An Approach to the Analysis of Virtual Metropolitan Dammam

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Abstract:

The paper seeks to set out a suitable approach to the analysis of the emerging "virtual cities" by examining activities in virtual space by three groups of urban activity agents in the Dammam Metropolitan Area (DMA). Using current literature, the paper reviews the development of IT in cities and models for the analysis of the relationship of IT to urban spatial structure. Based on the review of models, the Activity Systems Model is chosen to explore how virtual DMA could be analyzed using available information.

Keywords:
Virtual Dammam Metropolitan Area, Information Technology, Activity System, and Urban Development.

Introduction:

The convergence of computing, telecommunication and multimedia technologies has led to the emergence of Information Technologies (IT) as a cluster of these technologies (Graham and Marvin 1996:15). In this paper, IT is similar to the concept of Information and Communications Technologies (ICT) that includes not only the infrastructure but also the management processes of these converging technologies. Specially important is that the application of IT has also led to the evolution of the concept of virtual or cyber space, whereby city residents, firms and institutions are able to interact and carry out activities using the IT medium, without actually interacting with the physical city. The implication of this development to the planning and management of cities has made it an important research issue, focused on understanding the phenomena, and its implication for city planning and management.

To its advocate activities in the cyber or virtual city have some advantages over actual city. First, its e-commerce generates wealth but avoids traffic congestions and pollution. Second, the city encourages social equity by allowing access to goods, jobs, services and wealth as the right of all citizens. Third, it exploits competitive

advantage through its investment in IT infrastructure so as to attract small and medium enterprises as the key engine of growth. Fourth, it uses investments in IT infrastructure to shift jobs and populations to the desired locations. Fifth, the government uses IT for interaction with residents, conduct business, promote commerce, reduce traffic and increase efficiency (McCurtis, 2003 and Graham and Mervin 2002).

The basic aim of this paper, therefore, is to explore relevant approaches for the analysis and the implications of the application of IT in cities and propose one that can be used in the context of Saudi Arabia. Using DMA as a case study, the paper suggests an approach appropriate for the analysis of the activities of the residents, firms and institutions as key agents in urban places and in cyberspace, and the impact of these activities on the physical cities. The DMA is neither the largest nor politically the most important city in the kingdom, but it is probably the fastest growing being the center of oil production, the seat of the largest oil firm in the world and housing many technologically oriented higher institutions of learning.

The methodology used here includes the review of international and local literature to identify the relevant theoretical concepts and issues as well as the various strategies employed to resolve them. Field observations of major physical development and reviews and analysis of the contents of relevant websites were the methods used to define the emerging development trends in the DMA.

Literature Review of the Relationship Between IT and the City

Many researchers have proposed a wide variety of competing models for analysis of the relationship between the use of IT and urban development. Most of the differences may be due to ideological and theoretical emphasis and the reflection of the social and physical science background of the researchers themselves. We shall briefly discuss a selection of the dominant models so as to illustrate the range of alternative approaches, suggesting that this new field of research is quite open without a generally accepted consensus. The review includes variants from the techno-determinism, the utopianism-futurism, dystopian/political economy, and socio-political construction of technology models and will help us in determining the suitability of each of them for use in the analysis of the relationship between DMA and the application of IT technologies in the metropolis.

Technological Determinism:

There are many variations to these models, but the central idea is that the new telecom technologies are seen as directly causing urban change. In its broadest

sense, and in a direct and linear way, machines and technologies are viewed to arise and evolve in a different realm to alter the world (Thrift, 1993). The effects of this model are many and far reaching, as suggested by Graham and Marvin (1996: 83): "The decentralization, or even dissolution, of cities, the free availability of highly capable communications in all locations; the shift towards city economies based on information; the growth of a culture based on tele-interactions; the shift to an 'immaterial' urban life; the growth of telecommuting – all will be shaped by new innovations in IT in a deterministic and inevitable fashion."

Utopianism-Futurism

Many researches are forecasting on the effects of the recent advances in, and the use of, computing, media and telecom technologies upon the future of cities. These people generally have an optimistic view of the future impacts of telecom on cities and urban life. The electronic networks and spaces are speculated to have quite positive effects on city's physical development and on urban life, so that where externalities arise, they too may be solved through new technologies (Eubanks, 1994).

The concepts of futurism and utopianism have been used by many scholars in the search for radically better and new forms of social life. Their efforts have also tended to highlight the negative aspects of industrial cities. Since Ebenezer Howard and F. L. Wright, these activists abhor pollution, overcrowding, moral laxity and social disintegration in these cities and to them technology had always offered the key to unlocking these problems. Continuing this trend, the utopian thinking perceive the power of IT as offering a solution to these perceived issues in various ways such as toward smaller communities (Gold, 1990), electronic cottage – a household that becomes the locus of employment, production, leisure and consumption (Toffler, 1981), intelligent city – in which electronic homes are linked in a citywide system of intelligent networks as new ways of managing and organizing urban life (Toth, 1990).

Dystopian/Urban Political Economy

Another approach is the dystopian/urban political economy model, which stress is placed on the ways in which the development and application of IT technologies are fully embedded into the political, economic and social relations of capitalism. This suggests that city-IT relations – both within and between cities- can best be understood within the broader context of political, economic, social and cultural relations. Thus IT are biased, not neutral in their social and spatial effects, as they can be designed to serve certain special interests (McNiel, 1991).

As a result, according to the critics of these approaches suggest that IT are used to support capitalist restructuring of cities, nations and the world. Some suggest that this has led to exploitation, control and surveillance of groups of workers and consumers in distant locations, as well as to the easy management of all information (Slack, 1987). Others argue that IT induced changes may not lead to an ironing out of geographic differences, but are modified to support more efficiently new styles of production and consumptions and to meet the needs of influential agencies (Martin 1991).

Social and Political Construction of Technology

This group of ideas emerged as a result of the rejection of technological determinism by some researchers. The social constructivists that advocate for these ideas see technology, not as an external force, but as inextricably part of society. These researchers stress the degree to which space becomes a tool for political and social processes that can shape the ways in which IT are produced and used within cities and within wider society. Thus the purpose of research, according this tradition, is to understand how technology and its uses are socially and politically "constructed", over time, through complex processes of interactions by agencies and individuals (Guthrie, 1991).

The implication of this approach is that it is difficult to identify a single technological "cause" and equally hard to define a single, all-embracing impact of IT on cities or systems of cities. Rather, the implication is that the ways in which IT relate to changes in and between cities is likely to vary in time and space in many complex ways. Some suggest that IT uses are now so closely interwoven with humans and social life that a new "cyborg" culture emerges where human beings are intimately linked into webs of digital technologies at every level (Gregory, 1994 and Mitchell, 1995).

Activity Systems Model

Building on the work of Chapin and Keiser (1979), Benna (2001) proposed a schema for the analysis of Virtual Dammam Metropolitan Area. The simplest form of the model assumes that motivated by societal values, goals or specific objectives, the various activity agents or *actors* (individuals, households, firms and institutions), tend to take decisions or *actions* by means of physical or IT interactions that follow a defined behavior sequence that culminates in spatial and non-spatial development (i.e., Goals → Actions → Development). From this simple form, the model was modified for use whenever the identification of the socio-cultural variables of

development or the pattern of spatial or non-spatial development is the focus of research effort.

The model, however, fails to admit that even in the most technologically advanced societies with a much higher application of IT as means of urban activities, most of these activities are still accomplished by mean of face-to-face or physical contact. Thus, by far the highest proportion of activities takes place both in the urban places and in the cyberspaces.

Evaluation of the Models for Use in the Analysis of DMA

The suitability of any of these models for the study of the relationship between urban places and electronic spaces in the kingdom depends on its degree of flexibility to incorporate Saudi value system and its ability to accept changing levels of IT penetration into the society in which the access to the Internet, as the leading IT tool, became available only in 1999.

It seems clear that each of these models has a different way of viewing the city and has different implications to the wider issue regarding ways in which social systems and IT relate to urban activities. The merits and the different qualities of these models suggest to carefully assess their suitability for the purpose of the analysis of Virtual DMA.

The technological determinism and utopianism/futurism models are clearly unacceptable candidates in this case for a number of reasons. First, although they may be useful in highlighting the broad, macro-level historical urban changes, they over simplify the complex interaction between cities and IT. Second, they seem to ignore the vital social and political processes through which technologies are actually adopted and adapted within cities and societies in the developing world. Third, utopianism/ futurism model is biased towards the interests of the multinational firms or local decision-makers who would benefit materially from related contracts. Finally, the models seem to leave little scope for policy making at the local and national levels that would affect the IT-mediated development of the city. Thus, the worldview of these models is counter to the cautious and Islamic-derived approach to development pursued by Saudi Arabia.

Given this Saudi approach to development, it seems clear that the urban political economy and social constructivism approaches hold greater promise, although each has its own problems. For example, the urban economy model seems to exaggerate the effects capitalist structures have on the IT but downplays the effects of social processes on these technologies. The social constructivism model, on the other hand, seems to focus more on the role of the elites and neglect the potential imbalance in

the wider society, especially the problems of the poor who might be excluded or marginalized from the benefits of IT-induced development. Thus a blend of these models may prove to be a better option.

On the basis of the value-laden "continuity-with-change" approach, the Activity Systems model that seems to strike the right accord not only with the Saudi society but also with those societies that want to apply the advanced technologies and yet hold dear their traditional/religious values. Central to this model, and the source of its greatest appeal, is its explicit assumption that the values of the society are the major forces for all major public decisions and actions on the development at the various levels. It also places great emphasis on the role of the forces of human agency, whether in the form of individuals, social groups, in the various types of firms, or in institutional settings. The model, however, needs to be modified to recognize the reality of urban activities being carried out by the means of physical interaction and/or by means of IT tools. The next section suggests this modification and proposes how the new version of the model may be applied to the analysis of DMA.

The Activity Systems Model Applied to DMA :

The revised Activity Systems Model sees the major urban actors –namely residents, firms and institutions- as the dominant shapers of urban development through their daily activities. These activities tend to influence the urban physical development if they are accomplished by means of face-to-face interactions. On the other hand, if the activities are carried out by means of the IT, they tend to affect the pattern of activities in the cyberspace. As shown in Figure 1, the model suggests a dynamic relationship between its four main components: goals of the main urban actors, their activities, the means of carrying out the activities and the resultant patterns of development, which will now be defined.

Goals: are value-derived motivators for the activities of key urban residents, firms and institutions. Sometimes expressed as objectives or aims in qualitative and quantitative targets, the social, economic and management goals tend to guide the decision and actions of urban actors.

Activity Types and Means: urban activities are the complex goal-directed actions undertaken by residents, firms and institutions and they may be carried out by means of personal presence in the traditional urban places or in the new electronically created virtual spaces by means of such tools as the Internet, Intranet, e-mail, fax, video, fixed and mobile phones. The primary activities of the residents may be categorized as self-sustaining, socializing, personal

development and recreation, which in turn trigger secondary of subsidiary activities. Firms undertake three broad categories of activities, namely goods production, distribution and provision of services to other urban actors, while institutions generally carry out public investments, coordinative and regulatory activities that are essential for the functioning of urban socio-economic life.

Activity Outcomes: are the cumulative effects on urban places and cyberspaces of the activities by the three main urban actors. Thus intense urban commercial activities in close proximity created the Central Business District, while down town development is created by high-density residential and cultural activities. If, on the other hand the activities are undertaken by means of emerging IT tools, this increases the importance of the cyberspace and that in turn trigger changes on urban spatial development. The exact nature of the impacts these changes on urban spatial structure are still unclear, but some researchers suggest complex simultaneous dual activities whereby activities in the cyberspace tend to either substitutive, enhancement, complimentary or integrative with those activities in the urban places.

DMA Residents: their Goals, Activities and Development Impacts

Residential activities play an important role in shaping the growth and image of the city. These goals-directed activities have been based on face-to-face interactions in urban places to achieve the desired social and economic objectives of the individuals and the households. However, the activities are increasingly being carried out using the various IT tools, especially since the recent introduction of the Internet and mobile phones, which seems to have led to the emergence of networked homes in certain areas of the DMA.

Goals of DMA Residents

The normal daily activities of the DMA residents may be motivated by self-sustaining, socializing, personal development and recreation goals (Benna 2001). These goals that are shaped by Islamic value system appear in many forms, for example, the self-sustaining goals are those essential to the sustenance of life and balanced urban existence such as eating, drinking, relaxing and sleeping. Socializing goals appear in the urge to build and maintain social support system among family members, friends and neighbors. Personal development goals are reflected by the need to improve intellectual and emotional capability so as to be full and responsible member of the community. The recreational goals reflect the need for entertainment and relaxation in a suitable environment.

Residents' Activities and Means

The residents' goals identified above tend to influence the types of activities pursued by them. The self-sustaining activities, for example, include those related to eating, drinking and sleeping. Socializing activities are those related to the social exchanges and interactions among family members, friends and neighbors. Social development activities are related to education and training such as schooling, continuing education, learning new skills, follow-up of new advances in education and may include managing personal business, office work, government interactions follow-up, business follow-up and charity-work. Recreational activities may be active (sports, games, shopping) or passive (playing chess, cards, and electronic games) in nature.

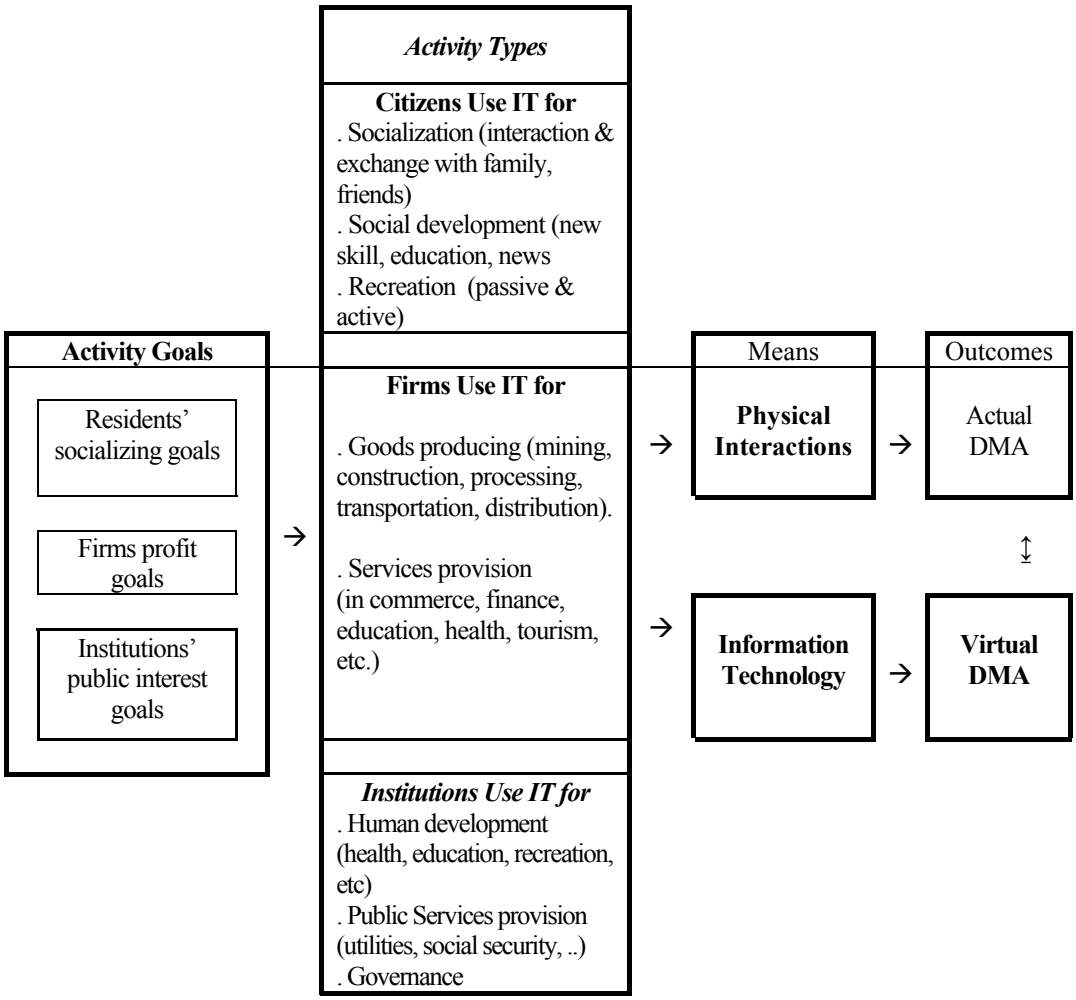

Figure 3: Conceptual Framework for Analyzing Virtual Dammam Metropolitan Area

The means for undertaking these activities have traditionally been based on place-based interactions, now the many and diverse IT tools are offering an alternative means of interactions. The Internet, e-mail, files transfer protocol, video, fax, mobile phone devices are among the most commonly used TI tools in the DMA to participate in cyberspace activities. There are many indications that many residents use both the urban places and cyberspaces.

There constraints that limit residents' ability to use the cyberspace in the same way they use urban places for their daily activities. First, some activities cannot be

performed using any of the IT tools. For example some self-sustaining activities such as cooking, eating, sleeping, and feeding babies cannot be carried out in the cyberspace, although searching and obtaining information on how to improve them can. Second, there are circumstances that limit the ability of a large proportion of the DMA residents in the use of the IT option, and these include affordability, lack of skills, lack or inadequate IT infrastructure at convenient places (such as homes, neighborhoods or workplaces). Many efforts are, however, underway to reduce the effects of some of these constraints. First, there is the global effort to increase- through the market mechanisms- the productivity and efficiency of the firms producing IT devices the prices of some of which are said to fall by about half every eighteen months (US Commerce Dept, 2000). Second there are the efforts the Saudi Government to develop skills among school children through Watani Project for example, and the efforts to improve manpower skills by private IT training firms such New Horizons, al-Alamia, and Executrain.

Pattern of Virtual Activities by the Residents

The increased use of IT by the residents of the DMA has contributed to noticeable developments in the homes, the neighborhoods and in some large urban complexes in the DMA. We shall review these changes highlighting specific examples where possible.

Changes in the Home- From Living Space to Activity Center

The frequent use of IT tools in the homes seems to be transforming it from a living space to an activity center. The living space concept, according to Venkatesh and Mazumdar (1999) conceives the home as consisting of three components. The first is the social space which composes of four main elements: the members of the household, the socio-economic activities performed by them in the home; the time spent on those activities; and the interactions between the members of the family. The second is physical space, which comprises of the physical layout of the home and its constituent parts (kitchen, bedrooms, bathrooms etc). The third is the technological space, consisting of the household technologies (such as cables, PCs, fax machine, TV, videos, wired and wireless phones) that are embedded in the physical space and used by the members of the family as part of the social space. These spaces tend to change to reflect the pattern of activity but the physical space, unlike the social space, changes less often and it more concerned with the location and sequence of activity spaces.

The home as a living space gets transformed into an activity center as a result of changes in the household technologies from stand-alone to full pledged networked devices. Thus the networked PCs make it possible for the household to access the

Internet, use e-mail, surf the cyberspace, organize video conferencing and participate in many online social, educational, commercial and recreational activities. Through the networked system many home appliances like fridge, TV, video recorder are increasingly being manipulated from a distance.

These new advances in IT seem to offer new opportunities for the two largest groups among the DMA population: the women and the youth. Activity-centered home offers women more opportunities for more participation in the labor force in ways that are in conformity with local tradition and culture. On the other hand the need for child-rearing and the increased ability to set up home-based businesses are other forces that may be exerting changes in the function of the home. Considering the claim that over $100 billion belonging to Saudi women remain inactive in the banks, and the increasing use of the Internet by Saudi women as reported by Al-Sharq Al-Awsat of October 7, 2001, the potentials for ladies home-based business are tremendous. This is especially so if advantage is taken of the many possible roles of the home as a center for shopping/financial transactions, information gathering, learning and for communication not only for strengthening social ties but also engaging in the world of business, art and culture both close to home and afar. It is through these interactions that households can have everlasting affects both on the social and physical characteristics of their homes, neighborhoods and cities, such as DMA. Similarly, for the DMA youth, the activity-centered home offers the opportunity for educational advancement, learning new skills, use of diverse entertainment devices, interacting with diverse types of e-groups.

The Emergence of E-communities with the Neighborhoods

The DMA consists of distinct neighborhood like Dawasser, Dana, Rakah, Subeiha and others. They all have some distinguishing characteristics, which may include the presence of local public facilities, well designed, interesting and engaging streets, lively service shops that serve both economic and social functions, and public places as realm for social interaction. Each neighborhood derives special recognition, general agreement on a name for that part of the city, an effective organization of residents, a network of social acquaintances, a cluster of like-minded people, a service area of a facility such as mosque or a school, or a clearly bounded geographical area. Such an area also is distinct, imageable, manageable and containing a group of residents who generally share many common interests.

The intrusion of IT in everyday life of the community tends to trigger a process of change in which virtual community is added to a physical unit. In most of the DMA neighborhood physical activities and face-to-face interactions still remain the dominant form of effecting changes in urban places, however, e-community

alternative is gradually emerging. Many young people, especially among college students and those who live in the digitally connected areas or who can afford to pay Internet Café fees, may be active members of overlapping e-groups many of whom behave like normal communities but whose members may be living in cities across the globe. On April 1, 2004 Yahoo e-groups (www.groups.yahho.com) listed 69, 33 and 43 e-groups in Dammam, Al-Khobar and Dhahran respectively. In conformity with the local culture, many of the Internet Cafes are designated for ladies only.

An important development is the emergence of a number of new IT facilities that encourage increased tempo of cyber activities in the neighborhoods of DMA. The first of these are new facilities for the sale and servicing of computers, including Internet services. According to Bu-Ali (2001) some 56 such facilities were surveyed in Dammam (along the CBD section of King Fahad Street) and 21 in Al-Khobar (clustered along King Fahad Road and some of the malls). The second new facility types are the Internet Café that are dispersed mainly the more densely populated areas of Dammam and Al-Khobar, with 24 and 31 facilities respectively in 2003. The third types are the Call Cabins, the number that is increasing despite the growth in the number and use of competing facilities such as Internet café and mobile shops that sell not only mobile sets but also many types of digital cards. The fourth new facility is the fixed and mobile phone outlet, the number and use of which are steadily increasing

Transformation of Some Large Urban Complexes in the DMA

Many large urban complexes in DMA that had for a long time functioned as residential entities, were transformed into centers for cyber activities as soon as the IT infrastructure is embedded in them. Many gated communities in the DMA such as the Aramco compound, the campus of the King Fahad University of Petroleum and Minerals and the many private compounds such Oasis, Jadawel and al-Rashed tended to acquire additional functions as soon as they became connected to World Wide Web of the Internet.

In many respects these communities are different from the nearby residential areas in Thuqbar, Subaikha and Dawasser not only in their electronic connection and higher use of the diverse IT devices, but also in other community characteristics such as level of density, income level, education level and quality of physical design. In this way, the IT is helping to accentuate the polarization of the DMA spatial structure.

DMA Firms: their Goals, Activities and Development Impacts

Firms' Profit-making Goals

As indicated in the model, private firms are usually motivated by profit making and need for business growth in the pursuit of their business activities. These business goals are sometimes explicitly stated or they remain implicit but they are always vigorously pursued, usually within the bounds of Islam. In many complex ways this goals direct and shape choices and decisions by firms both in terms of their daily and long-range activities. Decisions on the location of a retail store, a factory, a warehouse or which type of IT device or software to use in order to increase productivity are always shaped by the need to maximize profit and business growth. The implementation of these decisions tends to affect not only the physical development of the DMA but also its embedded IT infrastructure.

Urban Activities and IT Use

In the pursuit of their mainly economic goals, DMA firms undertake three broad categories of activities, namely goods production, distribution and provision of services to other urban actors. The goods production activities include extraction or mining of raw materials including crude oil, agricultural production and processing, construction of buildings and urban infrastructure networks and facilities. Distribution activities include transportation, retail trade, wholesale, and warehousing, while services activity types relate to businesses such as banking, insurance, real-estate- and other services in agriculture, education, health, engineering, law, recreation, as well providing computer solutions such as factory control, software design, web design, and just-in-time inventory.

The means for undertaking these activities, and which directly affect the nature of urban development, are physical contact and electronic-mediated. The physical means are mainly the traditional place-based face-to-face interactions, while the electronic means include capacity data transmission systems, the Internet, Intranet, e-mail, fax, video, fixed line telephone and mobile devices frequently used in the distribution service. While residents tend to prefer ubiquitous mobile phones, firms tend to prefer the high-speed digital transmission system more.

Changing Pattern of Firms' Activities

The spatial and cyber activities by the DMA firms have influenced the pattern of commercial development, increased the opportunity for the emergence of e-commerce and has triggered some notable IT-induced changes. The place-based changes include the new opportunities to decentralize activities for institutions and firms, greater prospects to offer services to customers from afar, a reduction of

display and storage spaces resulting multimedia displays and the use of just-in-time delivery systems. Furthermore, the decline in the number of employees translates into a reduction of parking spaces. The non-physical changes include the more efficient ways firms are managed, the improved productivity of the manufacturing sector, and the increased efficiency of the IT-mediated activities in commerce, finance and distribution of goods and services

Changes in Commercial Development

In an attempt to maximize the growth of their business and profits commercial firms tend to cluster together, as a result the following patterns are emerging. In the first place there is the growth of the Central Business Districts of Dammam and Al-Khobar as areas of mixed residential, business and retail activities but also as centers of electronic-mediated transactions. Second, is the emergence of Malls (such as Waha Mall, Al-Khobar Mall, Rahamaniyah Mall) and larger super markets (such as Tamimi, Fahad, Panda and Farm 9); and Exhibition places (such as Dhahran Exhibition and Seef Expo Center in Al-Khobar) as important centers that depend on IT. Third, is the growth of intensive IT use in the linear commercial streets within cities (such as Sweket and Khaled Streets in Al-Khobar) and the largely wholesale and warehousing activities along the highways connecting the cities (such as Khobar-Dammam Highway and Dammam-Dhahran Highway).

Increased Prospects for E-Commercial

The increasing widespread and intense use of IT tends to blur the boundaries between the various sectors of the new economy, yet the commercial sector appear to stand out due to its great appetite for IT. Since this sector tends to exert the most influence on urban development it seem appropriate to explore the prospects for e-commerce in the DMA for which there are many indicators.

The first indicators for high potentials for e-commerce include the planned public spending of about $5 billion by 2008 to establish e-government, a plan that will likely boot e-commerce (Madar 2003). In addition to this are the official enthusiasm and optimism that led to the support by the Ministry of Interior for Microsoft to build the “Saudi gateway” which will be a public web portal. To some extent this optimism is reflected by the views of the managing director of National Information Systems who forecasted that IT could become Saudi Arabia’s largest industrial sector after oil and gas by 2020 (Ingham, 2002). This official optimism is reflected by the private’s two giants SABIC and Aramco whose representatives informed the audience at an e-Commerce seminar in Riyadh in May 2002 that they

have been boosting internal efficiency and driving down costs through the use of information technology. (Ingham, 2002)

The second indication of the prospects of e-commerce is the increased realization of its significance to the private sector development in the era of globalization. The financial sector may be the most advanced in the use of IT to support its activity and this is reflected by the recent rapid growth of the ATM banking services, speed cash and foreign exchange transactions outlets. In view of the impact on both the physical and cyber developments of the DMA it would be appropriate to use it to illustrate the potential influence of this sector.

All the major Saudi banks offer a varying degree of Telebanking products and services, which have great benefits for both customers and the banks themselves. To the customers it offers cost savings, time saving, safety of cash and convenience, while to the banks the advantages appear in the form of savings in manpower, time and office space and increased consumer confidence. Let's take NCB (Al-Ahli) to illustrate the range of services.

The Al-Ahli online and phone banking services provide an easy and secure direct access to accounts at anytime and from anywhere in the world via the Internet or WAP-enabled mobile phone. Al-Ahli Online (www.alahli.com) is available in Arabic or English for added convenience to customers. Some of the products and services offered the online and phone banking include the following services: online transactions with multi-currency, account enquiries, credit card enquiries and payment, investment fund enquiries and transactions, and utility bill payment. Other services offered include the option to view up-to-date foreign exchange rates and Deposit rates, view up-do-date Investment Prices, request for statement of account by mail, request for cheque book, send email enquiries or instructions to the bank, receive updates and inquiry responses through your email, register new accounts or new beneficiaries, register new Saudi Electricity Company or Saudi Telecommunications Company invoices.

The third indication is the positive role by semi-public Saudi Aramco in the development of e-commerce. As the largest employer in the DMA, it has taken positive steps to promote e-commerce environment both with the firm and among its business partners. To enable this business environment, Saudi Aramco's IT strategy seeks to create synergy between technology and human talent to excel and innovate in all company endeavors (www.aramco.com). Value-added IT solutions that are robust, reliable and scalable are embedded in the system so as to allow the creativity of users to provide innovative business solutions from their work locations anywhere, anytime, to increase their contributions to the company. In addition to its

internal initiatives, Aramco is ensuring the increased use of the new technology in the local community. The company has a good track record in this regard. For example, it has sponsored 55,000 families for free Internet access at the same time it supported the emergence of e-commerce by its insistence that all its suppliers have to interact with it through the Internet (Madar, 2002). All these activities will eventually translate in better e-commerce prospects but also into concrete cultural, social and economic development in the DMA.

IT Induced Changes

The increased use of IT by almost all firms has led to a number of significant changes ranging from those related to the physical elements of the DMA, to the goal achieving strategies adopted by the established firms and to the creation of entirely new firms for provide new e-business solutions. Let us examine a new of these cases.

The first is the emergence of synergic and wired commercial complexes. Rashed Mall, Fouad Center, Gulf Center and Giant Store are examples of new types of development that encourage complex hybrid urban activities. Each of these centers has a large footprint and has a wide range of activities such as retailing, business, restaurants, sports facilities, entertainment facilities, simulated historical scenes, zoos, electronic games and Internet Cafes. Within the same roof they encompass activities similar to the Dammam and Al-Khobar Central Business Districts. More importantly these centers are centers of cyber activities that takes places not only in the Internet Cafes but also in most of the computer hardware and software retail stores located in them.

The second type is the emergence of "click and mortar" or hybrid strategies among some of the leading firms in the DMA. Established firms like Aramco, Al-Rashed, Al-Gbosaibi and Zamil, to mention just a few, tend to exploit their physical assets and capitalize on customer loyalty to use IT to make their traditional business more efficient and to automate routine activities so as to shift their capable staff to the more profitable aspects of e-commerce. These e-commerce strategies may take many forms ranging from approaches with limited interaction between the physical and virtual entities, to those where the two modes become inseparable.

The third indicator is the establishment on "cyber-pure" firms. They are new firms whose activities are purely to meet the needs of the market created by the activities in the cyberspace. GulfNet.com, Sahara.com and GuftZone.com are few examples of DMA-based firms that provide Internet solutions, which include Web design and hosting, domain name registration, set up of networking system,

provision of IT manpower and implementing corporate Internet and Intranet infrastructure.. There are other, such New Horizons and Executrain firms that specialize in the training of software application and networking.

To sum up, we have explained how DMA firms, motivated by the need for profits, are increasingly using IT to organize their activities both in the urban places and in the cyberspace thereby changing existing facilities, creating new ones and initiating new process and products all of are gradually transforming DMA

DMA Institutions: Their Goals, Activities and Development Impact

Similar to the DMA residents and firms, the public institutions are motivated by the desire to promote the public interest as shaped by Islam values, and which in turn influence their choices and activities both in the urban places and in the cyberspace.

Goals of Institutions in DMA

The urban development activities of the public institutions of the central, provincial and local governments are usually guided by public interest in both their tangible and intangible forms. Some of these goals are sometimes explicitly stated and vigorously pursued, however at other times they are implicit but still powerful motive for urban activities. The tangible forms of the public interest may include the provision of public goods and services that seek to promote general welfare, human development, and environmental quality and to advance economic efficiency and social equity. The intangible types may include regulatory measures that are designed to ensure public security, safety and public order.

Institutional Activity Types and Means

To promote public interest in urban development process, many public institutions of the central government, local authorities in DMA and the local non-Government (NGOs) agencies have in various ways undertaken activities that have directly or indirectly advanced the growth of the metropolis both physically and in terms of cyber activities. There are generally two types of activities. There are those that seek to establish and strengthen conducive urban environmental that enable all urban actors to carry out their activities in the pursuit of their goals. Thus the institutions interact with the residents both physically and where possible by means IT devices to inform, educate, engage, and to solicit ideas. They also interact with private sector to encourage economic investment, as well as to regulate and guide their activities. The institutions also coordinate activities among the various public service delivery agencies and those related to public-private partnerships.

The other types of activities are those seeking to promote cyber activities, which include IT knowledge diffusion (dissemination of information and development of new IT skills), economic incentives (involve in the provision of favorable prices for network services and other incentives), regulation and legislation (liberalization and privatization of the telecommunication market and the various technical standards utilized in cyber business transactions).

E-Government Initiatives

The government of Saudi Arabia has embarked on e-government initiatives as means to promote its public interest goals. The initiatives that direct the activities of public institutions consist of a number of components. The first component is in the educational sector where the Ministry of Education has been increasing technology adoption in all schools, spending more than US$ 150 million every year on IT (Madar, 2003). Connected to this initiative is the Watani School Net Project through which some 1,300-computer laboratories are being set up and also to train the same number of computer teachers and install over 100,000 PCs in public secondary schools. Backed by Crown Prince Abdullah, the project is to cost about US$ 27 million but it is expected to attract private investment of about US$ 2 billion. A similar project is the GOVTEVOT Network Project in which a Wide Area Network (WAN) is to connect most of the 17 General Organization for Technical Education and Vocational Training (GOVTEVOT). The project involves the setup, implementation, administration and support of the Internet. Together these two projects are likely to ensure broader application of IT at work, home and at the educational institutions for the overall good of the society.

The second component is the so-far uncoordinated attempt to ensure government presence on online of about 60 percent of the 22 cabinet ministries. The Saudi Arabian Information Resource- a public sponsored agency- has been maintaining a mini portal for government, containing some 2000 web pages (Madar 2003). Many of the websites contain useful and often updated information in both Arabic and English, but most of them are not interactive and do not allow for the inputs of the residents and firms in public policies and hardly have they been used to advance e-commerce through e-procurement and similar incentives.

The third component is the role of major IT public events in the encouragement of progress towards e-government. First, there are the local annual IT exhibitions held at the Dhahran Exhibition Center and the exhibition at the campus of King Fahad University of Petroleum and Minerals where both

the private and the public sectors display most recent IT advances of interest to them. Second, there are national e-commerce (and e-government) conferences and exhibitions organized by Saudi E-commerce Forum. These events cover a wide range of e-government and industry specific topics including e-solutions for many sectors such as health, education, transportation and manufacturing, as well as for e-banking e-procurement and venture capital.

IT induced transformations in the DMA

Two types of transformations may be linked the increased IT-based activities in the DMA. The first relate to physical changes resulting from the embedded networked infrastructure and its use, while the second is concerned with the emergence of complimentary cyber facilities and their effects of the physical elements of the metropolis.

Physical Changes

Government complexes are located in various parts of the metropolis and the form the hub for most public activities both in form of physical face-to-face interactions and in IT-mediated exchanges and transactions. Thus, these complexes are gradually connected by mean of IT infrastructure not only with each other but also with the headquarters in Riyadh. While these complexes previously relied on face-to-face interaction with public official, now however, thanks to the many IT devices they have become hybrid public activities centers based mainly physical face-to-face interactions with the local residents and firms. As more the IT-mediated interactions increase, the importance of the complexes as places for physical interactions is likely gradually decline.

Emerging Virtual DMA

The main purpose of the use of IT in the public sector is to advance the Public Interest. This takes the form of the improved delivery of services to the citizens by the public institutions, increase transparency and accountability in government, regulate the behavior of the private sector in the delivery of services its customers, increase citizen empowerment through information, and to improve the efficiency and cost-effectiveness of government purchasing system. Recent investigations reveal that many local public institutions have presence online. These institutions include those in human development sector such as Directorate of Education (www.edueast.gov.sa) and Dammam College of Technology (www.dct.gotevot.edu.sa); health institutions such the Teaching hospital (www.kfu.edu.sa/hospital.asp), and Public Health Department (www.alshha.net). They also include utilities agencies such as Saudi Telecom (www.sct.com.sa),

SCECO (www.sceco-east.com) and Saline Water Conversion Corporation (www.swcc.gov.sa); and some important Non-government organizations (NGOs) such as Saudi Red Crescent Society (www.srcs.org.sa) and World Assembly of Muslim Youth (www.wamy.org).

There is room for improvement to make public presence online more effective. Currently the websites of most ministries merely present information about the functions and the structure of the agencies. Most on the NGOs, on the other hand, try to encourage interaction with the visitors to their websites. Many local institutions have so far missed the opportunity to inform and educate residents and potential tourists what DMA can offer with regards to improved living conditions, business opportunities in the area, the range of services provided by the municipalities and their vision for the future. To develop enlightened and participatory urban actors, the website could include news, events and highlights about the metropolis. For those who seek general and practical information, the website could provide directory for important public and private agencies, range of online services and application forms, as well as provide important official documents online. Also important is the need to make the website design attractive, easily navigable and with links to other relevant public and private agencies.

Generally it is clear that e-government in DMA is evolving gradually within the general guidance of the central government using ad hoc plans, projects and initiatives, so far without the benefit of an overall plan or strategy. While such a grand strategy is slowly emerging, much work is needed to increase public awareness regarding practical benefits of Internet technologies and their use in a wide variety of e-solutions. A program is needed for adult training in IT skills, somewhat similar to the Watani Schools Net Project, targeted to public servants and the general public so as to match the pace of automation of public institutions.

Summary and conclusions

The paper has proposed approach to analysis of Virtual DMA using the Activity Systems Model that views changes in both the virtual and actual spaces as a result of the application of the digital technologies by residents, firms and institutions to achieve the goals. It has been suggested that to achieve their socialization goals, residents of DMA undertake a variety of social transactions, social development and recreational activities using both face-to-face and cyberspace interactions which have introduced new functions to the home and triggered changes in the neighborhood where new facilities and new e-communities emerged, while gated communities were given IT-mediated capabilities. As firms use both the urban

places and cyberspaces to carry out their activities related to goods and services production, transportation and distribution in the pursuit of profits and business growth, they created new cyber-pure firms to meet the demand for e-solutions, networked and transformed large malls, and developed hybrid business strategy that allows then to have presence in the urban places and cyberspace simultaneously. Institutions are also gradually using the cyberspace as well as the face-to-face interactions to carry out their human development and public services delivery activities to achieve their public interest goals, in the process of which new e-government strategy is emerging and public offices complexes are being transformed and fitted with IT-infrastructure.

In conclusion, this paper has achieved its basic aims of proposing and applying an approach for the analysis of Virtual DMAS. However, such claim cannot be made about the suggested substantive relationship. For example, despite the use of IT to initiate new processes with their supporting facilities in the form of e-community, e-commerce and e-government, we are neither certain about the durability and the pervasiveness of these processes, nor do we fully understand their implications on the pattern of physical interactions by the actors or on the DMA. These may be the subjects of future investigations.

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منهجية لدراسة حاضرة الدمام الإلكترونية

عمر قربة بنا و فهد بن نويصر الحريقي

قسم التخطيط الحضري و الإقليمي

كلية العمارة والتخطيط - جامعة الملك فيصل

الدمام –المملكة العربية السعودية

ملخص:

تهدف الدراسة إلى اقتراح منهجية مناسبة لتحليل المدينة الإلكترونية وذلك من خلال دراسة النشاطات الحضرية الإلكترونية لسكان في حاضرة الدمام. تتبعت الدراسة - من خلال مراجعة الأدبيات- تطور الاتصالات وتقنية المعلومات، وكذلك أساليب تحليل العلاقة بين التطور في هذه المجالات والتركيب العمراني الحضري. بناء على تقييم المناهج المختلفة لدراسة اختير أنموذج النشاط الحضري لتحليل حاضرة الدمام الإلكترونية باستخدام المعلومات المتاحة.

مفتاح الكلمات: حاضرة الدمام الإلكترونية، تقنية المعلومات، أنموذج النشاط الحضري، التنمية الحضرية.