EJISDC (2008) 35, 6, 1-24

THE CONTRIBUTION OF ICT TO FREEDOM AND DEMOCRACY: AN EMPIRICAL ANALYSIS OF ARCHIVAL DATA ON THE MIDDLE EAST

Farid Shirazi
Institute for Research on Innovation and Technology Management
Ted Rogers School of Management,
Ryerson University,
Toronto,
Canada
f2shiraz@ryerson.ca

Abstract
This study is based on an empirical analysis of Information and Communications Technology (ICT) archival data for ten Middle Eastern countries: Bahrain, Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, and United Arab Emirates for the period of 1995-2003. Some previous studies consider the impact of ICT on socio- economic development in the region. Using a set of regression analyses, this paper shows that ICT expansion in the Middle East has not only resulted in the reduction of the Digital Divide between this region and developed countries, it has also had a positive impact on promoting democracy and freedom of expression in a region that suffers most from political, social and global conflicts (Freedom House, 2006; Reporters Without Borders, 2005).

Keywords: *Democracy, Digital Divide, Digital Opportunity Index, Economic intervention, FDI, Filtering, Freedom, Gender digital divide, ICT, Institutional resistance*

1. INTRODUCTION

A fundamental goal of the World Summit on the Information Society (WSIS) is to promote democratic and social change in certain regions of the world through aggressive expansion of the information and communications technology (ICT) infrastructure. In its 2003 declaration of principles reaffirmed in Article 19 of the Universal Human Rights Declaration, WSIS states that "everyone has the right to freedom of opinion and expression; that this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers" (2003). From the perspective of WSIS, ICT expansion and global inclusion is fundamental to social processes of freedom and democracy in the present millennium. A number of scholars have also endorsed the view that ICTs such as the Internet can stimulate rapid democratization in regions of the world such as the Middle East, where democracy has not been adopted (Ferdinand, 2000; Meier, 2000). Although the use of ICTs have influenced social movements and have also had an effect on the social life and democratic freedoms in some communities (Jones, 1994; Cleaver, 1998), in some it is unclear as to whether ICTs are having as profound an influence on democratization in the Middle East as was predicted (Alterman, 2000; Kalathil and Boas, 2002).

The current definitions of freedom and democracy, by the UN Universal Declaration of Human Rights, states that every individual has rights to free communication, religious and political participation, and to engage in economic activity. In much of the literature, these rights are defined as political, economic, and religious freedoms. Many scholars equate political freedoms with constitutional democracy (the right of individuals to elect their governments) and freedom of the press (Sen, 1999; Rose, 1999; Pettit, 1999; Joyce, 2003).

Some scholars have argued that constitutional democracy is essential as it provides the basis of economic freedoms via its protection of civil liberties and political rights (Lundstrom, 2002; Berggren, 2003; Gwartney and Lawson, 2006). Gwartney and Lawson (2006) define four main components of economic freedom: "a) the right to trade with others, including foreigners, at mutually agreeable terms, b) the right to enter and compete in the business or occupation of your choice, c) the right to keep what you earn, and d) protection of your property from confiscation by others, including the government".

ICT is viewed as a medium by which relationships can be transformed and free and open interactions will lead to the democratization of societies. On the level of social organization, ICT is seen as a catalyst for civil democratic processes of citizen consultation and participation such as voting, and other decision-making (Castells, 1997; Wheeler, 1998; Escobar, 1999; Coleman, 1999; Noveck, 2000). On the economic level, ICT is viewed as a catalyst and medium for integration into the global market and the rise of worldwide electronic trade and business activities (Zembylas and Vrasidas, 2005; Pohjola, 2001, Norris, 2000; Keohane and Nye, 2000).

This paper investigates the extent to which ICT expansion is impacting social and political freedoms in ten countries of the Middle Eastern region, defined as non-democratic states (Alterman, 2000; Ghashghai, 2000; Sarsar, 2006; Wheeler, 2006). These countries are depicted in Table 1. This study investigates two prominent and interrelated issues in these countries: (1) the extent of the contribution of ICT expansion to freedom of expression and (2) the impact of government economic intervention and regulation (institutional resistance) to ICT expansion, and in turn, democracy and freedom of expression.

To investigate these issues, a stepwise robust regression method was applied on the panel data for the period of 1995-2003. The rest of this paper is organized as follows. Section 2 provides background demographics and ICT development in Middle East, while section 3 provides an overview of the impact of ICT development on democracy and freedom of expression in this region. Section 4 introduces the empirical data used in this study as well as variable definitions. The results of the regression analyses are provided in section 5 and Section 6 concludes with discussions and findings.

2. BACKGROUND DEMOGRAPHICS

The Middle East is the birthplace and spiritual center of Zoroastrianism, Judaism, Christianity, and Islam. It defines a cultural area and does not have precise borders. The most common and highly arbitrary geographical definition includes Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), Yemen, the West Bank and Gaza Strip. This region has seen both periods of relative tolerance and violence.

Seven out of the ten countries listed in Table 1, namely Bahrain, Iran, Kuwait, Oman, Qatar, Saudi Arabia and UAE are located in the Persian Gulf region. Although it is an important country in the region, Iraq has not been included in this study due to a lack of available data which can be attributed to the long history of conflict in the country which has had a devastating impact on its social, economic and political development.

The seven countries listed above currently produce more than 18,000,000 barrels of crude oil per day and export more than 30 billion cubic meters of natural gas. The oil and natural gas sectors are heavily ICT-dependent, as ICTs are used in all phases of oil and natural gas production, from searching for new reserves to refinery and transportation. ICTs provide possibilities for expanding proven crude oil reserves, improve the rate of crude oil extraction from existing wells, and provide additional means to discover new wells (UNCTAD, 2006).

Two other countries in the region that are not included in this study are Yemen and Israel. Yemen was not included due to a lack of sufficient data. Israel, was not included because its socio-political situation is quite different from other Middle Eastern countries in that it is not classified as an Islamic state.

The ten countries included in this study share many similarities, and yet experience different levels of social, economic, and political developments. Many of these countries have adopted Islamic Sharia law in the development of legislation and judiciary system (Table 1). These countries are active members of the Organization of the Islamic Conference (OIC), an inter-governmental body with 57 state members. Its goal is to consolidate cooperation and solidarity among Islamic governments for the purposes of facilitating progress and safeguarding their economic, social and cultural interests.

From 1995 to 2003, the average GDP per capita (GDPP) in the ten countries studied increased dramatically. The lowest increase was $8,887 whereas the greatest increase in GDPP was $11,272. This growth can be attributed to the demand for petroleum products, which are the main exports from this region (Saxton, 2006). The Human Development Index, (HDI) uses standard measures to compare various demographics to determine whether the country is developed, developing, or underdeveloped and considers economic factors that affect the quality of life. Countries such as Kuwait, Bahrain, Qatar, and the United Arab Emirates ranked high on the 2006 Human Development Index Report (HDI report, 2006), while others such as Iran and Syria did not. Despite the increase in the price of oil in Iran, its government was not able to attract foreign investors in oil and natural gas, sectors that are highly dependent on such investment (Saxton, 2006). Syria is the poorest of the countries and ranks lowest at 106 on the HDI. Of the group, Iran has the largest population (68,017,860) overall, as well as the highest proportion of people under 30 years of age. Life expectancy in these countries average at 73.7 years and adult literacy is high. Bahrain has the smallest population (688,345) with a life expectancy of 74.5 years and an 86.5% literacy rate.

Sarbib (2002) explains that Arab countries spend a higher percentage of GDP on education than countries in other regions. They have also made significant advances in literacy and enrolment rates in the last two decades. In 1995, over 90% of males and almost 75% of females in theses countries studied were enrolled in primary school; at the secondary level, the enrolment rates were 60% for males and 50% for females. At the university level, male and female enrolment in Arab countries was higher than enrolment in all developing regions with the exception of Latin America (Sarbib, 2002).

The countries listed in Table 1 have seen a profound expansion of their ICT infrastructures throughout the last decade. In particular, the increase in Internet access has had a significant effect on the relationship between society and the state. The increase in accessibility to information, and communication within communities as well as outside of local or national boundaries has created a phenomenon where politically constructed spaces have no immediate connection with physical territory (Mudhai, 2003). Two divergent perspectives have emerged on this issue: one believes that ICT in general empowers public participation in democratic and decision making processes and contributes to a more civil society where political groups, NGOs, ethnic minorities, religious groups and traditionally silent voices have the opportunity to contribute to discussions on socio-political and economic matters (Ferdinand, 2000; Jankowski & van Selm, 2000; Bimber, 2001, Bennett & Fielding, 2001; Becker, 2001; Clift, 2003; Guillen and Suarez, 2005; Wheeler, 2006). Other scholars argue that ICTs, the so-called technologies of freedom and empowerment, may in fact enhance imperialism, increase disparities, and create undesirable confusion (Main, 2001). Since this study focuses on how ICT expansion has affected democracy and freedom of expression in these Middle Eastern countries, it is important to provide some details on their political organizations and governmental systems.

2.1 Political Organization and Government Systems

Although these countries are commonly considered Islamic states, their governmental systems vary greatly. The degree of citizen participation in governing also varies widely among the countries and likewise the degree of religious influence on the larger population and the government (Kamrava & Mora, 1998).

According to Kamrava and Mora (1998, p.896), "most Middle Eastern states have effectively tied their own corporate identity with that of most or some of the more powerful social groups and organizations (e.g., religious establishment), therefore, curtailing much of society's independence and autonomy…the state's ownership of, or control over, the various economic resources…which have profound influence to dominate and control social organizations.".

Table 1: Demographic Data of the 10 Countries

Countries	Land area (Sq. km)	Population	LE 2006	Adult Literacy 2006	GDPP (US$) 2006	HDI index 2006	HDI rank 2006	EFR 2006	Democracy rank 2005	PF Score 2006	Constitution
Bahrain	665	688,345	74.5	86.5	20,758	0.859	39	25	88	72	Islamic Sharia
Iran	1,648,000	68,017,860	70.7	77	7,525	0.746	96	156	132	84	Islamic Shi'a
Jordan	92,300	5,460,265	71.6	89.90	4,688	0.76	86	56	97	62	Monarchy
Kuwait	17,820	2,335,648	77.1	93.3	19,384	0.871	33	50	91	56	Islamic Sharia
Lebanon	10,400	3,826,018	72.2	84	5,837	0.774	78	73	99	60	Parliamentary
Oman	212,460	3,001,583	74.3	81.4	15,259	0.82	56	74	89	70	Islamic Sharia
Qatar	11,437	863,051	73	89	19,844	0.844	46	78	113	61	Islamic Sharia
Saudi	1,960,582	26,417,599	72	79.4	13,825	0.777	76	62	117	79	Islamic Sharia
Syria*	185,180	18,448,752	73.6	79.6	3,610	0.716	106	145	124	84	Partly Islamic Sharia
UAE*	82,880	2,563,212	78.3	81.7	24,056	0.839	49	65	90	65	Partly Islamic Sharia

**The main source of legislation is Islamic jurisprudence*
LE= Life Expectancy, EFR= Economic Freedom Rank, PF= Press Freedom (score of zero best, 100 worst)
Sources: UN, ITU, Freedom House, World Audit, The Heritage Foundation

Bahrain is a constitutional hereditary monarchy. Its leadership consists of a Prime Minister as head of government and a King as head of state. In 1999, a National Charter was instituted which allows for freedom of assembly whereby political parties and organizations are allowed to operate and organize activities. Formal political parties, however, are considered illegal. According to Freedom House (2006), the government owns all broadcast media; therefore, while there is limited freedom of expression in broadcast media, there is a greater degree of freedom of the press in the print media. Internet access and emails are generally unrestricted, although there have been reports of government monitoring of email communication.

Iran is a Theocratic Republic consisting of several interconnected governing bodies, with an Islamic Sharia Law constitution. The chief of state is the Supreme Leader, who is appointed for life by the Assembly of Experts. The Supreme Leader has the final word in all major political, cultural, religious, judiciary, foreign policy and economic decisions. Since 1987,

Iran has seen a steady rise of political activism through an increase in the number of political parties and activist groups; however, the country still does not have a free press. The government represses both individual and organized freedom of speech by directly controlling television and radio broadcasting. It has issued gag orders on media coverage of specified events or topics and has successfully blocked broadcasts. The government censors websites by filtering Internet content, based on the assumption that uncensored content contains information of social immorality and defamatory statements about Iran's religious and/or political leadership.

Jordan is a constitutional monarchy. Since gaining independence from British rule in 1946, Jordan was primarily ruled by King Hussein (1953-99). In 1989, parliamentary elections were reinstated and since then a gradual economic and political liberalization has developed. Jordan is not classified as an oil producing country, and much of its ICT infrastructure development was developed due to the Foreign Direct Investment (FDI). It holds no exceptional economic weaknesses or strengths, but does have relative strengths in terms of a very low rate of corruption, strong property rights, and low tax rates on individual and corporate income (Heritage, 2008).

Kuwait is a constitutional monarchy with an Amir as chief of state and Prime Minister as head of government. Even though formal political parties are forbidden, political gatherings are not considered unlawful. The government of Kuwait allows for some open debate on politics in the press but because it restricts freedom of assembly, public gatherings require approval. Major newspapers are privately owned, foreign broadcasts are available, and Kuwait has allowed private television channels to be transmitted. There is a civil law system for public matters, but Islamic Law dominates family and personal matters.

Lebanon is a secular republic governed by a unicameral National Assembly or *Majlis Alnuwab*. The chief of state is the President and the head of government is the Prime Minister, who are elected and serve four-year terms. The legal system in Lebanon is independent of the government and is a mixture of Ottoman law, Canon law, Napoleonic code, and Civil law. There is no judicial review of legislative acts. The government of Lebanon does not officially acknowledge Islamic Law. Political parties are legal and there are many active political parties, including socialist parties, democratic parties and religious parties such as Hezbollah. There is a partly free press in Lebanon and freedom of association and assembly is allowed, with some restriction on freedom of expression concerning political criticism. Most of the media are owned by political elites; however, independently operated television and radio stations do exist. Several conflicts contributed to the destruction of Lebanon's infrastructure, including the 15-year civil war in Lebanon (1976-1991), the involvement of Syria in Lebanon's internal affairs and the Israeli and Lebanese war (2006).

Oman is an absolute monarchy. Formal political parties are not allowed in Oman.
The legal system is based on both English common law and Islamic law. Freedom of expression is allowed but there are laws prohibiting criticism of the Sultan. Omanis have access to the Internet, but it is censored by the government for political and pornographic content.

Qatar is a hereditary monarchy ruled by an Amir, the Chief of State in conjunction with a unicameral Advisory Council or *Majlis al-Shura* composed of a Prime Minister and 35 appointed members. Although there is a system of legislative election, none has been held since 1970. The legal system is controlled by the Amir under a recently established civil law.

Islamic law dominates family and personal matters. There are no political parties but Qatar is home to various press agencies including the controversial Al-Jazeera News Network. Al-Jazeera hosts a web site that generates more than a million hits per day (Alterman, 2005). In 2005, Qatar adopted a new constitution, which allows for freedom of expression. The government has refrained from overt censorship; however, print and broadcast media content is influenced by the state. Internet content is censored for pornographic or politically sensitive material.

Saudi Arabia is a constitutional monarchy governed according to Islamic Shari'a law. The chief of state is the King while the head of government is the Prime Minister. The government exercises tight control over state media content and has taken stringent measures against the media for publishing information considered morally or politically offensive. It has been reported that camera cell phones are banned (Shihri, 2004). Although there are no political parties or free press in Saudi Arabia, there is much political activity by Islamic groups.

Syria: is a republic under an authoritarian military-dominated regime. Their legal system is based on a combination of French and Ottoman civil law and religious law is used in the family court system. The president appoints the vice presidents, prime minister, and deputy prime ministers. Freedom of speech is restricted and defamation of the state image is punishable by law. Media are mostly state owned, and satellite dishes are illegal, though tolerated in society.

The **United Arab Emirates** is a federal republic comprised of seven emirates, with an elected President as chief of state and a Prime Minister and Vice President as head of government. The Supreme Council is the highest federal authority of the rulers of the seven emirates. The UAE has a federal court system that includes both secular and Islamic law for civil, criminal, and high courts. There are no political parties in the UAE. The constitution allows freedom of expression; however, there is a proviso law that prohibits pornography as well as criticism and defamation of the state, leadership, and religious issues.

2.3 ICT Infrastructure Expansion

A growing number of scholars argue that investment in ICT, particularly in machinery, equipment, and infrastructure, will contribute to economic growth (DeLong et al., 1991; Greenstein et al. 1995; Hamilton, 2000; Roeller et al. 2001; Correa, 2003). For example, Roeller et al. (2001) show that between 1970 and 1990, one-third of Germany's economic growth could be attributed to an increase in the penetration rate of fixed telephone lines. Hamilton (2000) argues that investment in basic telecommunication in Africa had a positive impact on economic, political and institutional development.

In the late 1990's, Middle East governments invested heavily in ICT, enabling them to not only renew, but expand their ICT infrastructures by implementing new technologies. From 1995 to 2002, ICT expenditure (on equipment, software and telecom services) in the Middle East was 5.2% of the countries' GDP. ICT investment for the period of 2000 to 2003 increased from 2.8% of GDP to 3.02% (The World Bank, 2005, 2006). Much of the investment in ICT expansion is derived from oil and gas production and export revenues. Market demand for oil and gas has led to increases in the GDP of each of these countries and subsequently, these countries increased investment in their ICT infrastructure.

ICT development in the Middle East came in two different forms: oppressive control of ICT development and partial privatization. The oppressive control of ICT development, imposed by governments in Iran and Syria, for example, controlled the area of Internet

development, and mainstream media such as radio, and television broadcasting. In Iran, the telecommunications sector was considered a key element of national military and economic security, areas too important to be left in private hands, whether domestic or foreign (Moshiri et al., 2004). Press freedom has never been guaranteed in the Middle East. Both print and broadcast media are either entirely controlled by governments or are heavily censored by governments. Iran officially banned ownership and production of satellite dishes in 1995 (Shuji, 1997).

The more liberal approach adopted by countries such as Bahrain, Jordan, Kuwait, Oman, Qatar and the UAE involves partial privatization of the state owned telecommunication sector. ICT privatization in developing countries has been viewed by many scholars as the key catalyst for modernization and expansion of public telecommunications networks (ITU, 1997b; Pisciotta, 1997; Wellenius, 1999; Bortolotti et al., 2002). The World Bank (2006) emphasizes that governments can create competitive markets that grow faster, cost less, facilitate innovation, and respond better to user needs if they open their telecommunications markets through well-designed reforms resulting in increased private investment and ICT development. Privatization of telecommunication infrastructure and ICT in general also helped to boost foreign direct investment (FDI) — a major source of ICT financing.

Privatization of telecommunications in the Middle East and the role of telecommunications provider in the expansion of ICTs, started in the early 1980's by the establishment of Kuwaiti's Mobile Telecom company (MTC) which currently operates with a new name (Zain), is the largest private operator in wireless services covering six Middle Eastern countries and 14-sub-Sharan African countries. Qatar introduced its government owned telecommunication (Q-tel) partial privatization in 1998, and other leading Middle countries such as, the UAE Telecom (Etisalat) in 2000, Bahrain telecom (Batelco) in 2001, Oman telecom (Omantel) in 2004 and Jordan telecom company (JTC) in 2004 (Dahel, 2001; Oman Telecommunications, 2006/2007; ITU News, 2007; American University, n.d.).

Table 2.1 shows the outcome of telecommunications revenue (percentage of GDP) between 2000 and 2004 for ME countries.

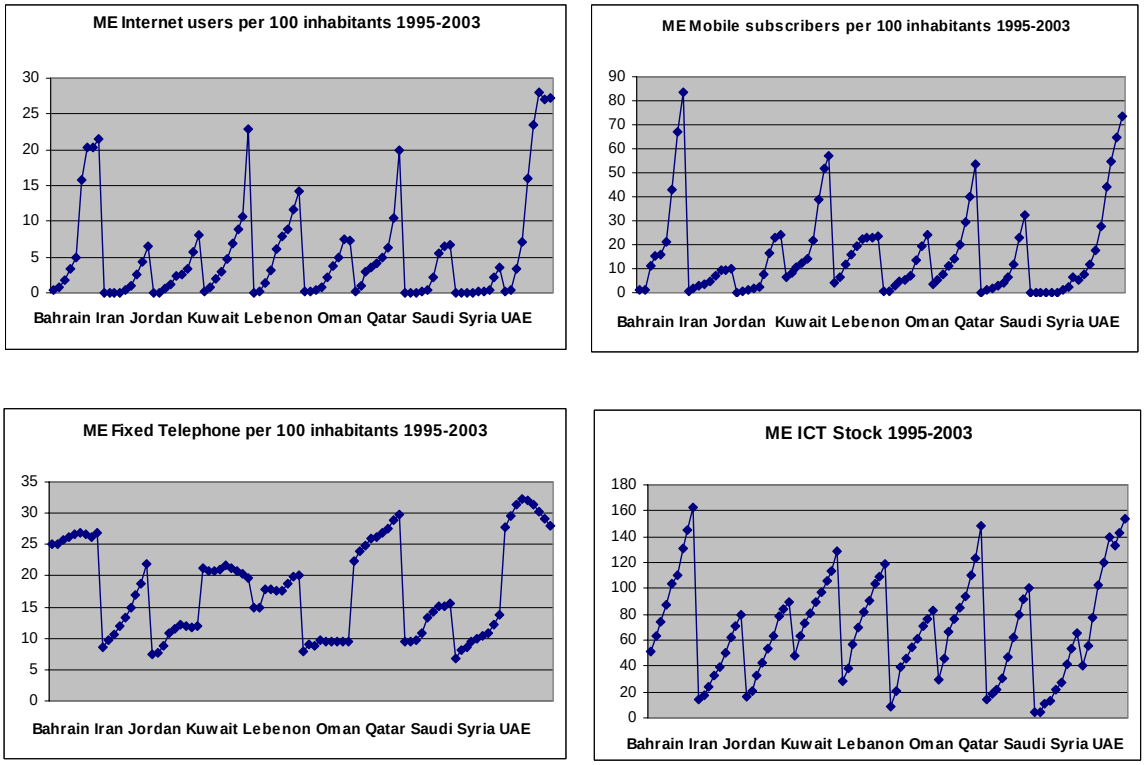
Table 2.1: Telecommunications Revenue for ME Countries

Country	2000	2004
Bahrain	4.9	5.3
Iran	1.2	1.1
Kuwait	1.7	2.4
Jordan	6.7	8.4
Lebanon	6.4	4.9
Oman	1.9	2.5
Qatar	1.9	2.7
Saudi Arabia	2.4	3.2
Syria	2.0	-
UAE	2.7	3.1

Source: World Bank, ICT at a Glance

As a result of ICT investment and ICT expenditure during the period of 1995 to 2003, the number of Internet users, mobile subscribers and fixed telephone lines per 100 inhabitants increased drastically (see Figure 2.1 and Appendix A).

Figure 2.1: ME Mobile, Internet, Fixed Telephone per 100 inhabitants and overall ICT Stock



Source: ITU & Orbicom

Despite the expansion of ICT in the Middle East and the subsequent increase in the number of ICT users, the digital divide between the most developed countries in the region and the least developed countries has in fact increased during this period. This is discussed in more detail below.

Table 2.2: ME ICTStock Index

Year	Bahrain	Iran	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi	Syria	UAE	ME	World
1995	44.0	11.4	16.3	41.4	25.7	7.7	29.2	12.3	3.0	32.9	**23.1**	**43.3**
1996	54.0	15.5	20.7	54.8	34.4	17.7	45.5	16.7	3.1	45.9	**31.9**	**51.4**
1997	63.3	20.6	33.0	63.7	51.9	33.1	66.6	19.4	8.3	63.9	**43.4**	**59.8**
1998	75.2	25.1	43.0	69.8	63.0	39.4	76.9	26.5	9.8	84.5	**52.2**	**68.2**
1999	88.7	32.1	53.3	77.3	74.1	46.5	84.7	41.4	16.6	98.5	**62.2**	**78.2**
2000	94.4	39.4	63.7	84.0	82.6	52.1	94.1	55.0	20.9	114.0	**70.7**	**88.3**
2001	114.2	50.4	78.7	93.2	93.8	60.1	112.0	70.0	31.2	121.0	**82.9**	**98.0**
2002	121.5	58.3	84.2	97.8	99.0	63.9	127.0	79.3	39.4	126.0	**90.2**	**105.7**
2003	127.3	66.0	89.2	106.2	103.0	65.9	144.0	83.6	42.8	127.0	**96.2**	**113.4**

Source: ITU and Orbicom

As Table 2.2 indicates Qatar, Bahrain, the UAE and Kuwait had not only the most successful ICT implementation and contribution to such a growth in the region, but also gained a ranking well above the world average. Syria on the other hand had the least developed ICT infrastructure in the region.

While the empirical evidence of the Digital Opportunity Index provided by ITU (2007) shows a better evaluating method for analyzing the impact of ICT on human development and economic growth, it is argued that freedom of expression should be considered in all aspects of ICT development. The civil society of WSIS, for example, urges

that "every person must have access to the means of communication and must be able to exercise their right to freedom of expression" and concepts such as communication security should not be allowed to compromise freedom of expression (Gross, n.d.). Other scholars argue that the digital and economic divide between rich and poor, and developed and developing countries will increase (Varakin, 2003), and emphasize that the digital divide will become even wider where small elite groups hold the power, resources and knowledge (Alzouma, 2005).

Further investigation of ICT development in the Middle East, particularly in the Internet and mobile cell phone usage, shows that the digital divide in the region between the most developed countries and least developed countries in terms of ICT has increased. For example, the digital gap between Bahrain and Iran increased by 4.2 fold between 1997 and 2003. According to ITU (2007), this gap continued to increase in 2005 . The digital gap between Syria on one hand and Bahrain and UAE on the other became even wider (see Figure 2.1 and Appendix A).

It is clear that a modern society, which consists of networks, provides a more efficient way of facilitating communication among citizens, including government agents, politicians, political parties, NGOs and other related groups (Kippen & Jenkins, 2003). Others go a step further and argue that the substantial and normative power of traditional politics is supplanted by technocracy (Hacker & Van Dijk, 2000). Our study of the Middle East's archival data shows that there is a transitive and mutual relationship between democracy and ICT development, which is discussed in more detail later.

3. ICT DEVELOPMENT AND FREEDOM OF EXPRESSION

ICTs provide new tools for efficient public participation in the democratic process in the form of e-democracy, e-government, e-voting and the dissemination of opinions, thoughts, ideas, and/or rallying social action about things that concern citizens. Clift (2003) argues that e-democracy is the use of information and communications technologies and strategies by "democratic sectors" within the political processes of local communities, states, regions, and nations, as well as those on the global stage such as the United Nations. Morrisett (2003) points out that ICTs can be used to enhance the democratic process in form of e-government in which citizens are able to effectively impact the decision-making process in a timely manner within and between institutionally, politically or geographically distinct networked communities. Clift (2003) uses the phrase "representative e-government" to describe the e-democracy activities of government institutions whether local or international. Government institutions are making significant investments in the use of ICTs in their work, expressing "democratic intent". Their efforts make this one of the most dynamic and important areas of e-democracy development.

Brinkerhoff (2005) states that the Internet facilitates the expression of liberal values, such as individualism and freedom of speech, either through anonymity or access. Ferdinand (2000) argues that as a means of communication, the Internet has the potential to revolutionize political activity far more profoundly than the telephone or television ever did. This has led to the prediction that it will completely revolutionize government and democracy, to the extent that the outcome will be a new wave of democratization world-wide, as authoritarian regimes will find it increasingly difficult to survive and as established democracies transform. Kalathil et al. (2003) found that some studies have addressed the question of media and democracy, engaging in comparative case studies of the Internet across a variety of developing counties, including many authoritarian regimes. This section addresses the impact of ICT development and, more specifically, the Internet and mobile cell phones on the promotion of freedom of expression in a region that is governed mostly by such regimes.

In January 1994, Middle Eastern countries had no Internet connectivity, although the number of Internet users across the rest of the world was over 2.2 million. By January 1995, Kuwait and Iran had established the first Internet connection in the Persian Gulf region. Since the debut of the first Iranian weblog in 2001, more than 700,000 weblogs have been created. According to NITL Blog Census, Farsi is the most common weblog language after English, Portuguese and Polish (as cited in Greenspan, 2003). During the period of 2000 to 2005, the Middle Eastern countries had the largest World Internet growth – 370% according to the World Bank Report (2005). The Iranian Internet growth of 2900% can be attributed to a remarkably high number of Internet users in the same period. The number of Internet users in the Middle East has now exceeded 19.5 million, and as of 2007, the Arabic is among the top 10 languages used on the Web (Internet World Stats, 2007). ICT connectivity had drastically changed daily life in the Middle East. While the Internet is not yet a mass medium in most countries in the region, it is widely used among young elites (Alterman, 2005). Millions of youth use Internet as a forum to freely express their concerns and share opinions, ideas and thoughts normally prohibited from publication in traditional media controlled by governments in the Middle East. Group activism in the form of NGOs, ethnic minorities, religious groups, political groups/organizations and silent voices used the Internet to promote their causes and programs.

Recently, filtering of sites related to women's issues in the Middle East has increased. It can be argued that such filtering will ultimately impact women's participation in socio-political and knowledge based information exchanges, implicating a wider gender digital divide in the region. Huyer and Mitter (2003) argue that the gender divide has implications for every level of the knowledge society, for if women are not active participants and contributors to the shaping of the knowledge society, they risk exclusion from the opportunities it presents.

The mobile cell phone is another ICT device widely used in the Middle East to communicate by exchanging text, image and video messages. This tool transformed the means of communication, and in particular, the younger generation, who adopted it readily, using it to send text, pictures and video messages as an event occurred. Short Message Service (SMS), commonly known as text message service, is particularly popular among the younger generation who use it primarily for social purposes, but also for political purposes. During the June 2005 Iranian presidential election, millions of young Iranians sent SMS messages about boycotting the election or about supporting opposing candidates. The massive and intensive use of SMS messages angered hardliners who appealed to the Ministry of Justice to ban SMS messaging (Iranian judiciary, n.d.).

Another popular feature of mobile cell phones is their capability to transmit video that can capture almost any single event as it occurs. The increased number of video clips posted on the Internet by Iranians is increasingly politically motivated regarding the current situation. Given that such videos would not otherwise be possible to nationally televise, indicates the importance of this device in promoting freedom of expression (see Esfandiari, 2007).

ICT expansion facilitates the growth and development of new communities by coordinating individuals into groups, which can express protestation and grief over socio-political oppression. The main objective of civil societies, such as NGOs, women's groups, trade unions, human rights groups and independent media groups are to use ICTs in the pursuit of 'good governance' and democratic development (Mercer, 2004).

3.1 State Censorship and Governmental Intervention in ICT Expansion

Court and Cotterrell (2004) argue that media freedom would presumably be a key factor in communicating ideas into policy and practice. They also suggest that while autocratic

regimes often tend to limit the gathering and communication of evidence and have a weak accountability mechanism, open political systems allow evidence to be freely gathered, assessed and communicated. (Court and Cotterrell, 2004).

According to Reporters Without Borders' annual press freedom index (RWB, 2005), the Middle East has one of the worst press freedom records in the world. In its press freedom ranking report, RWB announced that Denmark had the best press freedom record in 2005, while North Korea was placed in the bottom of the list (167th place). Some Middle Eastern countries such as Iran (164th), Iraq (157th), Saudi Arabia (154th), Syria (145th), Lebanon (108th), United Arab Emirate (100th), Jordan (96th) and Qatar (90th) had the worst press freedom ranking. Kuwait had the best press freedom record among the countries in this study (85th).

Guillen and Suarez (2005) explain that governmental efforts to control the Internet may include: 1) restricting access by controlling networks and instituting registration requirements; 2) restricting the content by filtering information, blocking forbidden sites, taking disciplinary actions and even virus attacks on banned sites; and 3) threatening to arrest or imprison those who access unauthorized information or use the Internet to organize and mobilize politically (Guillen and Suarez, 2005).

Many political and religious leaders are reluctant to embrace technology that appears to encourage moral turpitude (Ghashghai and Lewis, 2002). Internet content filtering is commonly practiced by many Middle Eastern governments for fear that the Internet is spreading Western political agendas and sexual themes such as pornography for fear of usurping political authority and agendas. Wheeler (2006) argues that in the Arab World, the Internet has the potential to 'create the conditions for free association' while some leaders in the Middle East maintain that preventing pornography and the protection of Islamic values are the main reasons for filtering online content..

Hofheinz (2005) states that censorship is a contentious issue in the region, although not all countries exercise it to the same degree. For example, Iran does not have explicit laws regulating Internet content or require the implementation of filtering technology. Iran uses the country's Press Law to target specific content. The implementation of filtering is mandated, not by law, but by the Telecommunications Company of Iran (TCI), which is run by the Ministry for Information and Communication Technology (ICT). Filtering is further codified through ISP licensing agreements with end users in which users agree not to access "non–Islamic" sites (Villeneuve, 2006). Saudi Arabia is transparent about their control over media content and the extent to which they will exercise control. The government is quite open about the fact that all network traffic going into and out of the kingdom is routed through a central farm of proxy servers (Zittrain, 2002).

Other studies on Internet content filtering (OpenNet Initiative, 2005) show systematic filtering that not only targeted political and religious sites but also those that promote gender equality and women's rights (OpenNet, n.d.). An overview of the list of items filtered by the Iranian government can be categorized in six major categories: political and religious, sites created by ethnic minorities, women's rights, sites containing explicit content and websites of various international organizations. With the assistance of some well-known international Internet providers, Iran, Saudi Arabia and other Middle East countries, have implemented an effective filtering mechanism to track millions of users searching for the latest news and information that is otherwise censored by the traditional local media.

Middle Eastern governments claim that the imposed filtering of Internet content is to protect national security, defend Islamic religious values, and protect the country from the harmful material distributed on the Internet. However, the latest research on Internet filtering shows that the censorship imposed is mostly politically motivated.

Bandari (2008) points out that the systematic filtering of content has been extended to women's rights websites such as websites related to the "One Million Signatures" campaign. This campaign, initiated by women's rights activists in Iran demands an end to discriminatory Iranian laws against women. The "One Million Signatures Demanding Changes to Discriminatory Laws" campaign went online to attract more people to their cause (One Million Signatures, n.d.); however, this site has been filtered heavily, along with the website for "Change for Equality", as well as eleven related sites and blogs belonging to local branches of the One Million Signatures Campaign in several cities or regions in Iran were blocked simultaneously. The list of blocked blogs also includes Men for Equality. A review of the OpenNet Initiative (ONI) report (2005) on Iran shows that the filtering applied to sites focused on women's rights is among the highest on the filtering list (fourth place).

The ONI report (2004) on Saudi Arabia also shows that the government imposes strict controls on the information its citizens can readily access on the Internet using a sophisticated filtering system through which 41% of blocked sites are related to religious conversion and sites with tools to bypass filtering. Teitelbaum (2002) states that the Saudi's Council of King Abd al-Aziz City for Science and Technology (KACST), a watch dog body for ICTs in Saudi Arabia, ordered all ISPs to restrict access to pornography and gambling sites and to block any activities that the government deemed to violate the social, cultural, political, media, economic and religious values of Saudi Arabia.

Filtering and censorship is also applied on other ICTs such as satellite dishes and mobile SMS messages. According to Wheeler (2006) "any use of the Internet to openly oppose the state is often punished by imprisonment". In other words, any activity that alters the status quo is considered a target for filtering. In a recent statement from Iranian officials in regards to the extensive use of blogs, websites and YouTube as well as SMS and Satellite dishes for political, cultural discussions and dissemination of news, thoughts and ideas are branded as destructive tools that are aimed to infuse Western culture into Islamic society (Rafizadeh, 2008). Shuji (1997) points out that both Iran and Saudi Arabia placed a complete ban on satellite dishes under the pretext that the media could expose their countries to the decadent, corrupt and immoral cultures of the West.

3.2 Economic Restrictions

Haggard and Kaufman (1996) argue that one of the strongest findings in political science is Lipset's (1959) discovery of correlation between measures of economic development and democracy. Other researchers have argued that countries which have a high level of freedom and democracy also possess a higher level of economic freedom (Guillen et al., 2005; Lundstrom, 2005).

According to the 2006 index of Economic freedom published by the Heritage Foundation and the Wall Street Journal, the economic development of most Middle Eastern countries suffer from government intervention in and imposed regulations on the economy. Intervention is defined as the process of controlling resources through ownership while regulations[1] are the enforced restrictions on businesses in the private sector through taxation, licensing, and/or bureaucratic corruption. Of the ten ME countries, only three, Bahrain, Kuwait, and UAE, are ranked as mostly free. The remaining countries are deemed as mostly unfree and one (Iran) is deemed repressed. The ICT sector can suffer from this type of intervention and regulation since the main activities in this sector, such as telecommunication systems , are either fully owned or controlled by governments or the type of licensing applied on businesses make it almost impossible for free and fair competition.

[1] Regulation in the context of this study does not refer to the set of rules and laws imposed for protecting citizens' rights and their properties against aggressors (see Gwartney et al., 2006; Miles et al., 2006).

4. RESEARCH QUESTIONS AND EMPIRICAL ANALYSIS OF PANEL DATA

What does ICT expansion contribute to freedom of expression in these countries and what is the impact of government economic intervention and institutional resistance to ICT expansion, democracy and freedom of expression? To investigate these questions, a stepwise robust regression method was applied on panel data to test the following hypotheses.

H1: ICT positively impacts the promotion of freedom. As the level of ICT expansion increases it will provide tools and services to influence the ability of citizens to participate in the decision making process within a society.

ICTs in forms of e-mails, SMS messages, weblogs, websites, online meetings, online posting, online petitions and so on provide so called "E-citizens" (Clift, 2003) with the opportunity to influence decision making processes and voice their opinions, thoughts and ideas about issues that concern them. In other words, ICTs provide citizens with the ability to exercise "e-democracy" (Clift, 2003). As the level of of ICTs increase, citizens are able to use these tools and services more effectively and efficiently but also to do this in a faster and more timely manner.

H2: An educated population is the cornerstone for the usage of ICTs. The more educated the population in each country, the more demand for ICTs will increase, in turn having a positive effect on freedom of expression.

Eickelman (2002) argues that the increase in the level of education and the rise of new communication media, among other things, are turning Arab communities into public spheres in which greater numbers of people, not just those in the political and economic elite, have a say in governance and public issues (Eickelman, 2002). In its 2003 report, ITU states that education is a core component of the transition of each country towards participation in the global information society.

H3: The filtering and state control of information will negatively impact ICT development and ultimately impact freedom of expression.

While the ultimate objective of ICT investment is the increase of network bandwidth and the increased demand for ICTs (including PCs, the Internet, and mobile phones), the filtering applied on ICT applications have a reverse impact, that is, it not only restricts the bandwidth usage provided by ICT investment but it also restricts free access to information and data exchange among the general population. For example, in a recent move towards filtering of ICTs, the Iranian government banned high speed Internet access to civilians as a move to restrict Western influence. Banning high speed Internet links would limit faster access to information despite having the telecoms facilities, fibre-optic technology and internet infrastructure. As one leading female blogger in Iran put it, however, "the authorities want us to be undeveloped" (The Guardian, 2006).

H4: The imposed regulation and government intervention in the economy will negatively impact the expansion of ICT.

Institutional resistance in the form of government involvement in business activities and the imposed regulations on business activities prevents trade and investment in ICT infrastructure. Miles et al. (2006) point out that the degree of freedom to operate a business is strongly related to the low regulatory burden imposed by governments. They argue that

countries must maintain an open environment for business activities since extensive burdensome regulations provides an environment in which private sectors cannot operate without the fear of bureaucracy and corruption in political establishment. Clift (2003) notes that the private sector should not only be able to invest in an ICT infrastructure but also use ICTs as a means of competitive advantage to conduct business in the form of commercially-driven connectivity, software, technology, e-commerce, online transactions and so on.

4.1 The Panel Data Collection

The ICT data is composed of four main indicators including main telephone lines, mobile cellular phones, Internet users and the number of PCs per 100 inhabitants. These were mainly collected from ITU data. Other indicators in this study, such as the Index of Political Rights (PR), the Index of Civil Liberties (CL), the Press freedom Index, Education (education) Index, Government Intervention and Regulations were collected as follows:

a) Two main variables, namely the Political Rights and the Civil Liberties indices published by Freedom House were used to construct the freedom index as a metric to explore the correlation between ICT expansion and the level of political and civil freedoms in the region. The PR and CL indices from Freedom House rate countries as “Free”, “Partly Free” and “Not Free” on a scale of 1 to 7 (one being the most free and seven as the most restrictive). For the purposes of this study, a rescaling and conversion of these indices was performed to indicate one as the lowest freedom index and 100 as the highest.

b) The Press freedom indices published by Freedom House and RWB provide valuable information about the level of press freedom experienced by the populace of each country. The focus of these indices is the study of the degree of intervention in media on the part of governments and authorities. The Press freedom indices not only cover the level of state control and censorship on print media but also cover the information generated and distributed through ICTs such as the Web. Although these indices do not provide detailed information[1] regarding the state of filtering and censorship applied on ICTs they do provide a valuable metric for measuring each country’s level of freedom of expression. Freedom House and RWB assign the highest level of press freedom to a country when their authorities have the highest respect for freedom of expression in the media and there is no intervention on published data provided by journalists, media, webloggers, and so on. It also assigns this level where there is transparency in regards to freedom of expression as it is described by United Nation’s Universal Declaration of Human Rights. A score of zero indicates the highest level of freedom expression (zero filtering and state censorship). These indices do not consider the amount of data published by citizens despite the existence of censorship and state press control.

c) In order to emphasize higher education as a means by which to empower the populace in the dissemination of ideas, thoughts and opinions on weblogs, websites and other ICT-enabled communication, the formula education= (primary + 2 x secondary + 3 x tertiary) /6 introduced by ITU-Orbicom (2005), was used in this study. This index (edu) scores each country’s educational performance for the period of 1995 to 2003. The education data was mainly collected from UNDP, The World Bank and ITU.

[1] ONI provides detailed information regarding the state of filtering of content of ICTs. However, in its current stage, although ONI covers most countries, it does not provide any metrics for measuring the level of filtering and censorship.

d) The Regulation index introduced by The Heritage Foundation (HF) and The Wall (WSJ) Street Journal measures the impact of regulations imposed by governments on the economy and is composed of variables such as licensing requirements to operate a business, ease of obtaining a business license, corruption within the bureaucracy, labor and environmental regulations and regulations that impose a burden on business. A score of one indicates least regulation and a score five indicates the highest regulation.

e) The Government Intervention Index by HF and WSJ is composed of variables such as government consumption as a percentage of the economy, government ownership of businesses and industries, share of government revenues from state owned enterprises and government ownership of property and economic output produced by the government. A score of one indicates the least regulation and a score five indicates the highest regulation. An aggregation of these two indices was made to generate a variable called "resist", and then a rescaling of this index was performed to indicate one as the lowest regulation and intervention in ICT expansion (institutional resistance) and 100 as the highest.

This paper does not suggest that the above factors are the only factors that would affect the expansion of democracy and freedom. There are clearly many other factors such as the level of economic development, globalization, social and cultural factors among others that can influence the expansion of democracy and freedom of expression. This study is an attempt to highlight the positive impact of ICT on expansion of freedom in a region of the world that has the worst record on democracy and freedom of expression (RWB, 2005).

4.2 Regression Analysis Method

Following the literature review, the regression model shown in equation (4.1) was constructed as follows:

$$freedom_{it} = \alpha_0 + \alpha_1 * ict_{it} + \alpha_2 * edu_{it} + \alpha_3 * filter_{it} + \alpha_4 * resist_{it} + \varepsilon_{it} \quad (4.1)$$

where i indexes the ten countries in this study, a_0 is a constant, α_1 through α_4 are variable coefficients and ε_{it} is the normalized residual. While the dependent variable $freedom_{it}$ denotes the existing level of institutional democracy and civil liberties in each country, independent variables such as ict_{it}, edu_{it}, $filter_{it}$ and $resist_{it}$ represent the level of ICT expansion, tertiary education, degree of filtering and state censorship applied on media and the intensity of institutional resistance on the business activities in each country for the period of 1995-2003.

The test of the model was conducted by identifying the linear relationship between independent and dependent variables (see Appendix B). After the model was tested, two issues related to linear regressions were tested namely multicollineratity and heteroskedasticity. Multicollinearity is a problem linked to independent variables that are highly correlated with each other and may cause a wide swing in the estimate of parameters due to small changes in data. To test the multicollinearity issue (Gujarati, 2003) the Variance Inflation Factor (VIF) was estimated. The test shows a VIF value of 1.14 (see Appendix B) which is a value far from VIF's critical values of 10 (moderate multicollinearity) and/or 30 (severe multicollinearity). In addition, the study did not find a partial correlation among independent variables (see Appendix B). Another issue that was addressed was related to the outliers. Extreme points may influence the result of regression. To test outliers, Cook's distance on panel data was analyzed. Cook's distance of ith observation D_i deserves further investigation if $D_i > 4/n$ where n is the number of observation. The model was setup to ensure that in the case of heteroskedastic errors, the errors are eliminated using White's

correction for heteroskedasicity (White, 1980). This error occurs in situations where residuals may appear to be a function of independent variables. If a model suffers from severe heteroscedasticity it may bias standard errors and *p*-values as either too large or too small.

To address the above issues this study applies a stepwise robust regression method in place of the conventional linear regression. The conventional linear regression model uses the estimator of variance: $y_i = x_i\beta + \varepsilon_i$ (4.2) where (x_i, ε_i) are independent variables and random disturbances independently and identically distributed with variance ∂^2. However, a stepwise robust regression is based on the estimator of variance (Rogers, 1993). This offers the possibility to relax the assumption of independence on observed data, and to "correct" standard errors (in measurement sense) even if the observations are correlated. The goal of robust statistical regression procedures is to reduce the amount of iteration needed to obtain a working model, and filter out heteroskedastic problems. In addition, while the traditional regression analysis can often lead to an inaccurate final model, particularly if there is misspecification, or if outliers are present. The robust regression analysis, however, is designed to perform well when the shape of the true underlying model deviates slightly from the assumed parametric model (e.g. if outliers are present) (Olive, 2006).

5. RESULTS OF THE ANALYSIS

Table 5.1 shows the correlation matrix among variables with a confidence interval of 95%. As the table indicates, while there is a positive correlation between the variables *freedom, ict* and *edu*, there is an inverse correlation between these variables and the filtering. Furthermore while the variable *resist* shows a negative sign with *freedom, ict* and *edu*, it shows a positive correlation with *filtering*.

Table 5.2 shows the result of a regression analysis with a confidence interval of 95%. The results indicate:

1) The regression output shows a *p*-value lower than 0.05 for all variables in the model and therefore, the hypothetical condition to reject the hypotheses if (H=P>|t|>0.05) is fulfilled. Furthermore, the *t*-values indicate that all variables are statistically significant at a level of 95%.
2) The coefficients of variables *ict* and *edu* show positive values in regards to variable *freedom* indicating their positive impact on freedom.
3) The coefficients of variables *filter* and *resist* show negative values indicating their negative impact on freedom.

Table 5.3 provides additional statistics regarding variables in the model.

Table 5.1: Correlation Matrix among Variables

	freedom	ict	filter	edu	resist
freedom	1.0000				
ict	0.3758	1.0000			
filter	-0.6132	-0.0299	1.0000		
edu	0.4646	0.5330	-0.1748	1.0000	
resist	-0.3272	-0.0713	0.1858	-0.1635	1.0000

Table 5.2: Stepwise Robust Regression Result

Number of obs =	90
F(4, 85) =	58.30
Prob > F =	0.0000
R-squared =	0.5742
Root MSE =	7.0397

freedom	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
ict	.2879294	.1019228	2.82	0.006	.0852797	.4905792
filter	-.4928612	.0609109	-8.09	0.000	-.6139684	-.371754
edu	.388277	.1496699	2.59	0.011	.0906931	.6858608
resist	-.1443891	.0581683	-2.48	0.015	-.2600432	-.0287349
_cons	44.77222	5.947142	7.53	0.000	32.94771	56.59673

Table 5.3: Summary of Variables in Use

Variable	Obs	Mean	Std. Dev.	Min	Max
freedom	90	22.19076	10.54281	5.973777	42.19455
ict	90	11.31384	8.430539	1.885967	36.82859
filter	90	67.21111	11.45043	42	92
edu	90	36.65789	5.962588	28.33	55.4
resist	90	48.11111	12.80927	22	80

In addition, as Tables 1 and 2 in Appendix A indicate, countries such as Kuwait, Bahrain, Qatar and the UAE, based on their overall performance measured by the equation, are placed in a higher ranking position compared to other countries such as Iran, Saudi Arabia and Syria.

The results indicate that the ICT front-runners in the Middle East, which were able to liberalize their economy along with socio-political reform as of the late 1990's, were not only able to enjoy a higher degree of freedom in the Middle East but were also able to develop their ICT more effectively and at a higher rate. For example, according to the ONI Report (2006), Bahrain implemented the least filtering in the Middle East. The RWB (2005) report on Kuwait shows that the country exercises the best press freedom performance. In addition, according to the UNCTAD World Investment Report (2006b), Bahrain, Qatar and the UAE had the best foreign direct investment (FDI) inflow in the Middle East while Kuwait was led outflow investment. However, the case studies of Iran, Syria and Saudi Arabia show a different approach than the front-runners even though the degree of ICT performance may vary. As Appendix A indicates, Saudi Arabia was able to increase its ICT development particularly in mobile cell phone usage (32.11%) due to the country's partial privatization in mobile cell phone technology, in turn allowed private agencies to operate in the country, Its development in terms of Internet access (6.4%), however, is less encouraging due to the country's heavy governmental control of Internet development. The country's mobile cell phone penetration rate increased to a remarkable 54.12% in 2005 while the Internet penetration rate (6.6%) remained almost the same (ITU, 2007). The competitive data between countries in the Middle East shows that Iran and Syria had the least ICT development in the region due to the governmental control of development and the extensive use of filtering. This trend continued to play an important role in ICT development, preventing local and international investors from investing. According to the ITU (2007), in 2005, ICT development in these countries continued to lag behind other countries in the region, increasing the digital divide between these counties and the most ICT-developed countries in the region. In addition, according to UNCTAD (2007), Iran had a very poor performance in attracting FDI inflow to its infrastructure development and Syria had the overall poorest performance in the Middle East. The consequence of such an investment in ICT (telecom infrastructure and software) was that Bahrain, Qatar and UAE had an average ICT investment per capita of $407, $328 and $474 during the period of 1995 to 2003 while this ratio for Iran

was only $50 (ITU, 2007; The World Bank, 2006). To bridge the digital gap, Iran and Syria need to intensify investment in their ICT infrastructure, a task that does not seem feasible without involving private investors, which in turn requires a constructive socio-political and economic reform. Governments can create competitive markets that grow faster, cost less, facilitate innovation and respond better to user needs if they open up their telecommunication market through well-designed reforms (The World Bank, 2006).

6. CONCLUSION

The empirical analysis for Middle Eastern countries during the 1995-2003 period shows that countries that implemented privatization of their government owned telecommunication sector, and took a more liberal approach towards ICT development, enjoyed a higher degree of ICT expansion and digital freedom (Kuwait, Bahrain, Qatar and UAE). These countries invested more in their ICT infrastructure, which resulted in not only a higher return of ICT to their GDP (World Bank, 2005), but also a higher degree of ICT index. This study also shows that there is a strong association with civil liberties and political rights particularly within the two main ICT indicators, specifically, the Internet and mobile cell phones. The increased number of Internet users and weblogs published on the Internet during this period, in addition to the increased presence of the younger generation online in NGOs, human rights activists groups, political parties/organization[1], religious and ethnic minorities are a clear indication of the ability of ICTs to promote freedom of expression in this region. In addition, there is a strong correlation between education, ICT expansion, and freedom. The usage of ICT tools and services requires users to have access as well as the capability to learn and acquire a certain level of knowledge in order to use them effectively. People who possess this knowledge (the educated populace) are those who will be able to use, create and disseminate information, and demand for a more open and democratic society. However, government censorship of online content and SMS messages, along with the institutional resistance on economic development continue to be the main impediment for ICT growth and development.

Over time, it will become apparent that the sheer volume of information available to people in the Middle East, especially eagerly consumed by young people, will transform politics (Alterman, 2005) and the outcome will be a new wave of democratization, as authoritarian regimes find it difficult to survive (Ferdinand, 2000). The power of the state to regulate social, economic, and political activities has started to erode as citizens and other non-state actors, empowered by the Internet, started to create and disseminate information. The availability and accessibility of information, as well as the ability to create and disseminate information anonymously, has led to a sense of freedom among many Arab Internet users (OpenNet Initiative, n.d.). It is not clear that ICT development was able to make changes in institutional democracy in the region, but ICT expansion and its usage will prove its efficacy for shaping change in culturally, socially and politically in democracy, freedom of speech and further reduction of the digital divide.

REFERENCES

Alterman, J.B. (2005) IT Comes of Age in the Middle East: Focus on IT and Diplomacy, *Foreign Service Journal*, **82**, 12, 36-42..

Alterman, J.B. (2000a) Counting Nodes and Counting Noses: Understanding New Media in the Middle East, *Middle East Journal*, **54**, 3, 355-361.

[1] For example, http://www.politicalresources.net/m_east.htm provides hundreds of links to political parties and organizations, social movements, elections and more in Middle East.

Alterman, J.B. (2000b) The Middle East's Information Revolution, *Current History*, **99**, 633, 21-26.

Alzouma, G. (2005) Myths of Digital Technology in Africa Leapfrogging Development?, *Global Media and Communication*, **1**, 3, 339-356.

Baliamoune-Lutz, M. (2003) An Analysis of the Determinants and Effects of ICT Diffusion in Developing Countries, *Information Technology for Development*, **10**, 3, 151-169.

Bandari, R. (2008) Iran's Virtual Crackdown, http://www.opendemocracy.net/blog/2008/05/23/irans-virtual-crackdown

Becker, T. (2001) Rating the Impact of New Technologies on Democracy, *Communications of the ACM*, **44**, 1, 39- 43.

Bennett, D. and Fielding, P. (1997) *The Net Effect: How Cyberadvocacy is Changing the Political Landscape*, Merrifield: e-Advocate Press.

Berggren, N. (2003) The Benefits of Economic Freedom: A Survey, *The Independent Review*, **8**, 2, 193–211.

Bimber, B. (2000) The Gender Gap on the Internet, *Social Science Quarterly*, **81**, 868-876.

Bortolotti, S. (1999) Can the New Media Invigorate Democracy, *Political Quarterly* **70**, 1,16-22.

Bortolotti, B., D'Souza, J., Fantini, M. and Megginson, W.L. (2002) Privatization and the Sources of Performance Improvement in the Global Telecommunications Industry, *Telecommunications Policy*, **26**, 243-268.

Brinkerhoff, J. (2005) Digital Diasporas and Governance in Semi-authoritarian States: The Case of the Egyptian COPTS, *Public Administration and Development*, **25**, 193-204.

Castells, M. (1997) *The Power of Identity. The Information Age: Economy, Society and Culture*, Vol. 2, Blackwell: Oxford.

Centre for Iranian Studies, Understanding Iran's Assembly of Experts, Policy Brief #1, November 2006, Durham University.

Clift, S. (2003) E-Democracy, E-Governance and Public Net-Work, http://www.publicus.net/articles/edempublicnetwork.html

Correa, L. (2003) The Economic Impact of Telecommunications Diffusion on UK Productivity Growth. Working Paper 492, Department of Economics at Queen Mary, University of London.

Court, J. and Cotterrell, L. (2004) What Political and Institutional Context Issues Matter for Bridging Research and Policy? A Literature Review and Discussion of Data Collection Approaches, Overseas Development Institute, London, UK.

Dahel, R. (2001) *Telecommunications Privatization in Arab countries: An Overview*, Arab Planning Institute Working Paper 0107: http://www.arab-api.org/wps/wps0107.htm

DeLong, J.B. and Summers, L.H. (1991) Equipment Investment and Economic Growth, *Quarterly Journal of Economics*, **106**, *2*, 445-502.

Eickelman, D. (2002) Bin Laden, the Arab Street and the Middle East's Democracy Deficit, *Current History*, **101**, 651, 36-39.

Escobar, A. (1999), Gender, Place and Networks: A Political Ecology of Cyberculture, in W. Harcourt (ed.) W*omen@internet: Creating New Cultures in Cyberculture*, Zed: London, 31-54.

Esfandiari, G. (2005) Reformists Outraged Over Exclusion Of Candidates From Presidential Race, http://www.rferl.org/featuresarticle/2005/05/cbc7caf0-4671-4284-b587-fe6b7cba9318.html

Esfandiari, G. (2007) Internet Video Tells Leaders to 'Leave The Youth Alone', http://www.rferl.org/featuresarticle/2007/08/29da6771-bb8b-4896-a8c4-738cf37c1679.html

Freedom House (2006) Countries at the Crossroads 2006: Country Report – Bahrain, http://freedomhouse.org/modules/publications/ccr/modPrintVersion.cfm?edition=7&ccrpage=31&ccrcountry=111

Ferdinand, P. (2000) *The Internet, Democracy and Democratization*, London: Frank Cass.

Ghashghai, E. and Lewis, R. (2000) *Issues Affecting Internet Use in Afghanistan and Developing Counties in the Middle East*, Santa Monica CA: RAND Corp.

Greenspan, R. (2003) Blogging by the Numbers, http://www.internetnews.com/stats/article.php/2238831

Greenstein, S.M. and Spiller, T.P. (1995) Modern Telecommunications Infrastructure and Economic Activity: An Empirical Investigation, *Industrial and Corporate Change*, **4**, 4, 647-665.

Gross, R.D. (n.d.) Civil Society Rejects Official WSIS Declaration of Principles, http://www.ipjustice.org/WSIS/Civ_Soc_WSIS_Declaration.html

Guardian Unlimited. (September 14, 2005) Publish and be Banned, World News. http://blogs.guardian.co.uk/news/archives/2005/09/14/publish_and_be_banned.html

Guillen, M.F. and Suarez, S. (2005) Explaining the Global Digital Divide: Economic, Political and Sociological Drivers of Cross-national Internet Use, *Social Forces*, **84**, 2, 681-708.

Gujarati, D.N. (2003) *Basic Econometrics.* New York: Mc-Graw-Hill/Irwin.

Gwartney, J. and Lawson, R. (2006) *Economic Freedom of the World 2006 Annual Report*, The Fraser Institute.

Hacker, K. and van Dijk, J. (2000) *Digital Democracy, Issues of Theory and Practice*, Thousand Oaks: Sage Publications.

Haggard, S. and Kaufman, R. (1996) The Political Economy of Authoritarian Withdrawals, In *The Political Economy of Democratic Transitions*, Princeton: Princeton University Press, 27.

Hamilton, J. (2000) Institutions, Competition and the Performance of Telecommunications Infrastructure in Africa, *PURC working paper*, University of Florida, Gainesville.

Hofheinz, A. (2005) The Internet in the Arab World: Playground for Political Liberalization, http://www.fes.de/ipg/IPG3_2005/07HOFHEINZ.PDF

Huyer, S. and Mitter, S.(2003) ICTs, Globalisation and Poverty Reduction: Gender Dimensions of the Knowledge Society. Part I. Poverty Reduction, Gender Equality and the Knowledge Society: Digital Exclusion or Digital Opportunity?, Gender Advisory Board, UN Commission on Science and Technology for Development (UNCSTD), http://gab.wigsat.org/partI.doc

International Telecommunications Union.(1997) *World Telecommunication Development Report 1996/97, Trade in Telecommunications*, Geneva: ITU. See also *World Telecommunication Development Report 2003, Access indicator for the Information Society.*

Internet World Stats. (n.d.), Usage and Population Statistics, http://www.internetworldstats.com/stats5.htm

Iranian judiciary threatens SMS campaigners, (n.d.), http://www.iranmania.com/News/ArticleView/Default.asp?NewsCode=32749&NewsKind=Current%20Affairs; see also, http://www.rferl.org/featuresarticle/2005/12/4157cebb-4b0f-47c2-8e4b-da541c8cad82.html

American University (n.d.) Information Technology in UAE: Liberalization and Deregulation. http://www.american.edu/carmel/lr2962a/liberal.html

ITU (2005) World Telecommunication Indicators, ITU publication, v1.01.

ITU (2007) Measuring the Information Society 2007, ICT Opportunity Index and World Telecommunication/ICT indicators.

Jankowski, N., and van Selm (2000) *The Promise and Practice of Public Debate in Cyberspace*. In Hacker, K. and van Dijk, J. (Eds.), 149-165. Digital Democracy: Issues of Theory and Practice. London: Sage.

Joyce, P. (2003) *The Rule of Freedom: Liberalism and the Modern City*, London, Verso.

Kalathil, S. & Boas, T. C. (2003a) The Conventional Wisdom: What Lies Beneath, In *Open Networks, Closed Regimes: The Impact of the Internet on Authoritarian Rule*, Carnegie Endowment for International Peace, The Brookings Institution Press.

Kalathil, S. and Boas, T.C. (2003b) *Open Networks, Closed Regimes: The Impact of the Internet on Authoritarian Rule.* Washington, DC: Carnegie Endowment for Peace.

Keohane, R. and Nye, J.S. (2000) Introduction, In J.S. Nye and J.D. Donahue (eds.), *Governance in a Globalizing World*, Washington, DC: Brookings Institution, 1-44.

Kippen, G. and Jenkins, G. (2003) The Challenge of e-democracy for Political Parties, in H. Aster and T. Axworthy (eds.), *Searching for the New Liberalism: Perspectives, Policies, Prospects*, Oakville, ON: Mosaic Press, 321-354

Lipset S.M. (1959) Some Social Requisites of Democracy: Economic Development and Political Legitimacy, *American Political Science Review*, 53, 69-105.

Lundstrom, S. (2005) The Effect of Democracy on Different Categories of Economic Freedom, *European Journal of Political Economy*, **21**, 4, 967-980

Main, L. (2001) The Global Information Infrastructure: Empowerment or Imperialism? *Third World Quarterly*, **22**, 1, 83-97.

Meier, R. (2000) Late Blooming Societies can be Stimulated by IT, *Futures*, **32**, 163-181.

Mercer, C (2004), Engineering Civil Society: ICT in Tanzania, *Review of African Political Economy*, **31**, 99, 49-64.

Miles, A.M., Holems, R.K. and O'Grady, A.M. (2006) 2006 Index of Economic Freedom, Washington, DC: The Heritage Foundation.

Morrisett, L. (2003) Technologies of Freedom?, in H. Jenkins and D. Thorburn (eds.), *Democracy and New Media*, MIT Press, Cambridge, Mass., 21-31.

Moshiri, S. Gholami, R., and Lee, S. (2004) ICT and Productivity of the Manufacturing Industries in Iran. *The Electronic Journal of Information Systems in Developing Countries*, ***19***, 4, 1-19.

Mudhai, O.F. (2003) Methodological Issues in the Study of Digital Media and Perceptions of Civil Society in Urban Kenya and Zambia, Background Paper, IT & Civil Society Research Network, US Social Science Research Council, www.ssrc.org/programs/itic/publications/civsocandgov/okoth_fredrick_mudhai.pdf

Norris, P. (2000) Global Governance and Cosmopolitan Citizens, In J.S. Nye and J.D. Donahue (eds.), *Governance in a Globalizing World*, Washington, DC: Brookings Institution, 155-177.

Noveck, B.S. (2000) Paradoxical Partners: Electronic Communication and Electronic Democracy', *Democratization*, **7**, 1,18-35.

Olive, D. (2006) *Applied Robust Statistics*, Southern Illinois University.

Oman Telecommunications Market Intelligence Report 2006/2007. (2007), International Telecoms Intelligence ITU News Magazine. ICT in Qatar, http://www.itu.int/itunews/manager/display.asp?lang=en&year=2006&issue=02&ipage=ICTinQatar&ext=html

One Million Signatures Demanding Changes to Discriminatory Laws, (n.d.), http://www.we-change.org/spip.php?article19

OpenNet Initiative, (n.d.), Internet filtering in Iran in 2004-2005: A Country Study http://www.opennetinitiative.net/studies/iran/; see also http://opennetinitiative.net/bulletins/004; http://opennet.net/research/regions/mena; http://opennet.net/research/profiles/bahrain

Rafizadeh, S. (2008) SMS and Weblogs are Destructive, http://www.roozonline.com/english/archives/2008/06/sms_and_weblogs_are_destructiv.html

Rogers, W.H. (1993) Regression Standard Errors in Clustered Samples, Stata Technical Bulletin 53, 32-35.

Pettit, P. (1999) *Republicanism: A Theory of Freedom and Government*, revised edition, Oxford, Oxford University Press.
Pisciotta, A.A. (1997) Global Trends in Privatisation and Liberalisation. In W. Melody (ed.) *Telecom Reform: Principles, Policies and Regulatory Practices*, Lyngby: Den private Ingenirrfond, Technical University of Denmark.
Pohjola, M. (2001) Information Technology and Economic Growth: A Cross-country Analysis, In M. Pohjola (ed.), *Information Technology, Productivity, and Economic Growth: International Evidence and Implications for Economic Development*,
Reporters Without Borders (n.d.), Third Annual Worldwide Press freedom Index, http://www.rsf.org/article.php3?id_article=11713
Rizzo, H. and Meyer, K. (2006) Women's Dissent in the Middle East: Political and Civic Engagement and Gender and Religious Norms, Paper presented at the annual meeting of the American Sociological Association, Montreal, Aug 11.
Roeller, L. and Waverman, L. (2003) Telecommunications Infrastructure and Economic Development: A Simultaneous Approach, *American Economic Review*, 909-923.
Rose, N. (1999) *Powers of Freedom: Reframing Political Thought*, Cambridge, Cambridge University Press.
Sarbib, J.L.(2002) *Building Knowledge Societies in the Middle East and North Africa, Knowledge for Development*, Marseilles, September 9.Oxford: Oxford University Press.
Sarsar, S. (2006) Quantifying Arab Democracy: Democracy in the Middle East, *The Middle East Quarterly*, **13**, 3, http://www.meforum.org/article/970
Saxton, J. (2006) Joint Economic Committee, *Research Report #109-31*.
Sen, A. (1999) Democracy as a Universal Value, *Journal of Democracy*, **10**, 3, 3-17.
Shihri, A. (2004) Saudi Edict Bans Mobile Phone Cameras, http://www.usatoday.com/tech/world/2004-09-30-saudi-phone-ban_x.htm
Shuji, H. (1997) The Internet and Middle East Studies, *Japanese Institute of Middle Eastern Economies*, **10**, 36, 93-116.
Teitelbaum, J. (2002) Dueling for Da‘wa: State vs. Society on the Saudi Internet, *Middle East Journal*, **56**, 2, 222-239.
The Guardian (2006) Iran Bans Fast Internet to Cut West's Influence, October 18. http://www.guardian.co.uk/technology/2006/oct/18/news.iran
The Heritage Foundation (2008) 2008 Index of Economic Freedom. www.heritage.org/Index/
The World Bank. (2005) Financing Information and Communication Infrastructure Needs in the Developing World: Public and Private Roles.
The World Bank (2006) Global Trends and Policies - 2006 Information and Communications for Development. www.worldbank.org/ic4d
UNCTAD (2006) Information Economy Report 2006, The Development Perspective.
UNCTAD (2006b) World Investment Report 2006, FDI from Developing and Transition Economies: Implications for Development.
Varakin, L. (2003) International Telecommunication Academy Position Paper on the Global Information Society, WSIS-03/GENEVA/CONTR/005-E.
Villeneuve, N. (2006) The Filtering Matrix: Integrated Mechanisms of Information Control and the Demarcation of Borders in Cyberspace, First Monday, **11**, 1, http://firstmonday.org/issues/issue11_1/villeneuve/#v2
Wellenius.B. (1999) Mitigating Regulatory Risk in Telecommunications (Note No. 189), In *Public Policy for the Private Sector*. Washington, D.C.: The World Bank Group.
Wheeler, M. (1998) Democracy and the Information Superhighway, *Democratization*, **5**, 2, 217-248.

Wheeler, D. (2006) Empowering Publics: Information Technology and Democratization in the Arab World — Lessons from Internet cafés and Beyond, *Oxford Internet Institute, Research Report*, 11.

White, H. (1980) A Heteroskedastic-consistent Covariance Matrix Estimator and a Direct Test of Heteroskedasticity, *Econometrica*, **48** ,817-838.

WSIS.(2003) Declaration of Principles, Building the Information Society: a global challenge in the new Millennium, WSIS-03/GENEVA/DOC/4-E. http://www.itu.int/wsis/

Zembylas M. and Vrasidas, C. (2005) Globalization, Information and Communication Technologies, and the Prospect of a 'Global Village': Promises of Inclusion or Electronic Colonization? *Journal of Curriculum Studies*, **37**, 1, 65-83.

Zittrain, J. (2002) Can the Internet Survive Filtering?, CNET, July; see also http://people.oii.ox.ac.uk/z/publications/

Appendix A

Table1: ICT development in Middle East (per 100 inhabitants)

Period	**1995**	**2003**	**1995**	**2003**	**1995**	**2003**	**1995**	**2003**
Country	Telephone		Mobile		Internet		PC	
Bahrain	25.11	26.76	1.31	83.53	0.36	21.61	7.13	15.42
Iran	8.6	21.97	0.75	9.8	0	6.48	2.53	9.05
Jordan	7.39	12.05	0.28	24.19	0.02	8.11	0.82	4.47
Kuwait	21.22	19.6	6.53	57.16	0.19	22.82	5.27	16.1
Lebanon	14.92	20	3.99	23.43	0.08	14.29	1.66	10
Oman	7.97	9.53	0.38	23.95	0	7.26	0.94	4.28
Qatar	22.27	29.72	3.35	53.31	0.18	19.93	5.44	17.13
Saudi	9.39	15.54	0.09	32.11	0.01	6.43	3.55	21.26
Syria	6.77	13.75	0.03	6.75	0.04	3.48	0.71	2.85
UAE	27.89	28.11	5.35	73.57	0.12	27.23	0.11	15.17

Source: ITU

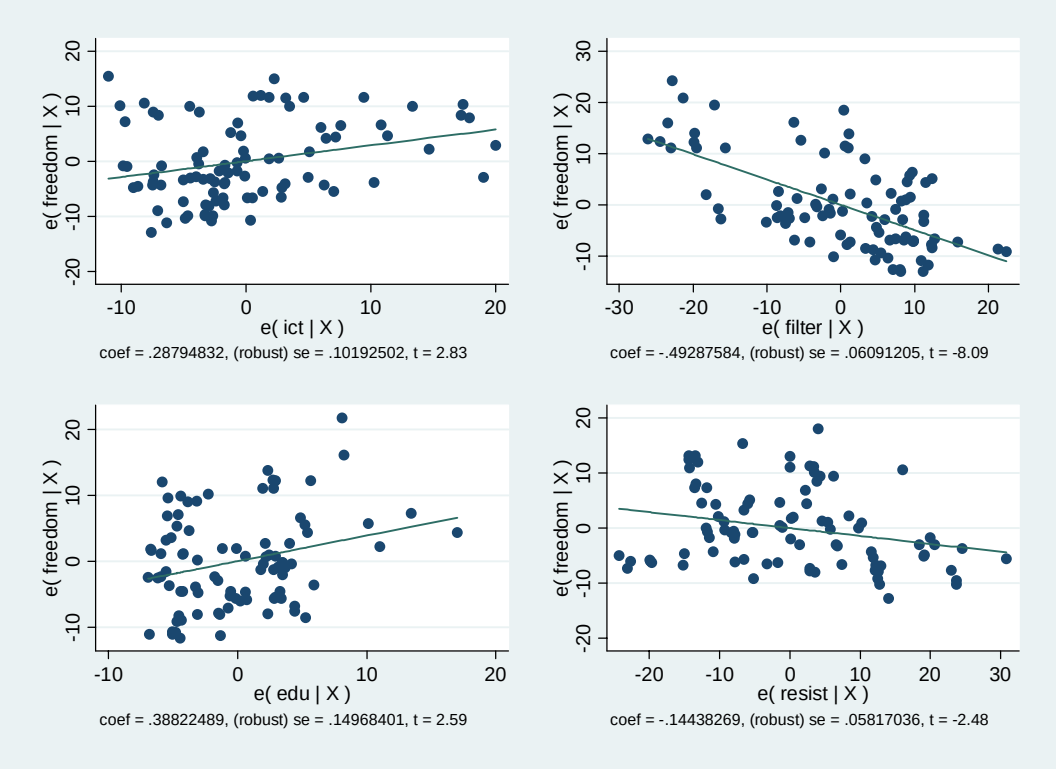
Table 2: Education, Filtering and imposed governmental intervention and regulation

Period	**1995**	**2003**	**1995**	**2003**	**1995**	**2003**	**1995**	**2003**
Country	Education		Filter		Intervention		Regulation	
Bahrain	42.00	50.75	57	68	4.5	4	1	2
Iran	34.33	37.62	83	76	5	4	4	5
Jordan	36.67	50.78	45	65	4	3.5	4	3
Kuwait	29.67	37.91	70	54	5	4.5	2	3
Lebanon	39.09	55.40	56	71	3	3	3	4
Oman	29.40	32.09	69	73	4.5	4.5	2	3
Qatar	35.67	36.61	64	61	4	4	4	4
Saudi	29.00	36.96	76	80	5	4.5	2	3
Syria	28.33	30.00	75	80	3.5	4.5	2	4
UAE	38.15	40.16	77	74	4	4	2	3

For governmental intervention and regulation indexes the value one indicates the least governmental involvement in trade & business activities and the value five indicates the most. Source: UNDP, World Bank, Freedom House, Reporters Without Borders, Heritage Foundation

Appendix B

Pair-wise correlations between independent and dependent variables



The model's Multicollinearity test

Variable	VIF	1/VIF
edu	1.47	0.680980
ict	1.41	0.711715
filter	1.07	0.938881
resist	1.06	0.947727
Mean VIF	1.25	