

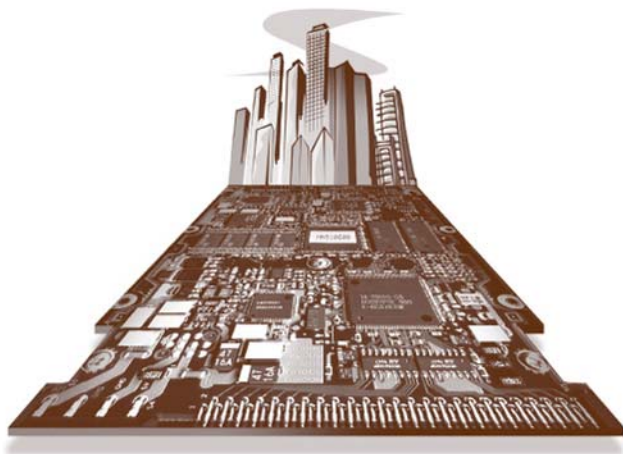


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Information Technologies

Emerging New Tools for Residents' Activities
in the Dammam Metropolitan Area, Saudi Arabia

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Introduction

The recent dramatic increase in the use of the main components of information technology (IT) in the cities of Saudi Arabia seems to have exerted some influence not only on the pattern but also on the tempo of urban activities that occur in their physical space. The share of Internet users relative to the general population increased from 0.9 percent in 2000 to 10.8 percent in 2005 (World Internet Stats, 2006), and to 14.5 percent in 2006 (Hammond, 2006). Estimates of the number of mobile phone users suggest even more dramatic growth, from 10 million in 2002 to about 22 million in 2009 (Hammond 2006). While the numbers are impressive, the quality of service and the incentives to the users are equally enticing, as the tools themselves could do more while performing better and with more cost-effectiveness. Access to the Internet is free, and users have a wide range of services to choose from. Mobile phone providers use 3-G technologies, and increased competition keeps prices down. Other IT tools include scores of active local and regional satellite television channels and radio stations using latest technologies to e-market goods and services and attract viewers and listeners by engaging them in phone-in debates and discussions on local, national, and international social and political issues.

This remarkable increase in IT use could have significant implications for the development of Saudi cities and for wider social and political advances. This is particularly true given the worldwide experiences that show IT-city relations tend to bring about profound economic, socio-cultural, environmental, and urban form changes in cities (Mitchell 1999; Graham and Marvin 2001; Castells 1989), as well as adjustments in global inter-city relations (Sassen 2000). While most studies on the information society are from the developed world, it is important to assess the implications of information technology in developing societies like Saudi Arabia, where some view IT as disrupting the established Islamic norms, values, and practices.

This paper addresses the issue and is organized into four parts: first, a review is made of the relevant literature in order to explore the various views about IT-city relationships and develop a suitable conceptual framework. This is followed by a description of the study methodology using Dammam Metropolitan Area (DMA) as a case study. In the third section, the results of the research focusing on residents' activities are presented and discussed, and in section four, the conclusions are presented.

1. Literature Review and Conceptual Framework

1.1 Literature Review

Models of analysis of cities in the information society tend to reflect the ideological and theoretical emphasis of the researchers themselves. Views varied from those predicting the dissolution, decentralization, or the substitution of certain functions, to those seeing cities as a network in a global economy (Townsend 2003). The range of the following models suggests that this new field of research is still quite open and lacks a generally accepted consensus. These models include variants from techno-determinism (Pascal 1987; Mansell 1984; Thrift 1993), utopianism-futurism (Dizard 1982; Castells 1989; Santucci 1994), dystopian/political economy (Robins and Gillespie 1992; Harvey 2000; Graham and Marvin 2001), socio-political construction of technology (Westrum 1991; Mitchell 1996; Moss and Townsend 1999), and activity systems models (Meier 1962; Webber 1964; Chapin and Kaiser 1979).

Most of these models are based on experiences in the Western world, and their conclusions may not be relevant to a totally different cultural environment such as Saudi Arabia. To understand the effects of IT on the urban systems of Saudi Arabia, it is essential to appreciate the extent to which the Saudi culture is shaped by Islam and Arab traditions (Al-Munajjed 1997; Wheeler 2000; Al-Saggaf 2004). In view of this, the activity systems model is judged to be most suitable for the analysis of IT-city relations in Saudi Arabia.

1.2 Conceptual Framework

This paper proposes the activity systems model as a basis for the conceptual framework for the analysis of DMA as a case study of Saudi cities. As used here, *urban activity systems* are the patterned ways in which households go about their daily affairs in cities. The general framework posits that city development outcome is driven by actor attributes that are intermediated by the activities or interactions and the means by which the activities are undertaken (Figure1). In this framework the key city actors consist of the residents (individuals or households), firms, and institutions. To adequately respond to this postulation we intend to focus on residents only, implying that the same process of investigation could be used in the case of the other actors. The main components of the conceptual framework are operationally defined as follows:

First, the *actors* are the residents of DMA, whose *attributes* include (a) definable values or goals that inspire their daily activities, (b) characteristics such as age, gender, nationality, and income, and (c) the Islamic environment in which they operate (such as present social, economic, physical, and technological levels of development, and trends of change in these states). These attributes tend to influence residents' choices of activities and the means of carrying them out, as discussed further in section 3.1.2.

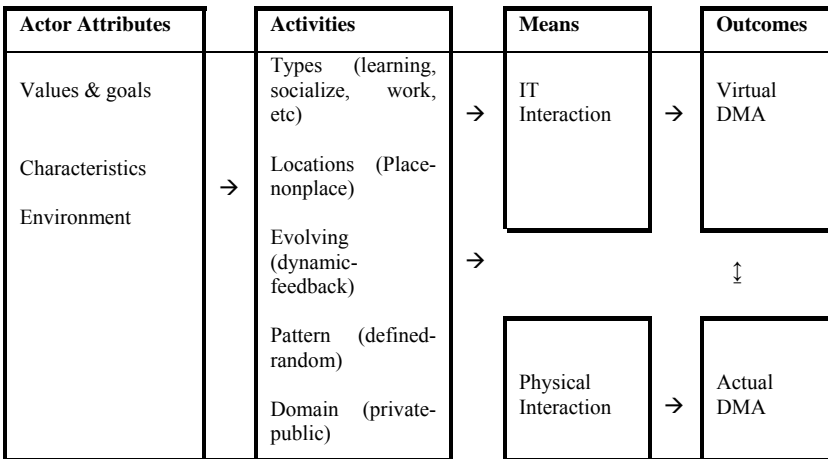
Second, the *activities or interactions* component includes the following: activity types (such as education, work, shopping, services, socialization, and recreation); activity locations (place-based or non-place based, local or non-local); activity pattern (whether defined or random); and domains (whether private or public). These variables are discussed more fully in section 3.2 of this paper.

Third, the *means* are the tools for accomplishing urban activities, of which there are two types. The first type is personal presence or face-to-face interaction including exchange of goods, services, and ideas accompanied by display of pleasantries, hospitality, and respect that are central to behavior in traditional societies. The second type is information technology (IT) such as

the Internet, mobile devices, fixed phones, and others as discussed in section 3.3.

Fourth, the *outcomes* or activity patterns influenced by IT or place-based means of interaction which, in turn, affect developments in the ‘virtual’ and ‘actual’ DMA respectively are discussed in detail in section 3.4. The key variables are the resulting nature of activities (tangible or intangible transactions), the effects on the city’s existing social, economic, and cultural activities and facilities (physical or electronic changes), and forces that are regulating activities (local or alien codes).

Figure 1: Conceptual Framework



Thus, as suggested in Figure 1, the main research question addressed by this paper is: what attributes and activities of DMA residents influence their choice of the means for accomplishing these activities and what are the outcomes on the development of the metropolis? Residents’ attributes are discussed in section 3.1, while the characteristics of their activities are taken up in section 3.2, and the means of interactions in accomplishing the activities and the outcomes of these activities are analyzed in sections 3.3 and 3.4 respectively.

2. Methodology

After taking necessary precautions to ensure the reliability and validity of the results of the study, a pre-tested self-reporting questionnaire, the main data collection instrument used in the survey, was distributed through culturally acceptable and effective methods to the sampled target population. The target population was defined as all people who lived in the Dammam Metropolitan Area having functioning Internet accounts, which they could use at home, work, Internet cafés or elsewhere.

The case study area is the Dammam Metropolitan Area (DMA), consisting of the cities of Dammam, Al-Khobar, and Dhahran, each of which has associated suburban settlements (Dammam Municipality 1993). The DMA is located in the oil-producing Eastern Province of Saudi Arabia, and connected to the State of Bahrain by a causeway. Dammam City – the oldest of the three cities – is the administrative center, and has a branch campus of King Faisal University; Dhahran is the headquarters of Saudi Aramco, and contains the campus of the King Fahd University of Petroleum and Minerals; Al-Khobar is the commercial hub, and houses a large expatriate population.

The conceptual model guided the development of the questionnaire in Arabic. The questionnaire consisted of three groups of questions and included questions on residents' attributes and the means of undertaking listed activities now and in the future – especially the types of IT tools owned and the frequency and duration of their use.

The survey was conducted in June 2003 with the help of intermediate girls' school students and the approval of the Presidency of Girls' Education in the DMA. The schools were carefully selected to reflect not only the socio-economic groups but also the constituent spatial structure of the metropolis. The students were mobilized to collect the questionnaire forms from their schools, deliver them to all the male and female Internet users in their households (the respondents), and return them to the schools, from where they were collected by the researchers. This approach

was adopted for three main reasons. First, the practice of gender segregation made it impossible for the researchers to identify the target female Internet user population from which to draw a sample. Secondly, it was more culturally acceptable to use the school system, rather than postal system, to deliver the questionnaires to and collect them from housewives, with schoolgirls being more socially acceptable than schoolboys for such services. Thirdly, in the past, girls have proved more efficient than boys in ensuring that questionnaires were completed by the right persons and returned on time (Harigi 1989). As the result of the cooperation of the schools' administrations, students, and above all, respondents, 72 percent (358 forms) of the distributed forms were completed and returned to the researchers within a few weeks.

3. The Use of Information Technologies in Residents' Activities

In order to answer the research question, we shall now analyze the data collected through the questionnaire and from literature review regarding respondents' attributes, their urban activities, the means of undertaking these activities, and the urban development outcomes.

3.1 Respondents and Their Attributes

The research question seeks to identify what attributes and activities of DMA residents influence their choice of the means for accomplishing these activities and the outcomes on the development of the metropolis. Here we shall discuss the residents' attributes namely their demographic characteristics, the values and goals that motivate their urban activities, and the nature of the environment exerting influence on their daily lives.

3.1.1 Respondents' Characteristics

The analysis of the respondents' characteristics shows that they are predominantly young, females, Saudis, educated to the secondary school level, with a monthly income of above Saudi Riyals (SR)

10,000 (SR1= \$0.267), living in villas and flats that are located mostly in Dammam municipality.

As shown in Table 1, the majority (60 percent) of the respondents indicated that they were less than 25 years old as of June 2003, an age bracket size that seems to reflect the general population profile of urban Saudi Arabia (Ministry of Planning, 2001). Gender and nationality profiles suggest that the majority (57.5 percent) of the respondents were females and overwhelmingly Saudi (83 percent). Regarding their educational levels, the majority (60 percent) of the respondents had studied up to secondary school level and 30 percent had higher educational qualifications.

The IT users were relatively affluent, as 43 percent of the respondents indicated they earned more than SR15,000 a month, 26 percent earned between SR10,000 and SR15,000, while about two-thirds claimed to live in villas. Three-fourth (72 percent) of the respondents lived in Dammam municipality but only 46 percent of them worked there, as the rest commuted to Dhahran or Al-Khobar to work. Dhahran is where Saudi Aramco, the world's largest oil producer, has its headquarters.

Table 1- Selected Variables of the Respondents' Background

Respondents' Background	Frequency	Percent
Age		
Less than 15 Years	80	22.5
15-24 Years	136	38.3
25 Years or Older	139	39.2
Total	355	100.0

Total Respondents = 358; Missing Responses =3

Gender		
Male	151	42.5
Female	204	57.5
Total	355	100.0

Total Respondents = 358; Missing Responses =3

Classified Nationality		
Saudi	298	83.2
Non Saudi	60	16.8
Total	358	100.0

Level of Education		
Less than Secondary School	147	42.5
Secondary or Diploma	93	26.9
University or Higher	106	30.6
Total	346	100.0

Total Respondents = 358; Missing Responses =12

Monthly Income		
5000 SR or Less	36	11.0
5001- 10000 SR	66	20.2
10001- 15000 SR	85	26.1
More than 15000 SR	139	42.6
Total	326	100.0

Total Respondents = 358; Missing Responses =32

City in Which the Respondent Lives		
Dammam	257	72.0
Al-Khobar	67	18.8
Dhahran	24	6.7
Others	9	2.5
Total	357	100.0

Total Respondents = 358; Missing Responses =1

House Type		
Villa	238	67.0
Floor in Villa	31	8.7
Flat	82	23.1
Others	4	1.1
Total	355	100.0
Total Respondents =358; Missing Responses =3		

3.1.2 Residents' Values, Goals and Environment

The value orientation school of thought (Firey 1945; Bell 1958; Gans 1962) tends to complement the views of activity system theories holding that cities are a way of life that may be viewed in terms of individual perceptions and values (La Gory and Pipkin 1981). Particularly relevant to this study is the view that diverse values, attitudes, and preferences of cities' residents lead them to perform different urban activities, which in turn shape their cities. In the DMA, where the overwhelming majority of the people are

Muslims, Islam as a way of life shapes the residents' values and goals, which in turn structures their urban development activities.

Thus, the Islamic environment in the DMA seems to influence both urban places and IT use. First, regarding its role in creating urban places, Islamic laws and behavior codes strongly influenced the physical form of old residential areas like the Dawassar district in Dammam. In this area, the application of traditional building codes and rules of behavior left a deep imprint on the individuals and communities on what was or was not acceptable in the processes of renovations, conversions, demolitions and erections of new buildings. Unfortunately the imposition, initially through Aramco, of conflicting and alien planning codes based on bureaucratic US models with the clear influence of the likes of F.L.Wright interfered with these processes (Al-Hathloul 1982; Bianca 2000; Al-Said 2003; Al-Hokail 2004).

Secondly, dwelling types, as discussed in the previous section, have wider implications in addition to reflecting the owner's purchasing power and use of IT devices. In this context, two developments indicate how the DMA was used as a test case for the contemporary urban transformation process in Saudi cities. First, the villa-type house was introduced to the Kingdom through Aramco's home ownership plan in 1951, setting off the process of the systematic replacement of traditional user-built compounds with contractor-built villas based on American concepts (Faden 1983). Second, the creation of Al-Khobar in 1938 sought to encourage a new form of urbanization by issuing building codes discouraging the use of local materials, establishing set-back, minimum lot size and right-of-way, the enforcement of which became municipal responsibility (Al-Said 2003). The emerging cyberspace development process has to find a fitting place between these two existing conflicting processes of urban development.

Third, the relevant influence of the Islamic environment relates to the roles of gender and age in shaping the choice of means of urban activities, and hence urban development. These will be discussed in some detail in section 3.2.1, but it is important to point

out here that for these two groups, the emergence of online alternative means to interact seems to offer welcome options.

To sum up, Islamic values tend to shape the goals of residents as they interact in the course of their daily activities in the DMA, which has a social environment where age and gender roles tend to discourage face-to-face interactions but appear neutral regarding cyberspace ones. On the other hand, the physical environment has shifted the planning and design of neighborhoods from their users to a central authority.

3.2 Urban Activities

It may be recalled that the research question seeks to identify what attributes and activities of DMA residents influence their choice of the means to accomplish urban activities, and what the outcomes are on the development of the metropolis. The discussion in this section focuses on the types of activities and their characteristics.

3.2.1 Types of Activities

Following Chapin and Kaiser (1979, 244-247), we selected urban activities that can be undertaken by means of both IT tools and personal presence. There are many basic human activities such as sleeping, cooking, eating, and drinking, as well as those related to religious worship, such as prayers, Hajj, and Umrah, whose nature means they cannot be undertaken using IT devices. In the questionnaire, the respondents were asked to consider the selected activities and then rank their choices (from first to fourth) against each of the listed activity they do by means of personal presence (face-to face interaction) now, and how they are likely to do them in the future. Table 2 shows the results in percentages in two main columns of accomplishing activities through personal presence, now and in the future.

Table 2- Respondents' Ranking of Selected Urban Activities Through Personal Presence

Selected Urban Activities		Ranking of Urban Activities Accomplished Through Personal Presence (%)							
		Now				Future			
		1 st Choice	2 nd Choice	3 rd Choice	4 th Choice	1 st Choice	2 nd Choice	3 rd Choice	4 th Choice
Education	Continuing Education	86.1	4.5	7.1	2.3	50.8	21.3	18.8	9.0
	Learning New Skills	46.2	17.8	27.7	8.3	22.7	32.6	26.3	17.4
	Following the News	10.3	9.9	21.0	58.7	4.4	10.1	27.6	57.9
	Knowledge Development	24.4	20.3	35.8	19.0	18.1	27.6	31.5	22.8
Work	Completing Office Work During Working Hours	72.2	10.6	13.2	4.0	44.2	17.4	24.0	14.5
	Completing Office Work Outside Working Hours	47.0	16.9	18.9	17.3	20.6	17.9	28.3	28.3
	Governmental Follow Up	72.3	8.4	11.3	8.0	38.4	17.6	25.9	18.1
	Private Sector Follow Up	71.0	16.9	13.9	8.2	33.8	16.2	32.9	17.1
Shopping	Shopping for Basics	90.7	1.6	7.0	0.6	66.7	12.7	11.2	9.4
	Shopping for Non Basics	73.9	11.7	12.0	2.4	50.2	15.4	17.4	17.0
Services	Paying Services' Bills	49.9	19.3	21.7	9.7	20.8	17.3	31.2	30.7
	Banking	63.7	13.9	14.3	8.1	30.7	15.5	26.9	26.9
	Travel Reservations	52.3	27.3	15.4	7.0	28.5	18.5	30.1	22.9
Socialize	With Relatives	66.7	17.4	14.9	1.0	62.4	18.3	12.2	7.2
	With Friends	44.7	24.4	25.9	4.9	38.5	20.6	32.4	8.5
	With Social Groups	26.8	21.7	32.3	19.3	26.7	18.1	33.2	22.0
Recreation	Personal Entertainment	47.3	17.5	23.6	11.6	40.7	19.4	27.2	13.7
	Family Entertainment	81.5	7.3	10.5	1.7	68.1	10.2	11.8	9.8

Three pointers suggest that the respondents plan to reduce their future physical interaction in the urban public domain. First, all urban activities show higher percentages in the ‘now’ category than in the ‘future’ category. Second, there is a smaller percentage change in all the choices with respect to all socializing activities, which reflects a socio-cultural preference for personal interactions in these activities as suggested by Al-Saggaf (2004). Third, the three activities with highest percentage responses are shopping for basics (90.7 percent), continuing education (86.1 percent) and family entertainment (81.5 percent), all of which have relatively low IT influence so far.

Table 3 reinforces the observation that young men and women in particular plan to reduce their future personal presence in the public domain. Their choices may be explained by the nature of their roles in a society that is different from western societies. In Saudi society, gender segregation has a profound influence on most aspects of public and social life (Al-Munajjed 1997; Ember and Ember 1998; Wheeler 2000). This implies that the female urban activities are segregated from their male counterparts, which often means providing separate places for education, health, banking, commerce and recreation. Under these circumstances, it is natural that young women would welcome an online alternative to the gender-based restriction, prejudices and inhibitions experienced in the public domain.

Similarly, age-gap in the traditional setting tends to negatively affect the full participation of young people in urban decision making. Where older members of the community dominate face-to-face discussions, younger residents hardly have the chance to fully express themselves and thereby develop their personality to the full (Al-Saggaf 2004). Given these conditions, opportunities for online interaction offer a welcome alternative to age-based restriction, prejudices and inhibitions experienced in the real world.

*Table 3- Relationship between Respondents' Background and Urban Activities
Through Personal Presence* (%)*

Selected Urban Activities	Gender		Age (Years)			Nationality		Income ('000 SR)			
	Male	Female	Less than 15	15- 24	25 or Older	Saudi	Non-Saudi	5 or less	5-10	10-15	More Than 15
Present											
Follow up News	4.0	6.4	2.4	4.4	3.6	9.5	.8	1.3	1.7	3.0	4.7
Follow up Private Sector	33.2	27.9	7.0	23.9	30.4	5.9	9.1	7.2	9.9	18.4	25.1
Shopping for Basics	38.7	51.9	18.0	37.3	35.4	77.3	13.4	8.9	18.4	24.9	38.6
Paying Service Bills	19.9	30.1	9.3	21.9	18.6	38.2	11.2	7.2	9.7	15.3	17.4
Communicate with Social Groups	12.0	14.7	5.6	9.5	11.5	22.0	4.7	3.8	5.5	8.4	8.4
Future											
Follow up News	1.8	2.7		1.3	3.1	3.5	.9	1.4		1.4	1.4
Follow up Private Sector	17.4	16.4	4.3	15.4	13.9	27.1	6.7	5.4	4.4	10.8	12.7
Shopping for Basics	28.4	36.6	12.5	28.3	26.0	56.9	9.7	8.8	10.4	19.5	27.9
Paying Service Bills	8.7	12.2	4.3	7.4	9.1	14.3	6.5	2.8	4.1	4.1	7.8
Communicate with Social Groups	10.4	16.1	5.2	13.4	7.8	24.1	2.6	2.8	3.7	8.7	11.0

* Figures represent respondents' first choices only and are in percentages

3.2.2 Activity Location

The location of the activities in the DMA is broadly determined by whether they take place offline or online. Most of the activities are accomplished offline by means of face-to-face interaction and are in polarized locations in the metropolis. Shopping and work activities are concentrated in the central business district and in the employment centers of the DMA, such as the industrial parks and Aramco office park in Dhahran. However, with the introduction and increasing use of IT, some of these activities occur online as well, and they tend to have higher location flexibility.

3.2.3 Activity Pattern

The pattern of activities has great influence on the transformation of the DMA and a number of trends are emerging in this regard. First, the increase in IT use at home, especially by females, has added new functions within homes. In some cases, this requires a refit of homes to make them suitable for multiple activities. Second, the pattern of place-based activities of the DMA residents tends to be well defined and has a centralizing tendency. Most educational institutions, for example, are close to the major roads, and most retail commercial activities occur in the three city centers. However, the tele-mediated activities have decentralizing tendencies and are best exemplified by the location of the Automatic Teller Machines (ATM) along major highways and at the petrol stations, as well as by the opening of back-offices in the less expensive parts of the metropolis such as Thuqbar district. Probably because the online activities are taking off and offline activities are still pervasive, the metropolis is experiencing both the centralizing and decentralizing of activities, which seem to be in line with the unresolved debate regarding these tendencies worldwide (Castells 2001).

3.2.4 Activity Domain

Our conceptual model suggests that the domain of activities tends to influence the nature of the development of the DMA. As already indicated, all public activities that involve people's participation are required to be segregated with separate places for males and females.

This segregation is extended to the facilities supporting IT based interactions such as the Internet cafes and telephone call cabins and the control mechanisms by setting up an elaborate Internet filtering system so that residents are not exposed to morally offensive images and harmful messages. Further, different gender roles have implications on activity domain specialization whereby, for example, men tend to play a leading role outside the home while women dominate activities within the home and an informal age-based segregation is usually practiced even among women.

To summarize, the data presented has shown that young men and women plan to reduce their future personal presence in the public domain. It was observed that offline activities are concentrated in the city center and industrial or office parks, while the activity patterns reveal some simultaneous centralizing and decentralizing tendencies. There is also a clear distinction between public and private domain of residents' activities whereby in the former, gender segregation is enforced, but the latter is more segregated by age and controlled by females.

3.3 Means of Activities

As indicated earlier, the research question seeks to identify development outcomes as influenced by the attributes and activities of DMA residents as well as by the means for accomplishing these activities. In this section we shall discuss personal presence and IT tools as the means by which DMA residents undertake their daily activities.

Since the fieldwork for this research was undertaken there has been a significant shift towards greater use of the mobile phone relative to the Internet, and also an increasing use of satellite television and radio, not only for entertainment but also to encourage political and social dialogue. The municipal election and other political reforms, the national dialogue and social integration reforms, increased social spending and other equitable social reforms, all seem to be associated with IT use and advances.

3.3.1 Personal Presence

Many researchers suggest that cities have always exerted a strong propensity for growth because of the opportunities for face-to-face transactions they offer, but that technological developments are reducing the necessity for such interactions (Meier 1962; Gans 1962; Chapin and Kaiser 1979; Mitchell 1999). As indicated earlier, personal presence interaction is not limited to mere exchange of ideas, goods and services but may include the exchange of pleasantries, and show of hospitality and respect that are part of the standard norms of behavior in Muslim societies. In the socializing activities, in particular, merely physical exchanges are not adequate in the Saudi culture where a greater show of commitment and regard to persons present is required (Al-Saggaf 2004; Long 2003). It is also important to again stress that there are many social and religious activities that cannot be tele-mediated but require face-to-face interactions.

In many developing societies, personal interactions are likely to remain not only the dominant means of activity but also more significant than IT-based interactions for reasons of culture, economics, and public policy (Evans 2003). It seems clear that Islamic values – as exemplified by the preference for the daily, weekly and annual congregational prayers and Hajj activities – place high importance on place-based and face-to-face interactions. Also the social advantages of personal interaction include the pleasure of informal contacts, chance encounters, attachment due to shared experiences, and could be socially reassuring. Furthermore, it is noteworthy that the DMA economy is still strongly dependent on infrastructure, management behavior and general public investments that were designed to promote face-to-face interactions. Hence despite the many public policy initiatives to privatize the telecom sector, promote IT more broadly in many areas of daily life, and to enact legislations on IT, personal presence will most likely remain the dominant means of interaction in the DMA.

The implications of these observations are that in the foreseeable future, some hybrid of both personal presence and IT

interactions will be used simultaneously, with the latter gradually substituting, enhancing or complementing the former (Graham and Marvin 2001). However, a balance is required between the forces promoting each of these trends.

3.3.2 IT-based Interactions

The increasing rate of residents' ownership and the use of a wide range of IT devices connected to the telecommunications infrastructure are providing a viable alternative to personal presence in undertaking many urban activities. We shall now discuss the electronic form of urban interactions using the following variables: residents' IT ownership and use, the size of active users of IT and the duration of use, and the affordability of IT devices.

IT Ownership and Use: The new 'electronic presence' offers huge benefits to those who can afford it. It offers, for example, the chance to reduce social distance and strengthen social bonds, cost savings and wider choice in e-commerce, empower the disadvantaged, reach out and engage with diverse people without the gender, racial or income-based prejudices and stereotypes associated with face-to-face interactions (Wellman 2000; Evans 2004).

Strengthening family and social bonds has high merit in Islam and many IT tools have proved to be very convenient means for achieving these objectives. Table 4 shows family size, ownership of telephone lines, mobile phone, PC and laptops, number of Internet users, as well as the frequency and duration of Internet use. The large size of the families, most of whose members are of school-going age makes the use of IT devices, especially mobile phones, essential means for the coordination of activities outside the home. Within the home, the need to promote activities in education, work, shopping, organizing and payment of services, socializing and family entertainment makes the use of these IT tools necessary, especially PCs and laptops for surfing the Internet and the use of its embedded services such as e-mail, fax, MSN messenger, for video conferencing and file transfer protocol.

Generally, there is a high level of ownership of IT tools among respondents' families. Much higher than national or even regional averages are the averages of family ownership of phone lines, PCs including laptops, mobile phones and Internet users. Regarding IT use, the figures suggest that an average user within a family surfs the Internet at least once a day for various time periods. This implies that a significant portion of time of a working day is spent in online activities at the expense of activities in the urban space and also suggests a similar shift in the aggregate demand for urban utilities, infrastructure and services.

Table 4- Family Size, IT Ownership and Use

Family Size and IT Tools	N	Minimum	Maximum	Mean	Std. Deviation
Family size (excluding house workers).	355	2.00	19.00	7.34	2.24
Household size (with house workers)	355	2.00	23.00	8.64	2.58
Number of Telephone Lines owned by the family	356	1	20	1.81	1.27
Number of Mobile Telephones owned by the family	356	0	13	3.46	1.82
Number of Personal Computers available in the house (including laptops)	357	1	12	1.89	1.26
Number of Internet Users in the house	354	1	13	3.60	1.76
Frequency of using the Internet during the week	354	1.00	14.00	7.3150	5.1003
Weekly Internet Use in hours	350	.50	28.00	9.5886	9.2223
Valid N (listwise)	343				

IT Active Users and Duration of Use: The size of IT users and the duration of use are important shapers of cyberspace activities. The relationship between respondents' background and Internet use may reflect the wider relationship between user characteristics and their use of the other IT tools as well. As shown in Table 5, some variations may be observed between respondents' characteristics such as gender, age, income, level of education and nationality on the one hand and their frequency and duration of Internet use on the other.

Given these respondents' characteristics, it appears that the more active groups in Internet use in terms of frequency of use and duration in cyberspace are females, the 15-24 year olds, those with secondary or diploma education, and Saudi nationals. However among the income groups, the most active in terms of frequency of use of the Internet is the SR10,000-15,000 monthly income group, but the lower income bracket surfs the Internet for a longer period.

Table 5- Respondents' Frequency and Duration of Internet and Mobile Use

Respondents' Background	Internet (Mean)	
	Frequency of Internet Use During the Week	Weekly Internet Use in Hours
Gender		
Male	7.9702	10.9367
Female	6.8375	8.5884
Total	7.3248	9.6006
Age		
Less than 15 Years	7.1026	6.6234
15-24 Years	7.4074	12.2388
25 Years or Older	7.3913	8.7537
Total	7.3333	9.6268
Monthly Income		
5000 SR or Less	5.5429	6.6571
5001-10000 SR	7.2846	11.0462
10001-15000 SR	7.8706	10.9471
More than 15000 SR	7.6051	9.9741
Total	7.3870	10.0875
Level of Education		
Less than Secondary School	6.9014	8.2363
Secondary or Diploma	7.5385	11.3833
University or Higher	7.4717	9.5952
Total	7.2456	9.4853
Nationality		
Saudi	7.2542	9.6907
Non Saudi	7.6186	9.0847
Total	7.3150	9.5886

Affordability of IT devices: The affordability and rate of IT use played an important role in the diffusion of new technologies and increased the chances of their impact on the DMA. Table 6 shows relationships between the income of the respondents and their ownership of telephone lines and PCs, and the percentage of Internet users in the family. Higher monthly income of SR15,000 is associated with ownership of higher number of telephone lines, mobile phones, number of PCs and also with a higher percentage of Internet users in the family. Thus, as would be expected, the higher income groups have more IT tools at their service, more Internet users within the household and are, therefore, more likely to accomplish more of their daily urban activities using the wide array of IT tools. There seem to be fears of digital divide in the DMA but there are efforts, with promising results, by the Saudi Telecom Company to improve and extend types of services and reduce prices (STC 2002).

Table 6- Respondents' Level of Income, IT ownership and use

Classified Monthly Income (SR)		Number of Telephone Lines per person	Number of Mobiles per person	Number of PCs per person	Percentage of Internet Users in the family
5000 or Less	Mean	.2177	.4556	.2504	47.0176
	Std. Deviation	.1729	.2665	.1947	24.3363
5001-10000	Mean	.2346	.4216	.2603	46.8784
	Std. Deviation	.1576	.2512	.1979	27.9137
10001-15000	Mean	.2357	.4640	.2335	48.0119
	Std. Deviation	.1232	.2094	.1317	22.9219
More than 15000	Mean	.3177	.5537	.3272	57.9749
	Std. Deviation	.2599	.2621	.2512	27.2050
Total	Mean	.2682	.4929	.2805	51.9139
	Std. Deviation	.2062	.2524	.2116	26.3932

3.3.3 The Principle of Blocking the Means

Local adoption of global technologies needs to be carefully tailored to the local context of both the developed and developing countries (Gibbs et al. 2003; Kalathil and Boas 2003). To allay the fears of

powerful forces in Saudi society that the introduction of the Internet will damage the culture and Islamic values, the government applied the principle of blocking the means. The *Shari'ah*, the Islamic legal system, postulates a unity and hierarchy of ends and means that is based on its principle of *sadd al-dharia* (blocking the means) which is a subset of *Istihsan or Masalih al-Mursalah* (public interest) (Husaini 1980). The principle, which affects both private and public actions, generally states that it is lawful to block the means to forbidden ends or consequences.

This principle has influenced the blocking of potentially undesirable outcomes, both physical and cyber. The municipalities in the DMA have used religious police, for example, to stop public or private activities that would lead to socially unacceptable activities, such as those that would give rise to 'red-light districts' or the building of breweries. With regard to cyber activities, the most important tool in use is the creation of one of the most extensive Internet filtering and blocking systems in the world (Zittrain and Edelman 2002).

To summarize, personal presence interaction remains the key medium for urban activities in the DMA although alternative IT-based interactions are increasingly being used as well. It seems for some time to come both means of interactions will be used simultaneously, thus allowing DMA residents to forge hybrid strategies to undertake their daily activities. Any of these means of interactions may be blocked if the activity is not in the public interest.

3.4 Outcomes

The research question seeks to identify what attributes and activities of DMA residents influence their choice of the means for accomplishing urban activities and their outcomes on the development of the metropolis. In this section, we shall discuss the outcomes of residents' use of IT tools leading to the emergence of 'virtual' DMA and their use of personal interactions culminating in the transformation of actual DMA – physically, socially, and politically.

3.4.1 Emergence of Virtual DMA

Virtual DMA – the intangible flows of capital, services, labor and media through telecom networks – can be viewed as the cumulative result of residents' daily activities using IT tools such as the Internet, e-mail, MSN messaging, fixed-phone and mobile devices as the medium of interaction. The interactions are not usually guided by formal codes of conduct and they only leave electronic traces and not physically defined patterns on intervening territory. From these interactions the following three patterns of electronic-based social, economic and cultural activities can be identified:

First is the e-community. Some residents interact with their peers to inform them about additions or losses in the family, organize social gatherings, buy or sell goods and services, or to mobilize opinion on issues of local, national or international importance. Others use these IT devices to interact with firms, get account balances, transfer funds or make investments, or track parcels awaiting delivery by courier firms. Still others use these tools to interact with public agencies to follow up visa or passport applications, arrange interviews, or enquire about the status of pending contracts.

At the social and political levels, there has been a rapid growth of virtual communities which offer young men and women an alternative environment for interaction, an environment that is relatively open and free to all regardless of gender, age, status or income; where they are free to share and debate ideas; and which is safe and accessible anytime. The use of blogs is a significant development as they allow for greater expression of social and political views in areas such as the abuse of women and children (Fatany 2006). Al-Saggaf (2004) also has shown how online communities affect offline ones in Saudi Arabia. According to him, the positive effects of online social activities on the participants included: gaining self-confidence, becoming more flexible in their thinking, more aware of the different characteristics of individuals within their society, and less inhibited about the opposite gender and more appreciative of them. He observed that in the case of

females, who traditionally stay at home to raise children, the online community has, for the first time, given them the opportunity to make their voices heard, thereby enhancing their self-worth and sense of empowerment. On the other hand, the negative effects, which are attributable to the addictive and the anonymous nature of the technologies, are that online actors neglected their family and friends, became less shy (or modest), and some became confused about some aspects of their culture and religion.

Second is e-commerce. Most of the residents pursue commercial exchanges using physical facilities, but at the same time there is growing e-commerce activity using IT devices such as the Internet, satellite TVs, and phone lines to shop, pay bills, make banking transactions, or travel reservations. There are indications that many residents not only drive to Rashed Mall, but also sometimes save trips by surfing Rashed Cyber Mall. In addition, an increasing number of residents are making financial transactions using ATMs and online banking system. Many residents also avail of the opportunity offered by Saudi Arabian Airlines online booking and reservation systems to complete their travel plans.

Though e-commerce is still in its infancy and the number of e-tailers small, the system has many advantages that could trigger changes in the urban landscape. For example, experiences elsewhere suggest that not only would the location of retailing and businesses lose its importance, and some offices and retailing spaces become obsolescent (Townsend 2003), but also the design requirements of office building and retailing spaces will change (Borsook 1999). However, the general lack of confidence among DMA residents in the security of online transactions has affected the rate of growth of e-commerce (see 2002 web survey in www.kacst.edu.sa).

Third is e-culture. Residents use not only schools, campuses and training facilities for their educational activities but also IT devices such as the Internet, satellite TVs, CDs, and others to pursue continuing education, learn new skills, follow the news, as well as knowledge development. To encourage e-learning, the government of

Saudi Arabia has a number of initiatives directed to each level of the educational system by both the public and the private sectors. One such initiative is the policy of building IT laboratories in all the public secondary schools that will cost more than \$ 150 million every year for the initial five-year period (Madar 2003).

3.4.2 Transformation of Actual DMA

Actual DMA – the physical container of social, economic and cultural activities – can be seen as the cumulative result of residents' daily activities that use personal presence as the medium of interaction. As has been shown earlier, the overwhelming majority of the respondents in the survey are now physically involved in carrying out their daily learning, working, shopping, socializing and recreational activities. In the course of these activities, existing urban places tend to be transformed or expanded, and new facilities are created. This prospect of continued growth in place-based interactions and the unfolding rapid transformation due to the increase in IT-based activities has raised the issue of the nature of DMA's development in the future.

The effects on existing places of these activities are complex and varied. Many researchers have expressed concern about the nature of Saudi urban transformation due to conflicts and duality that have emerged as a result of the grafting of the Western codes onto the Islamic codes of conduct in urban development activities (Bianca 2000; Al-Hokail 2004; Al-Saggaf 2004). Indeed some researchers have highlighted the significant role played by the DMA, and Al-Khobar in particular, in the imposition of Western planning ideology in the Muslim environment in the cities of Saudi Arabia (Al-Hathloul 1982; Al-Said 2003). This probably explains the remarkable difference between the residential layout and social, economic and cultural facilities in Aramco-planned Al-Khobar and Al-Dawasser neighborhoods. The difference may reflect the fact that Al-Khobar was based on American planning principles, while the Al-Dawasser neighborhood evolved under the Islamic concept of urbanism.

Despite the protests about the apparent or real conflicts and duality regarding building codes and socio-cultural processes, there

are strong integrating forces of change which make DMA function as a physical unit that has a discernible image. The integrating forces include elements of Islamic culture such as the Makkah-oriented mosques, the local identity-forming minarets, and the location and design of public facilities such as to allow maximum privacy for families both along the corniche and in other recreational places. To enhance these positive developments, there is a need for conscious effort to integrate the new and old processes and their resulting urban forms. It is noteworthy that some Western ideas being borrowed (e.g. grid iron, set-back, minimum lot size) are being rejected there, while at the same time some of the cutting-edge ideas being advocated by New Urbanism (Dutton 2001) in the West seem very similar to those developed in the old Muslim cities. Some key replicable ideas highlighted by Abu-Lughod (1980) include the following elements: first, residential super-blocks enclosing semi-public spaces; second, secondary 'after the fact' nature of the circulation systems (suggesting that in traditional Islamic cities circulation system is defined by the pattern of development, unlike contemporary urban design where circulation comes first); third, delegation of authority to police the use of individual property and common easements; and fourth, the recognition of property rights that separated land-ownership title from usufruct that allows division of spaces. These ideas could have wider implications to Muslim cities around the world (Abu-Lughod 1980; Bianca 2000).

The resulting transformation of DMA is not, however, limited to physical changes alone but extends to social and political advancements, which although not directly measured in this research could be inferred. The social transformation includes increased participation of the silent urban stakeholders such as the poor and the females. There are indications that these groups are using the new technologies to express their views on issues that affect them – such as more housing, more jobs and social services – and the authorities seem to be responding to them. Political reforms, such as municipal elections, increased openness and dialogue with public agencies, and the increased ability of residents

to transact business with agencies through their websites are important developments.

To summarize, the study shows that the use of IT tools by DMA residents in their daily lives has influenced the emergence of 'virtual' DMA as evidenced by the increased activities in e-community, e-commerce and e-culture, all of which have wider and deeper social and political impacts. There are as well the changes in the physical elements of DMA which seem to be struggling to integrate codes for development activities from Islamic and Western sources, along with those recently imposed by the new information society.

4. Conclusion

Five conclusions may be drawn from the evidence presented in this study:

First, the analysis finds that the 'activity systems model' captured most of the variables that influence the development of DMA. The analysis also suggests that studies on IT-city relationships could use the conceptual framework and the variables used in this study. This implies that future studies may focus on modeling and quantitative empirical testing of the relationships between actor attributes, their activities, the means of accomplishing the activities and the urban development outcomes as proposed here.

Second, the analysis finds that many Islamic value-laden variables tend to motivate residents to pursue their daily activities mainly by means of personal presence. Nonetheless, the respondents indicate a tendency to use less of this medium in the future, and probably use more of IT devices. This trend is likely to affect the relative importance of activity outcomes, thereby posing the challenge of developing a process that will ensure a balanced, integrated development outcome of the actual with the virtual DMA.

Third, on the means of IT tools and personal presence, the analysis finds that the young and women plan to reduce their future social presence in the public domain, presumably in favor of IT-based interactions. Hence, for the foreseeable future, both means of interactions will be used simultaneously, thus allowing DMA residents to forge hybrid strategies to undertake their daily activities. Future research could focus on finding suitable strategies that blend the simultaneous use of personal presence and IT-based interactions within the framework of Islamic values.

Fourth, in the literature review we have seen some futurists and utopian theorists predict the dissolution, decentralization, or substitution of certain elements of cities with tele-mediated systems. This research does not support these predictions. On the city dissolution forecast, our study suggests that urban places will interact with, but not replace, virtual spaces as some futurists and utopians predicted. In fact, there are indications that cities will endure and grow because there are many activities important to residents that cannot be tele-mediated. Neither does the prediction on large-scale decentralization of activities away from cities seem likely to come true. It is well known that Islamic history is an urban history as evidenced in the large-scale city building enterprises of Muslims worldwide and also as is indicated in the time-space organization of Islamic worship. Regarding the idea of the substitution of certain urban activities with cyber activities, it is also unlikely to occur on a large scale.

It is indeed possible to reduce economic, social, and environmental costs and adequately manage excessive polarization of activities so that they are more inclusive of all residents regardless of their attributes, if residents-based decision-making processes typical of the traditional Islamic city building activities are borrowed.

Fifth, increased application of the new technologies in urban activities tends to trigger wider equitable social advancements and sustained participatory political reforms not only at the local level but also at the national level.

Bibliography

- Abu-Lughod, J. "Contemporary Relevance of Islamic Urban Principles." *Ekistics* 47, no. 280 (1980):64-70.
- Al-Hathloul, S. "Cultural Conflicts in Urban Patterns: A Saudi Arabian Case Study." In *The Arab City: Its Character and Islamic Cultural Heritage*, edited by I. Serageldin and A. El-Sadek. Riyadh: The Arab Urban Development Institute, 1982.
- Al-Hokail, A.A. "Socio-cultural Contradictions in the Arab/Islamic Built Environment: An empirical study of Arriyadh, Saudi Arabia." Proceedings of the 9th International Symposium on Planning & IT, held in Vienna, Austria, February 2004.
- Al-Munajjed, M. *Women in Saudi Arabia Today*. UK: Macmillan, 1997.
- Al-Saggaf, Y. "The Effect of Online Community on Offline Community in Saudi Arabia." *The Electronic Journal on Information Systems in Developing Countries* 16, no. 2 (2004): 1-16.
- Al-Said, F. A. M. "The Pattern of Structural Transformation of the Saudi Contemporary Neighborhood: The Case of Al-Malaz, Riyadh, Saudi Arabia." Proceedings of the 39th IsoCaRP Congress, 2003.
- Bell, W. "Social Choice, Lifestyles and Suburban Residence." In *The Suburban Community*, edited by W.M. Dobriner. New York: Putman, 1958.
- Benna, U. G. "Virtual Dammam Metropolitan Area and its Implications to the Growth of the Metropolitan Area." Proceedings of Future Cities Symposium, Arab Urban Development Institute, Riyadh, Saudi Arabia, (2001).

- Bianca, S. *Urban Form in the Arab World: Past and Present*. London:Thames and Hudson Ltd, 2000.
- Borsook, P. "How the Internet ruined San Francisco." *salon.com*, news feature, 1999. <http://www.salon.com/news/feature>
- Castells, M. *The Intern Galaxy: Reflections on the Internet, Business, Society*. Oxford: University Press, 2001.
- Castells, M. *The Information City: Information Technology, Economic Restructuring and the Urban-Regional Process*. Oxford: Blackwell Press, 1989.
- Chapin, F.S, Jr. and E.J. Kaiser. *Urban Land Use Planning*. Urbana: University of Illinois Press, 1979.
- Cohen, G. and P. Nijkamp. "ICT, the City and Society: An Analysis of Perceived Opportunity of Urban ICT Policies in Europe." Working paper of the Tinbergen Institute, Erasmus University, Rotterdam, 2002.
- Dammam Municipality. "Dammam Metropolitan Area." *Cities* 10, no.1 (February 1993).
- Dizard, W. *The Coming Information Age*. London: Longman, 1982.
- Dutton, John A. *New American Urbanism: Re-Forming the Suburban Metropolis*. New York: Skria, 2001.
- Ember, C.R. and M. Ember. *Anthropology*. Prentice Hall: New Jersey, 1988.
- Evans, Karen. "The Significance of Virtual Communities." *Social Issues* 2, no. 1 (January 2004).

- Faden, Y. "The Traditional Houses of Makkah" in Islamic Architecture and Urbanism, Conference Proceedings, K.F.U Dammam, 1983.
- Fatany, Samar. "Spousal Abuse Prompting Meaningful Reforms." *Arabview.com*, 6/13/2006
- Firey, W. "Sentiment and Symbolism as Ecological Variable." *American Sociological Review* 10 (1945):140-148.
- Gans, H. *The Urban Villagers*. New York: Free Press, 1962.
- Gibbs, J., K. L. Kraemer, and J. Dedrick. "Environmental and Policy Factors Shaping Global E-commerce Diffusion: A Cross-Country Comparison." *The Information Society* 19 (2003):5-18.
- Graham, S., and S. Marvin. *Splintering Urbanism: Networked Infrastructure, Technological Mobilities and Urban Condition*. London: Routledge, Taylor & Francis Group, 2001.
- Hammond, Andrew. "Telecom Industry Sees 3G Boom in Saudi Arabia." 2006,
<http://www.eweek.com/article2/0,1895,1984646,00.asp>
- Harigi, F. N. "The Relationship Between the Prophet Mosque and its Physical Environment in Madinah, Saudi Arabia." Ph.D. dissertation, University of Edinburgh, 1989.
- Harvey, D. *Spaces of Hope*. Berkeley, CA: University of California Press, 2000.
- Husaini, S.W.A. *Islamic Environmental Systems Engineering*. London: The Macmillan Press, 1980.

- Kalathil, S. and T.C. Boas. *Open Networks and Close Regimes: The Impact of the Internet on Authoritarian Rule*. Carnegie Endowment for International Peace, 2003.
- La Gory, M. and Pipkin, J. *Urban Social Space*. Belmont Ca: Wadsworth, 1981.
- Lyon, D. *The Political Economy of the Information Society*. Cambridge: Polity Press, 1988.
- Madar Research. "Mobile Phones Overtake Fixed Lines in Arab World." *Madar Research Journal* 1, no. 1 (2002).
- Madar Research. "Saudi Arabia Will Spend Over \$5 billion in Uphill Course towards Institution of e-government." *Madar Research Journal* 1, no.2, (2003).
- Mansell, R. "Introductory Overview." In *Managing Of Information and Communication Technologies*, edited by R. Mansell, London: Aslib, 1994: 1-7.
- McNeil, M. "The Old and New Worlds of Information Technology in Britain." In *Enterprise and Heritage: Crosscurrent of National Culture* edited by J. Corner and S. Harvey. London: Routledge, 1991.
- Meier, Richard L. *A Communications Theory of Urban Growth*. Cambridge, Mass.: MIT Press, 1962.
- Ministry of Planning. *Seventh Development Plan, 2000-2005*. Riyadh: MOP Press, 2001.
- Ministry of Planning. "Population Characteristics in the Kingdom of Saudi Arabia." Riyadh: Ministry of Planning, 2001.
- Mitchell, W.J. *City of Bits: Space, Place and the Infobahn*. Cambridge, Mass: MIT Press, 1996.

- Mitchell, W.J. *E-topia: Urban Life, Jim, But Not As We Know It*. Cambridge, Mass: MIT Press, 1999.
- Moss, M.L. and A. Townsend. "How Telecommunications Systems are Transforming Urban Spaces." Taub Urban Research Center, New York University, 1999.
- Moss, M L. Telecommunications Policy and Cities, Research Report: New York University, 1996, <http://www.informationcity.org/images/pdficon.gif>.
- Pascal, A. "The Vanishing City." *Urban Studies* 24 (1987):597-603.
- Robins, K. and A. Gillespie. "Communication, Organization and Territory." In *Understanding Information, Business, Technology and Geography* edited by K. Robins. London: Belhaven, 1992: 145-164.
- Santucci, G. "Information Highways Worldwide: Challenge and Strategies." *I & T Magazine* (Spring 1994): 614-23.
- Sassen, S. *Cities in a World Economy* (2nd edition). London: Pine Forge, 2000.
- Saudi Telecom Company (STC). Annual Report 2002, www.stc.com.sa.
- Thrift, N. "Inhuman Geographic: Landscape of Speed, Light and Power." In *Writing the Rural Five Cultural Geographies* edited by P. Cloke, M. Del, D. Matless, M. Phillips and N. Thrift. London: Paul Chapman, 1993: 191-232.
- Townsend, A. "Wired/Unwired: The Urban Geography of Digital Networks." Unpublished PhD Dissertation, MIT, Mass., 2003.

- Webber, Melvin M. "The Urban Place and the Nonplace Urban Realm." In *Explorations into Urban Structure* edited by M.M. Webber. Philadelphia: University of Pennsylvania Press, 1964.
- Wellman, B. "Physical Place and Cyber-Place: The Rise of Networked Individualism." Paper presented to Community Informatics: Connecting Communities through the Web, University of Teeside, April 26-28, 2000.
- Westrum, R. *Technologies and Society: The Shaping of People and Things*. Belmont, Ca: Wadsworth, 1991.
- Wheeler, D. "New Media, Globalization and Kuwaiti National Identity." *Middle East Journal* 54, no. 3 (2000): 432.
- Yar, Majid "'Community': Past, Present and Future." *Social Issues* 2, no.1 (January 2004).
- Zittrain, J. and B. Edelman (2002) "Documentation of Internet Filtering in Saudi Arabia," available on:
<http://cyber.law.harvard.edu/filtering/saudi Arabia/>

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