

Influence of Government Policy, Legal Policy and Social Infrastructure on the E-Adoption: A Cross Country Analysis

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Abstract: *This study explores the influence of three macro environmental factors - government policies, legal policies and social infrastructure – on the e-adoption in the selected countries. For this study the three independent variables were measured using the indices used in (World Economic Forum (WEF)’s) latest Global Information Technology Report (GITR). Logistic regression analysis was used to analyze the data. For multinational comparison, the world was divided into six main regions. From the six main world regions, the following countries were respectively chosen: USA, Sweden, Israel, Australia, Morocco and S Korea were chosen because they showed highest level of internet adoption in their regions. For comparison sake China and India was also selected, so that policy orientation is better understood. Countries that showed best results of e-adoption (USA, Sweden, Australia and S Korea) reflected robust government and legal policies. China has better e-adoption than India – thanks to its robust legal policies. India lacks in two parameters: legal policy and social infrastructure. The results of the study were used to give a direction to the macro environmental policies for India.*

Keywords: Government policies, legal policies, social infrastructure, e-adoption, India

1. Introduction

1.1 Uneven Adoption of ICT and hence, E-commerce

The use of internet for business, also known as e-commerce, has considerable potential to expand business and make profits. But the adoption of e-commerce, also called e-adoption, varies largely among different countries and regions. This is noticeable in the UNCTAD’s GITR [1] report. According to the report, if we divide the world into six main regions – the Americas, Europe, the Middle East, Australia, Africa and Asia – and compare the e-adoption level (as ICT penetration per 100 persons in the nation, see Table 1), we find e-adoption scores in Africa (5.6 percent) and Asia (17.4 percent) are far below that of the average world score (23.8 percent).

Table 1: E-adoption in major World Regions

| World Regions | Penetration level of ICT (per 100 person) |
|----------------|---|
| American | 74.4 |
| Australian | 60.4 |
| European | 48.9 |
| Middle Eastern | 23.3 |
| Asian | 17.4 |
| African | 5.6 |
| Global | 23.8 |

The digital divide is more evident when we compare the e-adoption of the most internet-ready country from each of the six world regions. See Table 1.2. The data has been derived from the World Economic Forum (WEF)’s latest Global Information Technology Report (2010) [1].

Table 2 clearly indicates the problem of uneven adoption. While developed nations like Sweden, South Korea, USA and Australia have nearly 80 per cent penetration level of Information and Communications Technologies (ICTs), developing nations in Africa (Morocco) and Asia (India and China) have only one third of their respective populations using the internet. Owing to this wide digital divide, e-commerce in developing countries did not reach even five percent of global e-commerce in 2007 [1].

Table 2 : World Regions’ E-adoption Level

| World Regions | Countries topping in E Commerce in each region | Penetration level of ICT in % in this country |
|---------------|--|---|
| Europe | Sweden | 93 |
| Middle East | Israel | 70 |
| Asia | South Korea | 81 |
| Oceania | Australia | 80 |
| America | USA | 78 |
| Africa | Morocco | 41 |
| Asia | India | 8.4 |
| Asia | China | 36 |
| World | | 30 |

A GITR (Global Information Technology Report) [1] comparison of the top40percent and the bottom40percentcountries shows that the digital gap between the average e-commerce scores of fast-adopter and slow-adopter countries increased to 67percent over the period 2001 to 2010. This widening digital gap in the past half-decade creates an unfair competitive advantage for multinational oligarchs against local SMEs (small and

medium sized enterprises) and creates a “digital divide” between developed and developing countries. Countries that lag behind in e-commerce will risk being bypassed by those using the new technologies. Worse still, existing socio-economic divisions will be reinforced by the “digital divide” rather than being narrowed or changed by the benefits offered by e-commerce.

1.2 Role of Policy makers for gulfing the digital divide

Policymakers in all nations and other stakeholders of national economies have taken actions in the past decade to reduce the digital divide and enhance e-adoption at macro-environmental level. Bold plans to boost e-commerce have been developed by governments around the world. Many disparate guidelines, directives, laws, and treaties have emerged. The key areas that have seen regulations and policies for e-commerce include digital signatures, information privacy, intellectual property, and online taxation. For example, aiming at encouraging e-commerce worldwide, more than 140 member countries of the World Trade Organization (WTO) have committed to a moratorium on imposing customs duties on electronic transactions since 1998.

Such institutional activities, in turn, have created and shaped the national information environments for e-commerce adoption, although the extent of these effects varies across countries. This exploratory research on policy frameworks, investigates the influence of three macro environmental factors: government policies, legal policies and social-infrastructure – on the e-adoption in the selected countries (as shown in Table 2).

1.3 Orientation of various policies towards e-adoption

The adoption of e-commerce is promoted in developing countries such as India and China to compete on a more equal basis in world markets. It is argued that the adoption and implementation of ICTs allows reduction in costs associated with selecting suppliers, and negotiating and fulfilling business contracts, and ensures that contract terms are met. Thus, e-commerce facilitates a closer integration of the value-added chain. Furthermore, this reduction in the unit costs of co-ordination will encourage firms to expand their transactions across organizational and geographical boundaries.

Unfortunately, even though the benefits of e-commerce are accepted, many developing countries have overlooked the importance of the procedures, processes and policies involved in e-commerce. In many Asian and African countries, e-commerce is still at an early stage and a number of related issues are not yet resolved - security, privacy, data protection, encryption, copyright and intellectual property. Given the enormous economic opportunities at stake for all companies across the world, developing countries should be involved as equal partners with developed nations, in the advancement of internet governance.

There are various obstacles to the growth of e-commerce in developing nations. These can be divided into following three categories for easy comprehension: governmental

policies, legal and financial policies, infrastructure and social factors. Each is discussed in detail below.

1.3.1 Governmental policies: National policies governing the telecommunications sector and the number of computers are major factors determining the extent to which developing countries and their private sectors can partake in the global push for e-commerce. There is a satellite revolution facilitating access and connectivity across the globe but it is governmental policies of individual nations that will decide the pricing structure for these satellite links, determining their affordability for actors, especially in the developing world [2].

1.3.2 Legal and financial policies: A proper regulatory framework must be in place for e-commerce to prosper. Existing laws and regulations in many developing economies are not all applicable as some of the online services do not exist in the physical world and as boundaries between services as well as industries have blurred. Taxation is another issue of concern and contention [3]. Given the WTO “moratorium” on the imposition of customs duties on electronic transmissions [1] referred to in 2.2 above, if there is any dramatic shift from physical transactions, normally subject to sales and other taxes, to virtual online transactions, free from any transaction tax, the tax bases of local and state governments would mostly get eroded.

Businessmen need the involvement of banks to broaden the reach and appeal of e-commerce and to help prevent fraud and potential losses attributable to credit card fraud [2]. But many financial institutions and banks in developing countries are hesitant to take an active role in promoting e-commerce. Beyond the credit card approach, banks and other financial service intermediaries are challenged to develop alternative modes for secure and reliable online transactions in environments where credit cards are not commonplace [3],[4].

1.3.4 Infrastructure: Physical infrastructure is a significant barrier to e-commerce. It includes: inadequate telecommunication systems, poor internet connectivity and lack of access to the necessary hardware and software. Indeed, the gap between industrialized and developing countries, in terms of infrastructure and access, is huge and growing [1]. Besides inadequate geographic coverage of telephone services, for accelerating e-commerce there is also a need to give high priority to strengthening logistics and transport infrastructures in order to support time-sensitive, increasingly tightly integrated, global supply chains [4].

1.3.5 Social factors: There is currently a lack of awareness and knowledge in developing countries about e-commerce [2]. Within the private sector in particular, regional differences in the level of awareness have been observed. E-commerce requires a different mix of capacities and skills, which is another major constraint in developing countries [5]. It should become one of the priorities of developing countries to promote computer literacy and internet-related skills among the workforce at large and especially among

the SMEs. Programs to train and retain skilled IT professionals should complement this [1].

1.4 Need to have appropriate policies towards e-adoption:

Many developed economies in Europe and the US have made efficient and speedy inter-firm communications [3] [4]. However, if the prevalent 'partial' internet-based e-commerce is to become more widespread in the globe, much greater attention will need to be given to the specific characteristics of firms in developing country. The governmental, technical, financial, and social structures within which these firms operate must be understood and new supporting policies must be formulated. 'Top-down' government policies promoting 'e-readiness' will be unsuccessful unless much greater effort is given to examining how internet applications are actually being used in business and day-to-day lives of people. Policy makers, firms and development assistance agencies should therefore support 'bottom-up' approaches instead, that are based on realistic assessments of e-commerce opportunities and obstacles, and region- and value-chain-specific solutions.

2. Literature review

Many research studies on e-commerce (2001-2009) conducted in developed and developing countries have concluded that the external barriers to e-commerce are - the unfavorable economic environment, the high cost of ICT, and security concerns. The internal barriers are: poor internal communications infrastructure within firms, lack of ICT awareness and knowledge, inadequacy of ICT-capable and literate managers and workers, insufficient financial resources and the perceived lack of relevance of, or value-additions by, ICTs to the business

Businesses in most developing countries have not taken up e-commerce and have not used the internet because they fail to see the value of e-commerce to their businesses [6], [7] [8]. Many think e-commerce is suited only to big companies and that it is an additional cost that will not bring any major returns on investment. People play a vital role in the development of e-commerce. However, technology literacy is still very limited in most developing countries. There is a shortage of skilled workers among developing nations, a key issue in moving forward with using information technology in business [3].

A comprehensive understanding about the factors leading to adoption of e-commerce has been a growing concern of academic research [8], [9], [10], [11], and [12]. One of the research approaches to understanding factors that will foster e-adoption is to apply the New Institutional Economics (NIE) theory. NIE theory focuses on the external environment for e-commerce. Insights from NIE suggest that we should look beyond those proximate indicators (i.e. physical infrastructure) to examine how the institutional environment in a country contributes to (or undermines) confidence in e-commerce and supports private investment in the new medium of business transactions [13]. This study reviews literature related to national level e-adoption on the

basis of the three factors (see Fig1) determined by the New Institutional Economics.

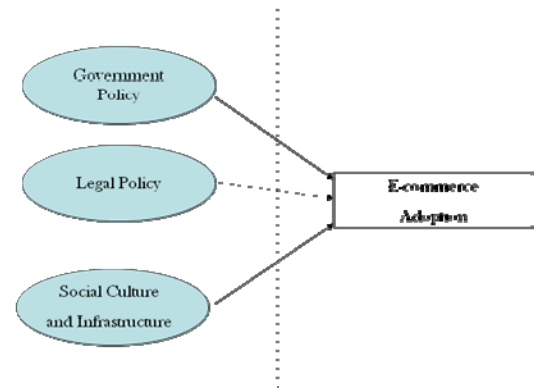


Figure 1: Theoretical Framework used for country-wise comparative study

2.1 Influence of governmental policies on E-adoption

Governmental actions should leverage and facilitate but not stifle e-commerce adoption. Oxley et al. [13] pointed out that governments play a critical role in creating the institutional environments that foster private investment in e-commerce. Gibbs et al [14] argued that governmental promotions and incentives are a major enabler of e-commerce and that national policies for IT infrastructure, such as trade and telecommunication liberalization, are also likely to have a big impact on e-commerce by making IT more affordable to society. Shore [15] suggested that governmental IT support could be provided through national policies for training and maintaining an adequate IT workforce. Government's role in supporting e-commerce diffusion has been variously referred to as that of leader, promoter, facilitator, regulator, educator and financier [16]. GITR [1] further posited that the slowness or failure of e-commerce adoption in some developing countries are the consequence of policy inaction or wrong action by their governments.

The national network and the physical infrastructure of many developing countries are characterized by relatively low tele-density, a major barrier to e-commerce. There are also relatively few main phone lines for business use among SMEs. A number of cross-country studies using secondary data found that the legal environment in a country significantly affected e-commerce activities and revenues in that country [13] and [17]. A group of survey studies also showed that the regulatory environment was significantly important in determining both the breadth and the depth of e-business adoption, especially in developing countries and newly industrialized economies [6], [9] and [12].

2.2 Influence of legal policies on E-adoption

A study of e-commerce adoption by SMEs in the APEC [18] region further specified that an adequate legal framework supporting e-commerce was important for reducing uncertainties and building trust and confidence in the electronic marketplace; and that this was particularly important for lower GDP economies [6] and [19]. Overall,

the legal environment should be secure, stable and predictable for e-commerce adoption [2], [4].

2.3 Influence of social infrastructure on E-adoption

There is a growing role of social and cultural values in adoption of the internet. Researchers argue that national culture plays an important role in determining not only whether social entities in a particular country would adopt a certain technology, but also the degree to which a technology innovation was accepted and the ways in which it was used [5], [17] and [20]. For instance, Stafford et al [19] found that cultural factors were one of the main explanations for the lack of IT diffusion in the Middle East because the Western assumptions that free movement of information had positive connotations violated the social and cultural environments of many Middle Eastern countries. E-commerce also requires a willingness of consumers and companies to freely share information with others. Culture might thus become a factor which either encourages or inhibits the sharing of information online [15].

3. Measurement of Indices

In order to quantitatively measure the three independent variables of Government policy, Legal Policy and Social Culture and Infrastructure, this study used indices, used in the World Economic Forum (WEF)’s latest GTR [1].

For last three decades, the WEF has devoted particular attention to innovation and technology research on competitiveness because they play an important role in building long-term growth and prosperity of a country. In particular, the GTR series[1], produced jointly with INSEAD since 2002, explains the extent to which 133 developed and developing economies worldwide, representing over 98 percent of global GDP, benefited from the latest ICT advances for increased competitiveness. In this survey two types of secondary data were collected: hard data and indices.

Hard data: Hard data provided qualitative information and an objective measure of a quantity. The original GTR survey [1] used the data from 2003 to 2010 available from international organizations (such as the International Telecommunication Union, the World Bank, and various United Nations agencies) and other national sources.

Indices: The original GTR used indices after identifying crucial factors for e-adoption. It provided governments and relevant stakeholders across the world with a unique benchmarking assessment of their respective economy’s strengths and weaknesses vis-à-vis their past performance and relevant comparators. The comparison was done on a 7-point semantic scale.

3.1 Indices for measuring E-adoption

Whether a country has adopted the internet or not can be indicated by its citizens’ preparedness to use ICT through indicators like actual numbers (hard data) on internet users,

internet access in schools and internet broadband subscribers [4]. E-adoption of a nation needs to be understood by measuring how private business firms within the country are using the internet for their operations [15]. It’s also worthwhile to measure if the government is providing to citizens e-government services, to encourage its mass use [21]. E-adoption also needs to be measured in terms of whether the country’s government is using e-commerce and its applications in its operations, such as: ‘agency enablement’ programs, ‘supplier enablement’ programs and e-procurement information systems; computerization of customs processes and operations (i.e., electronic submission, processing and electronic payment; automated systems for data entry to integrate customs tables, codes and pre-assessment);and tax administration (systems for electronic processing and transmission of tax return information, online issuances of tax clearances, permits, and licenses, and an electronic process registration of businesses and new taxpayers, among others) [2]. Keeping these factors in mind, this study selected the following indices (see Table 3) from the WEF’s latest GTR

Table 3: Measurement Items Used for E-adoption

| <i>Composite Indices</i> | <i>Measurement Items</i> |
|--------------------------|---|
| E-adoption | 1. Personal computers (hard data) |
| | 2. Broadband Internet subscribers (hard data) |
| | 3. Internet users (hard data) |
| | 4. Internet access in schools |
| | 5. Firm-level technology absorption |
| | 6. Extent of business Internet use |
| | 7. ICT use and government efficiency |
| | 8. Presence of ICT in government agencies |

3.2 Indices for measuring Government Policies

A nation’s government plays an instrumental role in encouraging e-commerce growth through concrete practicable measures and creating a favourable policy environment for e-commerce. Therefore it is necessary to examine public policy issues in electronic commerce [21]. Is government promoting access to inexpensive and easy access to information networks? Is government giving legal recognition toe-commerce transactions? With these factors in mind, this study has selected the following indices for measuring government policy (see Table 4). The first five indices will indicate the whether the macro environment of the country is favourable to doing e-commerce or not. The last four indices indicate the intent of the country’s government to have legal policies favourable for promoting e-commerce.

| <i>Composite Indices</i> | <i>Measurement Items</i> |
|--------------------------|---|
| Government Policy | 1. Extent and effect of taxation |
| | 2. Burden of government regulation |
| | 3. Financial market sophistication |
| | 4. Venture capital availability |
| | 5. Prevalence of foreign technology licensing |
| | 6. Government prioritization of ICT |
| | 7. Government procurement of advanced technology products |
| | 8. Importance of ICT to government vision of the future |
| | 9. Government success in ICT promotion |

Table 4: Measurement Items Used for Government Policy

3.3 Indices for measuring Legal Policies

A country's policy and legal framework for e-commerce also influences the adoption of e-commerce [18] and [8]. The nation must formulate laws and incentives that focus on promoting trust and confidence among e-commerce [20]. According to GTR 2007 [1] some examples of such laws are: contract enforcement, consumer protection and privacy, liability assignment, privacy protection, intellectual property rights, cross-border trade and improvement of delivery infrastructure. In the ASEAN region, only three countries-Singapore (Singapore Electronic Transactions Act), Malaysia (Cyber laws), and the Philippines (Philippine E-commerce Act)-have legal frameworks for e-commerce [18]. These frameworks provide for the legal recognition of electronic documents and signatures and penalize common crimes and offences committed in cyberspace. Keeping these factors in mind, this study has selected the following indices from the GTR (see Table 5). The first four indices reflect the ease of starting an e-business in a country, while the remaining four indices indicate the quality of legal protection that an e-business firm can expect from the country.

Table 5 : Measurement Items Used for Legal Policy

| <i>Independent Variable</i> | <i>Measurement Items</i> |
|-----------------------------|--|
| Legal Policy | 1. Time required to start a business (hard data) |
| | 2. Number of procedures required to start a business (hard data) |
| | 3. Number of procedures to enforce a contract (hard data) |
| | 4. Time to enforce a contract (hard data) |
| | 5. Effectiveness of law-making bodies |
| | 6. Laws relating to ICT Judicial independence |
| | 7. Intellectual property protection |
| | 8. Efficiency of legal framework in settling disputes |

3.4 Indices for measuring Social Infrastructure

While the actual users of internet will ultimately drive e-commerce development, the fuel will come from the government and the private sectors [6], [9] and [10]. Mere governmental initiatives in policies and in the legal environment will not augment adoption of internet. Both

In all countries except India, China and Morocco, more than half of the population possesses personal computers. This explains why more than half the entire population of internet users is in just five countries – Sweden (87 percent), USA (78 percent), Israel (70 percent), South Korea (58 percent) and Australia (53 percent). When the extent of e-usage was carefully examined, was observed that Sweden, South Korea and Australia show high levels (average score of 6 on a scale of 7) of internet use because

government and private sector partnerships will need to engage in a campaign to disseminate information to individuals and online users about e-commerce policies, best practices, success stories, and opportunities and obstacles relating to the use of ICTs and e-commerce [14]. Government can initiate pilot projects and programs for capability-building, training and e-commerce support services. Big businesses and corporations can encourage transfer of technology to SMEs by offering them free training in ICT and e-commerce. These awareness campaigns could include free training courses and workshops on e-commerce, security and privacy, awards programs, and information centers. Ultimately, this information campaign should come in the form of an overall e-commerce development strategy for the economy, focusing on its various innovative applications for small scale businesses [5], [8] and [9]. Keeping these factors in mind, this study has selected the following indices from the GTR (see Table 6). The first four indices indicate the intensity of human resource development required to encourage the country's people to get engaged in e-business while the remaining five indices reflect the robustness of IT infrastructure required to support e-adoption.

Table 6: Measurement Items Used for Social-Culture Infrastructure

| <i>Independent Variable</i> | <i>Measurement Items</i> |
|-----------------------------------|---|
| Social-Culture and Infrastructure | 1 Quality of the educational system |
| | 2 Quality of math and science education |
| | 3 Quality of management schools |
| | 4 Buyer sophistication |
| | 5 Secure Internet servers (hard data) |
| | 6 Electricity production (hard data) |
| | 7 Tertiary education enrollment (hard data) |
| | 8 Fixed broadband tariffs (hard data) |
| | 9 Internet bandwidth |

4. Findings

4.1 Cross country comparison of e-usage

This particular cross-country study was undertaken to understand the factors influencing e-adoption in major regions of the world. So the first observation related to the extent of e-adoption in every country (see Table 7).

there was very high access to the internet in schools in these countries and because the companies in these countries used the internet extensively for their business activities. Even government agencies in these three countries extensively used ICT for their operations (average score of 6 on a scale of 7). The findings showed a clear digital divide is evident between developing economies like Morocco, China and India on the one hand, and developed economies like the US, Australia and Sweden on the other.

Table 8: Cross country comparison of Government Policies (semantic scale scores where 1=least favourable, 7= most favourable)

| Country | Extent and effect of taxation | Burden of government regulation | Financial market sophistication | Venture capital availability | Prevalence of foreign technology licensing | Government prioritization of ICT | Government procurement of advanced technology products | Importance of ICT to government vision of the future | Government success in ICT promotion |
|-------------|-------------------------------|---------------------------------|---------------------------------|------------------------------|--|----------------------------------|--|--|-------------------------------------|
| Sweden | 2.80 | 3.99 | 6.44 | 4.29 | 5.80 | 5.8 | 4.39 | 5.33 | 5.55 |
| South Korea | 3.37 | 2.83 | 4.49 | 2.78 | 5.22 | 5.44 | 4.38 | 5.39 | 5.25 |
| Australia | 3.48 | 3.2 | 6.2 | 3.97 | 5.80 | 5.35 | 3.97 | 4.98 | 4.89 |
| USA | 3.59 | 3.39 | 6.22 | 4.17 | 5.56 | 5.62 | 4.77 | 4.91 | 5.19 |
| Israel | 3.54 | 3.13 | 5.69 | 3.86 | 5.15 | 5.06 | 4.18 | 3.98 | 4.60 |
| Morocco | 3.25 | 3.4 | 4.36 | 2.77 | 4.31 | 4.12 | 3.46 | 3.89 | 4.20 |
| China | 4.06 | 3.91 | 3.98 | 3.22 | 4.30 | 5.55 | 4.43 | 5.27 | 5.27 |
| India | 4.20 | 2.88 | 5.31 | 3.62 | 5.26 | 5.53 | 3.57 | 4.64 | 5.17 |
| World | 3.62 | 3.28 | 4.29 | 2.87 | 4.50 | 4.64 | 3.64 | 4.15 | 4.33 |

4.2 Cross country comparison of Government Policies

Any successful leveraging of the internet is strongly influenced by the overall environment existing in a country for innovation and internet use. In this sense, efforts made by the government to put in place policies for a supportive market and regulatory environment were considered beneficial.

The first five variables gauge the quality of the business environment for e-commerce development and diffusion in any given economy, taking into account dimensions such as the availability of appropriate venture capital, the extent of financial market sophistication and the ease of doing business (read the burden of taxation and regulations). As seen in Table 8, licensing of foreign technology was common in all the eight countries. This means all these countries are open to global exchange of technology.

The burden of regulation and the extent of taxation was heavy in all the countries showing a low score (3 in a scale of 7). It is worthwhile to note that, although in Sweden, USA and Australia the low scores (around 3 in scale of 7) indicate that it is burdensome for businesses to comply with governmental administrative requirement, yet all the countries have excellent levels of sophistication of financial markets (high score, near 6) by international standards. The high, favourable score (around 4 as against 2.5 of others) in venture capital availability also indicated that in these countries it was relatively easy for entrepreneurs with innovative but risky projects to find venture capital. The last four indices represented the particular nation's governmental vision, the priority given to ICTs in the national agenda and competitiveness strategies. In these indices, all eight nations showed high scores (above 5) indicating that these nations' governments place high priority on ICTs. The high scores of around 6 on the scale of 7 indicated that all eight governments were very successful in promoting the use of ICTs in their respective

countries. In one index, viz., government procurement of advanced technology products, Morocco (3.46) and India (3.57) scored below the world score (3.64). This indicates that the two governments do not have clear implementation plans for utilizing ICTs to improve their countries' overall competitiveness.

4.3 Cross country comparison of Legal Policies

The regulatory environment pillar (eight indices) captures the degree to which the national legal framework facilitates innovation and e-commerce development. In this sense, general aspects having to do with the protection afforded to property rights, the independence of the judiciary, and the efficiency of the law-making process are taken into account. ICT-specific features, such as the development of ICT laws and the extent to which intellectual property—key to generating innovation—is protected, are also considered, along with the level of competition in internet, international long distance, and mobile telephone services.

Legal policies (Table 9) were highly favourable for e-commerce in Sweden, Australia and USA. These countries showed excellent scores (average of 5 on the scale of 7) in 'ease of starting business' and 'having effective legal framework'. India displayed very low legal policy scores. For instance, to enforce a contract in India, it takes almost 1,400 days, while in USA, Australia and South Korea it takes less than half that time. In India, procedures to enforce a contract were (46) far higher than those in Australia (28), Sweden (30), USA (32) and South Korea (35). India did not display a strong intellectual property protection laws (a low score of 3.6), unlike Sweden (6.1), Australia (5.8) and USA (5.4). The developed nations (Sweden, Australia and USA) had high scores (6, 5 and 4.6) in the efficiency of legal frameworks in settling disputes.

Table 9: Cross country comparison of Legal Policies (semantic scale scores where 1=least favourable, 7= most favourable)

| Country | Time required to start a business (hard data) | Number of procedures required to start a business (hard data) | Number of procedures to enforce a contract (hard data) | Time to enforce a contract (hard data) | Effectiveness of law-making bodies | Laws relating to ICT | Intellectual property protection | Efficiency of legal framework in settling disputes |
|-----------|---|---|--|--|------------------------------------|----------------------|----------------------------------|--|
| Sweden | 15 | 3 | 30 | 508 | 5.62 | 5.76 | 6.11 | 6.16 |
| S Korea | 14 | 8 | 35 | 230 | 2.62 | 5.60 | 4.2 | 3.75 |
| Australia | 2 | 2 | 28 | 395 | 5.58 | 5.56 | 5.79 | 5.37 |
| USA | 6 | 6 | 32 | 300 | 4.17 | 5.54 | 5.44 | 4.60 |
| Israel | 34 | 5 | 35 | 890 | 4.16 | 4.08 | 4.03 | 4.07 |
| Morocco | 12 | 6 | 40 | 615 | 3.47 | 3.38 | 3.1 | 3.9 |
| China | 37 | 14 | 34 | 406 | 4.39 | 4.24 | 4.02 | 4.11 |
| India | 30 | 13 | 46 | 1420 | 4.64 | 4.54 | 3.65 | 4.39 |

4.4 Cross country comparison of Social Infrastructure Policies

Preparation and willingness to use the internet is a critical determinant of effective internet usage by all parts of a society. An economy whose stakeholders are more ready and how a greater interest toward e-commerce advances will be likely to use it more effectively and extensively. The first five indices of social infrastructure policies (see Table 10) measured citizens' preparedness to use the internet. The data showed that Sweden, South Korea, Australia, USA and India have among the best education systems, with an average score of around 5 on a scale of 7. This indicated that in these countries the buyers (consumers) are sophisticated, looking beyond price points and evaluating performance attributes while taking purchase decisions. In other words in these countries the market (consumers) showed a readiness to engage in e-commerce.

The bottleneck lies in the availability of physical infrastructure – the last four indices (see Table 10). Countries like Sweden and USA showed high scores in parameters of physical infrastructure, indicating that they had adequate and high quality secure internet servers, electricity connections, broadband tariffs and internet bandwidths. It is in countries like Morocco, China and India that essential infrastructure (secure internet servers, electricity production and internet bandwidth) in a dismal state (scores as low as 1 and 2).

Table 10: Cross country comparison of Social Infrastructure (semantic scale scores where 1=least favourable, 7= most favourable)

| Country | Quality of the educational system | Quality of math and science education | Quality of management schools | Buyer sophistication | Secure Internet servers per million population (hard data) | Electricity production kWh per capita (hard data) | Gross Tertiary education enrollment rate (hard data) | Fixed broadband tariffs(residential monthly fee in \$) (hard data) | Internet bandwidth per 10000 population (hard data) |
|-----------|-----------------------------------|---------------------------------------|-------------------------------|----------------------|--|---|--|--|---|
| Sweden | 5.28 | 4.81 | 5.40 | 5.06 | 772 | 15778 | 75.18 | 22.04 | 500.00 |
| S Korea | 3.97 | 5.19 | 4.48 | 4.62 | 696 | 8329 | 94.67 | 26.62 | 46.00 |
| Australia | 5.21 | 4.85 | 5.30 | 4.66 | 993 | 12040 | 75.06 | 20.98 | 55.00 |
| USA | 4.85 | 4.47 | 5.85 | 4.74 | 1174 | 14309 | 81.68 | 14.95 | 111.00 |
| Israel | 3.08 | 3.19 | 4.10 | 3.43 | 272 | 7606 | 60.41 | 30.4 | 21.00 |
| Morocco | 2.36 | 3.69 | 4.32 | 3.35 | 3 | 757 | 11.31 | 31.12 | 8.00 |
| China | 3.83 | 4.81 | 4.00 | 4.66 | 1 | 2179 | 22.89 | 36.76 | 5.00 |
| India | 4.36 | 5.03 | 5.38 | 4.01 | 2 | 646 | 11.87 | 16.40 | 0.31 |

4.5 Which is most influential?

We now analyze, using the logistic regression method, which of the three independent variables – government policy, legal policy and social infrastructure – each measured using eight to nine different scale indices most influences the dependent variable of e-adoption .

Since the three independent variables were measured in different units, it was difficult to determine the relative measure of each dependent variable (e-adoption) based on the coefficient of regression (see Table 11). It was therefore preferred to examine the beta coefficients. To find out which coefficients were significantly different from zero ‘t’ tests are performed. Test ‘t’ (true logistic) permits the testing of a null hypothesis of inexistence of a linear relation between dependent variables (e-adoption, in this case) with each of several independent variables(government policy, legal policy, social infrastructure). Beta (β) standardized is especially helpful for investigating the reliability of scales of multiple items that use measures between intervals (see Table 11). Beta coefficients speak of the level of influence of an independent variable over a dependent variable. R square and R square adjusted are used to direct and explain the differences that each independent variables exercises.

The scores of R square show that i) India has the highest score in Government Policy but the lowest in Legal Policy and Social-Infrastructure; ii) Israel, Australia and Sweden are high scorers in Legal Policy; and iii) China and Morocco are high scorers in social infrastructure.

TABLE 11: Logistic Regression Results

| Country | Policies in each country | Beta Coefficients | | | | | Logistic Model Summary | | |
|-----------|--------------------------|-----------------------------|------------|---------------------------|---------|-------|------------------------|----------|-------------------|
| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | R | R square | Adjusted R square |
| | | B | Std. Error | Beta | | | | | |
| Sweden | Government | 1.34 | 0.554 | 1.32 | 2.417 | 0.052 | 0.277 | 0.077 | -0.077 |
| | Legal | 1.002 | 0.003 | 1.277 | 352.569 | 0 | 0.229 | 0.053 | -0.105 |
| | Social Infrastructure | 1 | 0 | 0.561 | 13169.5 | 0 | 0.578 | 0.334 | 0.223 |
| S Korea | Government | 1.548 | 0.587 | 1.531 | 2.637 | 0.039 | 0.426 | 0.181 | 0.045 |
| | Legal | 1.002 | 0.006 | 1.18 | 170.206 | 0 | 0.166 | 0.028 | -0.135 |
| | Social Infrastructure | 1 | 0 | 0.527 | 8120.02 | 0 | 0.640 | 0.410 | 0.311 |
| Australia | Government | 1.058 | 0.436 | 1.057 | 2.428 | 0.051 | 0.056 | 0.003 | -0.163 |
| | Legal | 1 | 0 | 1.31 | 309.46 | 0 | 0.269 | 0.072 | -0.082 |
| | Social Infrastructure | 1 | 0 | 0.516 | 12202.9 | 0 | 0.661 | 0.437 | 0.343 |
| USA | Government | 1.206 | 0.568 | 1.174 | 2.122 | 0.078 | 0.160 | 0.026 | -0.137 |
| | Legal | 1.003 | 0.005 | 1.248 | 219.907 | 0 | 0.222 | 0.049 | -0.109 |
| | Social Infrastructure | 1 | 0 | 0.545 | 13099.9 | 0 | 0.608 | 0.369 | 0.264 |
| Israel | Government | 1.263 | 0.732 | 1.218 | 1.726 | 0.159 | 0.197 | 0.039 | -0.201 |
| | Legal | 1.001 | 0.002 | 1.508 | 642.829 | 0.000 | 0.411 | 0.169 | -0.039 |
| | Social Infrastructure | 1.000 | 0.000 | 1.631 | 5805.31 | 0.000 | 0.489 | 0.239 | 0.049 |
| Morocco | Government | 0.462 | 0.251 | 0.606 | 1.838 | 0.116 | 0.501 | 0.251 | 0.126 |
| | Legal | 1 | 0.002 | 1.126 | 607.017 | 0 | 0.119 | 0.014 | -0.150 |
| | Social Infrastructure | 0.997 | 0.001 | 0.408 | 1681.08 | 0 | 0.896 | 0.804 | 0.771 |
| China | Government | 1.196 | 0.318 | 1.304 | 3.764 | 0.009 | 0.265 | 0.070 | -0.085 |
| | Legal | 1 | 0.001 | 1.069 | 670.439 | 0 | 0.067 | 0.004 | -0.161 |
| | Social Infrastructure | 0.999 | 0 | 0.373 | 23221.9 | 0 | 0.987 | 0.975 | 0.971 |
| India | Government | 0.56 | 0.141 | 0.504 | 3.973 | 0.007 | 0.685 | 0.469 | 0.381 |
| | Legal | 1 | 0.001 | 0.956 | 1489.14 | 0 | 0.045 | 0.002 | -0.164 |
| | Social Infrastructure | 0.999 | 0.001 | 0.855 | 684.865 | 0 | 0.157 | 0.025 | -0.138 |

5. Recommendations

- 1) India is good in policy making, but not in policy implementation.

Since the 1990s, India has been shifting from an agriculture-based economy to a service- and knowledge-based economy. India has been increasingly replacing physical labor-based skills in all walks of life. The Government of India has been supporting state governments to promote software technology parks, biotechnology parks, export processing zones and so on, beyond the metropolitan cities. There have been many task forces and policy formulation bodies and the government has a strong commitment to implementation (See Appendix 1 for the list); but sometimes the way is lost before implementation happens. For instance, following the formation of a “National Alliance for Mission 2007” in 2003 to provide a platform for multi-stakeholder partnership, A National Alliance for ICT for basic human needs was launched in May 2004 to make certain that the rural poor are not excluded from the benefits of ICT, The Mission aimed to take knowledge-based services to all of India’s 600,000 villages by 15 August 2007, which marked the 60th anniversary of India’s independence. For this purpose, task forces were established to look into the issues of connectivity, content, capacity building, resources organization, management and program design. This seemingly impossible target has still not yet been achieved due to lack of proper planning, strong partnerships, and commitment of stakeholders and implementation policies of government.

- 2) Indian Government policy is focused on social development and not on IT infrastructure

The focus is to make ICT a tool for empowering certain social groups, such as artisans, farmers and common citizens, and it is being adopted at the grass roots level through many initiatives. Private/public partnerships have been established across India and many corporate organisations are collaborating with non-governmental organizations and local self-help groups for various social development and social welfare programs. But mere social welfare orientation will not suffice for e-adoption. Good IT infrastructure is also needed to empower scientists, researchers, educators, business people, policy makers, and citizens with the ability to access, create and distribute information much more powerfully and quickly for sustainable development and growth. The pace with which a telecommunications infrastructure is developed is also a significant factor because it influences the pace of development of the infrastructure needed for the digital economy. Various studies have indicated that initiatives for the digital economy in India are centered around six “Cs” of IT infrastructure:

- computer density;
- connectivity;
- contents;
- cyber laws; and
- costs

- 3) India as a whole must implement a uniform IT infrastructure and legal policies.

IT policy statements differ considerably from one state government to another; some of the progressive states have produced excellent policy documents which outline their government’s plans for rural connectivity, e-governance, virtual education and all round e-development; but there are others who still adopt conventional policies. Tamil Nadu hosts many rural ICT projects, and are supported by non-governmental and private sectors that have initiated and driven these projects. Again, the state governments of Maharashtra and Madhya Pradesh have already implemented several such initiatives; but Rajasthan, Bihar, Chattisgarh and Uttaranchal government projects are still in nascent stages.

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