offices. By the mid-1980s, the emergence of more advanced computer technologies was greeted with even more cynicism, as is evident in the writings of prominent feminist researchers such as Cynthia Cockburn:

"The advent of microchip technology does not, as some believed it might, break the technical sexual division of labour and give women the knowledge and know-how to design produce and control, as well as merely supply parts to or press buttons on, electronic equipment" (Cockburn, 1985, as cited in Cockburn 1992, p.35).

Radical feminists, on the other hand, were horrified by the new developments in reproductive technologies, and feared that this would lead to the exploitation of women's bodies. The overall view of these studies—similar to the tone of feminism at the time—was sheer pessimism regarding technology and gender equality, and an apprehension that "technological developments will [inevitably] reproduce gender hierarchies" (Wajcman, 2000, p.450).

2.4.2 Constructivist Studies on Gender and Technology

The late 1980's witnessed a major turning point in feminist technology studies. Advances in the sociology of science and technology have been credited by numerous researchers as breathing new life into this field of research (Cockburn and Ormrod, 1993, Lohan, 2000b, Wajcman, 2000, 2007). Two theories in particular have been recognised as having a significant impact on subsequent studies: SCOT and ANT. These theories challenged the deterministic views of technology prevailing SST, and due to general trends in social theory, this coincided with a shift in feminist views away from biological determinism (Cockburn and Ormrod, 1993, Cockburn, 1992) and gender essentialism⁹. Cockburn (1992) comments on this:

“It has been a significant conceptual breakthrough to acknowledge that gender is not predestined by biological sex difference. What we perceive as ‘facts of nature’ – ‘man’, ‘woman’, ‘sexuality’ – are largely cultural constructs. ... gender is more of a doing than a being. Gender is a social achievement. Technology too.” (Cockburn, 1992).

Feminist studies have drawn extensively on SST. Lohan (2000b) finds that this has resulted in a theory-collation that could adequately tackle the issue of gender and technology. She also suggests that constructivist studies have helped highlight the gender blindness prevailing technology studies. Feminists have long argued that technology research was generally carried out in sites where women were systematically excluded, such as research and development laboratories. They also pointed out that gender was not normally seen unless women were present (Berg and Lie, 1995, as cited in Lohan 2000a), and that women are often considered the gendered ‘other’ as part of a continuing male hegemony. Thus, women were absent from SST narratives because they were excluded from the very place that research was conducted. Feminist researchers such as Wajcman (2000) have found this to be a tendency of actor-network studies, which she characterises as large-scale innovation studies with “male heroes”. She describes the feminist solution to this: to apply SST

⁹ Gender Essentialism “is the belief that GENDER inequality is rooted in biological and psychological differences between women and men (such as a greater male tendency toward aggression) that operate independently of SOCIALIZATION and other influences of SOCIAL SYSTEMS” (Johnson, 2000, p.108).

tools, but go “further downstream” away from design issues, to where technologies are being used by women either domestically or at work. As a result, ensuing studies took on a new focus:

“[A]ttention in feminist technology studies was tending to shift away from the focus on women *and* technology. It was moving instead to examine the very processes by which technology is developed and used, and those by which gender is constituted” (Wajcman, 2000, p.450).

An exemplar of this approach is “Gender and Technology in the Making”, a study conducted by Cynthia Cockburn and Susan Ormrod (1993), which examines the design, marketing and usage of a mundane domestic appliance, the microwave oven. The authors set out with a specific set of aims: to demonstrate the importance of a gender analysis in innovation studies; to examine how technologies are inscribed with gendered meanings during processes of production through to consumption; and to examine how gender relations are influenced by a new technology. The study develops the concept of two symbolic spheres, the masculine and the feminine. It suggests that in our everyday thoughts and actions, we are engaged in the production and reproduction of gender spheres, which in turn determine the appropriate roles and mannerisms for each gender. By examining how gender factors into the development and use of the microwave, we are shown that the feminine sphere, “in the process of adaptive renewal, [is] constituted as of lower value” (Cockburn and Ormrod, 1993, p.76). In this brief review of the study, the following examines some of the themes that highlight this lower value of the feminine sphere.

The first part of the study was conducted in Electro UK, a manufacturing company specialising in domestic appliances. The study focuses on Electro’s introduction of a new range of microwaves being designed through the collaboration of two work teams: the male engineers responsible for the technical design; and the female home economists, whose cooking expertise is needed to test and promote the product. The home economists work in a predominantly masculine environment, where there is a structural ambiguity regarding their job roles, as they are allocated to differing departments, such as product planning, sales, or in some cases no department. The study finds this arrangement indicative that these women are more of an “interface” or

intermediary between the (male) company and the (female) end-user of the product. Hence the feminine sphere in Electro UK is “considered ‘other’, as ‘not engineering’ and as messy, out of place” (Cockburn and Ormrod, 1993, p.77).

The second part of the study examines the microwave’s influence on gender relations in the home, particularly between couples and housemates who use a microwave. It was found that despite the microwave’s simplifying of the task, cooking and preparing meals for the family was still generally considered a woman’s job. However, subtle changes were detected in male attitudes. While men had previously viewed using a conventional oven as unmanly, the microwave appeared less feminine to them because of its high-tech modern image, thereby encouraging men to use it. Another issue was that women often expressed their lack of the technical competence needed to understand how to use the microwave or fix any problems with it. They attributed this competence to their male partners, who were found in many cases to be even less knowledgeable. The authors find this reveals how women, just as much as men, reinforce negative feminine stereotypes, in this case, the technophobic female. In the end, the microwave study reiterates findings from previous research on domestic technologies and gender relations, in that a new technology often:

“steps into an existing gender context and helps to shift the masculine/feminine relation into a slightly adapted, modernized, mode without really transforming the important imbalance, the differential value, the hierarchy that characterize it.” (Cockburn and Ormrod, 1993, p.150).

The study is rigorous in its investigation of the different stages of the lifecycle of a technology and how this relates to gender. Interestingly, Cockburn (2009) recently revisits this study, and states that, a decade and a half later, it now strikes her as rather banal because of its materiality. However, she is still convinced of the importance of cultural studies in achieving a “systemic understanding of power” (2009, p.272).

The neglect of gender is not limited to SST studies, and has also been found to be the case in IS research. Gender issues remain both understudied and under-theorised despite the importance of examining gender and ICT in an organisational context (Wilson, 2002, Adam et al., 2004, Adam et al., 2006). One of the few studies in this

regard is Wilson (2002), which proposes an inter-disciplinary approach for studying gender and IS/IT, namely by combining SST methods with feminist research into organisational behaviour. To demonstrate the potential benefits of an integrated approach, the framework is applied to a case study of hospital nurses and an automated care planning system. Nurses as IS users were specifically chosen because they represent the archetypal female role, seeing that much of the characteristics associated with nursing are also considered feminine. The study examines the implementation of the Zenith system, which includes a care planning function to be used by the nurses instead of their handwritten notes. The nurses were required to first assess patients and then enter information into the system. The nurses saw this process as taking valuable time away from their patients; it forced them to prioritise between record keeping and care giving, which was unacceptable to them, as they felt that care giving was their primary role. The nurses felt that there were two categories of people entering their profession: the “hands-on, care oriented” (Florence Nightingale) types and the “career-oriented” types. The study reveals that a common perception among the nurses was that men entering the field were career-oriented, while only few women were seen in this way. The career-oriented nurses were also seen as the most competent with the technology, thereby associating the use of the Zenith system with “climbing the ladder” to management. In the end, the majority of the nurses resisted the system, mainly by continuing to use their traditional handwritten forms, and by entering minimum information into the system. The duplication of the nurse’s work—by completing both written and automated care plans—and the nurses rejection of Zenith, inevitably led management to withdraw the system. In the analysis, Wilson incorporates a number of analytical tools from SCOT and ANT, to highlight how these tools may inform an IS gender study. For example, the care planning system can be considered a script from system developers and managers, which prescribes that nurses record care activities in a timely fashion. Furthermore, the nurses are considered actants who interpret the system as incompatible with their work, leading them to resist attempts of enrolment to use it. The study also utilises concepts from feminist research, such as Cockburn’s gender spheres. It shows how the nurses’ contempt towards technology may represent a conflict of scripts in which gender is indirectly implicated; “the good nurse carrying out an archetypal female role and delivering quality care, versus the ideal [system] user prioritising the non-social task of interaction with (alien) technology” (Wilson, 2002, p.153). The study is important

in that it is one of the few accounts that attempt to theorise gender and IS, and propose a future research agenda (Adam et al., 2004).

2.4.3 Contemporary Approaches: Technofeminism and Cyberfeminism

The aforementioned studies, which resulted from intersecting feminist literature and SST, have now become known as Technofeminism or Technogendered studies (Lohan, 2000b, Wajcman, 2006; 2007). These studies stress the mutual shaping of gender and technology, and the notion that gender cannot be understood without reference to technology and vice versa. Other contemporary approaches also emerged in the late 1980's and early 90's, brought on mainly by the advent of the Internet and the growing ubiquitousness of ICTs at the time. Most notable is the Cyberfeminist movement which, contrary to its predecessors, is much more optimistic regarding gender equality, seeing the internet as a level playing field between the sexes (Rosser, 2005). Cyberfeminists define this movement as:

“A woman-centered perspective that advocates women’s use of new information and communications technologies of empowerment. Some cyberfeminists see these technologies as inherently liberatory and argue that their development will lead to an end to male superiority because women are uniquely suited to life in the digital age” (Millar, 1998, as quoted in Rosser 2005, p.17).

Rosser (2005) examines current cyberfeminist views, and finds that this approach is a mix of various feminist theories without any fully developed framework of its own. For example, she points to concerns about women’s equal access to digital technologies, an obvious extension to liberal feminist thought.

Cyberfeminists see in the internet the potential to radically transform the gender power imbalance, mainly because of its ability to foster the creation of virtual realities and transgendered identities (Wajcman, 2007). Wajcman recounts some of the more popular arguments, and finds the enthusiasm bordering on technological determinism:

“Industrial technology may have had a patriarchal character but digital technologies, based on brain rather than brawn, on

networks rather than hierarchy, herald a new relationship between women and machines” (Wajcman, 2007, p.291).

However, not all cyberfeminists are this enthusiastic, as some find that women’s oppression is extended, and even amplified, in cyberspace. These views cite numerous examples of women’s abuse online, such as the use of the internet to find mail order brides, female pornography, and prostitutes (Rosser, 2005). Thus, the Internet, similar to major technological changes in the past, has inspired conflicting utopian/dystopian views on gender. What is needed is a nuanced view that avoids “treat[ing] technology as either inherently patriarchal or unambiguously liberating” (Wajcman, 2007, p. 293).

Interestingly, Saudi feminism has been resurrected and made visible through the cyberfeminist movement, and is characterised as having a more utopian/deterministic view of ICT and the online sphere. This view is described in the following, along with the political scene in the Arab world, which is seen to have shaped Saudi cyberfeminist approaches.

2.4.4 Saudi Feminism and the New Media Context

In attempting to understand segregated work practices in Saudi, and the role played by ICTs, it is necessary to ground the discussion in the political and cultural scene of the country. Two aspects of this scene are of particular relevance here: the meanings ascribed to ICTs by Saudi society; and the once fragmented Saudi feminist movement now collectively transpiring through Internet blogs, social media sites, and online news outlets. These two issues have been increasingly shaped by changes in communication media. Long before the events of the Arab Spring in 2011, analysts such as Samin (2012) have observed this “new media context” that is seen to be reshaping the Middle East region. In the early stages of the Arab uprisings, it was speculated that events were primarily driven by social media. Social networking sites, personal blogs and microblogs¹⁰ rose in popularity during this critical time, the most

¹⁰ A Blog, short for weblog, has been defined as a website consisting of diary-like archived entries, with themes ranging from personal, corporate, political, etc. (Nardi et al., 2004). As implied from the name, a Microblog is a specific type of blog, with a speedier exchange of condensed entries (Ebner et al., 2009), used to relay textual messages or share media content. Out of the numerous microblogging platforms, Twitter has been noted as being the most popular, especially where political activism is concerned (Stieglitz and Dang-Xuan, 2012).

notable of which were Facebook and Twitter. As the initial shock and excitement died down, it became evident that claims of “Facebook revolutions” largely exaggerated the role of technology in these events. To exemplify this, Samin compares the aftermath of protests organised online in both Egypt and Saudi, the first resulting in the overthrow of the country’s leader, the second with very little effect or turnout:

“[I]t is not the Internet and social media, but rather the underlying dynamics of a given society that determine where opposition movements will emerge and persist. Social media serves largely as an accelerant of processes already afoot” (Samin, 2012, p.3).

The power of new media thus appears to be in the ability to disseminate information quickly on a global scale. So, instead of serving as the instigator in such events, social media has been more accurately described as a new form of journalism; “a real-time information stream for international-news junkies”, which is characterised as “human where other sources feel impersonal” (Hounshell, 2011, p.1).

For Saudi, the online calls for revolution did not pose any serious threat to the ruling monarchy, nor did they culminate into any major disturbances or protests. Yet because of the political changes sweeping over other Arab countries, and the perceived instrumentality of ICTs, popular opinion among Saudis began shifting towards the view that the Internet was a voice to be reckoned with. As the events of 2011 began to unfold, it became evident that Saudis were among the prominent commentators on the more potent Arab venues such as Twitter, therein drawing the attention of the general Saudi populace and attracting new subscribers. The popularity of online activism should come as no surprise given the limitations on freedom of speech and the governmental control over press and media. A few years before the Arab spring, discussion forums and blogs were serving as a space to air out criticism, and push for national dialogue and political reforms in the country. During that time, momentum was rising regarding the online sphere, and the envisioned role it could play in democratization efforts. The enthusiasm for this can be read in the words of a well-known Saudi blogger:

“If the press has been granted the title of the fourth estate because it monitors the performance of the other three estates and it relays this to the public, then Blogging is the fifth estate which will monitor the four estates combined, dedicating itself to real transparency, and holding people accountable without sympathy or hidden agendas” (Alzamel, 2009).

The blogosphere was only the beginning of Saudi online activism. The changes that occurred in the Middle East, and the role played by IT and social media, would later unleash a new era for the Saudi sousveillance¹¹ movement. Many Saudi citizens, having followed the online protest movements in neighbouring countries, began to feel the urgency to act in a similar fashion. In vigilant form, Saudis joined together online to highlight societal problems such as the rise in unemployment, the housing deficit, and the need to improve the status of women. However, given the prohibition on collective organising and physical protests, activism remained limited to the online sphere, most notably through Twitter hashtags. Hence, the Saudi Spring was not interested in a government overthrow, but rather the uncovering and publicising of various forms of social injustice on the organisational and individual level. The diligent attempts by ordinary citizens to digitally capture corrupt practices has, in many cases, led to desirable outcomes from the activists point of view. Least of which is the growing apprehension among officials that they are being monitored and will be held accountable for any impropriety. In this sense, the trend can be seen as successful in deterring would-be offenders, and has consequently led to an upsurge in whistleblowing activities and the ascent of “Little Brother”¹² (Bustillos, 2013). For many Saudis, these activities have come to be indicative of the growing influence of social media, both as a strong government watchdog, and as an alternative to state owned media and press.

¹¹ Sousveillance refers to the recording of events by participants with the use of portable or wearable technologies and communication devices. Capturing and later broadcasting material is done for a number of purposes, one of which is to fight state corruption by exposing misconduct (Mann et al., 2006). “Sousveillance is a form of ‘reflectionism,’ ... a philosophy and procedures of using technology to mirror and confront bureaucratic organizations”, and has more specifically been advocated to challenge government run surveillance mechanisms (Mann et al., 2003, p333).

¹² Little Brother refers to the sousveillance carried out by the general populace to monitor and record the activity of government agencies, corporations, or individuals. It can be seen as the antithesis to Big Brother in George Orwell’s (2009) “Nineteen Eighty-Four”, in which authoritarian rulers use technology to surveil and control citizens.

Thus, the attitude in Saudi regarding Internet and networking technologies—the meanings ascribed to them—has recently been influenced by this changing media context. These meanings are as wide ranging as the political or religious affiliations, and social classes of its residents. While these factions differ in ideology and way of life, they have managed to find semi-equal footing online, using ICTs as an outlet to pursue the interest of a specific group, promote its values, and attempt to rectify social ills and inequalities. The online experience is becoming intricately linked not only to social movements, but also to daily activities and leisure time. Social media statistics estimate that, as of January 2014, 89% of Saudis have a Facebook account (55% active), and 77% Twitter (%41 active) (Aldakhil, 2014). Saudi is also ranked among the top 13 countries worldwide for active Twitter users (at number 7 with 4.1% users, as of October 2013) (Fox, 2013). As such, Web 2.0 applications and the discussions they generate have become a source of water cooler conversations, and are followed extensively by the media and press. It could be said that there has been an almost frenzied “turn to social media” in Saudi, which along with the popularity and hype, has generated noticeable forms of technological determinism. Technology is seen to inherently provide a space of empowerment on a social, ideological, and political level. This view has become solidified in the minds of many, mainly due to the numerous and successful outcomes of online campaigns. Consequently, an exaggerated belief that social media is the panacea for all of Saudi’s problems has gone rampant:

“#Twitter has allowed us to directly engage with minds and bring down masks of deception only to reveal repulsive faces that have deceived us for a long time #Saudi Arabia” (al8nas_ksa, 2014).

“Wars are no longer managed on the ground. You only see results on the ground. Everything is executed on websites and social networks, where research is carried out, plans are developed, and mobilization for confrontation occurs. Nothing remains excluded online except actual bloodshed. But today ‘Twitter’ is the leader among all other [online] battlefields in terms of violent clashes. It is the easiest of these websites to

use, has faster interactions, and is the most popular. Consequently, it is easier to target a particular group or human gathering, as is occurring in the current Egyptian elections in the aftermath of the ‘war of the hashtags’. Through our own experience with Twitter in Saudi it can be said that what initially started as personal battles between individuals, has turned to infighting between groups of different political spectrums and thought currents, and today the battlefield has expanded further to become between us as a state and between foreign bodies and other countries” (Alharthy, 2014).

Similar to other advocate groups, the Saudi feminist movement has capitalized on the diffusion of ICT to bring attention to challenges facing women in the country. To this end, the increase in technological determinism may have triggered the onset of a new era, and propelled Saudi women to become more visible in the online sphere. The writings of Saudi feminists reflect varying forms of technological enthusiasm, and are laden with references to ICT’s role in stimulating wider discussion on female issues. For example, a recent article by Hijazi (2014) traces the activities of prominent feminists in Saudi, and begins by acknowledging the explosion in new communication media:

“Saudi women have been, and remain to be, a topic for debate in Saudi, which never ceases to appear in the media or private outlets. Similar to women around the world, Saudi female activists have undertaken the task to safeguard women's issues by calling for their rights and defending the female cause. Saudi society has always claimed an exclusivity that distinguishes it from other societies, with women receiving more than their fair share of this exclusivity. This Saudi exclusivity demands marginalisation and unjust treatment that robs women their legitimate rights; rights that are not prohibited by any definitive texts in the Koran or Sunnah. The Saudi feminist movement arose with the expansion of knowledge and information, and because it is not isolated from

the general social movement scene, it has been engaged in ideological battles similar to those fought by the community as a whole” (Hijazi, 2014).

The importance of technology to the movement is not only evident in feminist articulations, but is also reflected by the mediums in which these writings appear, and the references to information overwhelmingly stemming from ICT communication. The article by Hijazi (2014) is a good example, in that it is an exposé of IT garnered content, collected from activist twitter feeds and video posts on YouTube. Another example is the October 26 campaign organised to pressure the government to lift the ban on female drivers. The campaign spreads its message mainly through a twitter account (Oct26driving) with a large following, and other online social media sites. The specific forms of activism carried out by the campaign are predominantly Internet-based, such as online petitions and video blogs of acts of defiance.

Thus, ICT and the online sphere have been particularly beneficial to Saudi feminism, and has liberated the movement from the conservative monopoly on past communication media. What has come to public view is a fragmented movement attempting to find a meeting ground online and raise awareness on women’s issues in the country. It has also revealed a number of Saudi voices reflecting a strand of mature feminist thought, which highlights the Saudi specific context that has entangled women’s issues in the political agendas of the ruling monarchy and competing ideological groups. For authors such as AlGuwaifly (2011), this context necessitates a new form of feminism in the country, that can address the separation between female advocacy groups and the national reform movement:

“As a result of this separation between feminist issues and general reforms, most of the female elite are involved in soft forms of feminism, with very few adopting a discourse of political reform. It is now necessary to pause and reconsider the feminist position towards wider reform issues, and re-evaluate the utility of continuing to bet on what is granted from fatherly forms of authoritarianism” (AlGuwaifly, 2011).

2.5 ICT and Gender–Segregated Work in the Middle East

The diffusion of ICT in the Arab world has led to a wide interest into how technology may impact the region on a social and organisational level. The significance of ICT is due to the particular cultural make-up of these countries, in that they generally enforce gender segregation, limiting interaction between unrelated genders in institutional, public, and social spheres (Pharaon, 2004). This is due to a mixture of cultural and religious norms prevalent in Middle Eastern/Islamic countries. The extent of this segregation varies quite significantly from country to country, with conservative Gulf states such as Saudi Arabia, UAE, and Kuwait enforcing rigid segregation, whilst countries such as Lebanon and Jordan are more liberal in this regard (Tubaishat et al., 2006). Perhaps Saudi represents an extreme case, and enforces strict segregation with separate facilities for each gender, in education, work, and public institutions (Baki, 2004, Al-Kahtani et al., 2005).

During the past decade, a number of studies have been published on how ICTs are influencing gender relations in these countries. These studies are mainly concerned with general social life, with only a few examining organisational implications. Al-Saggaf and Weckert (2004) was one of the early publications on Saudi online communities, conducting their study five years after the inception of the Internet in the country. It set out to examine how online interactions were affecting individuals socially. The study suggests that online forums, which have enabled unprecedented public interaction between genders, were significantly transforming the “social landscape” and “disrupting long-established traditions” in Saudi. The study finds that after interacting on the forums, participants became more confident, flexible in their thinking, and less inhibited when communicating with the opposite sex. The study also finds that, while participants generally interacted in a manner consistent with their cultural traditions and norms, there were exceptions due to the anonymity provided by these forums.

A following study by Wheeler (2006) supports Al-Saggaf and Weckert’s findings. The study examines the Internet’s potential to enhance civic engagement and democracy in the Arab world. The study found that online interactions were

commonly being used to breach political and cultural boundaries, particularly gender boundaries.

“One form of Internet-enabled political manoeuvre in the Arab World is the attempt to use the technology to circumvent and transgress gender boundaries... Recent studies [suggest] that in the conservative Gulf, it is the politics of gender which are most easily transgressed and subverted online” (Wheeler, 2006, p.11).

To support this, Wheeler interviews internet café users in Jordan and Egypt, and finds that one of the main attractions of the internet was that it enabled these users to interact with people beyond their normal social reach, particularly members of the opposite sex. Users were fascinated by the ability to interact openly and freely with the opposite sex. They relayed stories of how online interactions often led to real life encounters, some of which ended in marriage. Other users found the Internet helped them better understand members of the opposite sex, as well as overcome their inhibitions regarding mixed-gender communication. “Cyber-experimentation can be an important training ground for women and men to develop their public voice” (Wheeler, 2006, p. 12). The study finds that this may be especially useful for women in the region, to help them better express themselves in the presence of men.

The organisation studies on gender-segregation and ICTs are mainly in the higher education context. These studies highlight the learning obstacles faced by students as a result of segregation, and the potential of ICTs in alleviating some of these obstacles. Tubaishat et al. (2006) examines learning environments in two Middle Eastern universities in Jordan and the UAE, which differed in their degree of segregation. While these universities are not completely segregated, mixing between genders is regulated, especially in the UAE. The study surveys students from both universities to examine how a wide array of ICT tools influenced their communication and collaboration with peers of the opposite gender. These tools ranged from the university’s Learning Management System (LMS), to discussion boards and email. The study found that these technologies improved communication skills, motivation to learn, and confidence levels. The study also found that students from the conservative UAE were more appreciative of the communication aspect of these tools, especially

female students, who used ICTs to improve their communication skills and help overcome their shyness with the opposite sex. The Jordanian students on the other hand, having much less restrictions on mixed-gender communication, rarely relied on technology for this purpose, and used it mainly for collaboration.

A number of Saudi studies have also been published in this vein. For example, a study conducted on female college students majoring in English, examined how participating in an online collaborative forum affected these students' self-image and social attitudes (Al-Salem, 2005). The study found that, in addition to improving their writing and critical skills, the students reported that their personal values had changed to varying degrees. They also expressed the desire to participate in topics related to women's rights, particularly rights that were in accordance with Islamic law, indicating that online forums were perceived as a medium that could aid in furthering women's causes. It is worth noting that the use of discussion forums by Saudi students is mainly from their homes or other private locations; accessing forums within educational institutions is generally prohibited in Saudi due to fears that this will encourage mixed-gender communication. This has prompted researchers to examine the feasibility of using e-learning environments in classrooms, since many e-learning tools incorporate discussion databases and instant messaging that connects users to online communities studying similar topics. As one study puts it, "any form of cyber-based interaction is regarded as a societal threat, and technology could be used to bypass cultural walls" (Mohamed et al., 2008, p.5). The study goes on to examine how a private school for girls used a customised e-learning package that prevents any form of uncontrolled cyber interaction. Students using the software were only granted access to interact with students and tutors from their immediate environment. The study suggests that the restrictions on online interaction inhibited a wider scope of knowledge sharing, and consequently, some of the benefits of e-learning were not achieved.

These findings are also consistent with more recent studies that stress "the intense social and political activity" shaping ICT use in Saudi:

"It has looked at the ways the evident social structures of Saudi society clearly influenced the patterns of adoption of educational technologies, showing this society to have been

struggling to hold on to what it already has. It has suggested that, in Saudi Arabia, technology is simply another thing that cannot be permitted to challenge the social order. Its potential and affordances were assimilated by the existing structures and used to perpetuate divisions (principally of gender) rather than challenging them” (Al Lily, 2013, p. 220).

Research on ICT has also been conducted to understand the experiences of Saudi faculty members. For example, one study examined the perceptions of female faculty in Saudi regarding internet usage, and the factors that influenced their desire and ability to use it (Al-Kahtani et al., 2005). The study interviews female faculty members from four higher education institutions in the city of Riyadh. These faculty were selected from different age groups and different academic disciplines, as variations in demographics were expected to influence perceptions of the internet. The main perceived advantages of using the Internet was that it enabled a wider range of communication, and was seen to increase the efficiency of educational research and collaboration. The study also makes a significant observation with regard to attitudes towards mixed-gender interactions:

“What was somewhat surprising is that none of the interviewees mentioned the Internet as a way to transcend the constraints of their culture. While several of the interviewees mentioned the use of the Internet as a way of collaborating with colleagues, none specifically mentioned the ability to work more with males without violating the strictures of traditional Saudi life. This may reflect a deep-seated reluctance to address this issue” (Al-Kahtani et al., 2005, p.241).

The studies previously mentioned on ICT in Arab world are among the few accounts on the topic. Upon surveying the literature, it is evident that research is primarily interested in how technology may bear on gender relations, yet these studies rarely touch upon work-related issues. The main focus is on general social life, the educational domain, and the manner in which ICTs help develop communication skills with the opposite gender. This is not to say that IS studies on the region

disregard gender, as there is a large body of literature that investigates diffusion initiatives in which gender is an important variable¹³. These studies, while important, only attempt to quantify use based on gender, with little attention being paid to understanding how usage will influence gender in the workplace.

2.6 Summary

This chapter has reviewed the relevant literature used to inform the current study on ICT and organisational change in the Saudi gender-segregated work context. The chapter has presented an overview of prominent theoretical and empirical studies in the IS field, from literature rooted in sociological research in general, social studies of technology in particular, and management and IS research. To illuminate the context of gender-segregated work and ICT, the review also examines the gender and technology literature dominated by feminist research, and delves into the cultural aspect of this context by surveying Middle Eastern studies on segregated work and IT.

Findings from the literature review point to the significantly developed IS literature, particularly with regards to the social aspects of technology use, as is evident in SCOT, ANT and Structuralist research. The review also highlights the problems associated with existing research in terms of theorising socio-technical agency and the field's treatment of materiality in narratives on organisational practices, as discussed by Rose et al. (2005) and Rose and Jones (2005), and the currently evolving Sociomaterial literature. These limitations helped direct the theoretical focus of the study to current and relevant topics in IS management research.

The IS Structuralist perspective was chosen by the current study as an appropriate lens for examining the shifting technology practices of a specific culture. Existing IS interpretations of Giddens (1984)—most notably the practice lens (Orlikowski, 2000)—present a strong body of theoretical and empirical research which has gone through rigorous refinement to stay true to the main tenets of structuration theory. However, the review points to two areas which can be strengthened in IS

¹³ See for example (Al-Shawi, Al-Wabil, 2008).

structurational models. The first is concerning the problem of agency and the lack of a proper treatment of non-humanistic agency inherent in ST. This limitation is behind the motivation of the current study to combine insights from sociomaterial research with a structurational view, and explore sociomaterial concepts such as performativity and entanglement as a way forward. The second area that can be strengthened is related to elements of structuration theory that have been overlooked in IS models, such as the importance of time-space narratives and the contextuality of interactions, i.e. the regionalisation of time-space. These elements present fruitful opportunities to understand the characteristics of digital interaction spaces, which can not only garner important insights on distributed work environments, but can also contribute to sociomaterial discussions on materiality and social practices.

Turning to the issue of gender and IS, publications on the topic have been found to be significantly lacking, guiding this study to follow the footsteps of previous researchers, such as Wilson (2002), to benefit from the more developed gender and technology strand of literature. A review of this strand reveals the strong influence of feminism, evident in the writings of prominent feminists taking on issues such as female exclusion in the IT field, and the gendered meanings that often become intertwined with technological artifacts. Over the decades, these studies have tended to reflect feminist concerns, and achieved major advances with the advent of the social constructivist perspective, as researchers explored the theoretical and methodological approaches emerging from SCOT and ANT to examine gender and technology use. The influential study conducted by Cockburn and Ormrod (1993) illustrates the utility of adopting the constructivist perspective, as the authors present a meticulous narrative of the social construction of gender and technology, and develop an invaluable conceptual tool described as the gender-spheres analysis.

The aforementioned studies provide empirically based findings that denote the appropriateness of using qualitative methods in the current study. Specifically, the practice lens (Orlikowski, 2000) guides the data collection and interpretation process involved in examining technologies in practice in the Saudi cultural context. In similar respects, the gender-spheres lens (Cockburn and Ormrod, 1993) is utilised to uncover the shared gendered meanings ascribed to the technological practices of different ideological groups in this context. Also, the boundary crossing literature (Hayes 2000, 2001, 2008) has been beneficial in terms of exemplifying the rich qualitative accounts

that can be achieved through a socio-political analysis of groupware technologies and the underlying struggles between competing groups. The following chapter, Chapter 3, elaborates on the qualitative approach adopted by this study, and describes in detail the research design and methodology.

CHAPTER 3

Research Design and Methodology

3.1 Introduction

This study examines the Saudi gender-segregated context, and how ICTs are implicated in changes to work practices and gender norms. For this purpose, a case study is used as a research strategy. Yin (2003) defines the case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context” (p.13), and views it as a comprehensive method that includes issues of design, data collection, and analysis.

The case under study is a Saudi university, which has for the past decade become increasingly reliant on ICTs for mixed-gender collaboration. Data is collected by qualitative means, namely interviews and observation of the phenomena under study: the use of ICT within a gender specific work context. Data is collected in two stages, a pilot stage and a main data collection stage. The following sections describe the research design and methodology, as well as the research methods applied by this study.

3.2 Philosophical Underpinnings

In order to discuss the philosophical underpinnings of the research methodology, it is necessary to delve into its epistemological and ontological positions. Easterby-Smith et al. (2002) describe epistemology as a “general set of assumptions about the best ways of inquiring into the nature of the world” (p.31). An epistemology is concerned with knowledge, knowing, and “how we know what we know” (Crotty, 1998, p.8). As for Ontology, it is our basic assumptions and views about the world and reality (Easterby-Smith et al., 2002).

This research is positioned within the social constructionist paradigm. Social constructionism, as outlined by Crotty (1998), is an epistemological view that our knowledge and understanding of the world is constructed socially through our interaction with the world. Reality in this view is not a pre-existing truth waiting to be discovered; it is understood by humans through engaging with it and attributing meaning to its various phenomena. Constructionism can be seen as a meeting point between two contrasting epistemologies: objectivism and subjectivism. Objectivism is the view that “meaning, and therefore meaningful reality, exists as such apart from the operation of any consciousness” (Crotty, 1998, p.8); i.e. there is an objective truth to be discovered. Whereas in subjectivism, meaning is imposed on reality by humans. With constructionism, there is no single truth but different interpretations of the same phenomena. And yet the phenomena or “object” is central in the interpretation process.

“It is therefore not a question of conjuring up a series of meanings and just imposing them on the [object]. That is subjectivism, not constructionism... Constructionism takes the object very seriously “ (Crotty, 1998, p.48).

The inter-disciplinary nature of this study necessitates drawing upon and integrating the views of two disciplines: IS management and feminist research. This integration extends to methodology, as the study triangulates to combine two methodologies in the study of the same phenomenon (Denzin 1970 as cited in Gill and Johnson, 2002). It should be noted, however, that IS research is considered the main discipline of this study, with the feminist methodology entering in to inform the IS view. The following is a description of the theoretical perspectives underlying these two methodologies: interpretivism and feminism.

3.2.1 Interpretivism

Interpretivism is an approach that was developed out of the need to research the social world in a non-positivist¹⁴ manner, as it is concerned with “culturally derived and

¹⁴ Positivism in social science research is a theoretical perspective which assumes “that the social world exists externally, and that its properties should be measured through objective methods, rather than being inferred subjectively through sensation, reflection or intuition” (Easterby-Smith et al., 2002, p.28).

historically situated interpretations” (Crotty, 1998, p.67). This form of research posits knowledge as constructed by humans, and sees theory building as a way to understand society (Walsham, 2006). Perhaps the key word here is “understand”. To fully grasp this, it may be useful to reflect on Max Weber’s distinction between the social and the natural sciences, in that the social scientist focuses on *understanding*, whereas the natural scientist’s main concern is *explaining* causality (Crotty, 1998).

Walsham (2006) explains that intersubjective knowledge, rather than objective, is the essence of interpretivism. In this case, multiple perspectives are used to construct an interpretation, and the concern is with meaning generation rather than absolute truth. However, the social researcher must be aware of what Giddens’ (1984) describes as the double hermeneutic, i.e. the inevitability of influencing the subjects or social phenomenon under study. Hence, the ability of qualitative research to produce rich and detailed descriptions (Denzin and Lincoln, 2008) must always be coupled with the knowledge that:

“value-free data cannot be obtained, since the enquirer uses his or her preconceptions in order to guide the process of enquiry, and furthermore the researcher interacts with the human subjects of the enquiry, changing the perceptions of both parties” (Walsham, 1995, p.376).

The interpretive approach is now well established in the IS field (Walsham, 2006). It is adopted in this study based on the assumption that the phenomenon being investigated—i.e. ICT interaction among genders—can be better understood from the perspective of the people experiencing it. This belief stems from the theoretical views of this study, namely those of structuration theory, in that individuals are considered knowledgeable agents who understand and reflexively monitor their actions in everyday life. It is, however, understood here that this knowledgeability is limited, providing only a fragmented picture, and therefore the need arises to bring in other forms of data to fully understand a phenomenon (Jones and Karsten, 2008).

3.2.2 Feminism

Feminist methodologies may differ quite dramatically depending on the epistemological positions adopted in the research study. Therefore, it is important to

examine the different approaches to understand what they have in common and where they diverge. One view shared among the various strands of feminism raises issue with the masculinity of modern science. Harding (1987) finds that this has been a major concern, as feminists have argued that women have been excluded from being considered “agents of knowledge”.

“[T]hey claim that the voice of science is a masculine one; that history is written from only the point of view of men...; that the subject of a traditional sociological sentence is always assumed to be a man” (Harding, 1987, p.3).

Harding outlines two strategies that have been employed to lend science a more feminine voice. The first is the use of women’s experience as an empirical resource, a strategy that has helped to produce some of the most powerful and distinctive feminist research. She bases this on the notion that traditional social research has mainly focused on experiences relevant to men, without inquiring about issues that were significant to women. This, she concludes, can only lead to a fragmented understanding of the social world:

“[F]eminist challenges reveal that the questions that are asked—and even more significantly, those that are not asked—are at least as determinative of the adequacy of our total picture as are any answers that we can discover. Defining what is in need of scientific explanation only from the perspective of bourgeois, white men’s experiences leads to partial and even perverse understandings of social life” (Harding, 1987, p.7).

The second strategy is concerned with the issue of reflexivity. Unlike positivist social research with its objectivist stance, feminist methodology encourages the practice of a form of reflexivity that clearly states the values and beliefs of the researcher, as these are seen to frame the study and should be explicit and open to scrutiny (Harding, 1987). It should be noted that SST (social studies of technology) also assert the importance of reflexivity, as this is often alluded to with regard to the contestability of scientific facts. In SST studies, knowledge—even knowledge emerging from scientific

laboratories—is considered questionable based on the assertion that the “personal careers and statuses of the main protagonists” play a key role in what is accepted as scientific fact (Latour and Woolgar, 1979 as cited in Easterby-Smith et al. 2002, p.32). Yet there is a difference between these two forms of reflexivity. Maria Lohan (2000a, Lohan, 2000b), differentiates between what she terms the ‘plain reflexivity’ of SST, and the ‘responsible reflexivity’ of feminist epistemologies. She criticises the reflexivity of SST that aims to contest claims put forth by others, and yet still maintains the detachment of the researcher:

“It is not enough constantly to stress that it (the scientific fact or technology) *could be otherwise*, and that it is socially constructed between different actors without taking into account the involvement, or the account, of the researcher him/herself” (Lohan, 2000b, p.907).

Thus, many feminists discourage the researcher from portraying him/herself as “an invisible, anonymous voice of authority” (Harding, 1987, p.9), or what Donna Haraway has termed the God-trick, i.e. “ways of being nowhere and claiming to see comprehensively” (Haraway, 1991, p.191, as cited in Lohan 2000a, p.109).

The previous can be considered some of the more commonly shared feminist views. As for points of divergence, Crotty (1998) details two research approaches that vary significantly in terms of underlying theoretical views. The first is what he describes as “feminist values” research, in which the researcher make no claims of following a feminist methodology, but instead uses a feminist standpoint to guide and inform other methodologies. The second approach is described as “feminine research” which finds that credible feminist writings can only be conducted by women. This view is adopted by feminist researchers for a number of reasons. For some it stems from the belief that feminist affiliation is exclusive to women, while others find that women have “distinctive patterns of research” (p.177) and will offer much needed “feminine” insights to supplement those offered by men.

Therefore, it is important to clarify which of these feminist approaches informs the current research. The feminist values approach, or the feminist standpoint, is seen as suitable for this study, and is incorporated into the interpretivist case study design and

methodology. The feminist values adopted here are mainly derived from liberal feminism, which stresses the importance of safeguarding the rights of women and ensuring they have equal opportunities (Tong, 1995, as cited in Crotty 1998). The fact that this research is carried out by a woman is seen as an advantage, and enables the use of female experiences as an empirical resource. Furthermore, stating the gender of the researcher is not meant to allude to any feminine forms of knowledge production. Instead, this should be seen as following the feminist tradition of reflexivity, in which the researcher not only states his/her gender, but also their background and values.

3.3 Research Design and Methods

The following sub-sections provide an overview of the research design and methods. They also outline the rationale for case selection, and the specifics of the pilot stage and main data collection stage—in terms of objectives and procedures for data collection and analysis.

3.3.1 Overview

This study uses an embedded single-case design, in which a number of cases are examined within a single institution (Yin, 2003). It employs qualitative methods of data collection and analysis. Research is conducted in two stages. Stage 1, the pilot stage, has been carried out over a one-month period, in the months of December and January, 2009/2010. Stage 2, the data collection stage, has been conducted over a five-month period, between the months of October and March 2010/2011.

Research was conducted in a co-educational, gender-segregated university in Saudi Arabia. The research site provides an opportunity to examine diverse ICT interaction settings, and the practices of segregated workers that collaborate solely through mediated communication. The study uses ethnographic methods to explore gender-segregated work, which includes interviews and non-participant observation. Fieldwork was carried out by a female Saudi researcher, who has over (8) years experience at the university under study, and has held administrative roles, including supervisor of the ITC (female branch) for (5) years. This experience provides

necessary insights into the research context, such as first-hand accounts of the events that took place during the implementation of the technologies under study. During the time fieldwork was conducted, the Saudi researcher was on an extended leave from her job post at the university, and was identified as a visiting researcher. As such, she took a peripheral membership role, and did not take part in any of the activities observed, while still having an insider's perspective on working in a segregated environment (Adler and Adler, 1994).

Participants for the study ranged from deans/heads of administrations, heads of academic departments, managers, academic staff, employees, IT technicians, and students. Participants were enlisted using a snowball sampling strategy, to help identify work teams consisting of segregated genders collaborating extensively through ICTs. Observation was restricted to the female campus, wherein women were observed collaborating with the male side, either by conducting office work or participating in video-conferencing meetings. Observation was overt, and all participants agreed to, and were aware that they were being observed. To minimise influencing participants' behaviour, the central theme of "gender collaboration" was not divulged until after the observation was conducted. Prior to observation, participants were simply informed that the study examined virtual work in distributed environments. The researcher has taken ethical considerations into account, and all care has been taken to ensure the anonymity of participants. Interviews were semi-structured, and sought to uncover how different technologies were used to collaborate, with a focus on gender related cultural attitudes (positive/negative associations, taboos, etc.). The researcher also employed a vignette technique, in which significant incidents witnessed during observation were noted and later used to elicit comments and opinions from participants (Hazel, 1995). Overall, a total of (37) interviews and (9) observations were conducted, each lasting between (approximately) (30) and (120) minutes. Observations were recorded by note taking. Interviews were audio recorded, transcribed, and translated from Arabic to English by the researcher.

From the data, (9) cases of mixed-gender work teams were discerned. Analysis was carried out to understand the technology in practice for each team, with a focus on changes related to gender-segregated work. Three main collaborative technologies were identified as relevant for the case study: instant messaging, video conferencing, and a management system (Oracle). Data was analysed to arrive at a set of recurring

concepts and themes, and was codified by the researcher to develop descriptive accounts and comparisons between cases. Data was also used to develop a conceptual model informed by the findings. During the analysis and collation of data, a number of theoretical categories were identified that led back to the literature. This approach provided a practical middle ground to iterate between empirical data and theory, avoiding the pitfalls of ignoring the literature (Suddaby, 2006). Throughout the analysis, structurational research was identified as the main interpretive lens, with sociomaterial literature guiding the analysis as a supporting lens.

3.3.2 Case Selection

This study investigates modern communication technologies in the workplace, and how they are implicated in changes to gender work dynamics in the Saudi cultural context. To do this, the case of gender-segregated work in Saudi universities is used to explore how the recent introduction of ICT and network technologies has affected work between genders. The field research is conducted at a major Saudi university: Umm Al-Qura University (UQU) in the city of Makkah. The case-based approach examines technology use at the university as a whole, which is considered the main case; and embedded cases of mixed-gender work teams that use technology. The choice of a single-case study is due to a number of reasons. The organisation under study is one of the more prominent, early-established universities in Saudi, and is seen as a representative case of higher education institutions in the country (Yin, 2003). Also, the topic under investigation necessitates extensive data collection and analysis to gain a comprehensive understanding of work practices within an organisation. Thus, for practical reasons, a single-case is seen as appropriate and sufficient.

Similar to most universities in Saudi, men and women work together at UQU but from different physical locales. The university is comprised of separate campuses—male and female—and the organisational structure is set up so that administrative units and/or academic departments consist of two branches. Work is coordinated between counterpart branches on a daily basis, with communication being mediated by traditional modes (letters, telephone calls, faxes) as well as ICTs (electronic mail, groupware, video-conferencing, and instant messaging).

The study looks specifically at the work practices of faculty members and employees, and examines cases of mixed-gender collaboration with the use of ICTs. From an IS perspective, the choice of this setting is significant for a number of reasons. Firstly, the unique work environment in Saudi presents a case of gender at work, which excludes face-to-face interactions between genders, and restricts interactions to mediated communication. In other words, it allows us to examine a workplace where men and women interact through mediated forms alone, much of which being through ICTs. Secondly, the case examines IS management within a different cultural context from the western-centric cases dominating the literature. The importance of this has been stressed by scholars, especially given the increase in global and cross-cultural work (Tricker, 1999).

The choice of a Saudi higher education institution, and this specific university, is also due to the researcher's professional experience in the field, and for ease of access. The researcher has worked—and continues to be employed—at UQU, and has also held several administrative roles at the university. During this time, she has witnessed the introduction of numerous ICTs at the university, and has been both intrigued and pleased with how these technologies are used to broaden the scope of communication between men and women. She has also been a member of numerous project teams that entailed mixed-gender collaboration, and has played an active role in the phenomenon under study. This experience, and the familiarity with the research context, is seen to enrich the data and provide an additional empirical resource, wherein past experiences can be retrospectively revisited by the researcher to understand the new cases under study (Allan, 2006).

3.3.3 Pilot Study

The first stage of data collection was carried out over a 1-month period. The purpose of the pilot study is to test data collection methods, as well as gain empirical insights that would be used to refine the research variables and theoretical framework. It sought to identify cases of mixed-gender work teams and the modes of ICT collaboration they used. In this stage, the focus was on a processual level, i.e. the situated use of a given technology and the specific work processes it supports. The field research was also attuned to changes in mixed-gender work, be it on the individual or group level, and paid particular attention to any underlying social issues.

Access to the research site was granted upon submitting a formal request to university administration, outlining the purpose of the research and its confidential nature. Due to restrictions on females entering male campuses, research activities were carried out from within the female campus. The ITC staff members were used as an initial springboard for selecting participants, as they are generally informed about technology use throughout the university, and help to facilitate this use by providing technical support. To locate work teams, the researcher explained that she was examining virtual work in distributed environments, and sought out individuals who were either collaborating with ICTs, or had insights on the practice. Initially, it was not disclosed that mixed-gender work was the focus of the study. This was in order to minimize influencing the participants before observation was carried out. When first contacting a potential participant, the researcher simply asked about collaboration in general. She later followed up on participants involved in mixed-gender teams—particularly those that relied heavily on technology for communication—and continued using this snowballing technique to locate further participants. The purpose of the study was not revealed until after observation was completed.

As shown in Table 3-1, the pilot study includes (29) participants; (14) male, and (15) female. Participants ranged from deans/heads of administrations, heads of academic departments, managers, academic staff, and employees. Among these participants, (5) mixed-gender teams were discerned. The technologies being used include instant messaging, email, video conferencing, and shared archives. It should be noted that some of the participants were not involved in project teams during the time of the study, and were selected based on their experience or knowledge in this regard.

Job Title	Male	Female	Total
Dean/Head of Administration	2	3	5
Head of Academic Department	1	2	3
Manager	1	2	3

Job Title	Male	Female	Total
Academic Staff	10	5	15
Employee	0	3	3
Total	14	15	29

Table 3-1: Pilot study participants classified by job title and gender

Data was collected by conducting semi-structured interviews and non-participant observation. A total of (14) interviews were carried out, and recorded by note taking or audio recording. These were (11) face-to-face interviews with females and (3) telephone interviews with males, each lasting between (approximately) (30) and (120) minutes. In the case of work teams, interviews were first carried out with selected team members to get an overall view of the case. This was followed by an observation of the team collaborating, if permissions was granted. These interviews generally included the following questions:

1. What types of projects are you currently working on that necessitate collaborating with IT?
2. What are the ICTs that mediate your interactions/collaboration with other team members?
3. Describe the dynamics of each form of interaction with team members (What would a typical day/week be like? How frequent is the interaction? Who initiates the interaction? What determines the choice of technology?)?
4. Have there been any positive/negative experiences as a result IT communication?
5. Have negative experiences resulted in a halt in collaboration? Why? (regardless of the answer being yes or no)

Out of the (5) work teams examined, the researcher was granted permission to observe (2) teams collaborating. Observation was carried out to better understand the team's collaborative practices, how technology factored in, and to detect any social issues or conflicts that were not brought up during the interviews. Overall, (3) observation sessions were conducted, each lasting between (60) and (90) minutes. These include (2) observation sessions for a team at administration [A] using an ad-hoc IS (instant messaging, a shared archive, and telephone), and (1) session to observe a video-conferencing staff meeting at department (c) (See Chapter 5, Cases 1 and 3). All sessions were recorded by note taking, and were immediately followed by interviews with key participants.

3.3.4 Main Data Collection

After the completion of the 1-month pilot study, a preliminary analysis of the data was conducted, to help refine the research methods and framework, and prepare for the second stage of data collection. The main data collection was carried out eight months after the pilot, and lasted for approximately five months. The pilot study directed the researcher towards the following forms of collaborative practices between genders:

- Work teams that collaborate on projects or work routines.
- Video-conferencing conjunctive meetings in departments and administrations.
- Conferences and university wide lectures that are held in conjunction through video-conferencing.

The case selection and recruiting of participants followed the snowballing technique applied during the pilot. The ITC and technical support staff were used to help locate work teams, and keep the researcher updated on any VC meetings and events taking place. While this technique relied on convenience, attention was paid to maximize variance in terms of ideological views, technical skills, and age groups. As shown in Table 3-2, the main data collection stage includes (68) participants; (25) male, and (43) female. In terms of participants, they are also similar to the pilot, but with the addition of IT technicians and students. Among these participants, (4) mixed-gender teams were discerned.

Job Title	Male	Female	Total
Dean/Head of Administration	0	6	6
Head of Academic Department	1	1	2
Manager	3	3	6
Academic Staff	11	15	26
IT Technician	1	2	3
Employee	4	11	15
Student	5	5	10
Total	25	43	68

Table 3-2: Participants in stage 2 of data collection, classified by job title and gender

The technologies examined are similar to those of the pilot study, and include instant messaging, email, video conferencing, and shared archives. Also, an additional technology was examined in this stage, this being an Oracle task management system. The fieldwork attempted to understand the following for each work team or event:

1. *The technology in practice*, i.e. the rules and resources (manifesting as facilities, norms, and interpretive schemes) (Giddens, 1984, Orlikowski, 2000). This includes an examination of the technological facilities during use by a particular work team and the dynamics of this use. It also entails investigating perceptions and attitudes regarding the technology; its role and purpose as perceived by the

users, its overall usefulness, as well as cultural issues associated with the technology (e.g. positive/negative associations, taboos).

2. *Change issues* related to mixed-gender work and the status of women in the organisation. This involves examining whether a change in technological facilities has led to changes in collaborative norms between genders; or changes to female inclusion, and participation in the decision making process. The focus on change is intended to determine whether the use of technology has improved in any way the status of female workers at UQU.

Similar to the pilot study, data collection consisted of semi-structured interviews and non-participant observation. A total of (23) interviews were carried out, and recorded by note taking or audio recording. These were (17) face-to-face interviews with females and (6) telephone interviews with males, each lasting between (approximately) (30) and (120) minutes. Generally, in the case of mixed-gender events and meetings, the researcher would first conduct an observation, which was followed by interviews with participants. As for teams using technology as part of their daily routines, an interview was conducted with the female participants first, followed by a telephone interview with male participants, and an observation session if possible. The interview questions were revised after the pilot study, and used the following script:

1. What types of projects are you currently working on that necessitate collaborating with IT? Who are your team members?
2. What are the ICTs that mediate your interactions/collaboration with other team members?
3. When did you start using technology? Was this a personal choice or part of your job role?
4. Describe the dynamics of each form of interaction with team members (What would a typical day/week be like? How frequent is the interaction? Who initiates the interaction? What determines the choice of technology?)?
5. Have negative experiences resulted in a halt in collaboration? Why? (regardless of the answer being yes or no)

6. Regarding your work, what is the role being served by this particular technology? Do you think this role is in compliance with what system implementers, policy makers, and university officials intended?
7. How useful has this technology been for your work? In social matters at work? Do you feel it is important to continue this use? If so, why?
8. What are the positive and/or negative aspects of IT use you have encountered?
9. What are your views on mixed-gender communication at work via ICTs? Do you feel this is socially acceptable?
10. Has your work differed in any way after collaborating with IT?
11. In your department, how involved are women in the decision making process? Is the female branch dependant on the male for these decisions? Or is it a more democratic process? Has this changed over time?
12. Has the use of technology brought about changes to: a) gender norms, b) women's status in terms of overall participation, decision making, and visibility?

The researcher was granted permission to observe all (4) work teams collaborating, in addition to observing a university wide video-conferencing event (a scientific seminar). Overall, (6) observation sessions were conducted, each lasting between (1-3) hours. These include: (2) observation sessions for a team at deanship [B] using an Oracle task management system; (1) session to observe a video-conferencing staff meeting at department (d); (1) session to observe an administrative VC meeting at deanship (x); and (1) session to observe a work team at deanship (y) using an ad-hoc system (See Chapter 5, Cases 2 and 3). All sessions were recorded by note taking, and were immediately followed by interviews with key participants.

3.3.5 Data Analysis

Data is analysed by following an inductive approach, as described by Ryan and Bernard (2000). Analytic induction is a method that examines cases or instances of a phenomenon to develop explanations for its occurrence. This is done by a progressive examination of the cases in order to find explanations that apply to them all. This is

contrary to deductive methods, in which hypotheses are developed first and later tested on specific cases to arrive at causal explanations.

The analysis looks specifically at the various technologies-in-practice and how they are implicated in organisational and cultural change. It is guided by concepts derived from theory, mainly those emerging from structuration theory (Giddens, 1984) and sociomaterial research (Orlikowski and Scott, 2008). While not being specific to IS (Jones and Karsten, 2008), structuration theory is often used to delineate the more social aspects of IS. It provides us with “a description of the nature of human action and social organisation” (Walsham, 2002, p.361), and the vocabulary to describe elements of the social world and the human actions within it (Jones and Karsten, 2008). The sociomaterial literature was used to guide the analysis regarding aspects of the socio-technical agency in the practices examined, and is seen to complement the structurational view in this regard.

To prepare for the analysis, data was transcribed and then translated from Arabic to English by the researcher. The open-ended interviews and observational data formed the basis of narrative texts to be analysed. As depicted in Figure 3-1, the analysis was carried out at two levels, the first unit of analysis being mixed-gender teams, and the second unit of analysis being the collaborative ICT application or system.

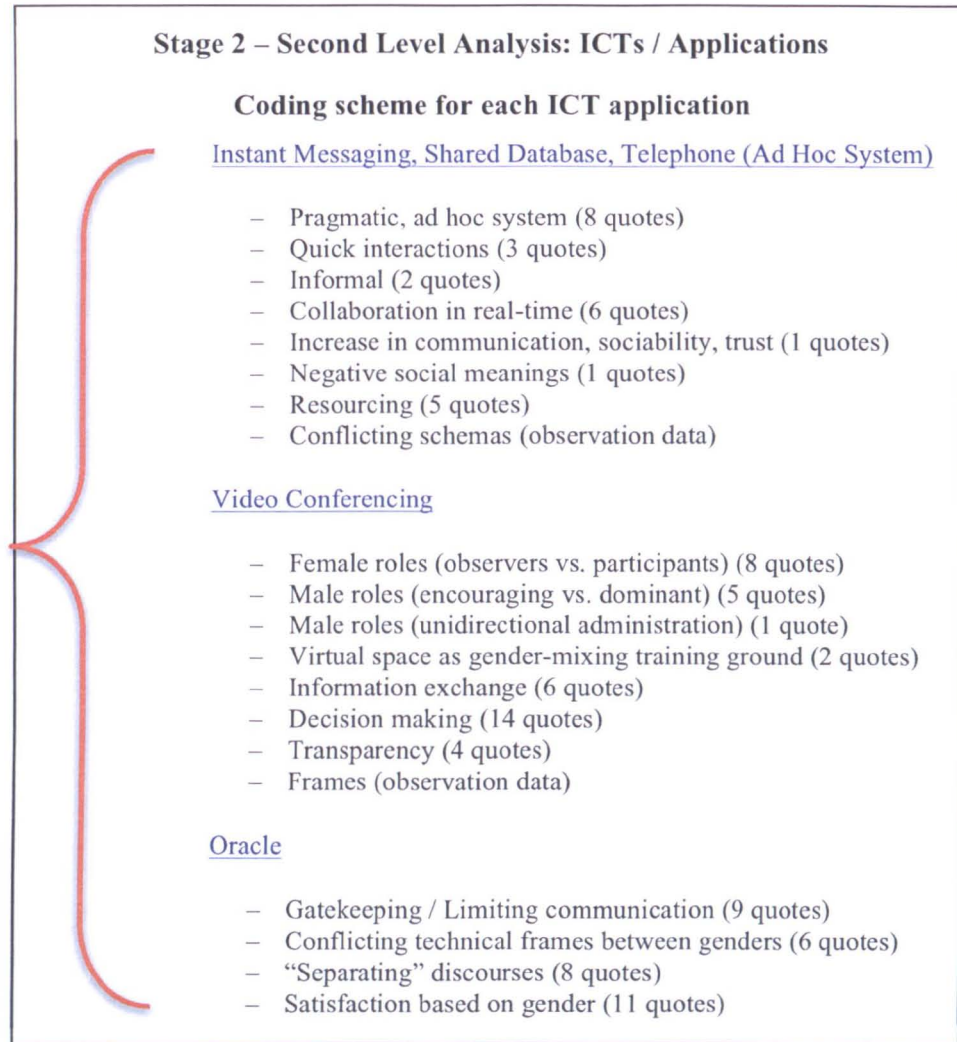
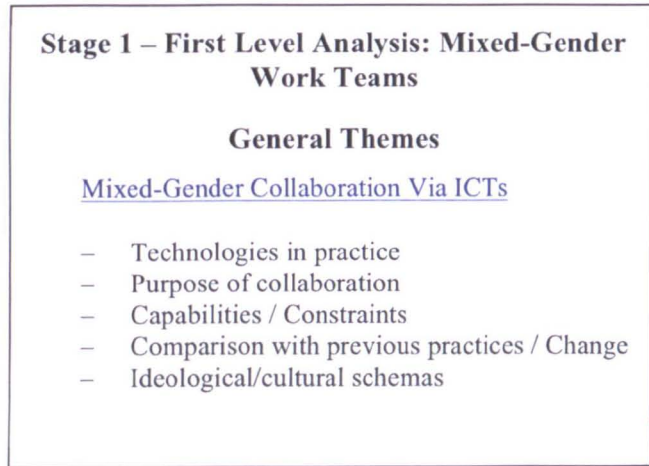


Figure 3-1: Stages of data analysis and coding scheme

The two levels of analysis were carried out as follows:

The first stage of analysis: The interview and observation data was analysed to understand the technology in practice for each team, with a focus on the purpose of collaboration, capabilities/constraints, ideological schemata, and change in comparison with previous practices. In this stage, the ICTs and applications used by each team were identified. From the (9) teams examined, (3) different technologies were found to be used for collaboration: 1- an ad hoc system using instant messaging, telephone, and a shared archive, 2- video conferencing, and 3- an Oracle management system.

The second stage of analysis: Data was re-examined to arrive at a set of recurring concepts and themes, derived either from the literature or from the data. Data was then codified by the researcher to develop descriptive accounts for, and compare between, each similar set of technologies in practice (Rubin and Rubin, 2005). A total of (20) codes and (102) related quotes resulted from the data analysis (see Figure 3-1).

More specifically, the analysis uses Orlikowski's (2000) practice lens to provide detailed descriptions of a technology in practice and understand change processes. As depicted in Figure 3-2, the study conducts a case-by-case analysis, which is done in a chronological fashion. This includes providing a case background, followed by an examination of:

1. *Gender issues in relation to the technology-in-practice, at different stages in time.* 'Gender' and 'technologies-in-practice' are both seen as social structures; examining these structures involves understanding the dimensions or 'modalities' of structuration; i.e. the rules and resources (facilities, norms and interpretive schemes). The socio-cognitive literature on schemas or frames is used to understand the various dispositions regarding ICT in segregated work, and the role of cultural factors. Schemas are defined as a common set of beliefs and assumptions held by a specific group to guide them on how to proceed in social interactions; the concept has been linked to structuration theory's interpretive schemes that describe mutual knowledge (Karsten, 1995). The examination of schemas provides a backdrop for Saudi culture, and has been instrumental in organising the findings. It has also been found to provide valuable insights into the

usage and interpretation of technologies within a specific context (Orlikowski and Gash, 1994).

2. *The case in terms of stability/change.* This includes looking at the case’s structural properties over time to determine whether a change in facilities (i.e. technology implementation) leads to a change in norms, interpretive schemes, or social and system integration.

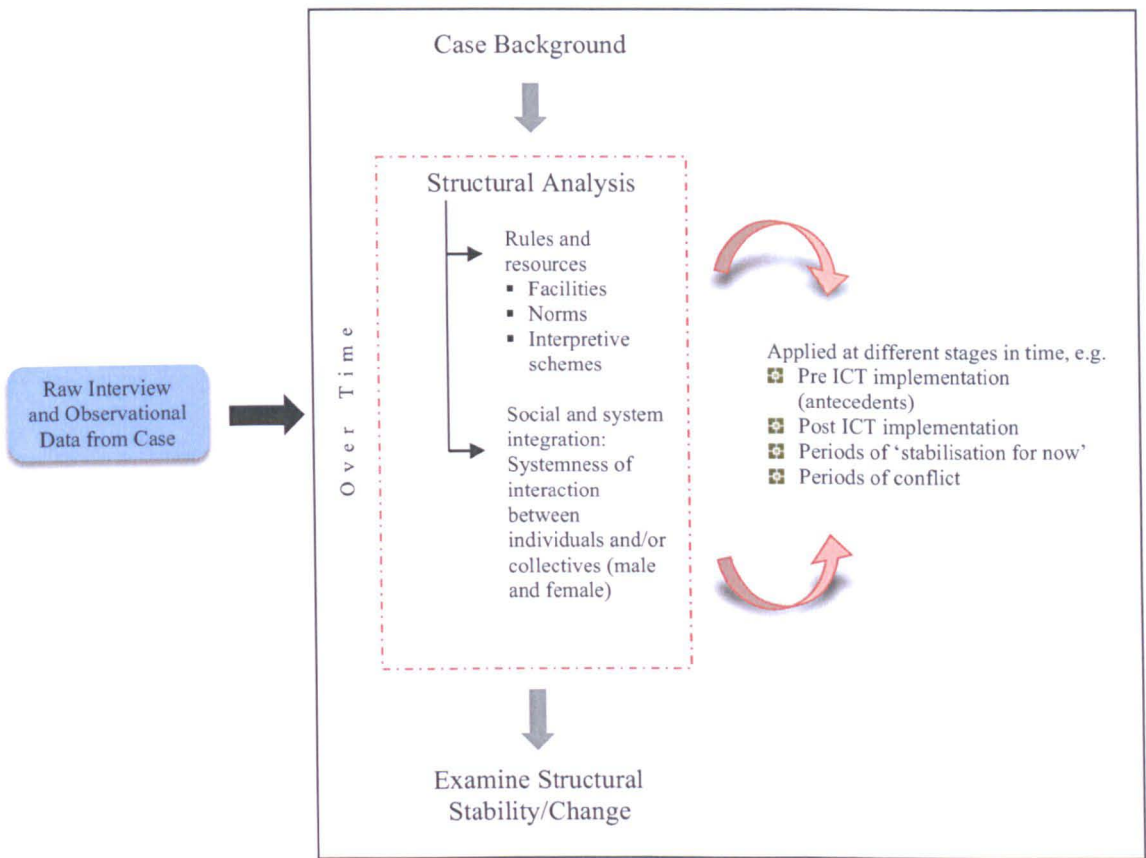


Figure 3-2: Case by case structural analysis, adapted from Orlikowski (2000)

After examining each case independently, an analysis is carried out to evaluate change in terms of mixed-gender work practices, particularly how this affects females as a marginalised group. This evaluation is guided by Cockburn and Ormrod’s (1993) gender spheres analysis. Cockburn and Ormrod adopt a constructivist perspective, which examines interpretive flexibility to describe the shared social meanings of different groups. The current study, however, describes gender spheres as they relate

to the frames or interpretive schemes of social groups. Finally, the study attempts to synthesise the findings and develop a conceptual model, to better understand the gender dynamics enacted through ICTs, and to account for structural stability and/or change.

CHAPTER 4

Case Study Background

4.1 Introduction

The following chapter provides a background to the case study and organisation where the fieldwork was carried out. It begins by introducing the university under examination, and describes the various types of ICT and network technologies used to facilitate mixed-gender work. This is followed by a retrospective glimpse into some of the experiences of the Saudi researcher during her work at UQU, and prior to undertaking this research. This includes relaying a number of examples regarding technology use in the distributed modes of work brought on by segregation. These examples are not intended to be part of the case study. They are included here to give additional insights into some of the experiences that have shaped the researcher's outlook on the topic, and could also allude to the motivations to carry out the research project.

Section 4.2 outlines three general uses of ICT for mixed gender work at UQU: 1- administrative collaboration; 2- conjunctive university events and meetings; and 3- male lecturers for female students. Section 4.3 presents a number of examples retrospectively revisited by the researcher, which are intended to illustrate some of her experiences on ICT and gender-segregated work.

4.2 Mixed-Gender Collaboration at UQU

The study was conducted at Umm Al-Qura University, which is under the auspices of the Saudi Ministry of Higher Education. UQU was established in 1981, and is distinguished by its location in the holy city of Makkah. The university employs over 1,400 faculty members, and has a student population of around 20,000. In addition to

its branches in the city of Taif, the university has three main campuses in Makkah: two male campuses in Al-Aziziyah and Al-'Abdiyah areas; and one female campus in Al-Zahir.

Information and networking technologies were gradually introduced at UQU by the ITC beginning in 1999. This involved building a fiber optic infrastructure for LAN, and an extensive infrastructure for Tandberg video conferencing technology in all three campuses. The ITC also invested largely in supplying office computers for administrators, faculty, and employees; as well establishing networked computer zones throughout its various campuses, to facilitate student lectures, training, and library services. After the implementation of network technologies, the use of ICTs in mixed-gender practices grew dramatically. These uses are described in the following subsections.

4.2.1 Administrative Collaboration

The use of ICT to support formal and informal collaboration in administrative work has become an established practice at UQU. This mode of work is used to maintain a link between employees and academics to their co-workers of the opposite gender. Members of administrative units and academic departments often work in teams based on their area of expertise, and these teams will most likely consist of both genders. The level of interdependence between genders varies from unit to unit, as this depends on the type of work carried out, as well as the personalities and ideological leanings of the people involved. At UQU, it is quite common to find units that are highly collaborative, and still equally common to find limited communication between genders in other units. This may also vary among members of the same unit, as some individuals are more inclined than others to work with the opposite gender. As for communication modes and media types, they are as follows:

1. *Email*: This is used when a formal method of communication is needed, such as requests for information or assistance. It is also used between team members for file sharing and quick exchanges, and is often used to supplement telephone conversations for follow up information. In addition, the university technology center has set up a variety of mailing lists for different functional groups and academic departments. Emails distributed by these lists are formal

newsletters authorised by heads of departments, as well as work related memorandums from employees and academics.

2. *Video-conferencing*: Video-conferencing meetings are now held regularly between male and female branches/campuses. These meetings range from university wide meetings headed by the university rector, to departmental and interdepartmental meetings of academics and employees. They are held in the numerous video-conferencing studios dispersed across the three campuses, which are fully equipped with Tandberg video-conferencing technology. The conferencing system is connected to a projector and audio equipment, and what is often transmitted is a video image coming from the male branch with only audio from the female side. Either side can also transmit presentations slides, or other electronic media from different applications. If there is a high demand on the conferencing studios, meetings are sometimes held in the various classrooms or computer labs equipped with the same technology. In addition, the Tandberg technology provides extra flexibility in that it can be used in any network socket throughout the university campuses, and contacted directly through an assigned network IP address. This allows workers to move the technology from room to room, and conduct meetings from any location, such as department boardrooms and personal offices. The downside is that the technology is expensive, so only a limited number of devices are available at a given time.
3. *Shared databases*: Communication between segregated genders is also facilitated by different types of shared databases. For example, some units work with groupware and task management systems, such as Oracle, that enable users to interact and post comments to each other. This is used by mixed-gender teams to organise work tasks, and as a means to stay connected with the other branch and document this work through system archives.
4. *Instant messaging*: Communication is also facilitated by instant messaging computer and web-based applications. This is used in a manner similar to email communication; i.e. for file sharing, sending quick requests, or having textual conversations (chatting). IM communication may occur either during, or outside of office hours. However, this form of interaction entails a great degree of trust because of negative social attitudes towards mixed-gender IM,

and will only occur between genders when they have known and worked together for a substantial amount of time and have developed this trust.

4.2.2 Conjunctive University Events and Meetings

Another way in which gender collaboration occurs through video-conferencing is by conjunctive participation in conferences, ceremonies, lectures, and departmental events. Each of the three university campuses has a number of large auditoriums and lecture halls, equipped with video-conferencing devices, projectors/sliding screens, and audio equipment. The manner in which a typical event would proceed is a video and/or slideshow presentation from the male side, with audio and/or slideshows from the female side. Usually there is a specific program agenda, with coordination between both sides to ensure a smooth transition between speakers. There is also high coordination between IT technicians from both sides, to resolve any technical problems that may occur. If the event being held is a major event, the technical support team will include up to four members from each side. Over the course of time, this type of event transmission has become very frequent and popular, with an average of four small events per week, and two major events per month.

4.2.3 Male Lecturers for Female Students

Universities in Saudi have, for a number of decades, relied on male lecturers to teach female students, either through CCTV or VC. This is because there are often less female lecturers in an academic department, and this practice is used to compensate for this imbalance. The practice is also needed when there are staff training courses or workshops in which the only experts available are male instructors. The teaching occurs in classrooms or computer labs, with a video transmission or slideshow presentation being transmitted from a lecturer studio. Communication between lecturer and female students is carried out by microphones, which are passed around the female classroom or permanently fixed to the walls or ceilings. Variations of this do occur, as some departments will have a teaching session in which a male lecturer is teaching both male and female students simultaneously. In this case, the lecturer does not teach from the studios, but lectures to an all male classroom, and has this lecture transmitted live to the female class.

4.3 Retrospective Reflections on ICTs and Segregated Work

The following section presents narrative accounts of the researchers experiences after the introduction of ICTs at UQU. The events described began approximately seven years before undertaking or even contemplating the current research. During this time, the researcher held the position of female supervisor at the ITC, and was therefore privy to various IT experiences of an exclusive nature. These examples demonstrate the utility of the new ICT practices in bringing about wider mixed-gender collaboration. They highlight the initial over-enthusiasm of the researcher, due to the success of such practices and the popular reception at the female branch. They also point to her growing disillusionment after encountering a number of set backs relating to the cultural exclusion of women; which were intensified by, and made visible through, the increase in ICT mixed-gender interactions.

The following accounts as described by the researcher are seen as personal experiences, and are therefore presented as narratives in the first person.



The following accounts present some of my work experiences at the university, which took a shift from limited collaboration with the male branches, to a sudden influx of communication mediums that helped connect the two sides. The examples were chosen due to their relevance to the research, in that they refer to the specific ICTs examined in the case study upon their initial use. They are also experiences that stood out for me personally, and were turning points in my perception regarding technology use in segregated work. Thus, the stories describe my journey from a hype-driven view that technology would provide grand solutions for critical gender issues and female inequality in Saudi; to a more realistic view that sees ICTs potential for change, while still recognising that there are major obstacles to be overcome.

4.3.1 Video-Conferencing as a Popular Medium at the Female Branch

The first major shift in mixed-gender work, in my opinion, occurred after the implementation of video-conferencing systems across the three campuses. I had been

asked by my supervisor to discuss with female administrators the possibility of installing conferencing devices in the main assembly halls. I soon found there was no need for convincing. Female management was delighted to hear of the potential to become more involved in male centered events, and to participate in proceedings held at the male branches, such as conferences and guest lectures. Attending these events had been seen as an impossibility by management, due to the strict gender-segregation at UQU. Upon hearing about the Tandberg technologies, female management became very excited, and began to follow up with me regularly, asking when the systems would be set up. They also granted access to all major halls, and encouraged the ITC to install the systems with no restrictions. After implementation, management decided to test pilot the system by holding conjunctive sessions for a scheduled nationwide conference that was sponsored by UQU. I was among the coordinating team for the conference proceedings, which took place over the course of a week; and the ITC arranged for technical support staff from both sides to attend and ensure there were no problems during the sessions. The conference was held in large auditoriums on the male and female campuses, and both genders participated in the conference proceedings simultaneously through VC. Conveners from both branches co-organised the proceedings; as each branch selected designated organisers, who would introduce speakers from their side, keep time, and mediate the question and answer segment. If the presenter was from the male side, it was typical to transmit a video of the speaker to the women's section; whereas women transmitted an audio stream of the talk along with the presentation slides. Having attended most of the sessions, I felt there was high participation from both sides throughout the week. To me, this first event was very successful. Before acquiring the conferencing systems, females were unable to attend these types of events because they were held in the male section. At the time, it was typical to simply have two separate conferences in each branch, and thus have male only and female only proceedings. The enthusiasm of the female side regarding VC was visible, both during and after the conference, and I received promising feedback from female faculty members expressing how beneficial it was for them to be able to attend these types of events, and have discussions with male academics in their field.

4.3.2 Mailing Lists and the Gender Inappropriate Email

In an attempt to encourage digital communication among workers, the ITC set out to create a large number of email mailing lists, granting access based on departmental and functional affiliation, while also including members of both genders in each list. Workers throughout the university were automatically enrolled for the service. The mailing lists had a varied reception by university members, and interactions ranged from very active lists to the very stagnant. The mailing lists had been in use for some time when an incident occurred involving members of an administrative unit, regarding an email sent to their list from a female member. I was forwarded a copy of the email, in which the female had sent an informal greeting to the group, expressing her gratitude and excitement for being added to the list. The email, in my view, was unprofessional in its tone, particularly her signature, which used an acronym instead of her name. Members from both sides received her email, however the male workers were particularly upset about the informal tone, and complained to department management. The female who had sent the email was admonished, and was required to send an apology to the list and head manager. My personal view on the incident is that the female had acted unprofessionally and needed to be reprimanded. However, I feel the male side had an exaggerated response, and the manner in which they spoke about the incident implied inappropriate behavior towards the opposite gender, something I strongly disagree with. The female had explained that she was emailing in the same informal manner as the men's department, and her behavior was singled out because she was the only female on the list. The anger expressed by the men was (in my opinion) stemming from the fact that she had sent this type of email to the men's department. If she had sent this to females only, she may have been criticised but not to the same degree. Similarly, if a man had sent the same email to a group of both genders, I suspect he would have been treated in much the same manner. Thus, it appeared that the workers were trying to establish a gender appropriate code for emails on the list. This was disappointing for me due to the fact that the emphasis was not on unprofessionalism, which would have been acceptable in my view. Instead the emphasis was on gender, and the cultural rules that reinforced separation and the negative social meanings attached to mixed-gender communication.

4.3.3 Instant Messaging and the Consequent IM Ban

A similar incident to the previous occurred with regard to instant messaging. Upon receiving office computers, workers throughout the university began using instant messaging applications to communicate with their colleagues. This served particularly useful for one administration, in which the workers found IM helped them stay connected with the opposite branch. The male and female workers used IM to send each other quick questions or requests, but did this discreetly without the knowledge of their functional supervisor. This type of interaction lasted for several months, but was halted by the male supervisor, who had found out about the application use, and found this type of communication questionable. He informed the workers of his intentions to request the ban of IM by the ITC. He then contacted the network administrator, and requested that the software be prohibited or blocked. Upon hearing about the incident, and to avoid any unnecessary problems, the ITC management decided to block the use of IM for all users at the university. It later came to my attention that workers had simply worked around the block by accessing IM through a web-based version of the software. Despite this knowledge, I decided to turn a blind eye to this, and did not inform the supervisor. This was not only because I feared the repercussions on the workers, but also because I felt the ban was unfairly imposed. I personally knew the women using IM, and they had explained to me how beneficial this communication was for their work with the male side. Previously, they had relied on the telephone, which served unpractical at times, especially when dealing with hard to reach mobile workers. As opposed to the telephone, instant messaging usually guaranteed them a response because of the asynchronous modes provided. To me the incident represents a culturally driven panic; a rejection of technology based on fears of unanticipated and unpredictable social change.

4.3.4 Groupware Gender Conflicts

As the female supervisor of the IT centre, I was involved in a project in 2006 to create a prospectus booklet for incoming and prospective students. The project was intended to revamp the old prospectus, which was in need of a fresh new look and contained out-dated information. The team consisted of male and female administrative workers from a number of departments. The project involved contacting various administrative units to collect the needed material for the booklet. The project team thought it would

be a good idea to organise tasks through a groupware technology, which allowed users to communicate, report on progress regarding the collection of the material, and enter the collected data for review by selected team members. The team was headed by a male project leader, and I acted as project liaison for the women's branch, and overlooked the female team. The mixed-gender team worked together on the project for over 2-months, and their initial communication was by telephone, email, and instant messaging in addition to the groupware technology. Initially, I was informed by telephone of the job duties of the women on the team, and was also informed that the male side would be in charge of granting access permissions on the groupware. After starting work on the project, issues began to arise regarding coordination between the two sides. The female worker coordinating tasks on our side encountered a number of problems due to access permissions on the groupware. She tried contacting the male worker in charge to alert him to this, but he became uncooperative and did not respond to her calls or emails. This delay in his response held up the female coordinator for a number of weeks. This was finally resolved when the team from the female branch complained to the male head of the project, stating the need to have certain access permissions, which were granted accordingly. Work on the project continued for some time, but complications kept surfacing due to a lack of coordination between the male and female workers. The female coordinator felt that some of the male team members were making changes to group specific tasks without informing the female side. To resolve this, she requested that the men fill in a system log; clearly stating who made the changes, when, and for what purpose. This helped in the coordination to some degree, yet there was still an underlying conflict between the male and female workers. When the conflict reached its peak, the male head of the project was consulted to resolve the dispute, and he tried for some time. In the end, however, the female team was informed that having both sides update the groupware was resulting in too many problems, and that this would now be done from the male branch only. This resulted in basically phasing out most of the female team members, except those responsible for data collection and entry. I remember conversing with the female coordinator involved in the conflict, and hearing her opinions on the events. She strongly felt that the reason the male workers were uncooperative was because she was a woman. I asked her if the male worker in charge of permissions made any comments regarding the quality of her work. She simply reiterated, "It's because I'm a woman. I think [he] was just disturbed about having to work with women". She

explained that the reason for this might be the fact that the male members were conservative with regards to mixed-gender work. The events surrounding the conflict and its resolution were very disappointing from my point of view. To me, the female coordinator was just as competent as the male team members, but was unfairly removed from the team simply because it was easier to do so. The male team members largely outnumbered the females, and at the time, the male project leader had become increasingly annoyed with the complaints from both sides. Although he expressed regret at having to making the decision, he explained that it was much easier to dissolve the female side of the team, and make do with the workers that were closer to him physically.



CHAPTER 5

Case Study – ICT Enabled Collaboration in the Gender-Segregated Context

5.1 Introduction

The following chapter presents the data analysis findings from the case study interviews and observation sessions. The main objective of the study was to examine the use of collaborative technologies among workers in Saudi higher education organisations, in order to understand how ICT use is changing work practices among genders in segregated environments. Data collection sought to uncover ICT practices aimed at integrating segregated branches and promoting collaboration between genders. The field research had three focus points: firstly, to identify diverse enactments of technology use; secondly, to understand the benefits and limitations of use from the perspective of the workers; and thirdly, to uncover the cultural connotations related to gender-mixing in the virtual sphere, such as gendered behaviour, positive/negative associations, taboos, stigmas, etc. The researcher also employed a vignette technique, in which significant incidents witnessed during observation were noted and later used to elicit comments and opinions from participants.

The case study investigation consisted of (9) embedded cases of cross-gender work teams using (3) technologies or similar technological systems: an ad-hoc system, (2) work teams; an Oracle management system, (1) work team; and video-conferencing technology, (6) work teams. Findings are presented as three separate cases to reflect the use of each technology at the research site. The first case, section 5.2, describes the practices of one of the two teams found to use an ad-hoc system, which consisted of a triangulation of instant messaging (IM), telephone, and a shared network drive. The second case, section 5.3, describes work within and administrative unit that uses an Oracle task management system. The third case, section 5.4, combines the findings

from the six work teams using Tandberg video-conferencing technology to conduct joint meetings and/or events.

In general, the findings are organised to highlight a number of themes, derived either from the data analysis or from past literature. Themes include the discrepancies found in organisational practices before and after ICT use, cultural themes related to virtual gender-mixing, as well as women's issues and the changes to female status. Each case consists of a brief background, followed by the main analysis of the technology in practice guided by the interpretive framework of structural IS research. Interwoven within the case narratives are the ideological interpretive schemes of IT use in Saudi (illustrated through the conservative-moderate-liberal typology described in Chapter 1, section 1.2 Research Background and Purpose), which have been instrumental in analysing the cultural aspects of IT enactments. The presentation of findings includes a description of the vignettes observed: Vignette 1 in case 1, and Vignette 2 and 3 in case 3. Findings also include the observation notes taken for four of the video-conferencing cases, given that these observations generally capture an entire event, and would therefore be better illustrated by providing a "visual snapshot" of the entire event from start to finish.

5.2 Case 1: Instant Messaging Ad-hoc System at Administration [A]

The first case follows the work practices of a small group of managers at Administration [A], who work together from corresponding branches, and use mediated communication to collaborate. The administrative unit provides a number of academic and extra-curricular services to university members, and consists of both male/female branches situated in two separate buildings dispersed across the university campuses. Work between branches is carried out with a high degree of coordination, but without face-to-face communication. Throughout the years, the unit has oscillated between the subordination and autonomy of the female branch. At the time of data collection, a male manager was responsible for the general supervision of

both branches. A female manager supervised the female branch, which consisted of a coordinator, (7) service experts, and (2) secretaries.

The case investigation focuses specifically on the use of instant messaging (IM) to coordinate work practices between the male general manager, the female manager, and the female coordinator, who all act as liaisons between branches. This team of three are considered the key sources for case 1. Table 5-1 shows the list of interviews and observation sessions conducted with the team.

No.	Gender	Job Title	Interviews	Observations
1	Male	General Manager	1 interview (1 hour)	2 mediated observations (1 hour each)
2	Female	Manager	Joint interview (1 hour)	None
3	Female	Coordinator	2 interviews (30 min each), Joint interview (1 hour)	2 observations (1 hour each)

Table 5-1: List of interviews and observations conducted in Case 1

In administration [A], both females communicate with the male manager on a daily basis. This is done to keep him up to date about current events in the female branch. Communication is carried out through various channels, e.g. formal letters, telephone and emails. However, the team prefers to interact through a mixture of interspersed and sporadic telephone and IM conversations, coupled with the use of a shared network drive, which serves as an archive for different media files and software. The IM textual conversations are carried out on the workers personal computers, through the web-based software known as Microsoft Instant Messenger. The messaging

software was used by the team despite the fact that upper management had taken measures to discourage its use between genders at the university. These measures include blocking the IM software within university network settings—something the team members obviously learned to work around—and issuing verbal and written warnings to workers against its use.

Over a three-year period, the team has developed a process for working with the other side, which relied on communication through the ad-hoc system (IM, shared drive, and telephone). For example, when carrying out a project, the team first creates a project draft that is placed in a shared folder with read/write permissions set by any one of the team members. This is followed by an IM to detail what is needed from other team members, and to determine if they are available for a “chat” about the project. The female coordinator explains:

“The shared drive has been very useful for us. When you work with someone over there you can look things over with him at the same time, or you could give him editing permissions on the system. Whoever opens the file first gets editing permissions. So, for example, if we want to work on the budget, he’ll say ‘let me edit’ and then he’ll open it first. I’ll be getting the changes and see them changing in front of me”.

The team members transition between communication mediums depending on the task at hand. Each technology serves to complement the other, and the affordances of one medium help overcome the limitations of the other.

“...[We] can continue over the telephone, and he’ll ask ‘why did you put in this number’ and so on, because in this case you’ll usually need to discuss it, not type it in IM. I mean sometimes him and I will both have the share open because it’s easier than typing in IM and having to go over it back and forth to revise the numbers and then type again. I guess we could type it, but it’s just easier in my opinion to open the file and talk over the telephone” (Female Coordinator).

Most importantly, IM's asynchronous communication helps maintain a link with the counterpart branch. In a sense, the three mediums combined serve to create a virtual meeting space for the team, in which they can "see" the presence of the other parties (IM), speak with them (telephone), and pull up different work material to discuss and collaborate on (shared drive).

The work dynamics previously described represent a shift from how the team had initially begun to interact just three years prior. The male manager, having been transferred from a different unit, had never been in contact with any of these females before. As is characteristic of segregated work relations in Saudi, the team went through an initial stage of awkwardness and hesitancy in their interactions with an unknown member of the opposite sex. This led them to resort to communication through letters sent by courier, or brief and formal telephone calls. The gradual shift to electronic modes of interaction served to familiarise the team with one another, and led to less formalised communication. The male manager explains how communication with the female branch has improved:

"In the beginning communication was non-existent, because the female branch was working independently from us, so I had great difficulty. Then we moved gradually to a state where more communication took place. After that we began using the shared network drive, and they put things for me there, files and the like, and that's how we started" (Male General Manager).

In addition, the use of ICTs helped develop a more collegial attitude between male and female members of the work team. This was particularly evident in an incident that occurred during an observation session, which will be referred to as Vignette 1, and is described in the following:

Vignette 1

The female coordinator was collaborating with the male manager. The two had been working together to update the administration's website. They began the day's work by having a brief telephone conversation, and the female was speaking in a reserved and formal manner. There was no exchange of pleasantries, and the conversation was

quick and to the point. What was most interesting is what happened once they switched to IM. Although they had conversed over the phone, it was only when they logged on to IM that they exchanged pleasantries. The male manager began by greeting her and asking how she was doing. He then gave some encouraging words, telling her she was doing an excellent job at the female branch. The two exchanged a number of smileys (emoticons), conveying happy faces. They continued for a brief time to exchange these less formal IMs before moving on to other work topics—End of Vignette 1.

After the observation session, the researcher asked the female coordinator why pleasantries were only exchanged through IM, and not during the telephone conversation. At first, the coordinator seemed perplexed by this question. She said she had never noticed this before, and explained that this was probably what usually occurred; a formal phone call with no greetings or social exchanges, followed by an IM that was relaxed and less inhibited. This reserved mannerism over the telephone is not uncommon in Saudi, particularly with conservatives, who prefer communicating through letters or email. The giving off of less social cues in textual communication is what deems it as appropriate in comparison to the telephone, which involves more of the presence associated with face-to-face interactions (voice, laughter, ...etc.). The observation made in Vignette 1 is the first example to illustrate discrepancies in behaviour associated with cross-gender interactions. The interaction style of both team members varied depending on the communication medium used, and resulted in the enactment of conflicting—if not opposing—ideological schemas. The first schema enacted through the telephone conversation is seen here as conservative, whereas the IM interaction was found to enact a liberal schema.

The second example involves the male manager, and the different schemas he enacted with regards to instant messaging. From the observation sessions, it was evident that he was communicating through IM in a proactive manner, as he initiated IM conversations with his female colleagues, and maintained interactions of an informal nature. However, during his interview with the researcher, the manner in which he verbalised his IM experience conveyed an underlying disdain for it, as he expressed his wish to limit this type of interaction because of what he described as “the negative social meanings associated with chatting and communicating with women”. The male manager was reluctant to go into details about IM use, and relayed his apprehensions

regarding its social implications. He also emphasised the importance of email and the shared drive when collaborating with his female team members, in an attempt to underplay his IM use. This example illustrates the enactment of two different schemas by the same individual with regard to ICT communication. The data shows that the male manager enacted a liberal schema with his female colleague when he proactively used IM to communicate with her. He later enacted a different schema with the researcher, as his attitude was conservative when speaking of communicating with females through IM.

5.3 Case 2: Oracle Task Tracking System at Deanship [B]

The second case involves the work practices at one of the university's main deanships, which is referred to here as deanship [B]. The deanship can be described as centralized in its management, with strictly defined rules put in place regarding communication between members. The deanship is comprised of male/female counterpart branches, with each branch consisting of a main office and three functional units. Each main office has supervisors in charge of all units, and each unit is headed by a unit manager. The female branch, however, has a general supervisor that overlooks the work carried out by all supervisors and unit managers. Interviews and observations for the case were conducted with: (2) female supervisors, (5) unit managers (2 male, 3 female), and (3) unit workers (2 male, 1 female). Table 5-2 shows the list of interviews and observation sessions conducted at deanship [B].

No.	Gender	Job Title	Interviews	Observations
1	Female	Supervisor 1	2 interviews (1 hour 30 min, and 30 min)	None
2	Female	Supervisor 2	1 interview (2 hours)	None

No.	Gender	Job Title	Interviews	Observations
3	Female	Unit Manager 1	1 interview (1 hour 30 min)	None
4	Female	Unit Manager 2	2 interviews (2 hours, and 30 min)	1 Observation (1 hour)
5	Female	Unit Manager 3	1 interview (1 hour)	None
6	Female	Data Entry Worker	1 interview (1 hour)	1 Observation (1 hour)
7	Male	Unit Manager 4	1 interview (25 min)	None
8	Male	Unit Manager 5	1 interview (20 min)	None
9	Male	Assistant to Male Supervisor 3	1 interview (20 min)	None
10	Male	Office Clerk	1 interview (15 min)	None

Table 5-2: List of interviews and observations conducted in Case 2

Despite there being corresponding female/male units, management has strictly discouraged workers from contacting the other side through any form of mediation. Therefore, direct communication between genders has been kept to a minimum. During the interviews, a number of reasons have been presented for this “limited communication between genders” rule. As explained by one of the female supervisors (Supervisor 1), the rule was implemented due to a mutual decision taken by her and the general supervisor. When asked to elaborate, she proudly maintained that she had effectively banned all contact between her female staff and the males. She went on to explain that, in the past, excessive contact had resulted in problems. For example, she relayed an incident in which some of the male employees had received raises to their salary, while the females had not. One of the males then contacted a female colleague and informed her of this, encouraging her and the rest of the females to speak up and confront management with the differences in salaries. This had caused conflicts between management and staff, and led the females to lose trust in their superiors. Therefore, the female supervisor was of the opinion that controlling communication would help minimize these types of conflicts in the future.

On the other hand, the female unit managers stated that they were displeased with this “limited communication” rule. They argued that collaborating with the men was crucial to their work, especially since the male branch is deanship headquarters, with most of the decisions and new projects originating from there. The female unit managers blamed the male side for this rule, and felt the men were not really concerned about what happened in the female branch. The females also explained that the men usually ignored their email messages and telephone calls, except in urgent situations. Although the decision to limit communication was issued by both male and female supervisors, the female unit managers were oblivious to this, and resented the male supervisors for the decision. They also expressed disappointment with their male colleagues for “taking the rule too seriously”, instead of ignoring or challenging it as they wished to do.

The male branch presented a different perspective. The male unit managers explained that the two branches were independent of each other, and that there was no need for communication between them. They felt the women were competent, with plenty of experience in the field, and were therefore capable of running things on their own.

The men also stressed that, contrary to what the women have reported, there was absolutely no contact between the two sides, not even in urgent matters.

As for ICTs at deanship [B], the main technology used conjunctively was an Oracle task management system, designed specifically for the deanship to support automated collaboration between the two sides. The system was implemented with the purpose of tracking service requests received by the deanship, which are to be carried out by the three units. Most importantly, the system enables supervisors to monitor work that requires coordination between the male and female units. Each service request is entered into an electronic recording sheet through a personalised interface for each user/employee. The request is then continually updated by different users until it can be marked “task complete”. The recording sheet includes drop down menus that detail information about the department requesting the service, employees delegated the task, as well as important dates and deadlines. However, the sheet leaves little space for comments or logging.

When asked about the Oracle system, a female employee reported she was quite happy to have this link to the male side:

“At least now we have this link with the men, this point of reference, to find out what’s been accomplished regarding specific services we’ve requested. Before using the system, we used to have to keep following up with them, and reaching them by email or telephone was very difficult. This way we don’t have to keep asking, have you finished this request? What have you done regarding so and so?” (Female Data Entry Worker).

On the negative side, she explained that the limited space for comments meant there was minimal interaction between the two sides through the system. Also, more often than not, she had no idea who was reading her entries or filling in the sheets on the male side. Yet she still felt this was an improvement to the situation prior to using the system.

Overall, the female workers viewed the Oracle system in a positive light. The female supervisor who had authorised the “no communication rule”, Supervisor 1, expressed

that she was pleased with the outcome of system use. She explained that the main purpose for implementing Oracle was related to supervisory functions and the monitoring of employees. In her view, this was beneficial because it kept the male supervisor up to date about the females' work. She felt that the use of the technology had simplified the supervisory role for the male general supervisor, who was unable to overlook the female side in the physical sense. She went on to explain that there was also an increase in her team's visibility, as their hard work and efforts could now be "observed" by the male supervisor. When questioned about her reasons for restricting communication between genders even through Oracle (e.g. the limited logging/comment boxes), she stressed that this had nothing to do with negative cultural implications:

"It's just not necessary. The girls have absolutely no need to contact the men. They have me here, and I'm authorised to contact the male supervisor to relay any problems. Everything else is handled through the system. Why would there be any need to contact them?" (Supervisor 1).

Thus, the main supervisors displayed extreme interest in limiting direct communication between genders. The Oracle system was instrumental in maintaining the separation by gatekeeping, and rendering direct contact unnecessary.

The interviews also uncovered other instances of ICT collaboration, such as the use of remote networking tools. However, this was only acknowledged by the female workers (excluding the supervisors). The male employees denied this claim, insisting that work was coordinated solely through the branch supervisors, who serve as middle managers between the two sides. These conflicting accounts may be an indication that the females did attempt to communicate through other mediums, but were met with rejection from the male side. The male insistence that communication has been halted between the two branches could also be a sign that they distrusted the researcher, and (understandably) would not divulge information that implied they had broken the no contact rule.

Finally, in examining case 2, it has been found that the schemas guiding cross-gender collaboration are rooted in managerial attitudes. These attitudes are related to the

integration or disintegration of work practices between the male and female branches. The general supervisor and female supervisor enacted a disintegration schema, as they prohibited direct cross-gender communication and opted for a system that would enable the two sides to continue to collaborate in an automated and impersonal manner. The Oracle system helped maintain separation through a number of functions. The system is used as a gatekeeper by the two main liaisons at the deanship, and assists the male supervisor/gatekeeper in monitoring workers to ensure no communication occurs through the system. Also, by encompassing a wide range of automated services, the use of Oracle has rendered direct communication almost unnecessary. Interestingly, Oracle use has reinforced cultural norms of segregation at the deanship, although its actual motivations are driven by managerial efforts to monitor and control employees.

5.4 Case 3: Video-Conferencing Staff Meetings and University-Wide Events

Case 3 presents the findings from interviews and observations conducted with six work teams using the video-conferencing technology. Participants for the case ranged from academic faculty members, administrators, employees, and students. The VC sessions under observation include departmental staff meetings, administrative meetings, and university sponsored events, such as conferences and seminars. In the following sections, a brief background is given for the implementation of VC at UQU. This is followed by a summary of the methods used to obtain data, and the observation notes from four of the meetings/events observed by the researcher. Finally, an analysis of the VC technology in practice is provided, which includes a description of the technological facilities, as well as the prevailing norms and mental frameworks found among respondents using the technology.

5.4.1 Background and Implementation

Starting in early 2004, the Information Technology Center (ITC) at UQU began acquiring and implementing Tandberg Video-Conferencing technology. The purpose

was to supplement the already available Closed Circuit Television (CCTV) studios, in order to meet the increasing demand for studios/classrooms that enabled male lecturers to teach female students. Soon after setting up the VC teaching studios, ITC management began to realise that VC could serve for other equally important purposes, namely to help integrate the male and female branches by facilitating conjunctive events. Also, the appointed ITC managers had as a priority an interest in improving the status of females at UQU, and the VC technology was thus seen as a means to promote this by increasing female inclusion.

With this vision in mind, the ITC took steps to widen the VC venture at the university. It recruited members of its own staff, administrative heads, and high-ranking officials to advocate for its use. University members—mostly faculty—were informed that the technology would be available at their request if they wished to use it for administrative and departmental meetings, or for university wide events, such as joint conferences, and seminars. The ITC also enthusiastically spread this message throughout the female branch, explaining the view that VC had the potential to allow women to participate on a larger scale in proceedings held at the male branches. VC was framed as a tool that would enable women to have their voices heard, as well as encourage more collaboration between the male and female side—something that would be beneficial for the university as a whole. The plans for the VC technology were received in a favourable light, and gained wide acceptance throughout the university, which ultimately lead to a pilot stage for this type of use.

After implementation, deanships and departments began to hold conjunctive staff meetings through VC. Also the female branch became increasingly involved in university events; the same type of events which they had previously been excluded from. Gradually, through continued use, these VC conjunctive practices became a regular occurrence, and VC could now be widely seen in the numerous conferencing rooms and lecture halls available. In these facilities, the conferencing system is connected to a projector and audio system, and what is often transmitted is audio/video from the male side with audio only from the female side. Both sides can also transmit presentations slides, videos, or run applications such as web browsers or other IT tools.

5.4.2 Methods and Data Collection

Data for the video-conferencing case was collected five years after the system had been implemented throughout the university. During this time, VC events were held regularly between male and female branches, ranging from university wide gatherings headed by the rector, to departmental staff meetings and conjunctive conferences. As shown in Table 5-3, data consists of interviews with workers from (5) academic departments, (2) deanships, and the ITC. To ensure anonymity of the participants, each department is assigned a pseudonym, and the observation sessions are similarly assigned a code.

Pseudonym	Administration Type	College	Interviews	Observation
Dept. (a)	Academic Dept.	Social Science	3	None
Dept. (b)	Academic Dept.	Education	1	None
Dept. (c)	Academic Dept.	Social Science	2	Obsv1
ITC	Center	---	2	Support/Obsv2
Deanship (x)	Deanship	---	1	Obsv3
Dept. (d)	Academic Dept.	Islamic	1	Obsv2
Deanship (y)	Deanship	---	1	None
Dept. (e)	Academic Dept.	Social Science	3	None

Table 5-3: List of colleges/departments examined in Case 3

A total of (14) interviews were conducted for the video-conferencing cases: (11) faculty members (7 female, 4 male); (2) IT technicians (female); and (1) employee (female) (see Table 5-4). Interviewees were asked about their views on the technology, and both the benefits and limitations of use. In addition, a special emphasis was placed on female status, to understand if the technology use had improved this in any way. This is specifically regarding the following issues: access to information, decision-making and overall participation/inclusion.

Participant	Gender	Job Title	Dept. Code	Duration	Observation
FA1	Female	Head of Dept.	Dept. (a)	2 hours	None
MA1	Male	Former Supervisor	Dept. (b)	40 min	None
FA2	Female	Vice Dean	Dept. (c)	30 min	Obsv1
MA2	Male	Former Supervisor	Dept. (c)	1 hour	Obsv1
FT1	Female	IT technician	ITC	2 hours	None
FA3	Female	Vice Dean	Deanship (x)	1 hour	Obsv3, Obsv4
FA4	Female	Supervisor	Dept. (a), Deanship (y)	1 hour	None
FA5	Female	Head of Dept.	Dept. (d)	1 hour	Obsv2
FA6	Female	Faculty	Dept. (a)	1 hour	None

Participant	Gender	Job Title	Dept. Code	Duration	Observation
FE1	Female	Employee	Deanship (y)	45 min	None
MA3	Male	Faculty	Dept. (e)	1 hour	None
FA7	Female	Faculty	Dept. (e)	1 hour	Obsv3
MA4	Male	Faculty	Dept. (e)	45 min	None
FT2	Female	IT technician	ITC	1 hour	Obsv2

Table 5-4: List of university members interviewed in Case 3

In addition to the interviews, (4) observation sessions were conducted for various VC events: (2) departmental faculty meetings, (1) administrative meeting, and (1) university-wide event (see Table 5-5). In choosing the departmental staff meetings to be observed, the aim was to find two departments that were contrasting in terms of cultural/religious ideologies. This was done in order to better understand different approaches to VC usage. As for choice of the other two meetings, this was based on convenience, and depended on the range of VC events occurring at the time of data collection. After each observation session was completed, an interview was conducted with at least one of the attendees in order to gain insight on meeting proceedings from a participant's point of view.

No.	Dept. Code	Purpose	Attendees	Duration	Interviews
Obsv1	Dept. (c)	Faculty Meeting	19	1 hour, 20 min	FA2, MA2
Obsv2	Dept. (d)	Faculty Meeting	12	1 hour, 30 min	FA5, FT2

No.	Dept. Code	Purpose	Attendees	Duration	Interviews
Obsv3	Deanship (x)	Administrative	15	1 hour	FA3, FA7
Obsv4	Assembly	University Event	250 (approx.)	3 hours	FA3

Table 5-5: List of observation sessions conducted in Case 3

Before presenting a description and analysis of VC technology use at the university, the following sections provide the detailed notes taken by the researcher for each observation session.



5.4.3 Observation-1: Faculty Meeting at Dept. (c)

I conducted an observation session of a faculty meeting held at Dept. (c). To arrange for this, I spoke to the head of the department who explained that he had no problem with my attending, but that he needed to inform faculty to get their permission as well. I was asked to wait outside the meeting room while he explained to them the purpose of my research. There were no objections to my attending, and I was welcomed inside the meeting room. The observation lasted for the entire duration of the meeting (1 hour 20 min), and was recorded by note taking. After the session, I interviewed (separately) two of the faculty members attending the meeting, one male, and one female.

Summary of Observation Session

The female meeting room consisted of a large rectangular table with two table microphones dispersed among the attendees. A ceiling projector projected the video from the male side onto a pull-down screen at the front of the room. Attending the meeting are (12) faculty (male side), (6) faculty and department secretary (female side). The video is spanning the meeting table on the male side, and all the men are in view, although the faces are slightly unclear. The audio quality is excellent.

The meeting is chaired by the head of department, and he begins the session by asking the female side about the sound quality and if they are experiencing any technical difficulties. After he confirms that both sides can hear each other clearly, he states the agenda for the meeting. He then turns over the microphone to a speaker on the male side. After about 10 minutes, a discussion begins with participants from both sides, as faculty pass around the microphone to whomever wishes to interject. If the person wishing to speak is a female, she will interject and ask the head if she may interrupt. She then states her name and begins to speak.

During the meeting I had a number of observations regarding the atmosphere and mannerisms of each side. The atmosphere was very relaxed, as faculty often joked and laughed with members from both sides. The men were quite attentive to the women, and I noticed that the head made a great effort to include them in the discussions. He would also end each discussion by asking the females if they would like to add anything else or had any questions. The male faculty often referred to their female colleagues respectfully as “our female colleagues” and “our sisters over there”. The same was true of the females, as they referred to the males with similar labels.

In the female room, the women were generally attentive. However, when discussions were occurring between the male faculty, the women would sometimes whisper among themselves. These whispers revolved around the topic being discussed by the men, or other topics the females were considering bringing up in the meeting. This appeared to be distracting for the females, because at one point a female asked a question only to be informed by the men that they had just answered that. The female retorted that she had not heard the answer because the sound was low (I did not notice any faults with the sound). I believe she may not have heard him because she had been pre-occupied with her female colleague. A similar incident occurred when some of the females were whispering while a male was speaking. The women’s voices could be heard on the other side, and the head tried to control the situation by saying “just a minute” and signalling to the camera. The women kept on whispering and one of the men exclaimed gently “they are talking over there”! The head asked “Are you with us ladies?” and the women replied, “Yes of course doctor please go on”.

As previously mentioned, the atmosphere was very relaxed and sometimes involved faculty joking with the other side, although this was prompted more often than not by

the men. A noteworthy incident occurs halfway through the meeting, which will be referred to as Vignette 2, and is described in the following:

Vignette 2

The department head, after hearing whispers from the other side, asked the females what they were discussing. A female replied that she was just going to remind him of an upcoming international conference. The head responded by saying, “Then you and I can go there together”, at which point everyone in both rooms laughs loudly. Soon after this, a similar incident occurred, and involved teasing the same female faculty member. She had brought up the subject of her sabbatical request, and was explaining her reasons for needing it urgently. A discussion between her and the head began, in which she replied respectfully and yet assertively to his objections. This back and forth continued for a few minutes and was concluded by a male faculty asking her (jokingly) to postpone her sabbatical leave to the summer (a time when she obviously would not need it as much). Again everyone laughs and she responds (sarcastically) “Thank you doctor I appreciate that”—End of Vignette 2.

There were also many instances in which males directed words of encouragement and appreciation towards the females. For example, the head responded emphatically to one of the topics brought up by the female secretary, exclaiming “Bravo (her name), thank you for bringing that up”! Also, a male faculty took a few minutes to express his thanks and appreciation to his female colleagues for their work on a joint project. He stated that they had put in an enormous effort, even at times when there was a lack of communication between them. He mentions a number of female faculty by name, and apologises if he has forgotten to mention any others.

At the end of the meeting the noise level is raised in both rooms, as faculty begin talking to others in the same room. A female faculty, however, speaks into the microphone and asks for one of the male faculty by name. He comes up to the microphone and they begin a discussion (relaxed and collegial) about some of the topics brought up during the meeting. This discussion continues for a brief time, while the other faculty members begin leaving both rooms.

5.4.4 Observation-2: Faculty Meeting at Dept. (d)

I conducted an observation of a joint meeting at Dept. (d), after having interviewed the female head of department (FA5). In the interview, she relayed how pleased she was with the video meetings they had recently begun conducting just 3 months earlier. I asked her who was behind the decision to have the females attend, and if this was something she had requested. She explained that this was due to a decision from the head of the college, as he had recently required all departments to conduct joint meetings.

The female head went on to give me a very enthusiastic view of these meetings. She was delighted that she could finally have discussions with her male colleagues in an open format. She stressed that the male head of department was a “wonderful” colleague, and that working with him was pleasant because of his cooperative attitude. She explained that she usually communicated with him through telephone or email, and that the meetings were a bonus to their collaboration, as it gave the females a window to the male branch. In her opinion, the meetings helped the females stay updated on university news, and it also aided them in getting their voices across to the other side.

During this interview, I received permission from the female head to attend an upcoming departmental meeting. As far as I am aware, permission was not requested from the other faculty members. The observation lasted for the entire duration of the meeting (1 hour 30 min), and was recorded by note taking. After the session, I was able to speak briefly with the female head.

Summary of Observation Session

Upon attending the meeting, I was very surprised to find the atmosphere different to what I expected after my interview with FA5. Her description of the meetings implied much more participation by the females than what I observed during the session. The meeting room layout is similar to that observed in Obsv1. When I first entered the room accompanied by the female head I noticed that there were two female faculty, and no video transmission as of yet. An hour later, after all the females had been assembled for some time, the female IT technician receives a call from the male side requesting the room IP number. Shortly after, the transmission begins but with audio

only from both sides. FA5 asks the female IT technician why there is no video, and one of the female faculty interjects (with distaste) that there is no need for video from the men. “Why do you want it anyway? Leave the audio on and that will be enough”. Both the demeanour of this faculty member, and the fact that she is from an Islamic department, points to the conclusion that her distaste was for conservative religious reasons. The female head (FA5) replies to this by saying that she disagrees, and finds the video transmission very helpful. A few minutes later, we receive video from the male side, showing the meeting table and male attendees. Attending this meeting are: (7) faculty (male side), and (5) faculty (female side). The female IT technician leaves the room.

Before starting, the chairman (male head of department) makes sure all the females are present. He then greets the attendees, and goes over the agenda for the meeting. The men are discussing issues among themselves. Topics include new projects, suggestions for creating small project teams, and sharing contact information for those interested in joining. Also, a male faculty shares an online resource he has created. What was most striking was that, for almost the first half of the meeting, the men had discussions seemingly oblivious to the female side, while the females observed them as if watching a television.

The chairman continues by going over university newsletters, and departmental matters. The female side’s first interjection comes only after an important item in the agenda is brought up. The ensuing discussion between the male and female side is described in the following, and will be referred to as Vignette 3:

Vignette 3

The chairman informs faculty that the department will begin the hiring process for a new job post—a female faculty—and that the head of the college has formed a committee to overlook this process. The committee is made up of (4) faculty, (3) male and (1) female. The chosen committee members are present, and all agree but one, the female (this female faculty member is the same conservative that objected to male video transmission at the beginning of the meeting). I observe her as she begins gesturing (with hand signals and facial expressions) to the female head, as if to say: tell them I don’t want to be part of the committee. The female head refuses to pass on

the message to the men (shaking her head no), and so the female faculty comes up to the microphone and interjects in a low, stiff voice. She greets the men and then says “Although I am honoured to be chosen, please remove me from the committee”. The chairman responds politely by saying that he had already excused her from a number of other such roles, and that there was no way that she would be excused this time. He explains to her that this was a decision from people above him, and that they had asked him not to excuse anyone. Again the female simply replies “I am aware of this, but still I ask you to please please please remove me from the committee”. A number of male faculty members try to convince her by saying that the work was not that complicated, but she ignores them and does not get into discussions. She simply keeps repeating her pleads (2 more times), while the females in the room begin signalling to her (in a scolding manner) to stop pleading and accept the decision—End of Vignette 3.

The manner in which this female was trying to convince the male side is very surprising to me. It is completely different from what I had seen in other departments, such as Dept. (c), in which the women were very bold, and discussed matters assertively with their male counterparts instead of pleading. The whole atmosphere of the meeting also differed from Dept. (c), wherein men and women engaged in discussions, joked, laughed, and then socialised and made small talk afterwards. At Dept. (d), however, the mannerisms were very formal, and even when there was laughing it was only between the same gender. The men would sometimes make jokes and laugh loudly, and the women respond to this by smiling and looking at each other. Also, at one point, one of the females commented in a joking manner, but the chairman responded seriously and firmly to her, and none of the male attendees laughed or acknowledged the joke. To me, this seemed to be an indication that he was trying to maintain a formal atmosphere between the two sides.

Other observations I have are to do with female participation during the second half of the meeting, which witnessed much more from them, although their manner remained meek and shy. The chairman engages more with the female side, and asks for names of faculty willing to work on the projects mentioned earlier. Yet, as the meeting proceeds, the men return to discussions with each other, while the women attempt to partake in this, but in very low voices (I doubt the men could hear them). There were instances when one female (obviously the boldest in the group as she is the same

person that joked earlier) would speak on account of other females, either to present an argument or request to the male side. I also noticed that on several occasions, the meeting split into two separate meetings, with females muting the microphone and discussing one topic while the males discussed another. Sometimes the females muted in order to deliberate on a topic amongst themselves, and then would unmute to give the men a unified decision.

Finally, the meeting ended quite abruptly, without any interactions between the two sides afterwards. It should be said that a lot of issues were covered during the meeting and that most of the people got their voices across and were heard. In this it seemed a successful collaborative meeting between the two sides. Yet this was done in an extremely formal and traditional (conservative) atmosphere, with reserved mannerisms between genders.

5.4.5 Observation-3: Administrative Meeting at Deanship (x)

The meeting I observed at Deanship (x) revealed another theme related to collaboration via video conferencing: the non-attendance of key male participants. The purpose of the meeting was to follow up on preparations for a three-day joint seminar that would be held in conjunction. The meeting's main objective was to give the female participants a chance to meet with the male dean (head of the organising committee) and discuss their various roles in the seminar. I received permission to attend the meeting from the female vice dean (FA3) during the interview I had with her earlier. The observation lasted for the entire duration of the meeting (45 min), and was recorded by an audio recorder and note taking.

Summary of Observation Session

I arrive at the meeting hall, a much larger facility than the studios used for departmental meetings, with a capacity to seat approximately (100) people. Assembled are (15) female faculty and employees from the coordinating committees, with no male attendees seen through the video transmission as of yet. After about a half hour of waiting, the female dean (FA3) enters the meeting room with apologies. She explains that, unfortunately, the male dean may not be able to attend, as he has not been answering her telephone calls all morning. She goes on to tell the attendees

that she will be chairing the meeting, and will start straight away so as not to waste their time. The meeting begins without anyone from the male side.

During the meeting, FA3 is constantly speaking on behalf of the male dean, and her appearance is of one who has been put in an awkward situation. She keeps repeating that he said this and he said that, and it appears as if she is his spokesperson. As the meeting progresses, she is confronted with a number of questions that she cannot answer, and explains that she needs to confer with the male dean and get back to the participants. FA3 repeats the following phrase several times: “You see, this is the problem with having to deal with the male side, this is what makes it difficult. Especially when they don’t take your calls”. When she is pressed to answer more questions, she states, “Up until this moment, I have no further information than what we have all received together”.

Some female participants interject, and try to make things easier for her. A senior faculty attempts to console FA3, “We have all been there doctor. You call once twice three times, and then you get too embarrassed to call again. I’m sure he’s just extremely busy, or has something urgent to attend to”. The attendees also give FA3 advice on how to better reach the male dean, such as leaving him SMS text messages, etc. The meeting ends with the female dean promising to arrange another meeting, to give the participants a chance to speak directly to the male dean.

After the meeting had ended, I interviewed one of the attendees. When asked about the meeting, she expresses her disappointment over the dean’s non-attendance. To her, this was an indication that the men could do as they please. It was also upsetting because male participation often determined whether meetings were successful or not. She then informs me that the male dean was not particularly keen on speaking to females, and that this might be the reason behind his non-attendance. She relayed one of her experiences with the male dean that took place a few weeks prior to this meeting. After having attended a joint meeting with him acting as chair, he sent an email to her and the rest of the female attendees giving them instructions on their duties. At the end of the email he included a note asking the female participants (participants included faculty and students) to have a male relative contact him if they needed further assistance. To her, this was a clear indication that he did not wish to be contacted by females.

5.4.6 Observation-4: Scientific Seminar (University-Wide Event)

I attend a scientific seminar, which is a university-wide event that is held in conjunction between the male and female campuses (this is the same event that was being organised during the meeting conducted by deanship (x), Observation-3). The seminar is a three-day event, conducted between the hours 9 am to 3 pm, with papers and projects being presented from both sides. I observe the assembly on the first day it commences. The observation was carried out over a 3-hour duration, and was recorded by note taking.

Summary of Observation Session

I attend the seminar, which is held in the largest auditorium on the female campus, having the capacity to seat approximately (3000) people. There is a large screen hanging from the auditorium stage, displaying video being streamed from the male auditorium, which has approximately the same capacity as the female auditorium. The audio transmission from the men can be heard from large speakers permanently fixed on the auditorium walls. The male side is receiving audio only from the females. I begin my observation 1-hour after the start of the seminar. Attending are approximately (100) females, and (150) males.

As I enter, a female is speaking into a microphone, giving comments on a paper that has just been presented by a male participant. The men acknowledge her comments, and the chairman thanks her for contributing. A female coordinator introduces the next female presenter, and it becomes apparent that there are both male and female coordinators assigned the task of introducing speakers on their respective sides. The female presents her paper, with her segment lasting 15 minutes. Just as she finishes, there is a cut in transmission due to a technical fault, and we lose the male feed. This is resolved a few minutes later, after IT technicians from both sides see to the matter.

A male coordinator announces that there will be a break in transmission, as each side has prepared separate segments. The VC is halted for an hour. We are not told what the men have planned, but in the female hall a professor is being interviewed on stage. She was selected due to the experience she has in her field, as well as her administrative contributions at the university. Some of the questions pertain to the role of women at the university. The professor explains that, throughout her life, she has

never felt there was any difference between men and women accomplishment wise, and that being a woman has never held her back from pursuing her goals. As I observe, I can't help but question why this segment was not held jointly with the male side, and whether this was due to the personal nature of some of the interview questions. The earlier segments were of a strictly academic nature, conducted in a formal manner, and this up close and somewhat personal interview may have been seen as inappropriate to transmit to the men.

The transmission resumes from both sides, and the coordinators maintain alternating the segments in a steady flow. From time to time the camera spans the male auditorium, and we receive glimpses of the male audience. After two papers are presented from the female side, a male presenter appears on the screen and begins his presentation, which is a motivational talk relating his personal experiences as an academic. This talk is similar to the segment with the female professor, only it is not in interview format, but is given as a speech. After this segment the alternations continue between campuses. I notice the atmosphere is guarded between the male and female coordinators, who speak to each other in an extremely formal manner. Finally, a panel of both male and female academics assess a project carried out by a female student. The student exchanges pleasantries with one of the male academics on the panel, whom she appears to know. She continues briefly with the personal exchange, asking him to wish her luck on an upcoming exam. He responds cordially and wishes her luck. After the exchange, the panel members provide feedback on the project, before a final assessment is made. At the end of this segment I stop my observation.



5.4.7 Video-Conferencing Technology to Facilitate Segregated Practices

The following provides a description of the technological infrastructure and facilities designated for video-conferencing between segregated branches. It also details the range of mixed-gender work norms and interpretive schemes found in the case observations and interviews.

Technological Infrastructure and Facilities

In comparison with the previously used CCTV, the Tandberg technology provides extra flexibility and more advantages in terms of material constraints. While CCTV necessitated that the studios be physically adjoining the female campus, the Tandberg conferencing system only requires a LAN socket in the rooms that facilitate the event. This has allowed the females to participate in events carried out in the geographically distant male branches. In addition, with CCTV technology, the men had to travel from their work locations to the studios adjoining the female campus to give lectures to the female students, something which was obviously time consuming. The necessity to commute between campuses meant that additional coordination needed to take place between branches, in order to factor in the distance, and how it would affect male workers who needed to return to their campuses, often in a rush in order to give male student lectures. Thus, one of the first benefits of the Tandberg technologies, which was to the delight of the male lecturers, was that it helped them fulfil lecturing duties without needing to leave their campuses.

As for limitations of the VC technology, these are related to technical faults, and more specifically, network disruptions. Issues such as network lags, and delayed audio and/or video transmission are seen as the main problem when using VC, and were reported to have been experienced at least once a month. The inconveniences caused by technical faults were found to be particularly demotivating for some of the male lecturers. As one lecturer explained:

“Each time transmission is disrupted, someone from the ITC needs to be contacted. As you can imagine, this causes even more delays because now you are relying on individuals with heavy work schedules to show up. I’ve even had to cancel lectures because of this problem” (MA3).

Female workers also found this to be demotivating, especially given that they are now reliant on the technology to facilitate participation in joint events.

Mixed-Gender Work Norms and Video-Conferencing

The following section describes work norms associated with the VC technology, and is divided into two subsections: the first relates to conjunctive staff meetings, and the second, to university-wide events:

Departmental staff meetings

The use of video-conferencing in this type of segregated environment has elevated cross-gender group interactions to a level that surpasses previous mediums. Workers see VC meetings as a chance for both sides to familiarize themselves with one another. Male interviewees, such as MA1 and MA2, have repeatedly expressed that the main benefit of VC is that it enables them to hear the views of their female colleagues. The females have also reiterated this:

“At least we hear their ideas. I mean when I hear them, I can understand how cultured they are, how well they speak...After all we do teach the same curricula” (FA6).

The level of female participation in the meetings varies considerably between departments, and is often dependent on attitudes from both sides. In the observation sessions conducted, female participation/presence depended to a large degree on the role of the chairman, and whether the male side as a whole encouraged females to participate in discussions. In the meetings with high female participation, such as Observation-1, the chairman/facilitator was careful to include the female side, ending each discussion by asking if the ladies had any comments or questions. This conscientious effort, coupled with an overall relaxed atmosphere between attendees, allowed for free-flowing discussions in which the females appeared quite comfortable in their participation.

On the other hand, female interaction was noticeably low when a facilitator was neglectful of the female side. This was found to be the case in Observation-2, the conservative department observed first hand. The chairman started the meeting by acknowledging the females' presence, but quickly moved on to discussions with the male attendees, which ultimately led to the exclusion of the women for the first half of the meeting. The females began to partake in the discussion only after being clearly

invited by the chairman, who had arrived at an item on the agenda that concerned the females specifically. Throughout the rest of the meeting, the women spoke only when prompted for a reply. The low participation could also be the result of personal preferences of the female attendees, especially given the conservative nature of their department. This is true for at least some of the females, who displayed conservative behaviour, such as manner of dress, and speech styles. This conservatism applies not only to the females, as the entire atmosphere of the meeting reflected traditional segregated norms. Thus, the socialising and collegiality witnessed in the more liberal departments was noticeably lacking.

In addition to the previous, a third reason for the asymmetrical participation among genders is to do with the technological medium itself, and the interactions setting. The practice of disabling outgoing video coming from the female side has inadvertently led some women to assume an observer status, and view VC as a “show” in which they “watch” their male colleagues. A female faculty who was particularly quiet in the meeting led on to this perception:

“You see [the men], see their impressions, understand their feelings while you watch them. It’s exactly as if you were with them. The only negative here is that, while we see them, they don’t know what we’re doing here” (FA5).

The one-sidedness of the video transmission has also led to shortfalls related to turn taking between the opposing branches. As one female faculty describes:

“Personally, in all the meetings I’ve always been silent. There’s no chance to communicate. You know I’m very- I follow these protocols that’s all. I mean if I’m given the chance I will talk. I don’t know how to interrupt in a video-conference. People don’t see me, how can I interrupt? How can I say hey I have something to say when people- especially when the men are arguing? And it’s not only me who’s like this, most of us are, with the exception of the head of the female department who tries to interrupt occasionally. But generally it’s the men who are dominating the talk” (FA7).

She goes on to explain that, because the men do not see her, she must follow certain protocols and reintroduce herself every time she speaks:

“And even when I do talk I have to say its me and state my name. I don’t like to say that. So I don’t find it in that sense a natural or authentic kind of communication” (FA7).

For FA7, this has resulted in a disconcerted feeling of being a “silent observer”, and has consequently discouraged her from interacting in the meetings. However, not all the females shared her sentiments. For example FA4 and FA5 have simply accepted this as part of their culture, and considered it a minor inconvenience compared to the advantages of attending VC meetings.

In addition to the previous, and as illustrated by the observation notes, one-way video has led to instances of split meetings, i.e. a meeting splitting into two separate meetings, with females discussing one topic while the males discuss another (see Observations 1,2, and 4). This occurred on several occasions during the VC staff meetings of both departments observed. The men were seen to become increasingly engrossed in discussing a topic in their meeting room, and the females would follow their lead and have a similar disjointed talk. In some cases, the females would also mute their microphones, thereby cutting off the men entirely. When asked about the split meetings, and whether she considered it rude when the men engaged solely amongst themselves, FA7 gave the following response:

“No, I don’t think so. [The video-conferencing medium] is not effective communication. It’s easier, it’s more convenient that they communicate with each other because they see each other, they see each others faces, they know each other...We communicate by ourselves and we put it on mute” (FA7).

On other occasions, the females were observed to instigate a split meeting by speaking to each other in low whispers (Observation-1), and it appeared as if the men were oblivious to this. This was not case, however, as confirmed by a male attendee (MA2) during an interview, in which he stated that he could hear the female whispers clearly. “Too clearly in fact” is how he termed it, showing some resentment. He also complained that the women often whispered while sitting too close to the

microphones, and that this would sometimes annoy the men because it was very distracting.

Despite these annoyances, general attitudes regarding the opposite gender and interacting through VC were mostly favourable. The opportunity to gather, have lengthy discussions, and collaborate in a group setting has led many to view their colleagues in a new light. MA1, when asked about his impressions of collaborating with the female branch, spoke highly of the women he worked with:

“Well from my work experience, I believe that women are more devoted, harder workers, and they can lead much better” (MA1).

Similarly FA5, a female head of department, spoke with great reverence for her male counterpart, whom she worked closely with. Before using VC, she had been in regular contact with him through telephone. She explains that observing him in a group dynamic served to renew her respect:

“For example, there was this one time in a joint-meeting, where a female colleague was upset with the men for declining a request of clear nepotism. She was a bit harsh with her words, but he contained the situation and replied prudently: all of you are our sisters and we wouldn’t want to do anything that would upset you, but this is just out of our control” (FA5).

She explained that from her experience, she had not encountered anything negative from the male branch, and found her colleagues to be “knowledgeable and sophisticated”.

Another female, FA4, stated that her male colleagues treated her with the utmost respect during joint-meetings. She explained that they encouraged women’s participation, and objected when they noticed microphones being muted, insisting that the women be fully “present” with them for the entire duration of a meeting.

“There is a lot of concern and appreciation for us, they even ask each one of us by name, doctor what’s your opinion, what’s your opinion, what’s your opinion” (FA4).

FA4 holds an administrative position, and therefore has attended meetings with two different work teams, in department (a) and deanship (y). When asked about her experiences with the male team at the deanship, and whether or not their treatment was similar to departmental colleagues, FA4 gives an enthusiastic response:

“The same. Responsiveness, concern, appreciation, cooperation!” (FA4).

Not surprisingly, there were staff members who held differing views, as there’s no denying the subjectivity in attitudes regarding co-workers in general, let alone those associating in segregated environments. FA6 relayed a particularly negative view of working with the male side, and interestingly, she works in the same department as the previous respondent, department (a):

“I don’t think that [the men] are very pleased with us being a part of these meetings...They hold many meetings without us, and then they send us memos to sign, so that they can claim to officials that we’ve attended” (FA6).

These two females, FA4 and FA6, collaborate with the same team of males, and the stark contrast in opinions points to differences in perceptions and/or expectations. While one female (FA6) was clearly offended by being sent memos to sign, the other (FA4) found it acceptable, and took it as an indication that the male branch wanted to keep the females updated:

“There’s a certain expectation here that if we [females] don’t attend, we should at least be given the minutes of the meeting, what was discussed, the outcomes, because we’re members of the university too, and we need to have some idea about developments at the university level” (FA4).

An interview with FA1, a third female from the department, revealed the favourable opinion to be a popular one, as she echoed the view that the men were very enthusiastic about joint-meetings. She also found that VC has brought her closer to male colleagues in the same department.

A final observation regarding VC and gender norms is that technology use is not only helping genders familiarize themselves with one another, but also creating the “stage” in which new gender boundaries are explored and challenged. In the confines of the VC studios, faculty have found a new space that enables them to interact more freely with the opposite gender, and perhaps test the waters regarding appropriate and/or inappropriate behaviour.

In the staff meetings observed, the transitioning state of gender norms was clearly evident, and is best illustrated by Vignette 2, described in Observation-1, the staff meeting held at department (c). The relaxed atmosphere among genders had given way to instances of joking, teasing, and laughing among genders. What is interesting, however, about this particular incident was not simply the joking, but that it was regarding genders meeting in person, perhaps in a foreign country, something many Saudis would consider to be culturally inappropriate. The eruption of laughter by the attendees signified that everyone understood the comment to be a joke that was not to be taken seriously. Yet still, there was an undercurrent of tension regarding the comment/teasing, which was revealed after the meeting, during separate interviews with two of the attendees.

The first interview was with FA2, the female whom the comments were directed at. Her uneasiness regarding the chairman’s behaviour became evident when she interrupted the researcher’s questions, and asked (cautiously), “Did you notice what the head of the department said to me in front of everyone about travelling abroad together”? She went on to explain that he sometimes put her in awkward situations similar to this, something which made her feel uncomfortable. She relayed an incident that occurred while they were both attending a lecture outside the university. The venue seated both genders in the same lecture hall, but with females in the back (wearing full head covers and veils). He did not know that she was attending, and when he heard someone say her name he turned around and started calling her in a loud voice exclaiming “[FA2’s name]! Why didn’t you tell me you were here”? She

explained that she felt quite embarrassed at the time. When asked to consider the possibility that maybe, the chairman meant well and didn't realise he was making her feel uncomfortable, she agreed that was probably true. Still, she said that she preferred he behave in a more conservative manner, and continued warily, "My husband would probably be upset if he knew a male colleague was acting in this manner towards me".

A male attendee gave a similar disapproving, albeit amused, reaction to the chairman's comment. During an interview with MA2, he brought up the subject laughingly, asking the researcher if she had heard what was said about the international conference. He stated that the chairman sometimes acted foolishly during the VC meetings, and that the comment was inappropriate. MA2 also relayed some of the reactions in the male meeting room. He said the two faculty members sitting next to him had looked at each other with raised eyebrows and laughed, as if to say: this time he had gone too far. Again, the researcher pointed out that the chairman might have meant well, in which MA2 replied, "Yes probably, but still he goes too far sometimes".

The reactions surrounding Vignette 2 exemplify the differences in ideological schemata among members of the same department, and the underlying complexity of the situation as whole. While the head of department represents one group that is considered liberal concerning mixed-gender interactions, the disapproving members of staff represent a more moderate group. For the second group, simply speaking of face-to-face encounters, even if only in jest, is seen as distasteful and crossing a cultural line. Most importantly, however, the incident reveals a perceived difference between gender-mixing occurring in virtual settings, as opposed to real-life settings. The moderate faculty members, while comfortably interacting with the opposite gender in the VC setting (Observation-1), were clearly uncomfortable when discussing face-to-face meetings. Hence, much of the progressive changes witnessed at the meeting can be seen as limited to the virtual world.

University-wide events

The observation sessions reveal two aspects of the university-wide VC events in which an asymmetry exists between men and women: meeting administration (chairing) and selective event transmission. Firstly, similar to departmental staff

meetings, all events are presided by a male university member, as females never administer joint proceedings, and rarely take the lead in turn-taking procedures. Secondly, these events are unidirectional insofar as only events organized by the male branches are transmitted or held in conjunction, i.e. from the male to the female side. The only exception to this is if a male administrator was asked to meet with female staff and/or students, such as the VC meeting described in Observation-3. In this situation, the male administrator would normally attend alone, unlike male organized events that normally consist of a sizeable attendance by the females.

This gender-based asymmetry is acknowledged by two of the female interviewees, FA6 and FA7, as exemplified in the following:

“The men should definitely attend our administrative meetings. As it is, these meetings are purely female...By attending they can understand all our efforts and achievements, which are now being sent to them by memos only. Memos can never fully portray things as well as hearing directly from the source” (FA6).

“It’s always the men who are including us but we don’t include them, although the technology prescribes that both sides are represented” (FA6).

This represents a pressing concern for some of the females, as they have repeatedly expressed the need for an adequate balance regarding event transmission. As things stand today, the criteria for selecting conjunctive events stems from a need to rectify past errors of excluding women and keeping them in the dark. Consequently, VC events are now the end result of integrating the female branch into traditionally male only gatherings. Inclusion here is limited to permitting women to attend male meetings, often with very little participation. This limited view of participation is shared by both genders, and even among the more liberal advocates of female inclusion. For example, FA6 stated in the quote above that men should attend women’s events not because they had something to offer the male side, but only to see the work carried out by the female side, and to grant their approval of the female

efforts. Her words reveal an underlying subordinate attitude, and show how deeply ingrained gender-based hierarchies are among university staff.

These attitudes were also found among male faculty. For example, MA1 had this to say, when asked in an interview why VC events and lectures were only male to female and not vice versa:

“Well we never dared to do such a thing. We hadn’t come across a unique woman who had some sort of distinctive experience that couldn’t be found among one of the men. And also, as you know, we live in a conservative environment” (MA1).

The taboo nature of having a woman lecture to men or lead an event is evident in his response. In his view, the only rationale for female to male events is to fill a void, and access some form of expertise not found among the men. Still, he did not entirely rule this out in the future:

“The issue now remains who will pave the way, and who will dare to make the decision. I mean even with the male student lectures, what’s to prevent a woman from giving courses to male students. All that remains is who will make the decision and take the first step” (MA1).

Interpretive Schemes Associated with Video-Conferencing

While conducting the interviews and observations, it was important to understand the role video-conferencing was perceived to have in terms of facilitating collaboration with team members from the opposing branch. Because the majority of interviewees were females, the recurring themes resulting from the analysis were mainly related to enabling women, either by increasing access to information, allowing more inclusion in decision making, or promoting wider transparency among branches.

Information Exchange

With regard to information exchange between genders, the interviewees were mainly of the opinion that VC is significant for promoting wider exchange and access to information, with only one interviewee stating that it was of secondary importance. These views are described in the following:

1. Significant for information exchange: Three of the female faculty interviewed, (FA1, FA5, and FA6) were of the opinion that VC had increased their access to information. By attending departmental staff meetings, these females feel they are kept up-to-date about current issues and developments on the administrative level.

“It’s important because firstly it allows them (the male branch) to hear our side, and secondly it lets us know which direction the department is heading over there” (FA6).

“It’s important that all my female staff attend department board meetings. Why? Because memorandums are circulated, student statuses are discussed along with many other issues. New schemes are discussed; student supervisions are reviewed... It’s crucial that everyone makes sure they attend ”(FA5).

For heads of departments, such as FA1 and FA5, the importance of this is that it has been instrumental in allowing them to take part in the decision-making process:

“In the past we were clueless about everything. Sometimes we’d receive a memo summarising a meeting, sometimes that arrived late, and sometimes we had no idea what was going on. We used to be appointed students to supervise, but now they (the male branch) ask for your opinion. Are you willing to supervise so and so? Why have you stopped supervising someone? Why is so and so late? Have you called her? And this is done in front of all faculty members” (FA5).

Therefore, contrary to their experience before holding joint meetings, these females have become more aware of upcoming deliberations, allowing them to make better-informed decisions.

2. Of secondary importance: The use of video-conferencing as a means to enhance information exchange was seen by some females as supplementary to the existing channels of communication. While agreeing that attending staff meetings was beneficial, FA4 felt that it was of secondary importance for information exchange. She explained that her department provides them with detailed contact information for each faculty member, making it possible to reach her male colleagues directly:

“There is always a direct line of communication. So whenever I need anything I just contact them straight away, sometimes by phone and then we agree to follow up by email. Even for my administrative work, I always use email” (FA4).

She explained that, normally, her administrative work was carried out independently and with much autonomy. Conferring with the men was needed to resolve student schedules or for academic purposes, such as discussing resources for a taught module. In these cases, she never hesitates to call or email her male colleagues, and they treat her likewise. The importance FA4 places on attending departmental meetings is perhaps best summarised in the following quote:

“It’s not definitive that we [females] attend, as long as they provide us with the outcomes of these board meetings, so that we can stay aware of new developments at the university level. To me, this is what it means to attend the meeting, and see what’s happening” (FA4).

Thus, in FA4’s view, by receiving a memo that outlines the issues raised during the meeting, and any resolutions reached, she can remain “in the know”, and consequently be able to take action when needed.

Decision Making

The following two subsections describe attitudes regarding VC's role in promoting female inclusion in the decision making process. The respondents generally view the technology as having a strong role in enabling women, particularly in administrative voting procedures. However, the observations carried out by the researcher, corroborated by a lesser number of respondents, finds this role to be exaggerated given the persistence of the male hegemonic structure. These two views and their supporting data are presented in the following:

1. Gives females a voice, a vote: The majority of females interviewed found that participating in the departmental meetings helped them get their voices across to the chief decision makers, the male branch. Even among the more conservative departments, enthusiasm for VC was very high. FA5 spoke with excitement about what it has done for females so far:

“[A female faculty member] now has a voice and her views are taken into account. She has a say, she has an independent point of view. She can oppose, she can interject, she can state an opinion. She can add to and enrich the discussion. Frankly, she can do very very many remarkable things” (FA5).

A common practice in many departments is taking majority votes when decisions are being made. After having previously been excluded from this, the females now take part in most of the deliberations through VC. The resulting ambience at the female branches that partake in this is that of equal opportunity and fairness:

“It's much better than it was in the past, when the men would meet and discuss issues relating to [the female branch] without us. What's even worse is that they were making decisions concerning me personally without my being there to give my opinion. Now the situation is different” (FA1).

Accounts relayed by MA1 substantiate this, as he depicts female participation prior to having joint-meetings as bleak and superficial. He described the dilemmas faced by a female colleague, who confided her distress about not taking part in the meetings

(prior to VC implementation). To compensate for her absence, she used to prepare detailed memos of suggestions and complaints, and request they be discussed during the meetings.

“[She] later find[s] out that her requests have been rejected or not even discussed. Sometimes, she’d send in things only to be surprised that her phrasing had been changed. The chairman would say, well that’s what happened in the meeting so just accept it” (MA1).

Presently, and in light of VC use, the common consensus among female staff is that during meetings the men request input from everyone, and use this as a basis for making decisions. Nevertheless, opinions varied as to whether this was all-inclusive or not. FA1, FA2, and FA4 expressed confidence and contentment in their role as decision-makers. Others appeared more cynical:

“You could say they reluctantly ask for our opinions (sarcastic). They do say things like: can we hear your views on [a particular] student. I mean we’re an entire division, we’re entitled to have opinions just like they do” (FA5).

Similarly, FA6 also had reservations, stating that the authority structure remains in place even amidst the growing male concern to hear female views. Still, despite her misgivings, she asserts that, “to be fair, the men consult everyone when an issue is raised” (FA6).

2. Unchanged male hegemonic, hierarchal structure: While VC meetings have enabled women to participate more in decision-making procedures (such as majority votes), the fact remains that female subordination is still institutionalised in this and all governmental universities in Saudi. At UQU, the organisational structure of administrative units and academic departments leaves women inferior, dependant, and of a lower status to their male counterparts. Within a unit, a female is second in command or deputy to a male head of office. The male has full authority over the entire unit. The female has secondary authority over the female branch, which does not extend to the male branch, aside from exceptional cases where this authority is bound-

up in alternate functional hierarchies. An example of this is the role played by FA4, a female supervisor at Deanship (y) who was given authority by the dean over male personnel:

“The male employees consider me an administrative authority. They’re respectful, they ask for my opinion on things, and they always comply when I ask them to do something. This is given that I’m a faculty member; I’m an academic holding an administrative position in a unit and they’re employees in it” (FA4).

During an interview, this authority over male employees was brought up several times by FA4, and in a manner that appeared to help her sidestep some of the questions regarding female equality. When asked frankly if she felt equal with her male counterparts, her colleagues from the department, or the male dean himself, she replied by defending the men, and stating there was “concern and appreciation” for the women. She then went on to explain that, during joint-meetings, the dean would make a point of consulting female academics before turning to his male employees. In a manner of speaking, it seems telling that her examples of equality were only related to her status compared to lower level employees and not her colleagues from the department or the dean himself.

In other interviews, female responses were generally nonchalant regarding enquires about changes to their roles as decision maker due to VC meetings. FA6 expressed serious doubts in this regard, pointing out that there have been no visible changes in the authority structure:

“[H]as video-conferencing changed your status, has it given you decision authority? No, because it has nothing to do with that. Decision authority is non-existent to begin with. Video-conferencing won’t get you that. It can get you information that used to be hard to attain. That it can get. But decision authority has already been taken away from women.” (FA6).

“But it gives you a voice” (Researcher).

“But technology doesn’t give you that. Not technology. Your voice gets there because you’re willing to scuffle with telephones, letters, and complaints” (FA6).

In other words, technology may have improved the situation for women, but the lower status has continued unaffected. Video-conferencing in itself is seen as just one tool among many available to women, and yet decidedly, FA6 finds it is not useful in getting your voice across to those who have an upper hand. It is useful for information. Yet, to truly have a voice you must be willing to “scuffle”, to struggle and be persistent, using all channels of communication.

Not all the females spoke with the same discontent about the decision authority they had. The following story disclosed by FA5 exemplifies the forms of acceptance and justification some females exhibit when dealing with gender asymmetries:

“One time there was this issue of renewing a contract for a male faculty member. To avoid any embarrassment or problems, the chairman said that in making this decision, the men’s opinion would suffice, given that this man works at their branch with them. [The decision] had nothing to do with us, it was a private matter concerning them. Besides, we [females] were all saying make the decision without us” (FA5).

FA5 was then asked if she thought the men would do the same if the situation were reversed. Would they step back and let the females decide, or would they want to have a say? She replied slowly and cautiously:

“They have a say in it. They have to have a say. Don’t forget they are the one’s in charge. I’m deputy to the head of department. The head is in charge. The decisions are his to make. Yes he has the final say” (FA5).

Incidentally, a similar situation (but in reverse gender-wise) occurred during the observation carried out in FA5’s departmental staff meeting (see Vignette 3, Observation-2, department (d)). The male head of department had notified faculty that

a committee of 4 (3 male, 1 female) had been setup to hire a female lecturer. The three men agreed, while the female objected adamantly to taking part. In this example, the authoritative decision to be made concerned, for the most part, the female branch, i.e. hiring a female. As FA5 had concluded, the men obviously had a say, and actually outnumbered the females in the deciding committee. What seems unexpected, however, is a female's refusal to take part, instead of pushing for equal representation in the committee.

Taking a closer look at the two examples discussed above, a number of issues stand out immediately. Firstly, when decisions are concerning the other side (the opposite gender), it is only deemed "embarrassing" or "leading to problems" if females are to be involved in decisions for the male side. The deciding committee for a female matter was predominately male, yet there was no embarrassment there. Thus, evidently, it is considered awkward if women are interfering in the men's domain, but not vice versa. Secondly, FA5's assertions that men's issues are a private matter concerning only them, while women's issues are open to discussion by all, is seen here as a form of discrimination, which privileges male privacy over female privacy. It is also a discrimination against females by a female. Thirdly, in both situations, the females were more than willing to give up their roles as decision makers, either by being overly accommodating, or defiant and in fear of taking on the responsibility.

As previously mentioned, department (d) is one of the more conservative departments, so this may offer some explanation as to the passivity of the females. However, it is safe to assume that in the liberal departments, females would not have missed the opportunity to participate in a deciding committee. Further still, it would be equally hard to imagine them demanding to take part in "male only" decisions if they were excluded from doing so.

In summation, this section serves not only as a reminder of the gender hierarchies governing most Saudi organisations, and the ensuing subordination of women. It also points our attention to the ways in which females themselves inadvertently act in ways that reinforce their subordination.

Transparency

The final interpretive scheme found to be significant in the VC cases is the view that joint meetings has promoted transparency with regards to information access. This theme was pointed out in the interview conducted with FA6, and had not been included in the original interview questions. Under the circumstances of segregation, a common problem experienced by females within an academic/administrative unit is a lack of transparency, as workers are forced to rely on intermediaries and go-betweens. Without a common forum, a common physical place to meet with the male heads, females usually obtain information through female liaisons. This can sometimes result in liaisons withholding information, and is consequently a cause for distrust in females holding administrative positions. FA6 describes the increased transparency provided by VC:

“You hear the words yourself, instead of someone telling you the head of department approved something, when you don’t know whether he actually approved or not”(FA6).

Having expressed her misgivings regarding decision-making, FA6 acknowledges that increased transparency is one of the most important benefits of video-conferencing. She compares the current situation to what it had been like prior to implementing VC:

“Now, when the university rector has meetings with the male department, we are there listening. One time, this government official came and spoke at the university. Of course the issues discussed were relevant to us, and we heard everything for ourselves. If the speech hadn’t been transmitted, it’s probable that the rector might not have relayed some of the information to us. Technology allows for transparency. You hear, see and decide for yourself. You are the one doing it all directly” (FA6).

This repeated reference to “hearing and seeing for yourself” carried with it undertones of frustration regarding the past, when females had not been able to attend such events. And while the situation has definitely improved, FA6 implies that in all probability, this transparency has not been felt at the male branch due to the priority

given to male led events. In her opinion, it is necessary that the male side be included in female specific events so that they too can achieve the same level of clarity and transparency.

CHAPTER 6

Data Analysis and Results

6.1 Introduction

After having presented the empirical data in Chapters 4 and 5, the following two chapters—Chapters 6 and 7—aim to address the research questions by providing an analysis of the data and discussion of findings. This is guided by the research framework of the study, and explores two main research questions:

1. What are the experiences of Saudi workers using ICTs to collaborate with the physically segregated opposite gender? What changes have they experienced over time?
2. What aspects of the technologies-in-practice found in the segregated context account for changes in gender work norms?

The analysis and discussion are presented in relation to four main themes, as shown in Figure 6-1. Given that the first research question entails in depth analysis of the case study examples, it is explored in the current chapter, whereas the second research question involves wider theoretical engagement to provide a conceptual model, and is therefore addressed separately in Chapter 7.

In the following sections, the first theme explored in section 6.2: describes the technologies-in-practice found to be salient in the Saudi segregated context; and examines the changes that have been experienced in work practices and gender norms as a result of these practices. The second theme explored in section 6.3: evaluates ICT use and segregation in terms of progressive change, while differentiating between practice and policy; and evaluates the experiences of women as a subordinated group, to determine whether ICT collaboration has resulted in changes to their status as a marginalised group.

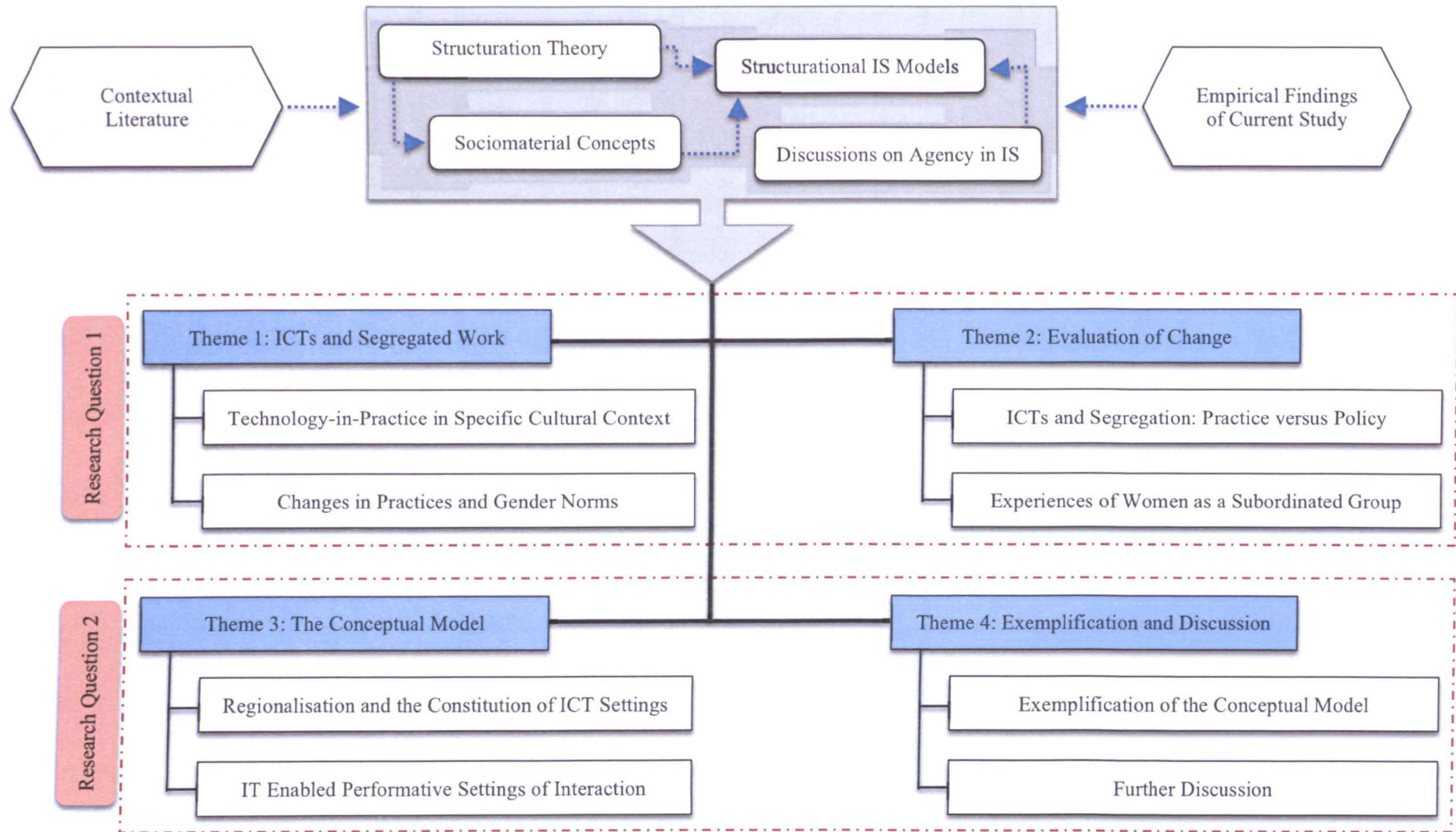


Figure 6-1: Analysis and discussion themes based on theoretical framework and research questions

6.2 ICTs and Gender-Segregated Work

6.2.1 Technology-in-Practice in a Specific Cultural Context

Findings show that the ICTs used in the study were mainly chosen for their ability to support communication. Among the (9) work teams found, (6) used video-conferencing, and (2) used an ad-hoc system that relied on text messaging. Only (1) team used software that can be classed as groupware of a more sophisticated nature, Oracle. Following Orlikowski's (2000) practice lens, an overview of these technologies-in-practice will be presented below. This will highlight the initial conditions of use, i.e. elements of the structure prior to use/implementation, as well as the TIP's structural properties, the facilities, norms and interpretive schemes in each case.

The small group of managers in administration [A] enacted a *cross-gender collaboration technology-in-practice*. The work team initially started off disconnected from the other branch, and followed existing norms that relied on formal communication. Gradually, they found that the use of networking technologies allowed them to maintain a link with the other side throughout the workday, and enabled collaboration in "real-time" with features such as file sharing and shared editing. The team was influenced by their adherence to a moderate religious ideology, the view that ICTs can provide solutions for the complications of segregated work, and a shared work ethic that believed in flexibility, autonomy, and a mutual concession to support the other side. To enact this TIP, the team drew on their knowledge of the networking tools available to them, the technical properties of these tools (asynchronous communication, file sharing/editing, textual exchanges), and an understanding of institutional norms that prescribed gender interactions. Consequently, the work team developed an ad-hoc system (IM - shared drive - telephone) to collaborate on projects, for supervisory purposes, or to provide/receive support.

The second technology examined is the video-conferencing technology used to carry out meetings and university wide events at UQU. Two salient technologies-in-practice were enacted, reflecting findings from (7) cases of departments/deanships holding conjunctive VC meetings. The first type: *progressive gender meeting technology-in-practice* enacted by department a, department c, and deanship y. In these three cases, staff and administrative meetings had been disjointed before the arrival of the VC technology. Main meetings were held at the male branches, and females, not being able to attend, were updated through memos and official letters. Upon the diffusion of the Tandberg devices, these departments began to hold regular conjunctive meetings that can be characterised as displaying progressive norms regarding gender collaboration. Both sides were actively engaged in meeting proceedings, discussions, and majority votes. The ambience of the setting was one of equal opportunity, a change that was to the women's benefit. The campaign led by the ITC was one of the main factors that influenced the workers and led to this particular technology-in-practice. The ambience in these meetings, and active engagement with the other side can be said to coincide with the vision the ITC had for VC. To enact this progressive TIP, staff drew on their knowledge regarding streaming video and VC. They also drew on the properties of the VC devices (LAN/IP connect, video streams, the ability to run shared applications such as PowerPoint and web browsers, and the ability to disable video). In addition, they drew on their knowledge of acceptable gender norms regarding interactions within a mixed group setting. And while each individual staff member drew on their own ideological beliefs, the group's enactment of the VC meeting was moderate/liberal.

The second type of VC TIP was found to be a *traditional gender meeting technology-in-practice* enacted by deanship x, department d, department e, and in a university wide event. The conditions leading up to implementation were the same as those found in the first VC enactment described, i.e. separate staff meetings for each gender, and the exclusion of women from main meetings. After the use of VC, these departments began to routinely hold conjunctive staff meetings that were of a more traditional nature, and which conformed to conservative Saudi norms. The male side generally dominated discussions, while the females observed quietly and engaged only in a limited capacity. Staff also tended to view the VC technology as a one way broadcasting system, where discussions carried out in the male branch were televised

to the women. The traditional TIP can be seen as contrasting to, and almost the opposite of, the progressive TIP. This is despite the fact that the facilities (VC devices, segregated buildings, meeting room layout, etc.) available in each of these cases were identical. The disparity between these two enactments is due to staff members drawing on and enacting differing norms and interpretive schemes. In the traditional VC setting, staff chose to draw on conservative norms of gender interactions. They also drew on their past experiences of CCTV, and its use to transmit events between branches with minimal interaction between the two sides. In the progressive VC meetings, however, users drew on moderate/liberal gender norms, and on their understanding of VC as a collaborative, interactive tool.

The third technology found to be used at UQU is the Oracle task tracking system in Deanship [B], enacted by managers as a *gatekeeping/monitoring technology-in-practice*. A main function of the deanship is to provide services for all university divisions. These services are authorised and fulfilled through the male branch. Therefore, requests from the female side require extensive coordination with male headquarters. At the time of implementation, and to complicate matters further, the deanship had recently applied rules to limit communication between genders in order to avoid managerial conflicts, and maximise control over information exchange between branches. The technology examined here, the Oracle module, was designed by management with an unprofessed role in mind: as a provision to ensure employees abide by the “no contact between genders” rule. Hence, after distributing Oracle, management made it clear that communication was permitted only through the system. In practice, the technology aided in this by acting as a gatekeeper, and providing an interaction space that could be monitored, and in which both sides coordinate and work on joint tasks without the need for direct communication. In other words, the system allowed management to maintain integrated, yet segregated practices between branches. To enact this TIP, managers drew on the technical properties of Oracle and the ability to add/edit modules. They also drew on their knowledge of segregated work norms, and centralised management. It can be said that the *gatekeeping/monitoring* TIP was scripted; managers from both sides were involved in the design of the technology, and later dictated a set of rules for its use. Employees, on the other hand, had a different interaction with the system, and enacted an *automated task tracking technology-in-practice*. These employees had very few

options in their usage of Oracle, and they basically followed the guidelines given to them by management. They used the system to track the tasks they were working on, follow up with the other side, and log any problems or delays they encountered. To enact this TIP, employees drew on technical skills to interact with the Oracle interface and the recording sheets. They also drew on their knowledge of collaborative technologies and their use to provide a link between distributed work environments. Finally, the men and women drew on their understanding of gender work norms in Saudi. The females understood that the system might potentially increase their visibility at the male headquarters. By logging their activities on the recording sheets, it was more likely that their efforts would be “observed”, and acknowledged by the male supervisor. For the male employees, following up and fulfilling services for the female branch is considered both a cultural duty, and a work responsibility. Oracle provided an easy and efficient tool to coordinate with other employees—both male and female—in fulfilling these duties.

The previous was an examination of three technologies that resulted in the enactment of (5) different technologies-in-practice. The ad-hoc (IM, telephone, database) system was not part of a planned initiative, but emerged through the specific needs of the work team. It was also used to communicate dyadically in reclusive settings. VC and Oracle, on the other hand, were part of planned initiatives, each with a specific vision for their purpose—envisioned by managers or change advocates—and each enacted in public settings.

Regardless of being planned or unplanned, the cultural imprint and efficacy of these practices are very distinctive, and in all likelihood, the original designers may not have foreseen these particular uses in segregated workplaces. This is evident in a number of respects. Web-based IM are generally considered social media tools, but were used here in the capacity of formal, work oriented applications. Oracle, an ERP system used mainly in manufacturing, was acquired by the ITC for the department of Student Affairs, with the intent to organise student registration and module enrolment. Its use to monitor employees and aid in gatekeeping was not even conceived of at the time of purchase. Finally, the use of VC has not strayed much from designer’s intent, although the cultural and gendered connotations are strongly present in each enactment.

Throughout the analysis of the cases there has been a deep focus on culture, and more specifically, the cultural aspects of the social structures examined. In the structural lens these aspects are represented most by the two modalities: interpretive schemes and norms. How a specific culture initially engages with a new technology, and later incorporates it in daily activities, is dependant on these pre-existing shared social meanings (schemata, frames), and practices. For example, technologies of a more dyadic and concealed nature (such as mobile communication, Bluetooth, etc.) have continuously been scrutinised in Saudi due to an apprehension that they may lead to inappropriate communication between genders. This is one of the reasons why IM has gained a bad reputation, and is seen by many as having “negative social meanings”. Contrary to this, group video-conferencing is viewed in a more favourable light due to its enactment in public settings.

The previous structural analysis has relied on Orlikowski’s (2000) model, which has helped present a detailed description of the social structures implicated in the cases examined. These depictions are considered a representation of the technologies-in-practice, describing the material/technical facilities, interpretive schemes, and institutional norms associated with each enactment at the time data was collected. In applying the ‘Practice Lens’, emphasis is on social aspects of technology use, and mainly centred on human agency. This has been pointed out by past research, and can be inferred from the discussion above where the focus has been on social structures, enactment, ideologies, all of which pertain to how humans perceive or use technology. In (over)emphasising human agency, technical agency is neglected in the practice lens, as there is only recognition of capabilities/constraints, with the assertion that structures are instantiated in practice, never “contained” in the technology. This neglect has led to a limitation in Orlikowski’s model—a limitation originating from Giddens’ work—and has prompted the need to turn to other theoretical frameworks that can provide insights on technical agency. These frameworks and their relevance to the study are discussed in more detail in Chapter 7, section 7.2.2 The Constitution of Regionalised Technical Settings: A Mangle of Human and Material Agency.

6.2.2 Changes in Practices and Gender Norms

The technologies-in-practice described in the previous section were all used with the general purpose of supporting collaboration between the male and female branches at

UQU. While the outcomes of usage all involve some form of change from earlier practices, determining how deep these changes are requires further scrutiny. Based on Orlikowski's (2000) practice lens, routinized use of a technology does not necessarily mean that significant change has occurred, as some uses bring about superficial or minor changes. Change is considered significant only when people use new technologies "to substantially alter their existing way of doing things" (2000, p. 423). This can be discerned by comparing the initial conditions of use—the context and structural properties—with the outcomes of the technology-in-practice over time. Orlikowski describes three general consequences or outcomes: processual (work practices), technological (properties, capabilities), and structural (broad social system). She also identifies *inertia* as the state in which there are no changes to these outcomes, *application* when there are minor changes in processes or technology but no changes to the status quo, and change when there are changes in work practices, the functions of the technology itself, and a transformation in the status quo.

By applying these criteria of change to the five technologies-in-practice examined in this study, it is possible to arrive at the level of change experienced in each set of enactments:

1. In the first *cross-gender collaboration TIP*, using the Ad-hoc (IM, telephone, shared drive), the team of managers had initially made acquaintance in an organisational unit with a gender-based hierarchy, and formalised communication between genders. The team drew on their technical knowledge, moderate ideology, as well as the technological tools available to them, such as networking and archiving tools. Over time, this enactment had a number of consequences, resulting in significant change and a transformation in the status quo. In terms of change to processes, most of the collaboration was now done in real-time as opposed to the letters exchanged via courier. IM also allowed the team to maintain a link throughout the day for supervisory purposes, and information exchange. Technological consequences include adapting the technology to suit the team's need. For example, the shared drive, generally conceived of as a file-sharing tool, was used by the team to co-edit documents. Similarly, Microsoft messenger, a software tool designed for casual social exchanges was adapted here by the team to discuss work issues and organise practices. As for structural changes, this includes a

transformation of the management structure to a less rigid hierarchy, with a more team oriented, cooperative culture. The gender-based hierarchy has not been eliminated completely, but the changes have led to more autonomy for the females. This can be seen as a direct result of the growing trust between the two sides, as well as the constant link between them provided by ICTs, that has allowed females to take on more responsibilities for the team and the administrative unit as a whole. Interestingly, the practices that entail gender collaboration have not undergone significant change, as change can mainly be discerned in the way practices are executed. This is most evident in the sociability and collegiality that has replaced the previous formality among team members.

2. Change in the *progressive gender meeting TIP* was of a subtler kind, characterised as application in Orlikowski's model. The TIP, enacted by 2 academic departments and 1 deanship, was implemented to integrate segregated staff meetings with the aid of video-conferencing technology. To enact this TIP, participants drew on their knowledge of VC, their moderate/liberal ideologies, as well as the VC facilities available. Unlike the other technologies examined, technical knowledge was not crucial for participant staff members attending meetings, given that a technical support member from the ITC is responsible for operating VC devices, and overlooking the technical aspects of the meetings. Over time, these enactments had similar consequences, which reinforced and enhanced the status quo. As defined by Orlikowski, application results in an enhancement to practices, the technology, but no significant structural change. The most significant change in the progressive TIP has been on the processual level. Integrated virtual meetings have now replaced the segregated meetings of the past. This has not only elevated group level interactions among genders, but has also included changes to the decision making process, by allowing females to participate in majority votes. Changes to the technology were less significant, consisting of a minor adjustment to the video-conferencing format in which video transmission from the female side is systematically disabled. This adjustment is seen here as an attempt to adapt the technology to a specific cultural context, and has been salient throughout all the VC cases. As for changes to the structural status quo, these have been found to be an improvement to the

previous structure, rather than a transformation. In the three progressive VC enactments, collaboration among genders had already existed before incorporating VC. The use of VC only led to a continuation of previous practices, but in a more enhanced and efficient manner. During these VC meetings, male and female staff organised joint projects. Attitudes among them were team-oriented, with a stress on information exchange and learning from one another. Also, these staff had no problem contacting the other side after meetings in an unofficial capacity, as they reported openness and flexibility in this regard. So the enactment of this TIP has brought about improvements in the three cases, but no significant change.

3. *The traditional gender meeting* TIP, enacted in four of the cases (two academic departments, a deanship, and a university-wide event), was found to induce no significant change in collaboration between genders, with technology use resulting in the state characterised as inertia. In these cases, conjunctive VC meetings were carried out, with men and women participating in the same events. However, despite this change in practice and facilities, the old traditional structure of gender collaboration is re-created in the new virtual setting, and enacted in much the same way that it had been before VC. To understand the traditional TIP, we must first look at the institutional conditions—governing administrations carrying out staff meetings, and the university as a whole when conducting university-wide events. The interpretive schemes predominant among workers are a view that VC technology is the same as CCTV. Hence, in their use of VC, they drew on their knowledge of the previous broadcasting technology. They also drew on conservative religious ideologies, as well as the technical tools at hand. This resulted in meetings and events being carried out in a traditional setting. Similar to CCTV, the streaming video is used as a one-way broadcast from the male to the female side, with men dominating discussions while the females observed quietly, and interjected only when asked to. There have been changes on a processual level, as meetings are now held in unison, and group interactions among genders are possible. Yet the traditional status quo remains intact, reproducing the same gender-based structure regarding teamwork and organisational learning. This means that during these VC meetings, collaboration and teamwork is very limited among opposite genders, and is

instead carried out mainly between same branch members in a segregated fashion. This was evident during discussions in which men deliberated separately, while the women either observed quietly or muted the microphones and had their own deliberations. In this sense, the mixed gender meetings still remained largely divided, despite having a venue that allowed all parties to be simultaneously present. Interestingly, workers enacting the progressive TIP used the same facilities and technology as those in the traditional TIP. Nevertheless, the resulting level of change was different, with the first being characterised as application, the second inertia.

4. In the case of the Oracle *gatekeeping/monitoring TIP* at deanship [B], there have been significant changes in practices and gender collaboration. However, it would be a mistake to attribute these changes solely to system use. In this case, the role of management, particularly the two chief supervisors/liaisons, played a pivotal role in change processes. Before implementing the Oracle task tracking system, work at the deanship had a flexible hierarchy, with female unit managers accountable to corresponding male managers on the other side. During this time, genders took part in different forms of cooperative work together, and communicated widely through various communication mediums and ICTs. The introduction of the Oracle system was driven by a change in managerial attitudes, and a shift towards more centralisation. The two chief supervisors (male and female) had come to the conclusion that excessive interaction between branches was the reason behind employee backlashes and conflicts. Rules to control future interactions were put into place. In addition to these rules, supervisors designed the Oracle module with a specific intent in mind, to limit the need for direct communication between genders. To enact this TIP, managers drew on technical knowledge—their own as well as IT specialists—to add/customize Oracle modules, and their knowledge regarding task tracking and archiving systems. They also drew on the technological facilities available, namely the deanship's customisable version of Oracle. The use of the task tracking system had a number of consequences for management, both intended and unintended. Processual consequences include task tracking functions, as well as workflow monitoring that enabled managers to stay in the loop about workers' progress. Considerable technological changes to the Oracle system were also discerned. A module was created to

organise collaboration between units, consisting of task recording sheets, functions to track and alert workers of urgent or delayed tasks, as well as message logging. Use of the system also led to an expansion of the deanship's data archives, detailing completed tasks and summary reports of any problems encountered. With the use of Oracle, a number of significant structural changes have been discerned. The electronic monitoring of tasks made it possible to streamline male supervision of the female side. Thus, the supervisory role of male unit managers was terminated, leaving all female managers accountable solely to the top male supervisor who was now monitoring the system. Hence, the previously flexible gender hierarchy has now been transformed into a centralised management structure.

5. The previous description of *the gatekeeping/monitoring TIP* allows us to gain insight on the utility of the system from upper management's point of view and the consequent changes in their roles and tasks. Employees and unit managers, however, have a different experience with the system, which is highlighted in *the automated task tracking technology-in-practice*. The conditions of use, as discussed in the previous point, were characterised by flexibility in gender interactions, and wide communication. The introduction of Oracle, coupled with the strict new policies acted to immediately sever direct communication between the two sides. For the workers, using Oracle meant following the script devised by management. This consisted of filling out task recording sheets, tracing task progress, and carrying out designated roles for each task. In general, employees saw system use as simply fulfilling a job duty. However, the females had an additional motivation, as it was hoped that Oracle would help them maintain a link to the male side; a link which they considered vital for their work. Employees enacted this TIP by drawing on knowledge regarding the Oracle interface, data entry skills, and the recording sheet tools. This TIP had a number of consequences for employees. Processual changes include a shift from paper to electronic forms of task recording and tracing, automated notifications and alerts, as well as message logging. Enactment by employees resulted in minor changes to the technology itself, but led to an expansion of the digital data and archives regarding work at the deanship. On the other hand, the broader structural changes were vast, characterised here as regressive change. In addition to the shift in

management—from a flexible hierarchy to a centralised structure—significant changes can also be found in the communication structure, with two main consequences to gender collaboration. Firstly, the comprehensiveness of the electronic recording sheets has made it possible to organise cross-gender work solely through the system. This has rendered direct communication unnecessary, and consequently led to minimising direct interactions between male and female employees. Secondly, any interactions that do occur through the system have an automated character about them. The recording sheets themselves are impersonal, consisting of drop-down menus and check boxes, with a limited capacity to exchange direct messages. As a result, the use of the system has also formalised communication between genders.

The previous analysis exemplifies the importance of Orlikowski's model for evaluating change in organisations resulting from technology use. By way of the threefold analysis of process, technology and structure, the model determines the level of change, whether it is superficial or has significantly altered work practices. The practice lens suggests that the three classifications of change (inertia, application, and change) are not exhaustive, and are presented simply as a starting point for future research. However, and for the purpose of this study, it has been found that these classifications provide an adequate taxonomy of change in the cases examined.

The following summarises the results and the analysis of change in this case study:

1. One technology-in-practice is characterised as inertia, represented by the four teams enacting a traditional gender meeting TIP. Although VC brought about small changes and facilitated joint meetings, interactions between genders remained relatively the same as the old gender structure was reproduced through the new technology. As a result, group level interactions did not benefit from the new platform, and meetings remained disjointed in terms of gender collaboration.
2. One technology-in-practice is characterised as application, represented by the three teams enacting a progressive gender meeting TIP. In these cases, collaboration has improved since using the VC technology, with meetings becoming more integrated on a group level. As a result, the cross-gender work structure has been enhanced, opening up new possibilities for further

integration. This particular TIP was classed as application—not significant change—for several reasons. The progressive attitudes observed were not a direct result of using VC, i.e. the technology itself did not lead to changes in attitudes. Even before joint meetings, these departments already had longstanding traditions of being permissive in terms of gender norms, and these enactments are simply a continuation of previous ethos, albeit in a more enhanced light. Secondly, and more importantly, there has been no change in the asymmetrical gender hierarchy. The overall lower status of females remains, and is most evident in the secondary administrative roles females are still limited to. Thus, despite the fact that there has been more inclusion of females through the VC meetings, the status quo remains relatively the same.

3. Three technologies-in-practice are characterised as change, represented by two teams enacting either cross-gender collaboration via the ad-hoc system, or gatekeeping/monitoring and automated task tracking via Oracle. Over time, incorporating these technologies led to significant changes in gender work norms. In the cross-gender collaboration TIP (ad-hoc system), technology use led to structural realignment by bringing together the disjointed male/female branches, facilitating a more collegial interaction space, and loosening the existing gender hierarchy. In the Oracle case, two enactments transpired, and also led to major changes, but of a more regressive type for gender work. Along with strict managerial policies, use of the task tracking system transformed the flexible gender hierarchy into a strictly centralised management structure, and eliminated the job of male middle managers. It also led to changes in the communication structure, transforming the ways in which genders corresponded and exchanged information. Consequently, a rigid, formalised, and loosely tied network of communication has now replaced the previously flexible and informal interactions, and has also severed the strong ties that existed between employees working with the opposite gender.

The research questions addressed in this section set out to understand how collaboration through ICTs differed from previous modes in segregated work. Or, to put the question another way, what has been achieved by using technology in segregated work? As evident from the case study, the key benefits are related to the increase in communication channels, and the integration of practices between genders.

Communication, particularly on the group level, has changed dramatically as a result of ICTs. Prior to ICT use, the most prevalent forms of communication between genders had either been the telephone or formal letters. Telephone interactions, a decidedly dyadic dynamic, had little utility for group communication. On the other hand, courier letters and distributed memos had a wider reach for groups throughout the university. Still, both mediums are considerably lacking when compared with ICT's ability to connect large groups in real-time, facilitate discussions (textual, audio, or video) and share a wide range of media. This transition from fragmented, dyadic forms of communication to group level interactions is seen as the starting point for the shift from social to system integration. For collaborative practices between genders, this means that the previously isolated and highly variable instances of collaboration have now been brought to the public domain, with a wider group of actors interacting simultaneously, thereby allowing more homogeneity in practices. This is not to say that technology practices are becoming identical, but only that less variable patterns of work are emerging, and through continued enactment, they may become institutionalised.

The (5) previous cases have particular relevance for studies concerned with ICTs role in the construction of interdependencies and the endurance of work practices. Karsten's (2003) study, examines this through a structural lens, and explores how mediation and information storage enhance this process. The main interest here is the study's premise that social integration—a crucial aspect of interdependence construction—can be achieved through mediation without the co-presence of actors. In Giddens' theorising, co-presence is deemed necessary in achieving the initial connections towards forming reciprocal practices—although he does acknowledge that certain forms of electronic mediation can offer “some of the intimacies of co-presence” (Giddens, 1984, p. 68). Contrary to this, Karsten suggests that social integration is possible via ICTs, given that interactions are situated, can be densely reciprocal, and can relay a high level of social information. Findings from the current study are consistent with this premise, and provide examples for work practices and social ties being initiated and carried out solely through mediation. In all the cases examined here, there was complete segregation between genders, with no instances of co-presence or face-to-face communication. Yet in each case, and through mediated means alone, gendered work teams formed and created reciprocal patterns of work.

The four aspects of interdependence construction noted by Karsten (2003)—social integration, time-space distancing, institutionalisation, and system integration—were present in all the cases during the period data was collected. To determine how deeply ingrained the changes are, the level of institutionalisation for each case is analysed below, and was found to differ between cases due to various institutional and technological factors (see Table 6-1). The criteria for gauging institutionalisation is drawn from ST but presented here as conjecture, as no quantifiable means for measuring were taken. In Giddens (1984), the institutionalisation of a social system is linked to the span of time-space distancing. “In general (although certainly not universally) it is true that the greater the time-space distancing of social systems—the more their institutions bite into time and space—the more resistant they are to manipulation or change by any individual agent” (1984, p.171). In other words, the possibility of institutionalisation increases depending on the length of time a social practice persists, and the wider the reach it has in geographic space: i.e. how widespread the practice takes place in terms of cities, countries, and regions, and for what time duration, months, years, decades...etc. Furthermore, time-space distancing is seen to be intensified when there are stored resources such as stored information, either in physical or digital form. According to Giddens, stored resources ‘bind’ time-space, giving a material existence to the social practices they represent, and thereby contribute to the persistence of social structures. Consequently, it can be inferred that the video-conferencing cases display the highest levels of institutionalisation. VC meetings at the university have been in practice for the longest time span out of all the technologies examined, utilised from 2004 to present date. The stored information associated with this TIP is in the form of official documents (files, memorandums, and letters in electronic and paper-based format). It describes the policies regulating VC, provides logs of conducted sessions, and helps organise future events and sessions. In addition, the implementation of VC was a large-scale project, making it a prominent and highly visible part of the technical infrastructure at the university, and thereby giving it an air of permanence. Furthermore, other longstanding social structures enacted in support of, and alongside this TIP act to further strengthen the ties between actors. “[T]he enactment of a technology-in-practice is situated within a number of nested and overlapping social systems” (Orlikowski, 2000, p. 411). In the VC TIP, these social systems include upper management (university administration) that have given their official endorsement to

holding VC events and are active participants. Similarly, faculty attending VC staff meetings are affiliated to the same academic department, many of which have long standing ties to one another, and a vested interest in the continuation of this practice for the benefit of their departments. All these factors—the relatively long period of operation, amassed resources, and coinciding structures—are strong indications that VC practices have been institutionalised. The practices associated with the Oracle task tracking system are found to be moderately institutionalised. The four-year duration of its implementation is not consequential enough to determine whether this practice has been fully integrated into the deanships routines. Factors such as stored resources in the form of paper-based documentation, and digital information archives may contribute to the endurance of this TIP. Still, other factors may go against this, such as instability at the deanship, due to recurrent overhaul in policies and hierarchal structure when new management appointments are made. In addition, the mutability of the Oracle system itself, and the constant editing/addition of modules may lead to new practices arising and the termination of the old. Finally, the Ad hoc system is seen here as having the lowest level of institutionalisation, and has in fact ceased to be in effect at administration A. Factors that may have contributed to this are the limited stored resources, both technical and physical. The TIP revolved around the use of IM, and was mostly improvised on a day-to-day basis. No written documentation was ever produced to regulate this practice, as it was an informal method of collaboration devised by the team. Other causes of its cessation include inevitable changes in job positions and team members; the practice was halted due to the transfer of all three managers and the dismantling of the team.

Technology in Practice	Level of Institutionalisation	Organisational Factors	Technological Factors
Progressive gender meetings (VC) Traditional gender meetings (VC)	<ul style="list-style-type: none"> ▪ High: Long time span (2004 to present) ▪ Stored resources - physical and technical 	<ul style="list-style-type: none"> ▪ Stored paper-based information (written policies, files, letters and memos). ▪ Other longstanding social structures linking actors, e.g. affiliation to same academic department 	<ul style="list-style-type: none"> ▪ Large-scale infrastructure (Tandberg equipment, studios specifically for VC)

Technology in Practice	Level of Institutionalisation	Organisational Factors	Technological Factors
Gatekeeping/Monitoring (Oracle) Automated task tracking (Oracle)	<ul style="list-style-type: none"> ▪ Moderate: Shorter but persistent time span (2010 to present) ▪ Stored resources - physical and technical 	<ul style="list-style-type: none"> ▪ Stored paper-based information (written policies, files, letters and memos). ▪ Actors tied by temporary social structures, given the shifting nature of hierarchies and job positions at the deanship 	<ul style="list-style-type: none"> ▪ Extensive archive of stored information ▪ Adaptable software making it possible to modify and change features
Cross-gender collaboration (Ad hoc system: IM-telephone-shared drive)	<ul style="list-style-type: none"> ▪ Low: Short time span that has ceased (2006 to 2010) ▪ Stored resources - technical 	<ul style="list-style-type: none"> ▪ No stored paper-based resources ▪ Actors tied by temporary social structures, given the shifting nature of job positions at the administration 	<ul style="list-style-type: none"> ▪ Limited archive of stored information (shared drive)

Table 6-1: Comparison of the level of institutionalisation between the gender-segregated technologies-in-practice

6.3 Evaluation of Change in Segregated Work

The evaluation undertaken by this study depends to a large degree on the lived experiences of the researcher and university workers. These experiences extend over a timespan of a decade and a half, from 1999 when Internet and networking technologies were first introduced at the university to the present date. The evaluation is based on a comparison of work dynamics prior to and after this turning point, and attempts to examine whether ICT use has in effect improved or hindered gender work relations. Finding a definitive answer to this is a difficult task given the still evolving nature of the phenomena, and the paradoxes of technology and segregated work. In this socio-historic context, ICTs foster new ways of challenging the cultural restrictions imposed on gender mixing in the workplace. Ironically, at the same time, they reinforce segregated practices by providing a bridging mechanism for

collaboration without physical (face-to-face) meetings between men and women. In other words, technology is enabling an adequate means for distributed work, and in so doing, it maintains the stranglehold of segregation by lessening the need to do away with it, and thereby impedes liberal forms of progression.

6.3.1 Changes to Practice Versus Policy

In order to present an evaluation while attending to the seeming contradictions mentioned above, it will be useful to differentiate between changes to practices versus policies. The overall assessment of the case study, and the embedded cases within, reveals that in terms of practice, the teams demonstrated varying levels of progression in gender work dynamics, ranging from low to moderate advances. At the most basic level, ICTs have incurred a monumental expansion of communication channels in the segregated context, both in terms of quality and diversity. The multiplicity of software and applications means that the choice is left up to user groups as to which communication modes they will use. These additional channels have redefined the way branches connect with one another, and offer enhanced capabilities as opposed to previous mediums—e.g. asynchronous modes of IM, data management in Oracle, and real-time rich media of VC. These new features have encouraged workers to collaborate in real-time on complex projects, instead of the excessive reliance on memorandums and official letters to coordinate work. ICTs' handling of dense social information means that, on an interpersonal level, workers are beginning to form collegial bonds with more trust, consequently leading to resourcing and mutual reliance among genders. These media environments also provide a space to explore new avenues in gender relations, serving as a means to experiment with and challenge existing norms.

As previously mentioned, these changes vary between cases, with the consensus among workers being that practices have generally improved. Shifting the focus to policy, we find a different story. The manifold ways in which ICTs have been incorporated in segregated work have an improvised, temporary feel to them. Aside from video-conferencing, most IT uses at UQU have been found to spring up based on the latest technology trends, and aim to achieve quick and easy solutions for the demands of distributed work. This makeshift status, and the lack of planning have translated into beneficial short-term technology uses, but leaves little room for serious

policy-making. A good example of this can be found in the ad hoc/IM case. The small group of managers had developed a system to support pragmatic collaboration, and for a specific timeframe had worked together successfully on integrated tasks and joint projects. Yet once the team dismantled, and a new group of managers took up post, these practices were lost, as there had been no official measures to document or retain them.

Literature on proximity versus distance in work groups can provide some insight on the transitory nature of ICTs in the segregated context. Kiesler and Cummings (2002) re-examine this age old notion in relation to ICTs, and assert that although distributed work teams can maintain productivity through mediation, they are often lacking when compared to close proximity workers.

“The style of communication in electronically-sustained work groups is likely to be somewhat less mutually attentive, less companionable, less frequent, and more effortful than when the team is nearby and talking face-to-face” (Kiesler and Cummings, 2002, p.90).

The study attributes the difference mainly to the shared social settings in proximity work, which often leads to similar expectations, mental schemas, and a strong group identity. Without this, work teams may suffer from low cohesion, i.e. a lack of a “strong commitment to the group or to one another” (2002, p.95). In segregated work, specifically the cases examined here, high cohesion was found between members of the same branch (same sex) but not between members of opposing branches (opposite sex). In some cases, this can also translate into an “us against them” attitude; women in one camp, men in the other. Therefore, it is highly likely that workers have developed a dichotomous view of gender and work. Same gender colleagues are considered part of the immediate (real) work environment, while the opposite gender—even those affiliated to the same unit—are seen as “the others” who are to be contended with, but only half-heartedly. In this instance, technology is recognised for its potential to solve practical issues of segregation: to help carry out necessary obligations, without any long term commitments. Not surprisingly, the ramifications of this disunity are reflected in many aspects of organizational life, one being the commitment to technology undertakings that attempt to bridge the gender divide.

Thus, the continual experimentation with different systems, the absence of proper policymaking, and the use of ICTs to merely cope with segregation, are all symptoms of the underlying disjointedness of gender relations.

The evaluation of the current study, in its attempt to take a step back and garner a comprehensive view of technology and segregation, shows that in the grand scheme of things, progressive changes are considered moderate but not significant. There has been a definite advancement in how work is carried out, particularly in the area of connecting workers more easily and efficiently. As for changes to any institutional parameters regarding segregation, such as structural changes that challenge the religious establishment or segregation itself, these are very limited. Hence, in the present time, the role of technology at UQU has been found to compensate for, but still enable physical separation.

Not surprisingly, the main roadblock to a more radical type of change has been the strongly imposed cultural restrictions that workers either revere and uphold, or reject privately but still act in accordance. The latter group appears to be the minority, as most of the interviewees conveyed acceptance of segregated practices, and only a handful expressed disdain or opposition. The case-by-case analysis also uncovered that interpretive schemes rooted in religious ideologies are a primary determinant of ensuing technology practices. These collective schemas influence not only the character, but also the degree of participation among different ideological groups.

6.3.2 Experiences of Women as a Subordinated Group

Moving on to the second issue under evaluation, the study examines the changes, if any, to women's status in the Saudi workplace. The main concern here is to understand the experiences of women as a result of ICT use, and whether new modes of collaboration have improved their lower level status and marginalisation. Focusing exclusively on women's issues will help exemplify the cultural sensitivities still at play, as there is no denying that "the place of women in Saudi" has been the source of recent conflicts and controversies. With the introduction of ICTs came high hopes that technology would somehow equalize the playing field for women, an optimism that has not panned out as of yet. A note in hindsight before proceeding to less encouraging findings: it is important to mention the markedly significant steps

forward with respect to female inclusion—steps that would not be possible without technology due to the cultural restrictions at hand. The range of ICTs used to connect segregated branches has lessened female isolation, and inadvertently opened up new opportunities for resourcing with male counterparts. This is most evident in the VC cases, where technology facilitates the virtual participation of women in meetings, events, and seminars they were previously excluded from. Also, taking part in majority votes is perhaps one of the strong signifiers of the shifting status of women on the departmental and administrative level.

Despite these advances, data from the current study indicates the continued subordination of women, even amidst their increasing exposure to, and reliance on, what had initially been advocated as emancipatory technologies. This echoes findings of previous studies, which find that technologies often enter into the existing gender context and modernize it “without really transforming the important imbalance, the differential value, the hierarchy that characterize it.” (Cockburn and Ormrod, 1993, p.150). The following sections illustrate this by presenting two different analyses: the first a structural analysis, the second a gender spheres analysis.

The Institutionalisation of Subordination: A Structural Perspective

Even a superficial investigation into the experiences of females will reveal the blatant reality of Saudi organisational life. The fact that the subservience of women is seen in a favourable light by the religious establishment has not only fended off resistance, it has also lead to the ingraining of these values in the country’s administrative and legislative practices. This institutionalisation is the main reason behind the unyielding status of females, as has been illustrated in the case analysis, particularly the cases of VC staff meetings. Through the analysis it is shown that the small victories enjoyed by women are overshadowed by the persistence of their subordination in a number of respects. Firstly, hierarchal structures on every level remain unchanged, with men not only dominating administrative positions, but also taking the lead in less significant and somewhat trivial matters, such as heading meeting proceedings, thereby constantly limiting women to secondary roles. Secondly, even practices that attempt to create balance between genders have an underlying impartiality about them. The mixed-gender voting carried out in VC meetings is one of the most telling examples of genuine efforts for equality, marked by subtle (and not so subtle) signs of

inequality. The voting process itself is managed and authorised solely by the male side: they have the authority to raise topics for voting, and can veto or reject certain topics while females cannot. Even more disquieting is the gender based filtering of voting participants. As observed in some departments, but certainly not as a rule, this filtering allows the male side to make decisions in all departmental affairs, while women are left restricted to female only issues so as to avoid “embarrassing situations”. Finally, it can be argued that the asymmetry in gender positions is made evident by even the most benign acts, such as the gentle prodding by the male side to encourage females to participate in VC meetings, and the constant checking up to make sure women are not neglected or forgotten. While these are all promising signs that demonstrate the men’s concern with female inclusion, they are also reminders that women are still in a weaker position and therefore must be looked after.

Gender Spheres in Segregated Work

The previous section illustrates the lower value ascribed to females from a structural/hierarchal perspective. Examining the gender spheres underpinning ICTs in segregated work can provide even deeper insight into gender-based differences in roles, status, and acceptable modes of behavior. The method, as described by Cockburn and Ormrod (1993), is useful in unravelling the ways in which gender is compartmentalized in relation to social practice, culture, and technology. Previous research on gender and technology, and gender and IS have demonstrated the fruitfulness of this lens. It has been used to examine a wide range of issues, such as the gendering of technology, gender stereotypes in technology use, and the exclusion of women in IT fields. Not surprisingly, these views stress the importance of attending to social context:

“[I]f we look not just at impacts but also to the social context of the innovation process, then it becomes evident that the IS itself will be imbued with the gendered environment of its creation” (Wilson, 2004, p.82).

Equally important is agreeing on a set of shared definitions in gender research. Udry (1994) offers a number of useful distinctions, and finds this is necessary given the inconsistencies in the literature about the construct of gender:

“*Gender* is the relationship between biological sex and behavior: a *theory of gender* explains that relationship. A *gendered behavior* is one that differs by sex” (Udry, 1994, p.561, author's emphasis).

As will become evident in the following, “gendered behavior” as a construct is instrumental when attempting to understand the gender spheres of a particular context.

For clarity, and to better illustrate the findings, two technologies-in-practice from the case study are re-examined before proceeding to the analysis:

1. The first example, gender as enacted in the university wide VC seminar, is considered to represent *mainstream typifications of gender*, ones which are most aligned with university sanctions and broader Saudi society. The high social bandwidth, wide range of participants, and the fact that this a publically visible enactment, makes this TIP a good indicator of the place of technology in Saudi work, especially in an official capacity. Over the years, these VC events have consistently played out to reflect traditional Saudi practices, and can be seen as the epitome of gender segregation in the information age. It is clear during these proceedings that segregation exceeds the physical (geographic) separation, extending to a deep-seated divide, which is governed by unspoken codes of ethics and strict rules. To an outside observer, this divide can be construed through behavioral and regulatory differences based on gender. Interactions between same sex participants differ from those between opposite sex participants. Discussions within the same lecture halls (among the same sex) appear lively, uninhibited, and informal, contrasting starkly with the monotonous and cautious tone transmitted to the other side (opposite sex). Furthermore, the selections of transmitted sessions, those being held in conjunction with the other side, are subjected to a “gender appropriate” code, especially concerning female participation. For example, in the scientific seminar, female transmissions are purely academic, consisting of paper presentations, panel discussions, and keynote speeches. What has been excluded, almost surreptitiously, are interjections that may convey femininity, or result in any excessive personification of women. However, this selective filtering of content does not apply to male segments. For example, faculty

interview segments and personalised motivational talks are considered appropriate to transmit from male to female side, but not vice versa. In other words, women receive transmissions of men being interviewed or giving motivational talks, which are video-streamed live to the female side. On the other hand, men do not receive similar female transmissions (not even audio).

2. In contrast to the previous example, the reclusive technologies-in-practice represent *tensions within the existing gender structure*, and go against traditional norms. These are modes of work still considered in the grey area; conduct that workers aspire to introduce to the mainstream, but are still hesitant due to their knowledge of accepted norms. Examples of this are practices associated with the ad hoc case (IM, telephone, shared drive), in which ICTs were used to deviate from official norms to carry out work in an autonomous fashion. The mixed-gender team worked as a closely-knit, highly integrated group, and although cultural barriers have not been completely superseded, there is a definite progression. The consistent link and sociable setting of IM has helped facilitate flexible and informal work patterns. Also, collaboration among genders has an egalitarian feel to it, with the codes of conduct being very similar for the men and women alike.

Based on the previous examples, the study finds that the gender spheres operating within segregated work are divided into public and private realms. Public realm interactions are those that occur in university-wide (open) events, or are practices that can be observed by university workers and members of the general public, and are not limited to a small work-team. These interactions often include a high number of participants. Private interactions are more reclusive, occurring between dyadic or small work teams. It should be noted, however, that this divide between public and private realms is only conceptual, intended to help provide a classification of gendered behaviour as enacted within different social contexts. In actuality, the two realms are seen as an inseparable, mutually constituted representation of interaction spaces in the Saudi context. This inseparability needs to be stressed in order to highlight the relational aspects of enactment within these two realms. Workers, in their daily IT interactions, are often simultaneously involved in a number of technologies-in-practice, some occurring in public domains, others in private. So in this sense, workers do not adhere solely to the gendered meanings of one realm or the other. Rather they

continuously alternate between the two, and modify behavior based on social bandwidth, as well as other contextual factors—relating to individuals and/or work teams—such as ideology, technical frames, personal preferences, etc.

As depicted in Figure 6-2, gendered behavior differed in the public and private realms. These differences relate to (a) the liberties taken in exhibiting gender traits, (b) conduct when interacting with the opposite gender, and (c) the roles workers assume, such as purely academic, leadership, or personal motivator roles. The focus here is on gendered behavior as an aspect of identity, but specifically as implicated in ICT interactions with the opposite gender.

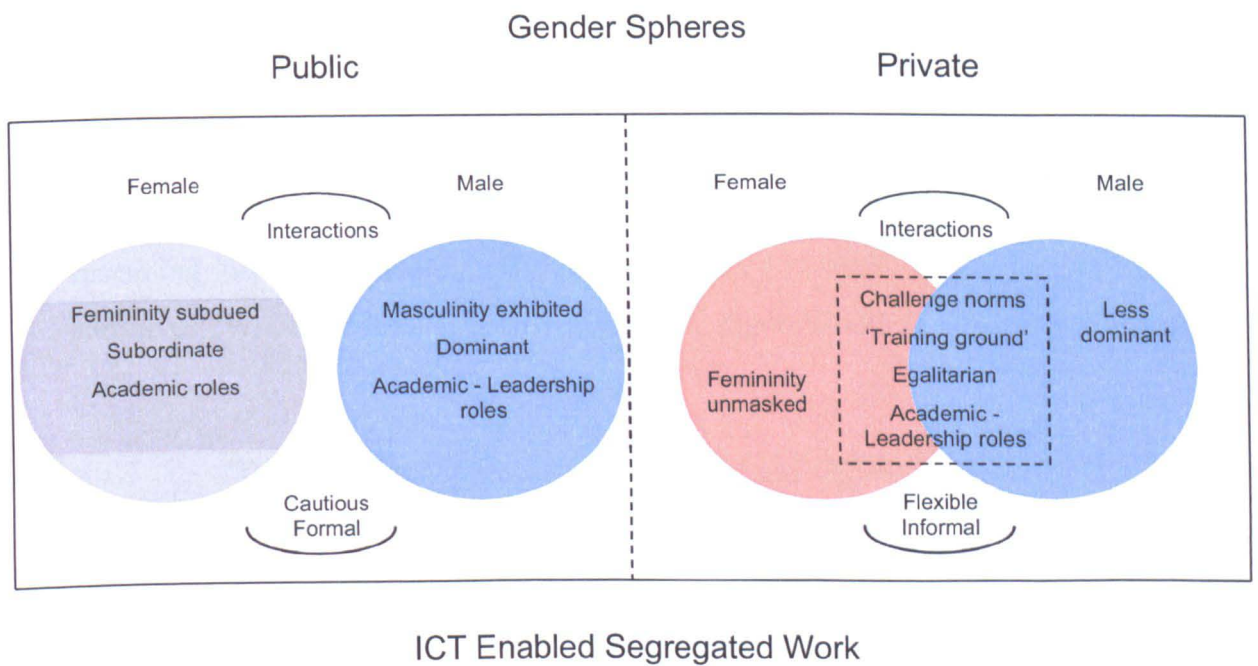


Figure 6-2: Gender spheres in the Saudi sex-segregated context

In *public realms*, interactions between opposite genders are extremely cautious and formal. Females, in their interactions with males, have been found to subdue feminine traits and hold them in check, by regulating spoken interjections and other social cues (such as laughter) to adopt male styles of communication. While women in western societies have also been observed to masculinize speech “in order to avoid losing authority and position” (Karakowsky et al., 2003, p. 3), for Saudi women, the move for power is only part of the motivation. Suppressing femininity in the presence of

men is an age-old cultural practice, learned through the socialisation process, and is seen as a signifier of female respectability, propriety, and religious reverence. Among the conservatives—even moderates to varying degrees—this behavior is expected of women, and can be seen as an attempt to achieve gender-neutral communication. The contrived and forced formality of ‘female to male’ interactions can be better appreciated when contrasted with ‘female to female’ interactions, in which formality still exists but without inhibiting femininity. In *private realms*, however, interactions between genders are less rigid, leaning towards informal collegiality. Here, gendered behavior towards opposite sex members is beginning to converge with behavior towards same sex members; i.e. there appears to be lesser disparity between how men and women treat the same sex and the opposite sex. In addition, both genders cooperate to challenge the established codes of conduct, and together create an impartial space, with lesser male dominance and unabashed female presence.

The gender spheres outlined for the segregated context are recognised here as the outcome of a co-constructive process by both genders. The active role women play in sustaining lower value norms must be kept in mind in order to avoid victimization narratives (Wilson, 2004), a position clearly explicated and upheld by past gender studies:

“[I]t is not the case that sexist culture and its discriminatory repercussions are merely imposed on women from the outside. Socialisation is all encompassing in two respects: firstly, it affects both men and women, differently but symmetrically (Davies, 1995: 21); and secondly, women internalise the views of society and (resistance aside) are shaped by it. Notions about the natural place of women in society are not only held by men” (Wilson, 2004, p.86).

In the segregated work cases under examination, the role of women in the construction of gender spheres, and their own subordinate status may be inferred from a number of indicators. These include, but are not limited to, reluctance to participate in leadership roles, rationalizing double standards that discriminate against women (Traditional VC TIP, department d), and participating/accepting practices that

reinforce weak and abashed conceptions of femininity (Traditional VC TIP, university-wide seminar).

From the previous, the case study on segregation has extended the gender spheres analysis to understand interactions in complex cultural arrangements. The examples highlighted in this section illustrate that social actors, being knowledgeable agents, possess tacit knowledge of the gender spheres operating within their society and—following Giddensian logic on human knowledgeability and social practice—use this knowledge to guide their technology use. This is especially evident in the public realms, in which university members acted almost in unison, tacitly adhering to unspoken rules regarding gender communication and traditional norms of segregation.

The examples also demonstrate that socio-historic contexts of gender are likely to be mirrored in technology enactments. Of course, the very idea of practices being mirrored between physical and virtual domains (or vice versa) has a number of implications that must be considered carefully. The distinction between domains denotes a spatial separation, a clear-cut divide between digital and real world interaction spaces, something that has long been cautioned against by IT studies in the field of human geographies. Authors such as Graham (1998) argue that viewing human interactions as occurring in an either/or, physical versus IT space, signifies a simplistic view of “spaces” and our utilization of technologies within them. He suggests a fully relational view that takes into account the mutual embeddedness of physical and virtual domains, as well as the “complex social power struggles” that shape them. Graham also draws on ANT (Latour, 1993) and the geographic studies that engage with the theory (Thrift, 1996), to present a holistic view of human interactions that attends to the:

“relational assemblies linking technological networks, space and place, and the space and place-based users (and nonusers) of such networks. Such linkages are so intimate and recombinatory that defining space and place separately from technological networks soon becomes as impossible as defining technological networks separately from space and place” (Graham, 1998, p.181).

Examining various approaches to the spatialities of information technology are relevant here for a number of reasons. Firstly, a nuanced view of Saudi must include informed recommendations regarding future directions for gender integration. The geography literature will thus help avoid reductionist views, which juxtapose real and virtual spaces as either evolving in separate directions, or one somehow mimicking the other. It also situates technology use within a specific “geographic” background, reminding us that arriving at any conclusions regarding Saudi needs to factor in the wider social construction of ICTs occurring in all domains of society, and not limited to organisational life. Secondly, geography literature concerned with communication spaces, context and power provide a useful segue to the next chapter concerning the agency in socio-technical systems. These ideas will be elaborated on further, and integrated within a wider framework that draws on concepts from Structuration Theory, and Sociomaterial literature.

CHAPTER 7

Performatively Regionalised Technical Settings – A Conceptual Model

7.1 Introduction

This chapter aims to build upon the previous chapter in addressing the main research questions of the study, which are presented in relation to four main themes, as shown in Figure 6-1 of Chapter 6. The first research question, addressed as the first and second themes in Chapter 6, explores the technologies in practice found in the Saudi gender-segregated context and the consequent changes to gender work norms. The third and fourth themes address the second research question: What aspects of the technologies-in-practice found in the segregated context account for changes in gender work norms?

In the following sections, the third theme explored in section 7.2 outlines a conceptual model that examines the constitution of ICT interaction spaces, their contextualisation, and how they come to enable distinct modes of collaboration. The model also presents a performative view of digital spatialities that can provide a deeper understanding of organisational power dynamics and change issues.

The fourth theme, in section 7.3, aims to exemplify the model by applying it to examples from the case study. It also provides a further discussion and elaboration on the model in light of the case study examples and previous research.

7.2 Performatively Regionalised Technical Settings of Interaction

In examining the IT practices that are enabling change in segregated work, it has been found that the technological features that are most significant are related to spatialities, and the fostering of distinct communication spaces in distributed environments. While ICTs are allowing more easily accessible and efficient modes of communication in Saudi work, this is not what is most compelling about them in this case. For over 3 decades, Saudi workers have had clear lines of communication between genders, by letters, telephones, faxes, etc. The novelty does not lie in establishing communication, but rather the creation of new *settings* or *spaces* of interaction, and the modes of behaviour enacted within them that can potentially bring about change.

To tackle the various issues that stem from the second research question related to technologically induced change, a new model is outlined here: a performative view of regionalised technical settings of interaction. The model aims to arrive at a better understanding of virtual spaces, the role they play in organisational change, and the power dynamics underlying mediated communication. Along with findings from the case study, insights from Structuration Theory and Sociomaterial research are used to develop this model. These theoretical insights and their originating works are mainly in relation to human face-to-face encounters that occur in physical (geographic) interaction spaces. The emerging model, however, while acknowledging these physical spaces, incorporates the virtual domain to this line of research, focusing on ICT interactions occurring in technical settings of interaction.

In the following sections, the two concepts from structuration theory, 'locale' and 'regionalisation', are extended to the IS context, and later merged with performative views. Firstly, regionalisation is examined in relation to ICT communication, and technical interaction settings. This is followed by attempts to understand the constitution of technical settings, and the socio-technical agencies involved in their materialisation. Finally, a comprehensive model is presented, which addresses the

performativity of ICT interaction settings, and maintains that regionalisation is an important aspect of this performativity.

7.2.1 Regionalisation and ICTs

Giddens' (1984) discussion on the regionalisation of time-space is considered here as a cornerstone for the new model. In ST, human encounters occur within *locales*, physical settings that provide backdrops for, and set the tone of interactions. *Regionalisation* is “the zoning of time-space in relation to routinized social practices” (p.119). The material aspects of a locale, along with the type of behavior enacted within it, create interaction settings that display contextual characteristics—i.e. various modes of regionalisation: form, duration, span, and character.

Findings from the case study indicate that, similar to “real world” encounters, virtual interactions also occur within regionalised zones. To better conceptualize this, ST's concept of ‘locale’ is extended here to include ICT interactions. In physical domains, locale refers to a specific geographic location that encompasses contextualized settings of interaction. For virtual domains, communication occurs by way of media platforms and software applications that come to encompass *technical settings of interaction*. A technical setting is defined as any communication space within digitally mediated environments, such as discussion boards, email, text logs in an information system, or chat boxes in instant messaging applications. These interaction settings come to be regionalised depending on a number of factors, such as designer's intent, user preferences, features/material properties of the technology, etc.

The modes of regionalisation presented by Giddens have been found to be particularly useful in examining the contextuality of ICT communication. Figure 7-1 provides an illustration of the various modes of regionalisation for technical settings, which is dependant on both social and material elements.

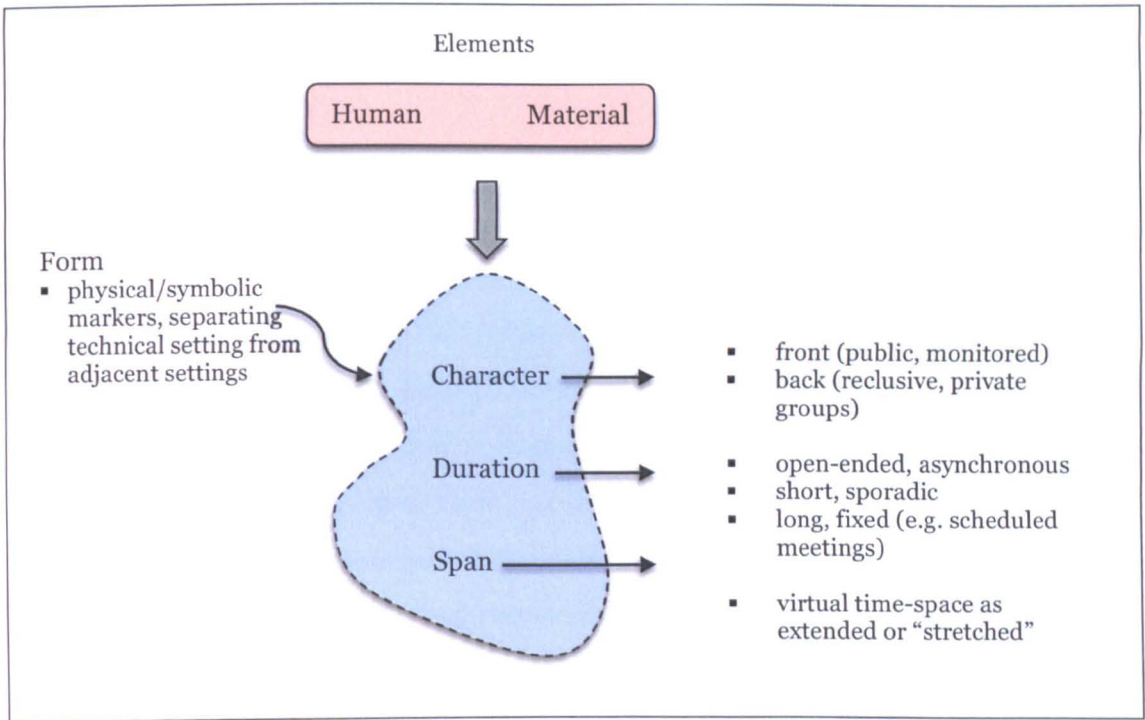


Figure 7-1: Modes of regionalisation for technical settings of interaction

A technical setting’s form can be seen as the boundaries that separate the setting from other digital or physical settings. The duration of interactions occurring in a technical setting often resemble that of physical encounters, and include opening/closing markers such as hello or goodbye greetings. At the same time, digital spaces are also clearly distinct in that they enable diverse durations, and can be temporally open-ended, asynchronous, or ubiquitous. Span refers to how deeply the technical setting has been institutionalised within routinized social practices. For example, a newly implemented information system in a small company has a short span when compared to a legacy system in a global organisation. Thus, an information system that has been in effect for a long duration and with wide global reach extends deeply in time-space and is thus institutionalised. Finally, the character of the setting refers to the behaviour carried out within it, it’s contextuality, and which end of the front/back region spectrum it is classified in. This relates specifically to the overall tone of interactions within the setting—whether interactions are monitored or unmonitored, public or private, formal or informal. It also relates to the social bandwidth of interactions, their density, and whether there are restrictions or rules as to who can participate or engage in the interaction. The modes of regionalisation found to be most significant in this

study are character and form, and will be highlighted in the following discussion on the constitution of technical settings.

7.2.2 The Constitution of Regionalised Technical Settings: A Mangle of Human and Material Agency

In attempting to provide a framework for regionalised technical settings, it is important to understand how they are constituted, and what agency—both human and technological—accounts for their regionalisation. A good starting point for this is to understand the structurational view of how physical (non-technical) settings are regionalised. In ST, interaction settings are not pre-existing “given *milieux*”, but are (re)constituted in practice by human agency. The physical properties of locales— aspects of the material world along with human artefacts—are used recursively “to constitute the meaningful content of interaction” (Giddens, 1984, p.119). In other words, the regionalisation of a locale depends not only on material elements, but also human elements; it is only to be conceptualised in relation to social systems.

Thus, ST considers social factors and materiality as intrinsic to the structuration of social conduct. This is also evident in Giddens’ inclination to use ‘locale’ instead of ‘place’ in defining regionalisation:

“For Giddens, place is not as strong as the word locale to accentuate human agency in constituting contexts of interaction since it still addresses toward physical features. He points out that locale embodies human actions and artifacts” (Sun, 2009, p. 247).

The use of the term locale, then, is intended to acknowledge what humans do to create and sustain settings, while still giving recognition to materiality.

It is important to reiterate, however, that materiality is seen as a resource in ST, which has no agency except that which is implicated in human action (Rose and Jones, 2005). This brings us back to the problem of agency in structurational IS research (Rose et al., 2005). Giddens non-dualistic account of structure and agency, while being beneficial in IS research, has been problematic in terms of technical agency. In ST, structure is considered a “virtual order”; it exists only as implicated in human

action, or as memory traces in knowledgeable human agents. This noted subjectivist ontology means that structure is inseparable from human agency, and therefore, structure (and agency) can never be embodied in technology. Consequently, in this view, agency is a purely human attribute; technology can have no agency of its own.

Theoretical discussions by Jones (1999) and Rose et al. (2005) were among research that highlighted these issues, subsequently leading to the development of sociomaterial literature. Jones critiqued the accounts of technological agency in both structurational IS research and actor network theory (ANT). Structurational research, particularly studies in accordance with Giddens' subjectivist ontology (most notably Orlikowski's (2000) practice lens), emphasise human agency at the expense of technical agency, while ANT research insists on the symmetry of the two. For structurational researchers wishing to stay true to Giddens, Jones suggests that a critical realist approach, which allows for "a relatively autonomous, relatively stable, institutional context" (Jones, 1999, p. 295) that is separate from human agency does not contradict ST's view of structure being instantiated in practice:

"The properties of a technology may therefore exist independently of its use in any particular context, but their meaning is locally emergent...Following this line would appear to enable structuration to be extended to allow for technologies having objective material properties by which they may exert agency" (Jones, 1999, p. 295,296).

This augmented view, however, is not enough for a proper treatment of technical agency. Giddens' limited reference to technology, coupled with his humanistic view of agency, leaves ST lacking in terms of its ability to adequately tackle this. Rose and Jones (2005) present a model, the double dance of agency, which encourages future research to better theorise agency in socio-technical systems. The focus of this research is to operationalize the agency involved in technology use, describe its human and technical aspects, while attempting to move beyond views of human voluntarism or technical symmetry. Drawing on Andrew Pickering's (1995) the mangle of practice, the study reconceptualises agency as that which emerges from the process of interaction between both machine (material) and human agency. It also distinguishes between the two, recognising that human agency is distinct because of

properties such as intentionality and interpretation, while material agency is seen to manifest itself in “its capacity to make a difference” (Rose and Jones, 2005, p. 28).

This view provides a framework that gives recognition to both the human and material agencies involved in constituting regionalised technical settings. Humans use the material properties of a technology (e.g. software features or existing configurations in IS) routinely “to constitute the meaningful content of interaction” (Giddens, 1984, p. 119). The technology, through its functionality, and both its enabling and constraining properties, exerts agency that helps structure interaction. Whether the case is an ERP system, a social networking tool, or IM, the features of the technology are used to construct bounded settings, with their own unique and diverse duration, span and character.

Figure 7-2 illustrates the on-going cycle that occurs in the creation and maintaining of technical settings, as well as significant aspects of their regionalisation. The interaction of human and material agencies in time-space creates a regionally bounded setting of interaction. The model distinguishes between ‘Time-Space’ and ‘Virtual Time-Space’ because of the unique temporal and spatial qualities that differentiate virtual encounters. For example, in virtual settings, asynchronous and space bridging communication can be established very easily, and in a way that would be hard to achieve in physical settings.

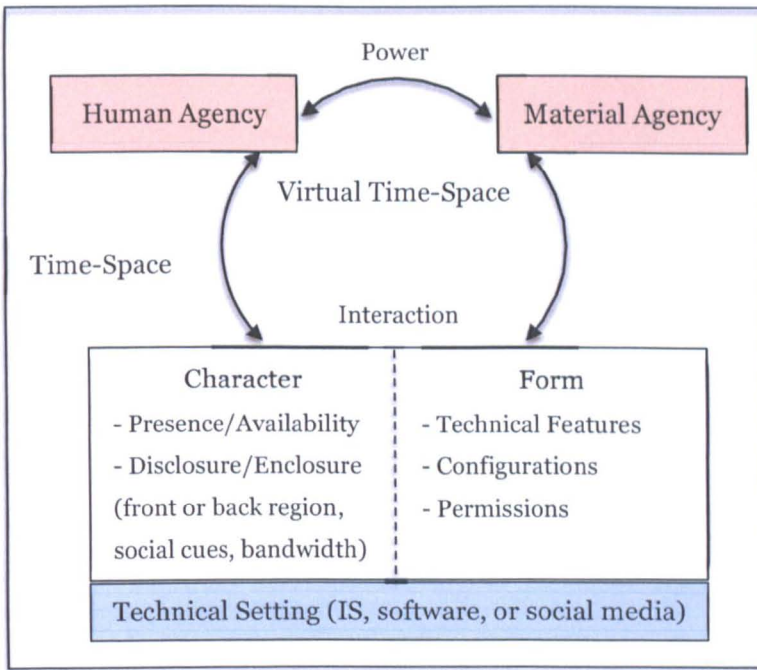


Figure 7-2: The constitution of regionalised technical settings of interaction

Due to their relevance to the study, the two modes of regionalisation described by Giddens, character and form, are highlighted here. The character of an interaction setting can be ascertained by examining the presence-availability and modes of enclosure/disclosure of the individuals involved. In physical encounters, presence-availability refers to how accessible individuals in a social system are to one another. This accessibility is not only related to physical proximity and the ability to interact with individuals face-to-face, but is also related to distance in social relations, whether a person is socially accessible. For example, individuals may be separated by social class, which can make it difficult for one class to contact or associate with members of the other class. Disclosure/enclosure, another aspect of character, refers to modes of front and back regions. An uninhibited individual is giving “more of themselves” in an interaction and is in a state of disclosure (back region), while being in line with normative behaviour can be a state of enclosure (front region). Based on these two components (presence-availability and enclosure/disclosure), it can be said that the character of a technical setting is determined more by social factors, and yet technical properties of the technology play a role in this as well. For example, on social networking sites such as Facebook, we allow people to access our profile and engage in informal communication. We may also choose to block certain people, thereby

preventing any access or communication through the site. All this is done by human agency—making the decision to allow access or block—yet it is carried out with the aid of the security configurations on the site. Finally, with regard to form, a regionalised setting is set apart from adjacent settings through a mixture of social and material factors. For IT communication, materiality plays the greater role in defining the specific boundaries of interaction. This is because the technological properties of the media platform are significant in determining the types of boundaries that can be created. What this means is that the configurations and permissions we define, and more importantly the technological properties of the media itself, both determine how closed off the interaction is from other interaction zones.

7.2.3 IT Enabled Performative Settings of Interaction

The idea of contextually emergent settings of interaction (regionalisation) posed by Giddens not only provides an interesting way to characterise virtual interactions. It also suggests a fruitful agenda for studying themes of power and change in ICT use that can be applied when considering complex information systems, communication media, or online networking tools. This form of analysis is intended to extend existing structuralist IS views, wherein technology has been noted to be “missing in action” (Orlikowski and Scott, 2008, p. 434). Moving beyond mere descriptions of technical capabilities and constraints, the study of regionalisation can ground virtual interactions as occurring in time-space, adding a more tangible dimension of materiality.

Before proceeding to outline the emerging model, it is first necessary to elaborate on the agency implicated in creating technical settings, which has only been alluded to in the previous section. The aim is to present a view that acknowledges the role of materiality while being consistent with ST. This is addressed in the following section.

Agency and Structuration Theory

The question of material/technical agency has traditionally been challenging to address from within a structuralist perspective, given the ontological issues relating to materiality in ST, and the decidedly humanist vantage point. However, Rose and Jones (2005) find that Giddens’ definition of agency does not entirely rule out technical agency:

“Agency is defined, following Giddens (1984) as ‘the capacity to make a difference,’ i.e. to act in a way which produces outcomes. From this perspective, therefore both machines and humans can be said to exercise agency” (Rose and Jones, 2005p. 28).

With this definition, along with an augmented view of structure that includes a pre-existing material institutional context in addition to the social, the authors suggest the viability of incorporating technical agency within a structuralist framework. To modify the view of structure, the authors draw on Storper’s (1985) critique of Giddens’ ST, although they mainly focus on the issues concerning materiality. In addition to materiality, this critique also points our attention to another arena in which structures should be considered “more real” than ST permits: the discursive arena of institutions.

Storper finds that Giddens only acknowledges the role of nondiscursive knowledge in practice (interpretive schemes), while not paying due attention to discursive strategies exercised by dominating groups. He argues for a “relative autonomy of discourse” (Godelier, 1984, as quoted in Storper, 1985, p. 421), i.e. separate from that which exists “as memory traces orienting the conduct of knowledgeable human agents” (Giddens, 1984p. 17):

“[S]tructures are more real, in yet another respect, than Giddens admits in his notion of instantiation: in addition to the real *durée* of the material, there is the intentional discursive arena of institutions” (Storper, 1985, p. 421).

Storper’s main insights on this are to do with the necessity of considering discursive practices as both implicated in the construction of society, and having a historical (institutional) existence.

A Performative View of Interaction Settings

To overcome the aforementioned limitations of ST—the undertheorising of material agency, and the minimal role given to discourse—the emerging model turns to the concept of performativity outlined earlier in the literature review. The view of performativity adopted here is derived mainly from research on sociomateriality (Barad, 2003, Orlikowski and Scott, 2008), but also gender performativity research (Butler, 1993, 1999), and performativity of economics (Callon, 2006). To help grasp this elusive concept, Butler’s definition, “for something to be performative means that *it produces a series of effects*” (2011 emphasis added), is used to provide an overarching interpretation. However, her focus on the citationality of discourse as being indiscriminately imposed on materiality necessitates a more nuanced view. For this purpose, Barad’s agential realism is drawn on to better conceptualise the materialization of phenomena, be it the materialization of bodies, social practices, or spatialities. The notion of “intra-action” is invaluable here. In her view, agency does not reside separately within materiality and/or social (discursive) practices, but rather emerges as a result of their coming together in a “*congealing of agency*” (2003, p. 822). Phenomena arise through this coming together of agency, and both materiality and practices are locally defined based on the specific agential cuts enacted between them. Performativity, in her view, is the on-going process of this, the “iterative intra-activity” which produces phenomena, power, and agency simultaneously (2003, p. 828). Similarly, Callon adheres to this notion of intra-action, or agencements as he terms it, and also finds that performativity is the power implicit within material-discursive “configurations”. His view of performativity goes further than the previous views and provides a multifaceted take on the concept. He finds that a discourse materializes into existence through various mechanisms, by acting as a self-fulfilling prophecy, a prescription, or a physical expression, and thus becomes a reality. This can only occur, however, through specific agencements—material and discursive—that performatively actualize this discourse into being.

After this brief overview of the conceptualisations of performativity that have been employed in the emerging model, it is necessary to turn to research conducted from within the field of human geography. Gregson and Rose (2000) present an important engagement with the concept, which can potentially enrich IS studies on IT mediated communication and collaborative work. One of the key insights of their study

indicates that interaction spaces are performative, and seen as significant to the structuring of the social practices enacted within them. This observation provides the theoretical basis for recognising the performativity inherent in technical settings of interaction, which is the focus of the current model.

To develop their view, Gregson and Rose take Butler's gender performance narrative, and use it as a lens for examining the performance of social practices within various geographic spaces, i.e. spatialities. The authors maintain the connectedness of performance and performativity "through the saturation of performers with power" (Gregson and Rose, 2000, p.434); power that creates subject positions (for social actors) and also creates the very spaces in which performances occur. Similar to Giddens (1984), the study rejects "Goffmanesque" notions of an anterior agent pre-existing performance, and also the idea of interaction settings as pre-given spaces. Instead, these spaces are seen as emergent and contextual:

"These 'stages' do not preexist their performances, waiting in some sense to be mapped out by performances; rather, specific performances bring these spaces into being. And, since these performances are themselves articulations of power, of particular subject positions, then we maintain that we need to think of spaces too as performative of power relations" (Gregson and Rose, 2000, p. 441).

In this sense, performances produce a series of effects, and so too do their spatialities. These effects are produced performatively, through "the citational practices which reproduce and/or subvert discourse and which enable and discipline subjects and their performances" (Gregson and Rose, 2000, p. 434).

The emerging model considers virtual interactions in the same light; as practices occurring in technical settings or spaces that are performatively (re)constituted, and thereby infused with power. The understanding and usage of performativity presented here is not confined to only one of the previous theorisations discussed. Instead, based on the case analysis, it encompasses a mixture of their varying insights. To further contextualize the model, and better understand the workings of power within technical

settings, regionalisation is also examined. This view of mediated spaces as performatively regionalised is detailed in the following section.

Performatively Regionalised Technical Settings

Based on the theoretical framework guiding this study, which merges ideas from both ST and sociomateriality, it is possible to outline the emerging model for performatively regionalised technical settings of interaction. Figure 7-3 depicts the theoretical building blocks for the model as discussed in the previous two sections, highlighting the modifications to Giddens' concepts of structure and agency, as well as the various understandings of performativity. The model attempts to reconceptualise ICT practices as being recursively organised interactions occurring in emergent *technical settings of interaction*. Through a fusion of human and material (technical) agency, these virtual settings are regionalised, performatively constituted, and infused with power. Time-space itself is seen to be constituted by means of ICT, resulting in spaces with distinct temporal and spatial characteristics. The technical configurations in ICT are used by actors to constitute interaction zones, and to provide context and meaning. This creates a virtual interaction setting, a fusion of material properties and human action, with its own set of behavioural patterns and discourses.

This interaction setting, however, is not simply a container for interactions or a static backdrop. It is performative. At the most basic level, to say that technical settings are performative means *they produce an effect*. Through the active engagement of human and material agencies, these settings materialise, bring “something” into the interaction context, and are actively involved in the construction of the practices they mediate. Their performativity rests on numerous factors: the discourses they come to express, prescribe, or “prophesise” through enactment; the (reflexive) human and material agencies that come to cite this enactment; and the locally emergent meanings that materialise from the specific agential intra-actions (cuts).

The regionalisation of a technical setting is also an essential aspect of its performativity. To better clarify this, a necessary distinction needs to be highlighted here between regionalisation—the contextualizing of interaction spaces—and structure. Technical settings are context-laden spaces created using technical (material) configurations of a technology. Structure is what guides the creation of

different contexts. Based on the interplay between structure and agency, regionalised spaces are created with differing forms of performativity. Furthermore, agency is seen here as both human and technical, the result of the entanglement of the human (intentionality, schemas, interpretations) with the technical (properties, features, the capacity to make a difference).

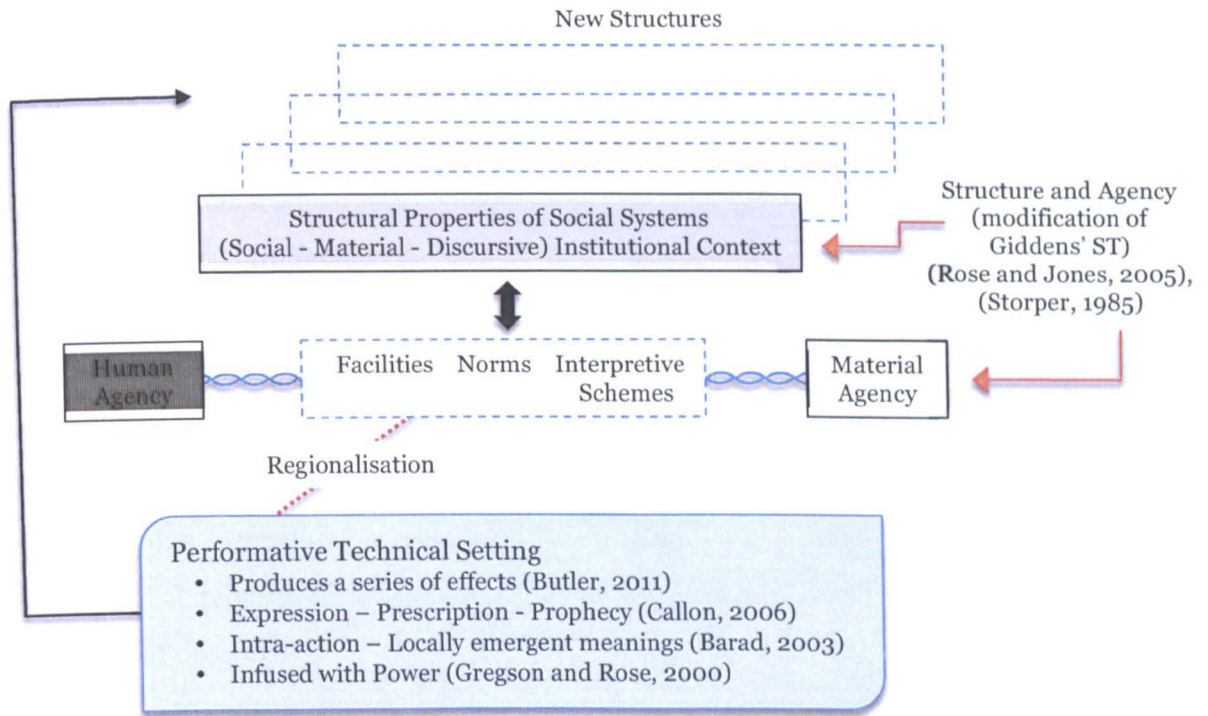


Figure 7-3: Performatively regionalised technical settings of interaction

There are many benefits to be achieved by coupling the concepts of regionalisation and performativity for the purpose of understanding IT interactions. Merged together, the two concepts allow us to conceive of the processes and agencies involved in constituting virtual spaces that are infused with power. They also offer a way to scrutinise the role of IT spatialities in organisational dynamics and change. The performative view provides an opportunity to focus on the discourses enacted as a result of, and within IT space, and allows for a better understanding of the related dominant, competing, or emerging practices. The study of regionalisation adds an important layer to the analysis, which highlights the contextualising effects of time-space on social practices.

The study of regionalisation has been largely overlooked by structuralist IS research, which is surprising given the centrality of time-space in ST:

“Giddens believes that contexts of social interaction are positioned in time-space – coordinated connections of, “locales” (settings of interaction) used chronically and largely tacitly by agents to sustain meaning in communicative acts” (Netto, 2007, p.53).

Netto (2007) adequately posits this centrality, and finds that—from Giddens’ writing—institutional analysis could benefit from theorising how practices are mediated and transformed across time-space. For Giddens, the crux of the matter is how time-space is implicated in the generation and distribution of power. He suggests that examining the regionalisation of locales, and their associated modes (e.g. character and form), can reveal underlying power dynamics among interacting social groups. For this purpose, he also explains at length how an understanding of front/back regions helps us become more attuned to power struggles in organisations. Back regions, specifically, are seen as critical to the balancing of power in asymmetrical relationships (Nandan, 1998); i.e. critical to what Giddens terms the ‘dialectic of control’:

“All forms of dependence offer some resources whereby those who are subordinate can influence the activities of their superiors. This is what I call the dialectic of control” (Giddens 1984, p.16).

Therefore, in situations where behaviour is strongly sanctioned and monitored, subordinated groups can use back regions as a resource to regain some control.

To put this in the perspective of virtual front/back regions, and illustrate by way of example, let us consider the use of groupware technologies within organisations, e.g. Lotus Notes. In many cases, the intended outcome of using the software is to encourage collaboration in a manner that is visible to all, but also monitored by management. The types of interaction that are visible are generally expected to be in line with managerial policies, and can be considered front region interactions. Based on the dialectic of control, this groupware can also provide a resource for those being

monitored (subordinate workers). Within the confines of the software, workers can gain access to, and privately message, members who were previously unreachable, for reasons such as hierarchy or geographical distance. These resulting confined *technical settings of interaction* can be characterised as back region, where communication can be used to work around the system, share knowledge, or provide any other means to empower subordinated workers.

Finally, it is worth noting that, from a structurational view, the study of interaction settings is important not only for revealing power dynamics, but also for providing the “missing link” in terms of how individual actions or agencies work to structure and are structured by society:

“The key-question of how an agency reproduces structural properties of the social system is somehow contained in ‘how far the situated practices studied in a given range of contexts converge with one another in such a way that they enter directly into system reproduction’... (Giddens, 1984p.xxxi)”
(Netto, 2007, p.52).

In other words, when there is a convergence in practice found in a multitude of contexts (regionalised settings), it can be said that these practices display structural properties. Further still, a contradiction in practice across different contexts—such as disparity between front and back regions—can be an indication of resistance, struggles among social groups, and a sign of impending change.

7.3 Performatively Regionalised IT Settings: Exemplification and Further Discussion

After having outlined the emerging model, it is now necessary to demonstrate how a discussion of regionalisation and performativity can shed light on virtual interactions. This is done in the following, by re-examining the three cases of segregated work to exemplify the performativity of technical settings of interaction.

7.3.1 Technical Interaction Setting 1: Instant Messaging Ad-hoc System at Administration [A]

In case 1, the technology-in-practice observed is the ad-hoc (IM, telephone, shared drive) system, enacted by a cross-gender team of managers (male general manager, female manager, and female coordinator). Observation of the team was conducted in an office setting at the female branch (the locale), which consists of a number of interaction zones, some of which depend on mediation. The first of these zones, the instant messaging chat box, is technological/virtual. Examining this IM setting through the lens of regionalisation provides an extra level of analysis, as what is implicated here is much more than simple message exchanges. Interactions between the male manager and female coordinator occur within the IM setting, which has a *form* and is regionally bounded in a manner inherently different from face-to-face interactions. The chat window (the technical setting) is seen on the computer screen in the office, the office itself a regionalised setting. These two regions can be considered adjacent or one interior to the other. The chat region is set apart from the office space, and because of the placement of the computer screen, it is very much a private setting. It can also be instantaneously concealed (most IM software now include add-ons or shortcuts to auto-hide chat windows and icons), something which cannot be done with non-technical regions.

The *duration* of these message exchanges is very flexible due to the asynchronous mode of IM; in some instances they are short and sporadic messages, but they can also take on longer durations. Presence-availability can be determined/secured in a number of ways. The status chosen in the chat application (Online, Away, Busy...etc.) provides some indication as to whether a team member is free to chat. Finally, the *character* of the chat region—the modes of behaviour and relations enacted within it—is carried out and maintained independent of what is going on in the office. The IM interactions observed between the male and female managers were very relaxed and informal. The choice of words and the conversation openers revealed a level of familiarity and comfort between the two, which was not evident during their phone conversation. Also, the chosen textual cues—emoticons and typed laughter—were playful. Hence, from all the previous, the chat region can be considered a *back region interaction setting*.

On the other hand, the telephone setting is considered a *front region interaction*. The telephone conversations take place in a public setting, and the female coordinator's responses can be heard by anyone inside the office or standing close to the door. Her mannerisms, tone of voice, and verbal cues cannot be concealed from adjacent regions. The character of the telephone setting is also an indicator of its being front region. The conversations observed were very formal, and the manner in which the female spoke was guarded. Unlike IM, the content of the interactions was limited to task related discussions. The discrepancies in behaviour between IM and telephone are particularly interesting, especially given the fact that these are the same two people interacting, only with different mediums, and with varying social bandwidths.

Moving on to the performative aspects of the IM setting, it has been found that the setting is distinctly characteristic of back regions. The privacy of the chat setting brought about interactions that were more sociable, and deemed appropriate by the workers, but also clearly differed from public gender norms. As such, the regionalisation of IM allowed the work team to challenge existing norms, and regain some power from superiors and societal influences. Power to act autonomously, and interact in a way that was in accordance with their ideological leanings. The performativity of the IM setting can be described as being an *expression* of an interaction space used to integrate work between genders. The use of IM for collaboration, the very enactment, creates an interaction space that comes to represent or 'express' the crossing of segregation boundaries. In other words, it creates a space in which the dominant discourse on gender relations is subverted. However, the reclusive nature of this enactment means that chances of it being seen by other workers and mimicked are limited, and so too its performativity to bring about widespread change. The material properties of the IM software—chat box preferences, text, auto-hide, and emoticons—were used by the workers to “constitute the meaningful content of interaction”, i.e. to provide context for the interaction setting. These properties represent the material agency in IM, which allow specific types of interactions and exclude others. This was evident in the unique exchanges that took place in IM between genders. The intra-action between human agencies and material properties of IM enacted an agential cut that led to communication being informal, and liberal. This differs from the intra-action between the same human

agencies with a different medium, the telephone, which resulted in formal and conservative communication.

7.3.2 Technical Interaction Setting 2: Oracle Task Tracking System at Deanship [B]

The Oracle system implemented at Deanship B is basically a task tracking and archiving system, used to organise work practices at both, and between, the male and female branches. Upon implementation, electronic recording sheets have taken the place of the paper-based forms previously used to track service requests. Once an e-recording sheet is filled out, a request is created, and the system will accordingly assign the task to unit employees. Later, the system will also send out reminders, and track the progression of the task until completed. In addition to this, the system facilitates managerial processes such as monitoring the flow of work, to help hold workers accountable. This has been particularly useful for male supervisors wishing to monitor the female branch, where direct supervision in the physical sense is not possible. As such, this technology in practice differs from the previous IM case in that it is involved in more than mediation, and is used to monitor and organise work practices.

To examine the regionalisation of Oracle, we first need to discern the interaction zones within the system, and then relate them to those occurring in physical regions. Employees¹⁵ from both branches engage with the system through the request form interface, mostly consisting of drop down menus, checkboxes, and a number of comment boxes for queries and logging. The only entries that entail a response from other users are the comment boxes, which are considered the interaction zones in Oracle. The rest of the entries are considered data, related to the nature of requests.

The *form* of the technical region is determined by the permissions setup by system administrators. These permissions are largely based on functional divisions within the units, as they specify the users receiving each group of tasks, reminders, and comments. As such, each user has an individualised interaction setting, made up of the intersecting regions of the other users.

¹⁵ It should be noted that these descriptions of engagement with the Oracle system mainly reflect the experiences of female employees, given that the observation was conducted at the female branch.

The *character* of the regions in Oracle are determined to a large degree by the monitoring function, and the anonymity of interactions. From the females' perspective, messages are sent to, and replied by, unknown male employees. The asynchronous mode of communication means that presence-availability cannot (and was not intended to) be secured. The females leave a comment for an unknown other that may or may not respond, leaving the user with the feeling that they are messaging everyone and no one in particular at the male branch. Exchanged messages include questions or details of specific problems associated with the request, with no personal notes or signatures.

On the whole, the use of Oracle has served to automate the organisation of tasks, and has resulted in a depersonalised interaction zone, which is monitored by management. It has also resulted in a number of changes for gender communication at deanship B. First, it has integrated practices between the two sides, in an efficient, hassle free manner compared to previous practices. Second, given that the electronic forms have been devised to organise a wide range of tasks, the system has rendered other means of communication almost unnecessary. This, along with the monitoring and surveillance of the system, and the "no communication between genders" rule, has led to the system acting as a gatekeeper on behalf of the deanship's managers to discourage communication between the two sides.

The technical settings in Oracle can be characterised as front region interaction settings. This is evident in the conforming nature of interactions, which follow strict policies set out by the dominating group here (management). Direct communication between genders, both in the physical and virtual settings, is kept to a minimum, and although practices are closely integrated, the two branches still act as separate units. At deanship B, a specific discourse was found to be particularly recurrent, and appears to be propagated by management to uphold this "separated integration". This discourse asserts that the male and female branches are completely independent of each other. It also stresses that the females are knowledgeable and competent workers, who have absolutely no need to contact the male side to carry out their work.

This discourse was actualized through a combination of *prescription* and *expression*. The complete separation of the male/female branches was first prescribed by management, and later enforced through rules banning contact. The Oracle system

was devised to increase this separation, as it enabled an impersonal and automated interaction setting. The use of the system became an enactment of the propagated discourse, a physical expression of it, and came to represent the segregated practices at the deanship.

In the end, the discourse delineated by management was actualized into a reality of increased segregation. Upon closer examination, this discourse is based on a number of false assertions, and is geared towards having more managerial control over workers, and their exchange of information. Claiming that the male and female branches are independent of each other is misleading on management's part for a number of reasons. Firstly, the male dean is the general supervisor of both branches, with the two female supervisors having little autonomy over the female side. The male/female counterpart units follow the same procedures for carrying out work practices, and the females rely on the male side for information, supplies, and equipment. Secondly, the claim that females have no need to contact the men has been negated by four of the female workers. They explain that their need for contact has nothing to do with competence, and that they need to maintain communication with the men if they are to stay in the loop, and have access to resources at the male headquarters.

Thus, collaborative work at the deanship was shaped by spreading a false discourse, which, despite its falsehood, was performatively actualized. This actualization did not transpire without some resistance. The females tried to resist management rules, and contacted the men through telephone and emails in an attempt to initiate back region interactions. These attempts were rejected by the male side, which chose to comply with management's vision for work practices between genders, and only respond to or carry out requests sent through the system.

7.3.3 Technical Interaction Setting 3: Staff Meetings via Video-Conferencing at Departments (Y) and (Z)

The video-conferencing case exemplifies how technology can be used to conjure up an interaction setting for a group of people who are unable to meet physically. In a strict segregated environment such as Saudi, the barriers to physical meetings are cultural, as there is no real physical hindrance to prevent men and women meeting

face-to-face. In physical locales, staff meetings within each department occur in an interaction setting that is regionalised as segregated and separate. This is evident in both the form and character of these physical settings, which dictate that women do not enter the interaction zones of men and vice versa.

With VC, however, technology allows for an interaction setting that is accessible from two different physical locales by means of a virtual space. It merges two interaction zones to form a culturally neutral setting in which men and women can interact together in groups. This merged virtual setting is regionalised as mixed-gender, although some aspects of the cultural limitations are still evident, such as audio only participation for females. Still, the ability to meet with the counterpart branch has done much to familiarise the two sides with each other, and has helped integrate practices, as has been reported by the majority of staff.

To illustrate the various modes of regionalisation within VC settings, two examples are given from the cases: the VC staff meetings carried out in departments (Y) and (Z). The choice of these specific departments is due to the disparity between them, in terms of attitudes regarding gender collaboration, and the prevalent ideological schemas. The first example, department (Y), has a moderate/liberal base, whereas department (Z), an Islamic discipline, is largely conservative. As will become evident in the following analysis, the two meetings demonstrate that the use of the same technology does not necessarily result in similar practices or modes of regionalisation:

1. Staff meeting at department (Y): The *character* of this VC setting can be described as a *back region*. The meeting is considered private, open only to staff from the department. Throughout the meeting, the behaviour of participants was carried out in a way that deviates from traditional gender norms. This is discerned firstly from the democratic nature of the meeting, and the ethos of equal participation between genders. Secondly, attitudes toward the opposite gender were collegial, with no exaggerated formalities. Thirdly, the head of department pushes the limits of gender norms further with a comment directed toward a female staff member, suggesting they travel to an international conference together. Although made in jest, this type of comment is generally viewed as culturally inappropriate in Saudi, as suggested during the interviews with a number of staff members, who felt the head of department “had gone too far”. So

although staff might have been disapproving of the head's actions, he continued to act in an autonomous fashion, and in a manner consistent with back region interaction settings.

2. Staff meeting at department (Z): The *character* of this VC setting can be described as a *front region*. Similar to dept. (Y), this meeting is also private, however, traditional gender norms are strictly adhered to. This was apparent in the classic roles prevailing the meeting: men interacting with each other, females observing quietly, or participating in a meek manner. The setting is also distinguishable as front region due to the atmosphere of surveillance pervading the meeting, as there were hints of "policing" to maintain segregated norms. This was evident through actions and attitudes of staff from both sides. The first of these policing efforts was by the conservative female staff member who spoke admonishingly to the female head, asking why video from the male side was needed. Her comment was clearly cautionary, and meant to show the attendees that she did not wholly approve of the VC setting, or viewing video transmissions of the male side. The response she received from the other females, and the fact that video was eventually transmitted, shows that others did not share her view. The second instance of policing was by the male head, who set the tone of the meeting as extremely formal between genders. This was evident when a female attempted to lighten the mood, and made a jesting comment. His response was to ignore the comment, and reply to her in a curt manner.

While these departments now hold VC meetings regularly, the difference in norms between the two is undeniable. The ambience of cooperation and equal participation in department (Y) is in stark contrast with the general mood at department (Z), which led the females to take on the role of silent observers during most of the meeting. The differences in ideological schemas can provide one explanation for this discrepancy, i.e. the contrast between liberals versus conservatives. A second possible explanation is the different technical frames these staff members have regarding the VC technology. During the interviews, staff at department (Y) spoke about the technology as a means to connect with the other side. A male staff member stressed this point, "All the men here pushed for video conferencing so we could include our sisters over there, and allow them to participate in our meetings. We wanted to hear their opinions on everything going on in the department. We wanted them to have a voice". Staff at

department (Z) revealed a different technical frame. In the VC meeting, the females sat quietly watching their male colleagues on the screen as if they were watching a “television show”. The mannerisms of the male side was also in line with this, as their discussions were amongst themselves during most of the meeting. Of course, these men were aware of the females’ “presence”, but this awareness was more to do with having observers rather than participants on the female side.

The contrast between the two VC settings in departments (Y) and (Z) points our attention to issues of local emergence and the interplay of human and technical agency discussed by previous studies (Jones, 1999). Both departments basically used the same technology to facilitate their staff meetings. Materiality in these technologies in practice—the technical configurations, meeting room layouts, disabling of video on female side—was the same. However, regionalisation and the enactment of gender relations were almost opposite. As previously mentioned, this is most likely due to differences in ideological schemas and the resulting technical frames prevalent in each department. The moderate/liberal staff at department (Y) viewed VC as a means to promote collaboration between genders. Conservatives in department (Z), on the other hand, viewed the new technology with their old frames of reference, i.e. a technology that allowed women to observe men working rather than fully participate with them. Consequently, these staff members used VC to continue carrying out the roles of male leadership and female subordination. Hence, the VC examples exemplify how technology exerts part of the agency in each enactment, while the other is determined by human perceptions, intentions, ideologies, frames, and so forth.

Moving on to performativity, it has been found that the regionalisation of the two VC settings, and the power dynamics enacted within them, served to either uphold and reproduce existing gender norms, or challenge and deviate from them. Power was found to be residing with:

- Autonomous actors (in back region settings): In the meeting at dept. Y, the back region character was evident in the unrestricted nature of interactions. Staff members deviated from institutional norms, and followed their own rules of associating with the opposite gender. The overall mood of the meeting was of equal opportunity and collegiality between genders. Turn taking was carried out to ensure that attendees from both sides participated. This means that, while power

still remains largely with dominating groups (such as university administration or religious institutions), the enacted virtual setting gives workers some latitude to follow their own ideologies.

- Normative authority (in front region settings): In the meeting at dept. Z, the setting was characterised as front region, with behaviour conforming to institutional gender norms. The mood of the meeting is in accordance with Saudi tradition, as the men interact amongst themselves, while the women observe quietly and speak when called upon. Also, the monitoring of these events by authority figures (male head of department, female conservatives) maintained norms of segregation. In this case, power still remains in the hands of dominating conservative groups.

To describe the performativity of VC, it is important to reiterate the circumstances of its implementation. The VC technology was first advocated by the ITC with the purpose of integrating male/female branches. It was also seen as a tool that would eventually promote inclusion of the female side. The discourse used to promote this was performatively actualized into a reality, by acting as a self-fulfilling prophecy, a prescription, and an expression of the vision the ITC had for improving segregated work. *Prophecy* was evident in the ITC's campaign to convince workers that the use of VC would alleviate the complications of segregated work. ITC members had a "belief" that this technology would break gender boundaries and improve women's status, and this is the discourse they propagated. *Prescription* followed, as the university's upper management jumped the bandwagon and began applying VC policies, such as requiring a compulsory number of females in staff meetings, and ensuring that events were held in conjunction with VC. Finally, the VC sessions—their physical enactment—served as an *expression* of the ITC's discourse of improved segregated practices. As the VC sessions began to regularly take place, they became more visible throughout the campuses, and were reflexively cited by university administrations, departments, etc. With time, these VC sessions—their enactments—came to signify cross-gender collaboration and improved segregated practices. In other words, the discourse propagated by the ITC was performatively actualized. Finally, in the staff meeting examples mentioned above, attempts to subvert the dominant discourse on gender were made in back region settings (dept. Y), while front regions were found to re-inscribe the dominant discourse (dept. Z).

7.3.4 Further Discussion

In constructing the narrative for this study, the concepts of regionalisation and performativity have helped gain valuable insight into how virtual spaces emerge, become contextualized, and potentially effect change in organisations and wider society. The view put forth here is that a technical interaction space is performative if it contributes to the social practices and discourses enacted within it. The study of regionalisation is seen to provide a useful lens to understand this performativity. Similar to physical spaces, the regionalisation of an ICT space is not pre-given. Its contextuality only begins to emerge through the recursive enactment of social practices. Furthermore, through continued enactment, this contextuality is then either reproduced or changed.

The case of gender segregated work and ICTs is ideally suited to illustrate the performative aspects of virtual spaces. In other areas of the world, ICT mediums have taken on different meanings and uses, but in Saudi they represent a very specific cultural enactment. Although IM and VC may appear to be just another form of communication, it is important to note that, without these technologies, Saudi men and women would not be able to interact so profusely, not in the physical sense. In essence, these technologies are used to “extend” segregated geographic space, and create a culturally neutral setting in which the prevailing discourses on gender communication can be challenged or subverted. In the case study examples, the material properties of a technology have provided an opportunity to regionalise virtual space differently from physical space. Consequently, it has been found that gender work norms were enacted differently in the virtual sphere, with the ethos of separation and inequality between genders transpiring more and more into a cooperative ideal.

Not surprisingly, back regions took on more subversive forms, creating performative spaces that challenge gender discourse. Front regions were also performative but in a more citational, mimetic sense, reproducing the dominant discourse of segregation. In case 1 (Ad-hoc/IM), a new discourse was enacted in the IM setting, that of closely integrated and collegial work between opposite genders. In case 2 (Oracle), the dominant discourse of gender separation was reproduced, although its reproduction was due to managerial efforts to control workers rather than cultural concerns. As for case 3 (Video-Conferencing), the VC virtual spaces brought about multiple and

diverse enactments. In the VC staff meeting at department (Y), gender relations played out in a way that differed from previous practices, as there was an air of equality and fairness that was simply non-existent before using the technology. The male side put in every effort to facilitate female participation, and the females reciprocated with equal enthusiasm. Also, there were attempts to test the waters by challenging traditional norms, such as the incidents of teasing and joking between genders. These instances can be seen as attempts to subvert discourse. The VC meeting in department (Z) revealed the other extreme and a different type of enactment. The interaction setting still brought about changes in gender group dynamics, as it enabled the two sides to meet routinely. However, there was an obvious effort to maintain the status quo, with members from both sides keeping proceedings in check, and ensuring that participants still conformed to traditional Saudi conservatism. So the performativity here is one that reproduces the segregated norms of physical space.

By examining regionalisation in the previous empirical examples, it is possible to understand why certain modes of behavior become associated with particular ICTs. In physical real world interactions, settings are contextualized depending on a mixture of the material properties of the locale (e.g. room layouts, partitions between rooms, furniture), and the social cues used by individuals (e.g. formal versus informal speech, laughter, voice intonations, and facial expressions). The same can be said of ICT spaces, in that the material and the social come together to contextualize interactions. In the IM/Ad-hoc case, the interaction space demonstrates technology's personalizing effects on human interactions, as interactions were more sociable, and led to bonding between team members. This can be attributed to the reclusive nature of the interaction setting, along with the informality of the textual cues used. The Oracle interaction spaces, on the other hand, exemplify depersonalizing effects. This can be seen as the result of the public and monitored backdrop of the Oracle sheets, the inability to exchange long textual messages in them, and the absence of textual cues conveying emotions, all leading to an interaction space with an automated feel to it.

The view that entanglements of human action and materiality influence social behavior bears resemblance to those presented by Marshall McLuhan on mass media and modern communication technologies. McLuhan's writings are taken with caution here, given his inclination towards strong technological determinism (Carey, 1967).

His famed “The Medium is the Message” (Fiore and McLuhan, 1967) centers around the idea that the technologies we use are more significant, more consequential to social conduct, than the messages being relayed through them. He attributes this importance to their effects on human sensory perceptions, finding this especially true of communication technology.

“In McLuhan's phrase, technology is literally an extension of man, as the ax is an extension of the hand, the wheel of the foot. Most instruments are attempts to extend man's physical capacity, a capacity shared with other animals. Communications technology, on the other hand, is an extension of thought, of consciousness, of man's unique perceptual capacities. Thus communication media, broadly used to include all modes of symbolic representation, are literally extensions of mind” (Carey, 1967, p.7).

McLuhan's observations focus on the effects a technological medium has on our senses, with those effects being consequential to the types of interactions that occur. If we are to consider this in relation to the emerging model, then it can be said that the way we engage with a communication technology, the way it effects our senses, will play a big role in how the resulting interaction spaces are regionalised. For example, a large number of ICTs revolve around textual (digital) interactions of a more sociable nature, such as IM and social networking sites. Following McLuhan, by using these social mediums, and interacting with the material properties of the technology, they become an extension of ourselves—an extension of our thoughts. Through the ongoing social interactions that occur, we become involved in instant and pervasive thought exchanges from within our immediate (and familiar) physical environments, with people that are not necessarily close to us either physically or socially. Therefore, it can be inferred that the lessening of our guards in these sociable spaces, and the popular tendencies to move quickly to informal behavior, even with people we are not familiar with, may be a result of the medium's effect on our senses, and the consequent regionalisation of these spaces.

In addition to the previous elaboration, the emerging model has helped to better scrutinize ICT use, and the changes in gender discourse in the Saudi sex-segregated

context. The empirical exemplification has revealed the scope of ICT influences regarding female marginalisation, ranging from the empowering discourse enacted within IM settings, to the regressive discourse enacted through Oracle that permitted the continuance of female marginalisation. The model has also uncovered ICT practices specific to the Saudi segregated context, such as the strengthening of gendered gatekeeping dynamics and the sustaining of managerial control over separated branches (enacted through Oracle), or increasing sociability between genders and the consequent integration of practices (enacted through IM).

The observations from the case study regarding gatekeeping dynamics are deserving of further attention, and have resulted in a number of findings that are relevant to network gatekeeping studies. At the onset of this research, there were strong assumptions that in segregated work, IT served mainly as a bridge connecting workers, and facilitating unrestricted information exchange and collaboration. What has emerged from the empirical data has pointed to other uses of IT, specifically for gatekeeping: to filter, monitor and circumscribe gender interactions. The dynamic is not new to the Saudi segregated context, and has existed prior to the advent of ICTs, often progressing as a result of liaising between two or more members of opposing branches who are in positions of authority. Conventionally, heads of counterpart branches (male and female deans, supervisors, front line managers, etc.) form an alliance in order to streamline work between branches. Through liaising, these individuals come to represent their branch, and become responsible for controlling information passed on to and from the other side. For female gatekeepers in particular, this is (in most cases) an empowering position, especially with regard to the decision making process. This is because a female gatekeeper is often the only female who interacts with the male superiors, and therefore has a monopoly over framing issues and passing on information to and from her branch. More recently, the implementation of new forms of ICTs has provided new tools and mechanisms to create or alter gatekeeping dynamics.

Gatekeeping in the IT context, or Network Gatekeeping, is understood here based on the theoretical framework proposed by Barzilai-Nahon (2008, 2009). She defines Gatekeeping as “the process of controlling information as it moves through a gate or filter... and is associated with exercising different types of power” (2009, p. 1). Her framework provides a comprehensive vocabulary for understanding gatekeeping, and

makes an important distinction between two key constructs: gatekeepers and gatekeeping mechanisms. A gatekeeper is defined as an entity that carries out gatekeeping through a gatekeeping mechanism, the mechanism being a “tool, technology, or methodology” (2008, p. 1496). In addition, the framework critically examines gatekeeping rationales from past literature, providing a typology for the motivations that underlie a gatekeeping dynamic, i.e. the purpose for instigating a gate.

For the purpose of this study, the two constructs of gatekeeping rationales and gatekeeping mechanisms are used to elaborate on the dynamics found in segregated work. Table 7-1 provides a description of Barzilai-Nahon’s (2008, 2009) specific typologies that are relevant here, and which have been augmented based on the case analysis (segregated context) to include two additional mechanisms: Proxy and Surveillance. Also, an overarching distinction has been found with regards to the role ICTs play in network gatekeeping. Findings from the cases indicate two types of change mechanisms: *formative* or *dismantling*. A formative mechanism is a function served by the technology that acts to create and sustain the gatekeeping dynamic, whereas a dismantling mechanism is one that causes the collapse of an existing gatekeeping dynamic.

Construct	Description of Typologies
Gatekeeping Rationale	Access: “Providing or preventing access to a service, status, or position... Used to control participation, inclusion/exclusion” (Barzilai - Nahon, 2009, p.13).
	Protection: “Regulating information coming from outside and its distribution in order to protect members of the network or the information” (Metoyer-Duran, 1993, as cited in Barzilai-Nahon 2009 p.13).
	Change Agent: “Engaging either deliberately or whose behavior results in social, cultural or behavioral change - this is usually done by agenda setting or shaping” (Katz and Lazarsfeld, 1965, as cited in Barzilai-Nahon 2009 p.13).
	Linking: “Link his/her internal community members with outside cultures, organizations, knowledge and services” (Tushman and Katz, 1980, as cited in Barzilai-Nahon 2009 p.14).
Gatekeeping Mechanism	Infrastructure: “Mechanisms which utilize infrastructure components and characteristics to control information and behavior of gated” (Barzilai - Nahon, 2008, p.1498).
	Regulation: “refers to rules, arrangements, treaties, agreements, or procedures that aim to control and direct behavior through information control” (Barzilai - Nahon, 2008, p.1498).
	Proxy: Delegation mechanisms that rely on inscription, i.e. technology acting as a stand in and interceptor for direct interactions (segregated context). Can also

Construct	Description of Typologies
	be considered a sub-category of Infrastructure mechanism.
	Surveillance: Mechanisms that enable monitoring of the gated to control information, either by utilising specific configurations of a system or by activity logging. The key here is that the gated become aware of the surveillance, which results in the adjustment of behaviour, or the Panopticon effect (Foucault, 1979) (segregated context).

Table 7-1: Gatekeeping rationales and mechanisms relevant for the gender-segregated context. Based on Barzilai-Nahon’s (2008, 2009) typologies

Based on the previous typologies, an analysis of the gatekeeping dynamics found in the segregated context is presented here. Among the technologies-in-practice examined, the Oracle system was utilised to create the strongest gatekeeping network. The gatekeepers in this case, the male and female supervisors, were able to circumscribe interactions between genders by mandating the use of the task tracking system and barring all other forms of interaction. The rationales for gatekeeping are numerous here. Most importantly, the dynamic prevents genders from gaining direct access to each other, while simultaneously allowing gatekeepers to serve as the primary link between their internal branch and the corresponding one. The gate also serves as protection for information deemed sensitive by the gatekeepers, such as the information regarding employee salaries that led to conflicts arising. Finally, this case exemplifies what has been termed agenda setting and shaping of social behavior (Katz and Lazarsfeld, 1965, as cited in Barzilai-Nahon 2009 p.13). The two gatekeepers, upon first being assigned to their posts as supervisors, entered into an administration that placed no restrictions on gender collaboration, and was comprised of decentralized units freely interacting amongst themselves. This unencumbered structure was seen as a threat to supervisor authority. Thus, the need for changes to segregated work arrangements arose. By implementing new policies, and devising a system to control gender interactions, the gatekeepers were able to script the acceptable forms of collaboration in their units. Of course devising a script and mandating system use does not necessarily mean that employees will comply (as they did in administration A), as there is always the possibility of resistance in IS implementations. Still, in this case, employees abided and the result was a transformation in communication and behavior.

In the Oracle technologies-in-practice, IS enabled gatekeeping through four mechanisms. It served as a technological infrastructure for mediation between gatekeepers and the gated. The complete scripting of the task tracking practice via the recording sheets prescribes acceptable forms of gender interactions, and in this sense Oracle serves as a regulation mechanism for behavior. The comprehensiveness of this script means that almost all the collaborative needs of the employees are contained within the system. Thus, Oracle's function is not limited to mediation, but also acts as a stand-in for gender interactions, which notifies of new tasks, delegates, and reminds. Functioning as a proxy, the system renders communication between genders (the gated) almost unnecessary, thereby providing an additional mechanism to prevent interaction between the gated. Lastly, the capacity to monitor the flow of work provides gatekeepers with a tool that surreptitiously acts to regulate and control behavior. By informing users that all interactions are surveilled, the system administrators are able to achieve a Panopticon effect (Foucault, 1979). This means that the mere awareness of surveillance creates compliance to interaction rules, and the desired behavior is internalized by the gated. Together, the (4) mechanisms used in the Oracle case have aided the gatekeepers in creating and maintaining a strong gatekeeping dynamic.

In the ad hoc TIP, a gatekeeping dynamic was found, however technology played a small role in supporting it. The male and female supervisors' work relationship was strengthened through their day-to-day use of IM, leading them to take on roles of mediators and representatives for their branches. Thus, lines of communication were dependent on these supervisors, and any correspondence between branches was done exclusively through them. The ad hoc system provided one mechanism for gatekeeping, that being data sharing enabled by a network drive. Branch supervisors encouraged workers (the gated) to use the drive for knowledge sharing between genders, and minimize as much as possible direct contact. Shared content accumulated into a large information archive, consisting of software, instruction guides, documents, etc., which consequently led to fewer queries or interactions between the gated.

In the video conferencing cases, two different outcomes related to gatekeeping were found. Before VC implementation, gatekeeping was practiced in varying degrees, with heads of units linking the two branches, and liaising over the telephone. Interestingly,

the progressive VC enactments led to a dismantling of gatekeeping carried out by management due to an increase in transparency. VC facilitated an open forum in which all members of staff gathered, discussed issues openly as a group, and spoke directly to all parties without the need for a middleman. On the contrary, gatekeeping remained intact in the teams enacting the traditional VC TIP. Compared to progressive VC meetings, mixed-gender group collaboration was very low in traditional VC meetings—almost superficial—due to the inequivalence of participation, and the guarded and conservative atmosphere. As a result, there were no realignments or changes in the communication structure, and information control was still maintained by the gatekeepers. Table 7-2 summarises the main points of the previous discussion, highlighting the gatekeeping rationale, ICT gatekeeping mechanisms, and change induced by gatekeeping for each technology in practice.

Technology in Practice	Gatekeeping Rationale	ICT Gatekeeping Mechanisms	Type of Change Provided by ICTs
Gatekeeping/Monitoring (Oracle) Automated task tracking (Oracle)	Circumscribing Gender Interactions: <ul style="list-style-type: none"> ▪ Access ▪ Linking ▪ Protection ▪ Change agent 	<ul style="list-style-type: none"> ▪ Infrastructure ▪ Regulation ▪ Proxy (between users) ▪ Surveillance 	Formative: acting as the infrastructure for mediation, enabling a new gatekeeping dynamic
Cross-gender collaboration (Ad hoc system: IM-telephone-shared drive)	Linking Segregated Branches: <ul style="list-style-type: none"> ▪ Linking ▪ Protection 	<ul style="list-style-type: none"> ▪ Infrastructure 	Formative: enabling the construction of a new gatekeeping dynamic
Progressive gender meetings (VC)	---	Dismantling Mechanisms: <ul style="list-style-type: none"> ▪ Transparency 	Dismantling: causing the collapse of previous gatekeeping dynamic
Traditional gender meetings (VC)	Linking Segregated Branches: <ul style="list-style-type: none"> ▪ Linking ▪ Protection 	Non-ICT Mechanisms	Neutral: enabling the continuation of existing gatekeeping dynamic

Table 7-2: Gatekeeping rationale, ICT gatekeeping mechanisms, and change induced by ICT's in the gender-segregated context

CHAPTER 8

Conclusions and Recommendations

8.1 Introduction

This thesis has explored the practices emerging and evolving over time from ICT collaboration between segregated genders at Umm Al-Qura University in Saudi Arabia. Chapter 1 provided a broad overview and rationale for the research study. Chapter 2 presented a review of the relevant literature, both theoretical and contextual. Chapter 3 outlined the research design, methodology, and methods adopted by the study. Chapters 4 and 5 presented the empirical core of the thesis, consisting of a background to the case study, as well as the findings resulting from data collection and analysis. Chapters 6 and 7 provided an analysis of the data and discussion of the findings in light of two broad issues raised by this study. Firstly, Chapter 6 outlined the culturally specific technologies in practice found in the case study, and the coinciding changes in gender work norms and the status of women within the organisation. Secondly, Chapter 7 outlined and exemplified a conceptual model based on previous theories and how they relate to the empirical findings of this study. The current chapter provides a synopsis of the research study, the contribution it makes to knowledge, as well as recommendations for future research.

The synopsis in section 8.2 presents the major findings as they relate to the main research questions. Section 8.3 outlines the original contributions to theory and practice. Section 8.4 presents recommendations and directions for future research. Finally section 8.5 outlines the limitations of the study.

8.2 Synopsis of the Research Study

This thesis has explored two broad issues relating to technology and organisational change. The first issue is concerned with the cultural changes associated with the diffusion of significant technological innovation. It examines the interplay between new technologies and existing cultural values and norms in a specific socio-historical and cultural context, i.e. the Saudi gender-segregated context. At the onset of this research, it was surmised that collaborative technologies had the potential to affect change in this context, either by serving to bridge the distance between separated workers, or by lessening the isolation and consequent marginalisation of female workers. This assumption was based on the limited research carried out on ICT in the Middle East, which describes the changes related to gender politics and the new media context in the region. It was also based on the retrospective observations of the researcher, a female Saudi worker, who had witnessed general improvements to the segregated work experience, particularly in the area of promoting collaboration between genders.

The second broad issue examines the notion of socio-technical systems, in an attempt to understand the fusion of social and technical elements that become enrolled to constitute organisational practices. The focus here is on a number of questions relating to technologically induced social change: What is the role played by both humans and technology in constituting practice? When considering communication technology, what aspects of the technological artefact and human actions are considered implicated in social change? These questions relate to a long-standing concern and subject of research in the field of IS management aimed toward developing a comprehensive nuanced perspective that acknowledges both human and non-human agency.

Thus, the research objective was divided into two main goals: 1- to arrive at descriptive accounts of technology practices and consequent organisational change, 2- to use the Saudi distributed work context to explore the socio-technical agency underlying mediated communication spaces. To achieve the first goal, the study developed a framework based mainly on Orlikowski's (1992, 2000) practice lens (IS structural model), a broad understanding of Giddens (1984) structuration theory,

and insights from gender and technology studies (Cockburn and Ormrod, 1993, Wajcman, 2000, 2007). This framework guided the data collection process, as well as the preliminary analysis of data.

Further data analysis and a re-examination of the literature directed the researcher towards achieving the second goal, and it became apparent that Giddens' concept of regionalisation could shed light on the virtual interaction spaces related to segregated work. The structurational lens adopted considers time-space as central to the structuring of social practices; practices which occur in regionalised (contextualised) zones of locales. However, this lens finds regionalised zones as constituted solely by human agency, which employs material elements from its surroundings—or material properties in the case of IS—for this purpose. In this regard, the structurational lens was found to be lacking in terms of recognising the technical agency implicated in constituting virtual interaction spaces, and hence sociomaterial literature provided a way forward (Jones, 1999, Rose and Jones, 2005, Rose et al., 2005). This literature was used to develop a wider theoretical framework and conceptual model, that finds existing material properties of an IS can exert agency, which, when merged with human agency, structures and contextualises interaction spaces. Furthermore, the notion of the socio-technical agency underlying ICT spaces was operationalized by drawing on a wide range of performative studies (Butler, 1999, Barad, 2003, Callon, 2006, Gregson and Rose, 2000), culminating into a performative view of regionalised technical settings of interaction. This view conceptualises the performativity of ICT spaces, and finds that an interaction space is performative if it contributes to the social practices and discourses enacted within it.

Underpinning the previously mentioned research goals is a strong emphasis on understanding the views and experiences of workers using ICTs to collaborate with the opposite gender. These considerations were reflected in the qualitative case study research design and methodology, and the use of ethnographic methods of data collection, including interviews and non-participant observation. A single-case design was seen as sufficient given the exemplary nature of the research setting—Umm Al-Qura University—and the large size of the research population. The choice of this particular setting was also due to convenience of the researcher, and her affiliation and familiarity with this particular organisation. Participants for the study consisted of a

wide range of university members, both male and female, who were either members of mixed-gender work teams, or had participated in conjunctive events.

Due to the restrictions imposed by segregation, interviews and observation of male participants was carried out through mediation, but was face-to-face with female participants. Data collection sought to uncover the technology practices used to support segregated work, with a focus on drawing out experiences related to participants attitude towards virtual gender-mixing and Saudi culture. Analysis was carried out at two levels, the first unit of analysis being mixed gender teams, and the second unit of analysis being the collaborative ICT application or system. Data was first analysed to understand the technologies in practice for each team, and changes in comparison with previous practices. After identifying the ICTs used by various work teams, data was then re-examined to develop descriptive accounts for, and compare between, each similar set of technologies in practice.

The findings of the study describe the technology practices of (9) mixed-gender work teams, using (3) different ICT tools, which are presented as three separate cases based on the type of ICT used (see Chapter 5). This description attempts to illustrate the day-to-day use of the technology, the dynamics between team members, and both the challenges and benefits of ICT collaboration. The cases were then examined through the practice lens (Orlikowski, 2000), to characterise the technology-in-practice in terms of its efficiency and progressiveness for segregated work; and to understand any changes, resulting from technology use, to the structural properties of work practices (the facilities, norms and interpretive schemes) (see Chapter 6). The study found five salient technologies-in-practice in the Saudi segregated context: 1- cross-gender collaboration (Ad-hoc/IM); 2- progressive gender meeting (VC); 3- traditional gender meeting (VC); 4- gatekeeping/monitoring (Oracle); 5- automated task tracking (Oracle). Following the practice lens, changes to practice were examined on the processual, structural, and technological level; with (4) teams experiencing little to no change; (3) teams experiencing improvements and changes on the processual level but no structural change; and (2) teams experiencing significant structural changes, one being progressive the other regressive. These findings not only provide insights on a unique cultural adaptation of technology, but also exemplify the veracity of utilizing Orlikowski's practice lens for the analysis of IT and change in organisations.

The changes observed in the gender-segregated cases demonstrate the viability of establishing strong work ties and integrated practices solely by means of ICT. This corroborates the findings of past structural research by Karsten (2003), although the current study illustrates this through an alternate and distinct context focused on gender and culture. Karsten's study highlighted the importance of the situatedness of ICT communication, the simulation of co-presence, and vast information sharing and storage capabilities as contributing factors to creating interdependent work relationships. Interestingly, in the gender-segregated cases, it was found that VC practices had the highest level of institutionalisation despite its limited shared archives, as interdependence was constructed mainly by simulating co-presence.

The segregated-context was also useful for exploring issues of power and control underlying ICT use. This theme was particularly evident in the Oracle case, in which the system was implemented as a means to instigate a form of network gatekeeping that aimed to mediate and control communication between segregated genders. The Oracle case helped uncover two IT gatekeeping mechanisms to be added to the list of typologies presented by Barzilai - Nahon (2008, 2009): 1- the proxy or delegation mechanism, in which technology acts as a stand in and interceptor for direct interactions; and the surveillance mechanism (Panopticon effect) that enables monitoring of the gated to control information exchange, and encourage an adjustment in their behaviour. Also, the power dynamics enacted through Oracle echo the findings of previous research, which demonstrates how ICT use can formalise communication, disturb power balances, and increase the visibility of workers (Hayes, 2008, Hayes and Walsham, 2000).

The findings also presented an evaluation of ICT and segregation in terms of progressive change in mixed-gender work in general, and how this affects the status of women as a marginalised and subordinated group in particular. The study's evaluation finds ICT use has led to improved work practices and an expansion of communication options lessening the severity of the divide, but that new practices remain unstable and mutable if they are not delineated and well defined by proper policy. The evaluation of women's status post ICT collaboration involved applying two types of analysis that are seen as complementary to each other: a hierarchical structural analysis and a gender spheres analysis. The structural analysis demonstrates the persistence of the

male dominated power structure despite the emerging discourse that promotes female inclusion and participation. The main reason behind this persistence is seen to be the institutionalisation of female subordination by the religious bodies overlooking higher education, which considers male domination over women to be a moral imperative. In the academic circles examined, the conflicting faces of this imperative are present, either as part of a blatant cultural/religious conservatism, or as underlying subtleties that remain in effect despite the spread of empowerment discourses. The findings reveal that, sincere efforts and practices aimed towards female empowerment remain undermined by the imposed male hegemonic structure, as exemplified by practices such as majority votes that include females in a process administered and authorized by men only. Thus, the atmosphere of inclusion is ironically run, by and large, by the male side, and unfortunately, due to organisational policies, can be fully reversed by male administrators if they wish to do so. The second analysis of female status attempts to understand the gender spheres underlying the new modes of work enabled by ICT, and draws on gender and technology studies (Cockburn and Ormrod, 1993) to illustrate gender-based differences in roles, status, and acceptable modes of behavior. It was found that, in the segregated context, the gender spheres that were in effect in public realms differed from private realms. Virtual interactions occurring in more publicly visible settings were found to reflect cautious segregated norms that subdued femininity and reinforced female subordination. On the other hand, mixed-gender communication in the private domain tended to be egalitarian, and challenged existing norms. This indicates that progressive changes are, at the present time, limited to the virtual mediated realm, and in the more private settings at that, with practices rarely being transferred to the public or face-to-face domain. In conducting the evaluation, the study concludes that, overall, progressive changes are considered moderate but not significant. The advances in mixed-gender IT practices are seen as promising, however they still remain lacking in terms of durability, overtness, and the ability to challenge institutional parameters regarding segregation or push towards more tangible reforms.

Finally, the findings outline and exemplify a conceptual model informed by the theoretical framework and empirical findings of the study. Drawing on two theoretical streams, structuration and sociomaterial studies, the model explores the spatialities of information technology. The two concepts 'regionalisation' and 'performativity' have

been particularly useful in understanding how interaction spaces mediated by IT not only contextualise social practices, but also play a role in power dynamics and change in organisations. By using the gender-segregated cases to exemplify the model, the study attempts to illustrate that bringing the two concepts together provides a deeper understanding of technology practices, their spatialities of communication, and the human and material agencies implicated in the structuring of practice.

8.3 Contribution to Knowledge

The following sections outline the eight main contributions of this research to the theoretical and practical body of knowledge.

The theoretical contributions include:

1. The conceptual model of performatively regionalised technical settings of interaction, which is the main contribution of this thesis to structurational IS research, sociomaterial research, and socio-theoretic studies on agency.
2. Applies the IS structurational model, the practice lens (Orlikowski, 2000), to a new context in which culture and gender are brought to the forefront.
3. Provides novel empirical insights to complement the emerging theoretical stream of literature known as Sociomateriality.
4. Applies and finds empirical support for the double dance of agency model (Rose and Jones, 2005), and incorporates aspects of the model into a wider framework that examines the socio-technical agency of ICT interaction spaces.
5. Extends theorisation on the performative aspects of physical geographic spaces from the field of human geography to IS research.

The practical contributions include:

6. Provides descriptive accounts of ICT practices as utilised in Saudi gender-segregated work. The study also evaluates the consequent collaboration between genders and the current status of women in the Saudi workplace.

7. Contributes to “gender and IS” and “gender, science and technology” fields of research by providing an account of organisational technology use aimed at bridging gender disparity.
8. Contributes to IS cultural studies by presenting a practice based, micro level analysis of a specific national/cultural adaptation of ICT to support work practices.

8.3.1 Theoretical Contributions

The following points outline the main theoretical contributions of this study:

Contribution one

A central theme to Giddens’ (1984) structuration theory is the manner in which time-space is implicated in the recursive organising of social practices, and how this, in turn, relates to the generation and distribution of power in social systems. This thesis extends his theorising to IS fields of research in a significant way, and builds on existing structurational research to develop a new conceptual model. This model is centred on the time-space implications for ICT interactions, and highlights how physical-digital spaces come to contextualise interactions and structure work practices. To achieve this, the two concepts of ‘locale’ and ‘regionalisation’ from structuration theory are extended to digitally mediated communication, and used to define ‘technical settings of interaction’. The model also attends to the human and material agencies involved in constituting technical settings by applying a reworking of Giddens’ notion of structure based on the double dance of agency model, wherein structure is seen to include a pre-existing material context (Rose and Jones, 2005). For IS research, this translates into a view that considers the pre-existing material configurations of a technology or IS as a means for technology to exert agency from within a socio-technical ensemble. Furthermore, the model incorporates key concepts from sociomaterial literature to better understand this agency (Barad, 2003, Callon, 2006, Orlikowski and Scott, 2008). Specifically, the notion of performativity is utilised for the study of technical settings, and is seen as an invaluable concept in understanding the materialisation of regionalised IT zones, the technical and social elements by which they are constituted, and how this relates to discursive practices and social change.

The distinct and in-depth descriptions provided by the exemplification of the model (see Chapter 7, section 7.3 Performatively Regionalised IT Settings: Exemplification and Further Discussion) supports the main contention of this study, that the significance of space in processes of structuration has been overlooked by previous IS research, even in the more prominent structurational models, such as adaptive structuration theory (DeSanctis and Poole, 1994) and the practice lens (Orlikowski, 2000). Their work took on the important task of importing structurational principles to the IS context, and led to significant insights on the structures and human agencies implicated in technology practices. And while temporality has been explored in these studies—especially Orlikowski’s work that examines practices over time—spatialities and concepts relating to interaction settings still remain an unexplored theme. Thus, the performative view presented here is seen to provide an additional level of analysis to structurational IS studies, and complement the previous focus on technical capabilities/constraints. The view also demonstrates structuration theory’s potential to contribute to on-going discussions on materiality and agency.

Contribution two

This thesis applies the practice lens (duality of technology) by Orlikowski (2000) to examine technology practices and organisational change in a new cultural context, the Saudi gender-segregated workplace. Orlikowski’s model is considered highly influential in advancing structuration theory in the IS field (Jones, 2011, Jones and Karsten, 2008). A pioneering influence in practice based research, the model puts forth the idea that technology use is a process of enactment, thereby emphasising the social aspects of technology practices (Corradi et al., 2010). Thus, the significance of Orlikowski’s work warrants its application to the study of diverse cultural enactments of technology. In the current study, this is done by examining the collaborative practices of Saudi segregated workers through the practice lens, which is seen as a descriptive/interpretive tool for the enacted technologies-in-practice and their respective structural properties (facilities, norms, interpretive schemes). To understand change processes resulting from technology enactments, the initial conditions surrounding technology use are analysed. The conditions of use are seen as the “historically and contextually-specific circumstances” (Orlikowski, 2000, p.421), which may be acknowledged or unacknowledged by the actors. They pertain to the interpretive, technological, and institutional aspects of the technology-in-practice.

After understanding the context of use, the model is then used to describe three related consequences or outcomes: processual (work practices), technological (properties, capabilities), and structural (broad social system). Finally, the initial conditions are compared with consequences to analyse the level of change occurring in each enactment; and determine whether the enactment represents no change (inertia), minor change (application), or a major change (change) in the status quo, work practices, or the functions of the technology itself. By applying the model to the Saudi case, this study demonstrates the usefulness of the practice lens in examining culturally specific practices and generating rich descriptions of IT at work. These findings also confirm key assumptions of the lens, particularly regarding social agency and the local emergence of practice.

Contribution three

This thesis provides case-based empirical observations that are examined by a new conceptual model informed by sociomaterial research. These observations relate to the performative view of ICT communication spaces, and illustrate the entanglement of technical and human agency, which led to changes in gender-segregated practices and discourse (see Chapter 7, section 7.3 Performatively Regionalised IT Settings: Exemplification and Further Discussion). The still emerging and densely philosophical nature of sociomaterial literature thus far is in need of empirical studies to help solidify or refine existing theoretical foundations. The importance of maintaining a consistent link between theoretical discussions and empirical research is highlighted by Leonardi (2013) in direct reference to sociomaterial research. He warns against the recurrent tendency among sociologists to “draw unempirical-based lines around phenomena in their attempts to classify and direct programs of study” (Leonardi, 2013, p.61). Accordingly, the current study adds to the growing body of empirical research engaging with sociomaterial concepts.

Contribution four

This thesis builds on theoretical suggestions that have evolved from a distinctive line of studies known as socio-theoretic accounts of agency (Jones, 1999, Rose and Jones, 2005, Rose et al., 2005). The suggestions adopted here pertain specifically to structural IS research concerned with socio-technical agency. They attend to the

problematics of extending the structural view of agency to include material/technical agency, i.e. 'the problem of agency'. As a whole, the socio-theoretic discussions have been invaluable for the current study, however two key insights from the double dance of agency model (Rose and Jones, 2005) have been of particular significance. The first relates to structuration theory's humanist conception of agency, of which a necessary reworking of structure is advised based on critical realist perspectives (see Chapter 7, section 7.2.2 The Constitution of Regionalised Technical Settings: A Mangle of Human and Material Agency). The second highlights the innate differences between human and machine agency; with machine agency manifesting as the capacity to make a difference; and human agency also characterised as having this capacity, but with human specific cognitive dimensions, such as intentionality and interpretation. In the current study, these insights are used to build a conceptual model that finds the agency constituting ICT interaction spaces involves specific entanglements of human action with the material properties of a technology. Furthermore, the exemplification of the model provides empirical support and demonstrates the viability of these suggestions, by illustrating both the human and technical aspects of agency implicated in ICT interactions occurring in the gender-segregated context.

Contribution five

The conceptual model outlined by this thesis extends performative views on the spatialities of communication put forth by Gregson and Rose (2000), from the field of human geography to IS research. This view presents a compelling alternative to performance/performativity studies that use Judith Butler's (1993, 1999) gender construction narrative to examine the spatialities that encompass the enactment, or performance, of identity. Previous studies, having employed a Goffmanesque based ontology, consider interaction spaces as pre-existing stages, which precede their performances. Gregson and Rose (2000) argue against this, and find that specific performances create subject identities and the very spaces or stages that encompass said performances; spaces which are seen to be "performative of power relations" (2000, p. 441). The authors also demonstrate how the emergence of new spaces can challenge existing dominant discourses and subvert practices. The current study extends this performative view of space to include the virtual domain, and finds that it meshes well with the regionalisation analysis presented by Giddens (1984). Both

views reject the anterior existence of space, and the idea that interactions occur in static backdrops, and instead emphasise the contextualising effects of space. Thus, the conceptual model and its exemplification (see Chapter 7, sections 7.2 and 7.3) present a performative view of ICT interaction spaces, which contributes to IS fields of research concerned with digitally mediated communication.

8.3.2 Practical Contributions

The following points outline the practical contributions of this study:

Contribution six

This thesis contributes to Middle Eastern studies concerned with new communication technologies, and their effects on gender-segregated work. The study provides qualitative narratives aimed at elucidating the transitional phase and ensuing changes associated with new technology implementations. The case study findings depict a picture of ICT mixed-gender collaboration that may run counter to the aspirations of earlier studies on the topic. The positive changes and increased integration between genders is undeniable; witnessed in all areas of life and is not limited to the workplace. Still, changes to the segregated work context remain uncoordinated, erratic, and detached from proper policy development. The findings bring attention to the competing ideologies that are in play, and the mental frames associated with emerging ICT practices. These insights can benefit management practitioners wishing to implement similar practices, as it presents the experiences of segregated workers relaying the advantages and pitfalls involved in virtual work. The findings are also useful for English speaking researchers and practitioners, given the paucity of studies in English on segregated work, particularly regarding the insular and enigmatic Saudi work context (Al Lily, 2011, 2013). Lastly, this study is important to practitioners concerned with women and management in the Middle East. It presents an evaluation of women's status in hindsight of the diffusion of ICTs, from both a structural and symbolic perspective (see Chapter 6, 6.3.2 Experiences of Women as a Subordinated Group). It also supports the findings of previous studies, that acknowledge the significant advances to women's work, but also point to the patriarchal work structure and the institutional/cultural barriers that hinder further advancement in the region (Metcalf, 2008).

Contribution seven

This thesis contributes to existing gender studies, in both information systems, and science and technology fields of research. Research on gender and IS in the western context has been found to be significantly lacking, both in terms of quality and focus (Adam et al., 2006). While the current study does not specifically address the gender inequalities of work in the IT field—a central concern in the western context—it has resulted in extensive qualitative narratives on the inequalities underlying segregated work, and how technology factors in. The case of Saudi is not intended to demonstrate the success of ICT initiatives in achieving desegregation. Rather, it illustrates the novel and culturally specific types of technology appropriations that have the potential to either inhibit further progression or effect change. The Saudi case also represents the problems experienced by a marginalised female workforce; problems which differ in intensity and appearance from those of female workers in the west. Yet the two contexts could be of benefit to each other, in cross-cultural studies and comparisons, or as a means to advance theorising on gender and IS. In presenting the cases of ICT and segregation, the study also contributes to SST research on gender and technology. Firstly, it is a direct response to calls for more culturally specific studies on women using technology, and the practices that emerge from complex social and economical challenges (Wajcman, 2007). Secondly, it applies the gender spheres analysis to a new cultural context (Cockburn and Ormrod, 1993), and garners valuable insights on the Saudi case, such as the dichotomous gender spheres resulting from segregation, leading to different roles in public and private spheres. These findings demonstrate the applicability and elasticity of this type of analysis for different cultural contexts.

Contribution eight

The final potential contribution of this thesis relates to the cultural aspect of the study. The study examines, as a primary focus, the impact of technology diffusion on Saudi culture, and the micro level work practices relating to gender-segregation. The lack of cultural IS studies looking into IT's impact on complex social issues has been noted by previous research. IS publications examining national culture and IT have been found to have a strong bias towards the study of cultural impact on IT usage, while neglecting how IT impacts cultural values and norms, often resulting in homogenized and rigid views of culture (Leidner and Kayworth, 2006). The need for research on

society-based critical issues has also been highlighted, particularly with regards to developing countries (Walsham and Sahay, 2006).

The thesis also contributes to IS cultural research due to the structural lens adopted by the study, a shift from the Hofstede analyses dominating the literature. Walsham (2002) points out that applying Hofstede-type approaches in IS cultural studies is limiting in a number of respects. Hofstede's (1984) work puts much emphasis on cross-cultural differences without accounting for variations within a specific culture. It also presents a static view of culture at work, and does not attend to themes, such as conflicts among groups. Walsham suggests the structural lens as an approach that could potentially resolve these shortcomings.

8.4 Recommendations For Future Research

This section provides a number of recommendations as to potential directions for future research that may arise from this thesis. The first recommendation relates to different approaches that can be used to address the complexities of Saudi gender-segregated work. A different methodological approach such as action-based research could be used instead of the exploratory case study approach adopted by the current study. Evans et al. (2009) find that participatory action research (PAR), if carried out with a core focus on reversing inequalities and social injustices, can be a powerful tool for the marginalised and oppressed:

“PAR emphasizes a collective process where previously considered participants (or subjects) are (re)constructed as collaborators or co-researchers. People's lived experience of marginalization is shifted to the center (Hall, 1992) and the tools of research are placed in the hands of disenfranchised and oppressed” (Evans et al., 2009).

Thus, a future research agenda can include a study designed by managers and workers in Saudi of both genders, with the goal of promoting participation, inclusion, and equal opportunity among genders. Also, the study could investigate the use of

different ICTs for gender collaboration in other Saudi institutions, and look into best practices in terms of different types of work teams (dyadic, small team, ...etc.).

A second recommended area for future research would be to further elaborate on the spatialities of ICT communication. The study can make use of the research carried out in the field of human geography regarding ICT spatialities, their embeddedness and relationality to physical space (Thrift, 1996, Graham, 1998), and inherent materiality (Kinsley, 2014). Also, the study could examine the distribution of power within virtual spaces of interaction in comparison to the male dominated physical spaces in Saudi. Studies such as Rose (1997) on “the spatiality of power” can be highly insightful, as they examine the materialization of power in different geographic regions through discursive practices, and develop a typology of power dimensions, e.g. zonality, hierarchy, and scale.

8.5 Limitations of the Study

An examination of the findings and discussion presented in this thesis needs to take into account the potential limitations of the research. These limitations relate to the selection of male participants, the inhibition of the female researcher in a small number of interviews, as well as limitations relating to the generalizability of the findings.

The first limitation is based largely on taboo cultural meanings surrounding mixed-gender communication, and the consequent inhibition experienced by the female researcher, especially with regards to conservative male participants. The majority of male interviewees were cooperative, friendly, and volunteered information about the topic of research. However, in two of the telephone interviews, the researcher felt the men were reluctant to go into the specifics of their interactions with female colleagues. This reluctance inhibited the researcher, and led her to hastily end the interview amid fears that she may be judged as being inappropriate due to the questions regarding mixed-gender work. In hindsight, the reluctance of these men could be due to the sensitivity of the topic, which is understandable, with no implications towards the researcher. Similarly, these cultural meanings also inhibited

the researcher from contacting a male lecturer for an interview. The snowballing technique used to identify participants meant that the researcher relied on input from female participants to locate male participants. In the case of the male lecturer, the researcher was warned that he may reject the interview request coming from a woman, or that he may agree to an interview but terminate it once he realized the nature of the questions. The advice from the female side led the researcher to reluctantly exclude this particular lecturer, as his point of view would have been useful for the research.

The second limitation relates to the generalizability of the findings to segregated norms at other universities in Saudi and how this relates to ICT. Saudi society is characterised by a wide variation in political and ideological perspectives, which is difficult to classify based on regional or class differences. With regards to work practices and segregation, the chosen university is representative of a large majority of Saudi universities, however there are exceptions, such as the King Abdullah University of Science and Technology (KAUST) (Islam, 2014). Hence, this study's discussion regarding segregated practices and female marginalisation cannot be generalized to all Saudi universities.

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