Chapter XV
Understanding the Supply Side:
ICT Experience of Marmara Region, Turkey

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ABSTRACT

Marmara region's local governments in Turkey are setting the benchmark for the country in the imple-mentation of spatial information systems and e-governance. The chapter aims to shed light on organi-zational realities of recent practices of information systems and technologies based on the evidences from selected local government organizations in the Marmara region. This chapter scrutinizes these practices and discusses the pivotal relationship between the information and communication technolo-gies and its local organizational context within the region. The chapter also exemplifies challenges and opportunities of the Marmara as an emerging information and communication technology-supported region by illustrating the specific information and communication technology supply instruments. The chapter reveals that the particular success in supply side does not guarantee the sustainable informa-tion and communication technology implementation. There are other concerns including demand side that are strongly linked to a realistic understanding of end user demand, the institutional capacity of respected organizations, public-private partnership, and the joined-up policy efforts at both national and local levels.

INTRODUCTION

Information and communication technologies (ICTs) are essential components of the knowledge economy, and have an immense complementary role in innovation, education, knowledge creation, and relations with government, civil society, and business within the city-regions. The ability to create, distribute, and exploit knowledge has become a major source of competitive advantage, wealth creation, and improvements in the new regional policies. Growing impact of ICT on the economy and society, rapid application of recent scientific advances in new products and processes, shifting to a more knowledge-intensive industry and services, and rising skill requirements have become crucial concepts for urban and regional competitiveness. Therefore, harnessing ICT for knowledge-based development has become a major issue for urban and regional growth (Carrillo, 2006).

Since the Helsinki European Council announced Turkey as a candidate for the European Union (EU) full membership in 1999, the candidacy process has accelerated the speed of the regional policy enhancements and adoption of the European regional policy standards. These enhancements and adoptions include: generation of a new regional spatial division—NUTS-II statistical regions; new legislation on the establishment of 'regional development agencies' (RDAs); and new orientations in the field of high education, science, and technology within the framework of the EU's Lisbon Strategy and the Bologna Process standards, which posed an ambitious new agenda in the development and application of contemporary regional policy in Turkey. In this sense, novel regional policies in Turkey endeavor to include information society objectives and creation of knowledge-based development through efficient use of new technologies such as ICTs. Such a development seeks to be based on 'tangible assets' of the region (i.e., organized

civil society; quality of urban infrastructure; region's human, intellectual, creative, and natural assets) as well as the best practices deriving from grounding initiatives at urban and regional levels (see Friedmann, 2006).

An ICT-supported region can be thought of as the one that capitalizes on the opportunities presented by various ICTs in promoting its prosperity and sustainable development. From a technological perspective, it is the region's capability to integrate the opportunities and challenges coming from the latest technologies to the regional development (Pfirrmann, 2003; Gricar, 2007). With promising implementations in harnessing ICTs, Marmara region's (see Figure 1) city governments in Turkey are setting the benchmark for the country towards an ICT-supported region. Therefore, the chapter aims to shed light on organizational and regional realities of recent practices of ICT applications (i.e., information systems and e-government) and their supply instruments based on evidences from selected local government organizations in the Marmara region. This chapter also exemplifies challenges and opportunities of the region's ICT experience, and provides a concise review of different ICT applications and strategies in a broader urban and regional context.

The chapter consists of three sections. The following section scrutinizes some background concepts on urban ICT policies and ICTs for city governments in developmental context. Then public sector ICT applications and supply instruments are elaborated in the framework of the Marmara region. Marmara's opportunities and challenges in moving towards an ICT-supported region are also discussed. Subsequently the last section discusses that particular success stories in the supply side do not guarantee sustainable ICT implementation. There are other factors including demand side that cover a realistic understanding of end user demand—businesses, institutions, individuals, or society as a whole; the institutional capacity of

Figure 1. Marmara region, Turkey

respected organizations; public-private partnership; and the joined-up policy efforts. The chapter concludes with a prospective research agenda.

BACKGROUND: CONCEPTS AND ISSUES

Understanding ICT Supply and Demand for Information Society

The relationship between ICTs and development is generally regarded as a supply issue rather than demand. ICTs are commonly conceptualized and viewed in economic terms. For example, ICT is seen as a 'sector' that refers to knowledge-intensive industries flourishing through the support of an ICT infrastructure that constitutes the parts of supply mechanisms such as production and services. ICT is also regarded as an 'enabler' or catalyst to help achieve social and economic development goals, including economic uptake,

education, health, and social inclusion. Additionally, ICT can be considered as an 'overarching platform' for development that reflects enabling strategy, policy, and regulatory regimes. Lastly, ICT can be regarded as a 'shaping factor' or power that implies possible spatial and social impacts on urban development and policy.

According to Heeks (2005), a lot of action surrounds the supply issues including 'environmental' such as policies, strategies, and regulations; 'resources' such as network infrastructure, finance, building skills, capacities, and knowledge; and 'mechanisms' such as public-private or multi-sector partnerships. These supply instruments are used to create an applications like e-government, e-health, or e-education. But little or nothing is done on the demand side. The demand side of ICTs shows the extent of services and goods used by the society and the degree to which they have penetrated into everyday life and application. In this sense, indicators of demand are more social than the economic ones, reflecting regional and

social divide, education structure, and type and structure of governance and policies (Gaspar, 2004). To measure the demand, 'proper market research' should be conducted beforehand and 'needs assessment' via prototyping during implementation. The latter provides a large profile of end user requirements and interests. Therefore, local governments should carefully measure current demand for content, infrastructure, and access before implementing ICT supply instruments.

Although the demand side is highly influential for ICTs in the developmental context, the lack of local/urban-level data is still a big problem in the determination of urban ICT policies and strategies. Since the most available data is about the supply side, demand from business, government, and households can hardly be measured properly at the local level. Therefore, one of the tasks of this study is to describe supply instruments (environment, mechanism, resources) and applications (i.e., e-governance) in the context of regional/urban development in the Marmara region of Turkey.

Urban ICT Policy

Urban ICT policy can be placed between three major areas of action: ICT and ICT policy, public urban policy, and ICT and urban development. ICT policy covers intersection of various policy areas including telecommunications, media, industry, and technology that can be national, regional, or international (Crede & Mansell, 1998). Public urban policy is a course of government action taken in response to various economic, social, and environmental issues. ICT for urban development is considered as an enabler contributing to various social and economic development agendas. The overarching concept of urban ICT policy, therefore, covers these concepts and includes ICT policies at an urban or local level and also other policies that policymakers may consider as relevant.

Urban ICT policy initiatives have gained credit in recent decades. At the end of the 1980s, urban ICT policy was dominated by national telecommunications policy incentives mainly based on technical infrastructure, and regulatory and economic aspects. The emphasis was on 'information(al) city', and international/national 'telecommunications policy' for take-up of urban economies with little or no consideration for social and cultural issues. The fashion of the 1980s was large, infrastructure-led telecommunications strategies such as teleports or 'national-led future city strategies' developed in countries like Singapore, France, and Japan for gaining better telecommunications infrastructures (Moss, 1987; Hepworth, 1990). In the early 1990s most research in ICT policy was either based upon secondary sources or anecdotal evidence. Meanwhile, studies of Graham and colleagues (1996) attracted attention of urban planners and policy researchers to ICT's impact on cities. In the late 1990s, strategies aimed at using ICTs as tools of endogenous urban development and policy. Local authorities have recognized the importance of ICT, and some of them are making efforts to accommodate these changes to mobilize ICT for general social purposes. Newcastle in the United Kingdom, Antwerp in Belgium, Tampere in Finland, and Stockholm in Sweden are among them (Firmino, 2005; Dobers, 2003; Van der Meer & Winden, 2002; Winden 2001).

ICT for City Governments: Governance and Development in the Regional Context

An increasingly developmental role beyond the traditional role of service provision pushes local governments to be more proactive and inventive in local social and economic development. In this sense, after the end of the 1990s, local authorities recognized the importance of ICT in achieving developmental goals under four major themes (Odendaal, 2003):

1. The creation of 'a promotional identity' because of strong competition in global economy helps governments in attracting investment, knowledge workers, and visitors.
2. The growing need of collaboration and 'networking' between city governments, between councils and other levels of government bodies, between councils and other institutions promotes ICT adoption.
3. 'Transparency' of decision making via consultation and participation with communities creates healthy two-way communication between city governments and the public. Additionally, a new trend in public administration covers 'joining-up' or 'integrating' and coordinating governance efforts.
4. A more strategic focus exists to manage and monitor changes in a 'proactive' and 'real-time' manner in the context of fast-changing macro-economic conditions.

ICT's potential contribution to three interrelated roles of local governance includes (Pratchett, 1999): providing services via e-government, at which many governments are successful; focusing on participatory public policymaking in the locality via e-participation, which a reasonable level of success observed; and promoting local democracy via e-democracy, which only a very few governments attempted.

ICT for local development encompasses a number of fields and actions. Possible contributions of these technologies can be summarized as follows:

- **Economic development:** ICT has been among the important supporting tools for economic development by: providing infrastructure, modifying firms' and employees' spatial behaviors, increasing economic productivity, and forming agglomeration effects (Raspe & Van Oort, 2004).

- **Social equality:** ICT provides essential infrastructures to be used in establishing virtual networks and social equity. Many governments and non-governmental organizations (NGOs) around the world are developing projects and initiatives for providing skill training in ICTs to disadvantaged groups. These efforts are helping in narrowing the digital divide and minimizing social and spatial polarization within cities yet hampered by some market models (Winden, 2001; Drewe, Maldonado, & Hulsbergen, 2003; Falch, 2006).

- **Urban development:** ICT also contributes monitoring and managing urban development through various e-applications (i.e., e-government) and spatial information systems like GIS (Masser, 2001).

- **Accessibility and quality of life:** Additionally, ICT supports virtual and actual accessibility to information, data, and physical locations. Quality of life is another central outcome of successfully implemented urban ICT policies (Berg & Winden, 2002).

In the regional context, ICT is one of the main pillars of the knowledge economy and in recent years has been recognized as an effective tool for promoting economic growth and sustainable development (Chen & Dahlman, 2005). According to Millard (2002), 5Es (entity, economy, equity, environment, and e-technology) provide basic conditions to achieve sustainable regional development. For example, 'entity' promotes territorial identity and integration; similarly, 'economy' is the engine for growth and efficiency, 'equity' resembles cohesion and inclusion in encountering the spatial digital divide and promoting welfare, and 'environment' is an important tangible asset for regions inducing sustainability. E-technology or ICT complements another four dimensions and can widen the spectrum of innovativeness and creativity of a region. In this sense, regional implementations of e-technology can be considered as

the set of innovative actions to achieve economic and social cohesion, and to raise the technological level of regions through the use of ICTs.

Another emphasis for the development of the knowledge-based economy is to enhance regional governance. It is widely accepted that good governance and effective institutional structure are important sources of regional competitiveness. This requires coordinated actions of private, public, and voluntary sector bodies aimed at driving forward the region's e-agenda. In this sense, the EU's regional approach and projects for information society and urban technologies provide a good framework towards understanding the regional context of ICTs. These policies can be outlined as follows:

1.   Support the provision of ICT infrastructure (i.e., broadband access) to reduce the digital divide and regional disparities
2.   Stimulate new electronic services and innovative ICT applications ranging from e-commerce to e-governance
3.   Invest people to ensure necessary skills and capabilities via distance learning and digital literacy (EC, 2006a)

In this framework, a variety of regional ICT initiatives in the EU have been underway: Kaunas e-Region (Latvia), e-Region Blagoevgrad (Bulgaria), e-Bourgogne program (France), Kuyavia and Pomerania e-Region (Poland), and e-Region Schleswig-Holstein (Germany). These initiatives are part of the e-Europe region, which means the information society at the service of regional development.

In summary then, this chapter considers the two dimensions of the relationship between ICTs for city governments in the regional context: One is about how supply instruments are accommodated by national/city governments to achieve desired governance and local/regional development outcomes. The other is exploratory—how urban ICT policies and incentives can be utilized for the Marmara towards an ICT-supported region.

NEW REGIONALISM AND INFORMATION SOCIETY IN TURKEY

Administrative System, Cities, and Regions

Public administration in Turkey is divided between the central and local administrations. As field administration units, Turkey is divided into provinces, which are subdivided into districts, which are divided into villages. In terms of territorial division, Turkey has a national, 81 provinces, 873 districts, and around 35,000 villages. Provinces and districts are both administrative units of central government and territorial units of local government. In Turkey, 32% of the population lives in 16 cities with metropolitan municipality organizations, and 22 million people live in municipal jurisdictions which comprise 41% of the country's total population (Altintas, 2002).

In the 1940s, Turkey was divided into seven geographic regions (the Black Sea region, the Marmara, the Aegean, the Mediterranean, Central Anatolia, the East Anatolian, and Southeast Anatolia) based on topographic and climatic conditions. This regional classification, however, does not correspond to any administrative division in a regional context (Sayan, Elci, & Avci, 2004). The administrative reorganization and spatial division of the regions have been under review, posed by the new regulations covering the establishment of Regional Development Agencies (RDAs) and EU-type NUTS II statistical regions (Bilen, 2005).

National ICT Policy and Information Society in Turkey

Turkey's experience with telecommunications was started with the installment of a telegraph line in 1847. Then the first automatic telephone exchange in the Balkans was installed in Ankara in 1926. Turkey's past orientation in telecommunications network policy was driven primarily by public

and national security needs until the second half of the 1980s. Those are the years of economic liberalization policies of Turkish government which made substantial improvements in Turkish telecommunications system (Kirlidog, 1996). The austerity program crafted by Turgut Özal and later implemented by his administration during the latter half of the 1980s placed a high value on expansion of telecommunications services. In this period Turkish government saw the quality telecommunications infrastructure as a vital part of the open economy (Wolcott & Cagiltay, 2001). During this time the network size was being tripled to cover all parts of the country with high-quality telephone lines.

With the end of the cold war and under external pressure from the World Bank and IMF, a process to liberalize the telecommunications market was started (Geray, 1999). Reforms and investments on telecommunications initiated in the previous decade have been slowed down due to the high political instability and economic crisis of the mid-1990s. However, two important developments came about in the telecommunications sector in 1993. Firstly, Turkey chose in 1990 the Global Standard for Mobile Communications (GSM) as its mobile phone standard, and GSM service became available in 1993 (Wolcott & Cagiltay, 2001). Current indicators suggest that the GSM market in Turkey is growing fast, and the number of GSM subscribers has almost tripled the number of fixed-line subscribers (WB, 2004). Secondly, the international connection to the Internet was first established by the Middle East Technical University in April 1993 (Kirlidog, 1996). By the latter half of the 1990s, the number of users began to grow rapidly. Today, the percentage of individuals using the Internet in the population is 13.9% as of 2005, and the proportion of broadband subscribers is 2% (1.5 million). A comparison of these rates to EU25 averages as of 2004, which are 47% and 6.5% respectively, indicates that there is still a long way to go in terms of increasing computer and Internet use by citizens (SPO, 2006).

In 1996, the National Information Infrastructure Master Plan (TUENA), completely financed from domestic sources, emerged as a bottom-up approach among affiliated public sector organizations. Completed in January 2000, the TUENA project was aimed at the maximization of infrastructure to achieve general socioeconomic benefits for sustainable human development, the optimization of national/local value added for Turkey's ICT industries, and advancement of Turkey's policies and organizational structures for leadership in her close region in order to get a share of the global ICT market (BILTEN, 2002).

Adoption of the EU's regional standards and information society objectives is a challenging ambition for Turkey. The EU's Lisbon agenda (2000) has also come up with a similar ambitious plan, with a strategic vision to become the most competitive and dynamic knowledge economy in the world that is capable of sustainable economic growth with more jobs and greater social cohesion (Aktas, 2005). To address these objectives, a comprehensive e-transformation program, e-Turkey, was prepared rapidly after Turkey participated in the 'eEurope+' initiative (now eEurope) in 2001. The main goals of this initiative include: a cheaper, faster, and secure Internet; investing in people and skills; stimulation of the use of Internet in the European region; and acceleration in forming the foundations of an information society. In conjunction with this initiative, the 'e-transformation Turkey' project was launched in 2002. The information society department of the State Planning Organization was assigned for the coordination of the project. The prime ministry, NGOs, and all public institutions are identified as affiliated organizations for this project (SPO, 2004). In conjunction with the short-term targets of the action plans, in 2006 Turkey's middle-term information society strategy covering 2006-10 was declared by the State Planning Organization (SPO, 2006).

PUBLIC SECTOR ICT SUPPLY INSTRUMENTS FOR MARMARA

The Marmara region covers the area encircling the Sea of Marmara, and includes the entire European part of Turkey as well as the northwest of the Anatolian plain. While the region is the second smallest of the regions of Turkey, it has the highest population density of all the regions. Marmara includes third-tier (or gamma) world city Istanbul, which is the economic, technological, and cultural capital of the country and has a population of about 11 million inhabitants according to the general population census of 2000 (TURKSTAT, 2000). The region also includes Bursa, Kocaeli, and Sakarya, the other leading provinces in terms of industrial concentration (Sayan et al., 2004).

Marmara is the most developed region in Turkey; it covers approximately 60% of the output of the Turkish manufacturing industry, 37% of the GDP-largest regional share, and 26% of the total population. The region's dominant position also has reflections in the share of public investment (28.7%) and the private investment incentives (46.3%) (Karadag & Deliktas, 2004). As a result of the policy choices of the globalization-oriented market economy, new manufacturing centers developed outside of Istanbul (see Keyder, 2005) and sprawled along surrounding regions including Bursa, Kocaeli, and Gebze.

Marmara has also been highly innovative in the implementation of cutting-edge ICT applications, innovation, and research and development (R&D). Although there are no data available on regional R&D and innovation performances, as the industry that accounts for 51.8% of Turkey's total industrial value added concentrated in the Marmara region, it is possible to conclude that industrial R&D and innovation activities are also concentrated in that region. This is also evident in the regional breakdown of government R&D and innovation supports where more than 60% of projects supported are from the Marmara region (EC, 2004). Additionally, many public sector (national and local governments) ICT supply instruments have been performed in the region, as mentioned in the following section.

Supply Environment

Centralized policymaking and administration has always been the government's approach in Turkey. Therefore the priority has been given to 'national' development over 'regional' development so far. Grounding the national-level ICT policies such as e-Turkey to the urban and regional level is a major challenge that needs to be tackled. Within the frame of e-Turkey, Yalova province in Marmara is selected as the 'pilot city' for the initiative. ICT projects of Yalova were presented as best practices in various national and international conferences, meetings, and platforms. In this context, various local ICT policies have been deployed in order to enhance public Internet access (public Internet kiosks), economic development (call centers), digital literacy (adult IT certification programs), and online public services (local e-government). Macro factors such as economic instability and change, and an ever-changing local political context, however, lead to a 'sustainability failure' of so-called 'IT City Yalova' projects (Velibeyoglu, 2006).

At a strategic level, two recent developments are important in the implementation of ICT applications internal to local governments' structure. Firstly, the strategic decision of Turkey to join the EU and the need to adopt EU principles in the field of local government have constituted a powerful driving force and accelerated local government reform in Turkey (Ozkaynak, 2005; Kosecik & Sagbas, 2004). In the new Local Government Act (2005), establishment of 'geographic and urban information systems' (UISs) for inter-municipality

tasks has become obligatory for all metropolitan municipalities. Secondly, through total quality management (TQM) strategies, some local governments (Bursa, Kocaeli, Yalova) in Marmara have reorganized their departmental structures and processes that allowed them to accommodate rational technical systems like GIS. In Yalova, for example, online local-government services are measured and evaluated through TQM principles (Velibeyoglu, 2006).

Supply of Resources

Local governments in Turkey have experienced serious policy bottlenecks in governing and investing in their ICT infrastructures. Infrastructure provision is largely left to the national government. The major drawback of this situation is that it depends on the state of public finances. A 'Broadband Strategy' is currently being prepared by the State Planning Organization aiming to cover rural areas and socially/geographically disadvantaged regions (EC, 2006a). In the current infrastructure provision, however, the geographical distribution of the Internet service providers indicates a heavy concentration in the Marmara region, particularly in Istanbul (34 out of 49), the largest metropolitan city of Turkey (see Sayan et al., 2004).

The detrimental effects of the Marmara earthquake in 1999 had important influence on local governments in Marmara as well as Turkey in terms of recognition of importance of telecommunications infrastructure and ICT-based services. For example, Yalova was selected as Turkish Telecom's pilot city for the provision of a 'natural disaster-resistant' Internet infrastructure. Another impact of the earthquake was the recognition of the vital importance of information infrastructure that accelerated the development of spatial information systems in the post-earthquake cities (Sakarya, Duzce, Yalova, Kocaeli, Bursa) of the region (Velibeyoglu & Saygin, 2005).

Availability of skilled personnel for operating ICTs has one of the biggest problems in public sector organizations in Turkey including local governments. This was largely due to the problem of public sector employment policy that neither computer skills nor individual productivity was encouraged and rewarded by the administrative system (Tecim, 2004). However, some innovative and careful attempts could be observed in the local governments of Marmara. In Bursa Metropolitan Municipality, for example, the Urban Information System Division was founded to support functioning of municipal services, in-house production and maintenance of information, and training of the staff in ICT applications (Velibeyoglu, 2005).

As distinguished human resources and hubs of knowledge economy, universities and research centers play a critical role in the creation of knowledge-based regions (Marceau & Martinez, 2005). In this sense, in Marmara there are a considerable number of universities and research centers (i.e., Marmara Research Center) that help to facilitate human resources and adoption capability in information systems and technologies. 'Bilisim Vadisi' (Informatics Valley), for example, is designed in the Marmara region, Istanbul, to ensure development of Turkey among the regional countries as a center of production and operation for international IT corporations as well as to attract foreign direct investment to the domestic IT sector (SPO, 2006). In addition, new technology park developments in Marmara have been decided to focus on R&D firms in the automotive and telecommunication sector in order to support 'Specialization in Technology Development Zones' objectives of the Information Society Strategy Action Plan (2006-2010) of Turkey (SPO, 2006).

As Sayan et al. (2004) indicate, the lack of appropriate secondary and tertiary education is a significant bottleneck for information society strategies in Turkey (human resource spending is well below the EU-15 average). This retards the ICT sector as it does not produce the required skilled human capital. In order to supply economic and social revitalization and give rise to a search

for new IT vision after the 1999 Marmara earthquake, the province of Yalova has implemented several educational incentives including the Adult IT Certification Program, IT courses in curricula of city high schools (pilot city of Ministry of Education), and the CISCO Networking Academy at the Yalova Vocational School.

In terms of material resources, currently there are 4.5 million personal computers in Turkey and over 4 million Internet subscribers (EC, 2006b). Marmara region had a higher rate of computer ownership (11.4%) than Turkey's average (6.5%). In the region, computer ownership rate of homes climbed to 16.8% in the year 2000—now 23.3% (see Geray, 2000; SPO, 2005). Additionally, according to Information Technologies and Electronics Research Institute's (BILTEN) survey, conducted with 5,702 individuals, Marmara region is still the leader in Internet connectivity, jumping from 2.2% in 1997 to 10.7% in 2000 (BILTEN, 2002). As regards the regional disparities, ownership rate is the highest (16.8%) in the most developed region, Marmara, whereas it is as low as 1.2% in Southeastern Anatolia, the least developed region. Similarly, regional analysis of telephone density exemplifies the parallel results: Eastern and Southeastern Anatolia have less than 50% of the penetration rates of the Marmara and Aegean regions (WB, 2004).

Supply Mechanisms

The information society model of Turkey is based on a participatory approach in which all actors are clearly mapped out including governments, NGOs and civil society, the business community, foreign consultants, donors, universities, trade unions, and the software industry (Geray, 2000). Building strong partnerships in disseminating and sharing knowledge between institutions such as academia, the public sector, and the private sector has become a vital issue in the transition to a knowledge economy (Yigitcanlar, 2005). The information need of post-disaster management

and recovery have provided some international/national donor aid in the establishment of UIS in the post-earthquake cities of Marmara. The Sakarya governorship GIS center, for example, has developed several applications for emergency situations (i.e., tents, prefabricated houses, food, social activities) with donations from UNICEF-Turkey and the Ministry of Internal Affairs (Tecim, 2004).

At an international level, local governments in Marmara have affiliated regional information society initiatives in Europe. Yalova Municipality currently is the only Turkish member of the Telecities network, which is a regional network that aims to bring together towns and cities for the development of urban ICT applications.

At local/regional levels throughout Europe, many cities and regions are developing their Local Agenda 21s (LA21s), an outcome of the 1992 Earth Summit, which emphasize the role of local authorities in the implementation of sustainability principles. Through the governance process, LA21s have been implemented in some pilot cities of Turkey. The early adopters of these initiatives came from Marmara (Bursa, Kocaeli, and Yalova) after the Habitat II Conference in Istanbul in 1996. Following the leading role of the Yalova LA21, some e-governance projects from the region received various national (e-Turkey e-governance award) and international (i.e., from UNDP and World Bank) awards.

ICT Applications

The notion of 'e-governance' provides the interface between local government and ICT. As aforementioned, new EU integration initiatives including e-Turkey have visible impacts on the implementation of ICT applications such as 'local e-government' and 'UIS' in local governments. The national and local e-government initiative lies at the core of the e-Turkey project. It is seen as an essential part of government reform and restructuring (SPO, 2004). Within the framework

of e-government projects, the following were determined as critical: restructuring of the state, raising the level of education and health of the society, strengthening scientific and technological capability, developing new technologies, and improving physical infrastructure. About 200 e-government projects are now underway. Among them, e-local government projects in the provinces of Marmara (i.e., Istanbul, Bursa, Yalova) have dominated e-Turkey's e-governance awards that promote the best projects and initiatives in ICT applications (Velibeyoglu, 2006).

Similarly, the metropolitan cities of Marmara (i.e., Bursa) have become the champions of the city-wide UIS projects that began to be popular among the local governments in Turkey after the late 1990s. The concept of UIS is used as an umbrella term encapsulating all the efforts for an information system—whether GIS or MIS—or information technologies like the Internet within an integrated system that is supposed to be performed in local government operations in order to support organizational rationality (Velibeyoglu, 2005). In the Turkish case, although no local government has been able to complete establishing a city-wide UIS so far, the most promising applications have come from the local governments in Marmara—that is, Bursa UIS—because of several reasons. Firstly, local governments in Marmara have relatively longer experience with UIS (i.e., Istanbul 1989, Bursa 1996). Secondly, there has been a positive reception of local governments in the implementation of various technological systems and therefore some of them rearranged their organizational structure for better utilization of IS (i.e., TQM or semi-autonomous UIS departments or centers). Thirdly, financial resources have been available particularly as a part of large-scale infrastructure projects. In the Bursa UIS case, for example, funding for UIS was obtained through an international donation within the framework of a freshwater infrastructure project (Velibeyoglu, 2005). Lastly, the specific supply instruments outlined above have been influential in the development of UIS in the region.

Evaluating Marmara as an Emerging ICT-Supported Region

This section concludes with a specific SWOT analysis of Marmara in comparison with national-level and supra-national-level (EU) evaluations produced by making use of other relevant studies in the field of Turkey's knowledge economy and information society (see Table 1).

CONCLUSION

The EU harmonization process has set the challenge of developing information society objectives in Turkey. In this context, there is an urgent need to find implementation paths to realize urban ICT policies not only at the national level, but at the regional level as well. This concise review revealed that city governments in Marmara have already taken place in the European urban and ICT networks. With best-practice implementations, city governments in Marmara are accelerating the challenge of the country in terms of UIS and e-governance applications. Although there are some positive indicators including short-term individual best practices from Marmara, the public sector supply instruments moving towards an ICT-supported region are still operated in an ad-hoc manner and largely suffer from overlaps and duplicated efforts.

As international relations have been intensified, and as common concerns have been shared, local governments in Marmara have required new networking mechanisms for inter-organizational as well as international cooperation. Therefore, new ICT supply instruments should be introduced by allowing public-private partnerships and community participation in decision-making processes, and encouraging local economic development and social cohesion. This is to say

Table 1. SWOT analysis of the Marmara region

	Supra-National Level: **EU (*)**	**National Level:** **Turkey (*)**	**Regional/Local Level:** **Marmara**
Strengths	- Relatively young society seeking better education and economic chances in unified Europe - Emerging dynamic industrial enterprises seeking closer economic ties to the EU	- Young, relatively well-educated population - Existence of policies and measures for innovation and information society - Public and private parties strongly committed to the development of IST - Significant progress towards the creation of legal and institutional grounds for regulation	- Highest rank of Turkey's total industrial value added - Istanbul as the economic and technological giant of the region, and international hub for its surrounding region - Best-practice applications on local e-governance and UIS - Growing population and high purchasing power, and hence, demand for ICTs
Weaknesses	- Relatively lower level of education of the adult population - Lowest GDP among all EU countries	- Digital and economic divide (i.e., gender, affordability) among regions - High regional disparities and lack of regional policies - Delays in ICT infrastructure market privatization - Highly centralized decision-making process - Bottlenecks in meeting the demand for university education and new jobs - High rates of internal migration and problems of rapid urbanization lowering the quality of urban living	- Sustainability failure for implementation of public ICT projects - Lack of an effective regional governance system for innovation and information society objectives - Lack of comprehensive urban ICT policies and incentives

Table 1 continued

Opportunities	- Human resources allowing to develop in middle-term strong IST services and R&D sector in Euro region - The EU accession ne-gotiations may fasten the economic growth and infor-mation society objectives	- Potential of being a software and services hub among neighboring countries - Integration of information society policy into a range of other public policy areas - Awareness of joined-up information society policies - Implementation of the e-Transformation Project in the short run - Liberalized competitive market place for ICT	- Increasing trends in high-tech manufacturing value-added share - Regional focus of R&D firms in automotive and telecommunications sector in new technology development zones
Threats	- The admission of acquis is not progressing - The EU accession is strongly delayed	- Brain drain - Failure to implement eco-nomic program and structural reforms - International political and economic uncertainty (i.e., oil prices) and instabilities in the near vicinity of Turkey	- Internal migration pres-sure and rapid urbaniza-tion - Macroeconomic and political instability risks

* Based on Skulimowski, 2005; EC, 2004; Sayan et al., 2004

that ICT applications need to be smoothly ad-opted for unstable, rapidly changing socio-spatial circumstances and ultimately considered soft organizational realities of local organizations.

Supply mechanisms and ICT applications should be fully accommodated in the future developments of the region. The current top-down approach may not address the rapidly changing demand of the ICT environment. To overcome these gaps, for example, a coordinating (semi)autonomous regional body for ICT policy and implementation needs to be established. Such a mechanism is therefore less vulnerable to environmental changes and political instability,

which are very important in a developing country context. On the other hand, regional ICT policies and programs should be established and strongly coordinated with the private sector in order to utilize the needs of the business community and citizens.

FUTURE RESEARCH DIRECTIONS

For future studies and research, regional-level indicators should be developed in relation to both supply and demand from business, government, and households. Similarly, the tangible assets of

the region should be taken into account for the sustainability of information society objectives. Regional pilot projects, with active participation of local actors, may help to indicate the potential of ICTs. Thus, local actors, with regional authorities, play a central role in the integration process by being closer to the European citizens and by being key actors in the future implementation of EU policies.

The best-practice applications obtained from the Marmara region should be extended, updated, and shared with other public sector organizations. But this does not mean that policies that work well for one simply produce the same outcomes for others. Yet, only a few studies focused on the institutional dimension of the ICT applications and the context of supply instruments. Moreover, demand-side research has received much less attention in literature than the supply side. A comparative research approach is useful here to focus on the differences in supply and demand mechanisms and how to balance them. The important and challenging task of researchers, then, is to demonstrate the multilevel evidences in recorded case studies and researches.

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