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An Information and Communication Technologies for Development (ICT4D) Decision Framework for Building an Information Economy in Developing Countries: The Case of Palestine

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An Information and Communication Technologies for Development (ICT4D) 
Decision Framework for Building 
an Information Economy in Developing Countries: 

The Case of Palestine 

by 

Hasan Z. Nuseibeh 

A dissertation in fulfillment 
of the requirements for the degree of 
Doctor of Philosophy 
Department of Information Systems & Decision Sciences 
College of Business 
University of South Florida 

Co-Major Professor: Alan Hevner Ph.D. 
Co-Major Professor: Rosann Collins, Ph.D. 
Donald Berndt, Ph.D. 
Jamil Jreisat, Ph.D. 

Date of Approval: 
July 5, 2016 

Keywords: decision support system, global IT, developing economies, decision making, ICT sector, contingency theory 

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DEDICATION

This Dissertation is dedicated to:

My Father, who passed away, believing in me and hoping for this day to come.
My amazing Wife, who supported me every single day and gave me strength to go on.
My Daughter, my angel, who always managed to make me smile in difficult times.
My Mother, whom I miss more than anything for all her love and care.
My Brother and Sister that I adore.
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ABSTRACT

Building a thriving information economy is a goal for many developing countries. This research helps identify the factors (inhibitors and motivators) that can be used to leverage the Information and Communication Technology (ICT) sector in a developing country to build a sustainable information economy that benefits other sectors of the economy. This is done by studying the current literature on this topic and then synthesizing the theoretical models to create a unified decision framework to help developing countries set their path to building a sustainable information economy.

Drawing on past literature and extant theory, a novel ICT4D decision framework is built that provides a three-dimensional view based on 1) the ICT value chain, 2) key factors (e.g. infrastructure, policies, markets), and 3) stakeholders (e.g. industry, government, academia). This decision framework is then used to study the case of Palestine, where secondary and primary data are used to compare the critical success factors for Palestine with the general framework. This synthesized framework and critical success factors superset is expected to advance the field’s understanding of how both controllable and non-controllable country characteristics contribute to or inhibit the growth and development of an ICT sector in developing countries. In addition, the framework and identified success factors help in setting a future path for development.

Results from both secondary data sources demonstrate the usability of the framework to analyze the current setting of the ICT sector, in addition, to help investigate a range of possible opportunities for action to reach a higher level of ICT success. Then, via a targeted set of interviews
with academic, industrial, and governmental sources who are experts in the Palestinian ICT arena, an exploratory study was performed that focused on key critical success factors for future development of the ICT economy. Controllable factors that have the potential for sustainable action were identified.

In the case of Palestine, it appears that despite having many challenges that are out of control, there seem to be many opportunities for change specifically in government and educational policies that can help the ICT sector in specific, and the Palestinian economy in general reach its real potential. Given the current political situation in Palestine, it was found that there is a great potential in creating new software products for export. The challenges in this particular area in the case of Palestine lies in the lack of adequate business skills to research the global market and to market products and services that can be offered by the Palestinian ICT sector.

The findings should also help stakeholders see if the challenges to developing an ICT sector in Palestine are the same as those for any developing country, and where they are truly unique. The outcomes of this research have the potential to frame and inform economic development decisions that could define the future of the Palestinian state.
CHAPTER 1: INTRODUCTION AND MOTIVATION

Building a sustainable information economy is a goal for many developing countries across the globe (Brynjolfsson, 1993; J. Humphrey, Mansell, Paré, & Schmitz, 2003; Lichtenberg, 1995). These countries observe the success of other developing countries that have leveraged a strong ICT sector to drive economic productivity. Studies have shown that there is a strong link between the production and use of ICT and the development of a sustainable and effective information economy (Techatassanasoontorn, Huang, Trauth, & Juntiwasarakij, 2011).

Building an information economy is particularly urgent for countries that do not have sufficient natural resources upon which to base an export economy. Such countries can choose to invest in and later utilize their human capital to offer value to the global information market in the form of technical support, software development, and hardware development (Masten & Kandoole, 2000). Also, a developed ICT sector would play a major role in supporting and enhancing other sectors of the economy, and therefore help further the country’s overall economic development process by improving productivity and increasing the return on investment in other sectors (Kraemer & Dedrick, 1994).

The importance of building a developing country’s information economy stimulates academic interest in understanding the different factors that can influence the success or failure of this endeavor. Several countries provide successful models such as India, Israel, Thailand, Malawi, and South Africa (Indjikian & Siegel, 2005; Masten & Kandoole, 2000; Moodley, 2002; Paul & Siegel, 2001). The study of these countries creates an opportunity for academics since the
enablers and inhibitors to building an information economy in the model countries can be identified, compared, and contrasted to understand better the critical success factors for developments of this type. Prior research has established that there is a wide range of factors that can play a role at a country level, including political, economic, geographical, and sociocultural factors (Ein-Dor, Myers, & Raman, 1997; Tan & Leewongcharoen, 2005; Techatassanasoontorn et al., 2011). Some of these factors can be changed or influenced by governments or the private sector to facilitate the transition, and others can be considered as exogenous factors that need to be understood and adapted to (such as geographical location and country size) (Tan & Leewongcharoen, 2005). The sum of factors synthesized from the literature can help determine the development path that a country can take to build a sustainable information economy (J. Humphrey et al., 2003; Masten & Kandoole, 2000).

A number of studies have been done on how growth in the ICT sector affects the economic growth in developed countries positively (Colecchia & Schreyer, 2002; Daveri, 2002; Jorgenson, Ho, & Stiroh, 2002; Lightfoot, 2004; Oliner & Sichel, 2000; Van Ark, Melka, Mulder, Timmer, & Ypma, 2002). However, when it comes to developing countries, there seem to be inadequate studies as reported in the literature (Baliamoune-Lutz, 2003; Harbi, Amamou, & Anderson, 2009; Tan & Leewongcharoen, 2005; Yousefi, 2011).

Models of information economy enablers and inhibitors have been developed in a number of studies for different regions and environments (J. Humphrey et al., 2003; Indjikian & Siegel, 2005; Masten & Kandoole, 2000; Moodley, 2002; Paul & Siegel, 2001; Techatassanasoontorn et al., 2011). However, it has been argued that there is no single model available for understanding information economy development in developing countries (Tan & Leewongcharoen, 2005). Therefore, it is important to study every country as a separate case to understand what specific
factors contribute to its economic development process (Techatassanasoontorn et al., 2011). This may be a particularly important approach when a country has one or more extreme characteristics, including both exogenous factors that cannot be controlled as well as those that are influenced by a country’s government or private sector.

Case research method was chosen for the second part of this study, since case research is most appropriate in certain situations that apply to this study (Yin, 2013) such as:

- In context-rich environments and when there are many variables.
- For how or why research questions.
- When the focus of the study is on contemporary events, rather than historical events, and when there is little chance for manipulating factors.

Another decision in case research design is whether to have one or multiple cases for the study. Single-case studies are useful for unique and extreme cases, and when building a theory or testing a critical case with a well-formulated theory where the factors being tested are well established in the literature (Yin, 2013). For the purpose of this study an extreme and unique case was selected (the case of Palestine) as will be explained next, also, pre-established factors from literature were used.

1.1. Contingency Theory and Frontier Analysis

One of the theoretical lenses that has been used by scholars studying decision-making in developing countries is contingency theory (Avgerou, 2010; Conteh & Ohemeng, 2009; Heeks, 2002). The theory is originally an organizational and leadership theory that contends that there is no best way of leadership that fits all organizations and that an organization requires an
understanding and a proper fit between internal resources, subsystems, and environment; therefore, the theory values uniqueness (Fiedler, 1967). The theory has been used in several information systems studies (Umanath, 2003; Weill & Olson, 1989) in several contexts such as understanding the factors or success or failure of information systems in developing countries (Heeks, 2002).

One of the challenges to understanding complex systems using contingency theory is that in many cases there are a large number of subsystems within an organization or a country (in our case), in addition to internal and external factors at play. This makes it difficult to study each subsystem or set of factors individually using a reductionist approach, due to the interaction between those subsystems and factors. A holistic approach can be used instead to study a system as a whole. One example of a holistic method was introduced in a study of the work systems within and between organizations (Sinha & Van de Ven, 2005) where an extension to contingency theory was proposed by adding two theoretical perspectives:

- Configuration perspective (Meyer, Tsui, & Hinings, 1993) examines the different contingencies and design alternatives of the subsystems. Therefore rather than studying each subsystem and how it affects the whole system’s productivity in detail; it looks at different configurations (design alternatives) of the subcomponents to improve the performance of the system as a whole by understanding the interaction between the subsystems. The configuration perspective promotes an internal fit between components, in addition to an external fit between the environment and the system.

- Complexity perspective (Anderson, 1999) views the problem of finding an optimal configuration as an optimization problem. It starts by searching through a fitness landscape for an optimal solution internally (shape of the peak) and externally (the
height of peak). The search can be done by incremental changes in the
configuration (hill climbing) or by dramatic changes (hill jumping).

Contingency theory supplemented by the configuration and complexity perspectives
applied at the country level is useful in our case to understand the need for analyzing a country’s
unique situation in detail in regards to its internal resources, subsystems, and global environment.
However, one challenge arises that is related to finding an optimal configuration both regarding
external and internal fit that would lead to increased efficiency and productivity from the ICT
sector resulting in an improvement in the economy in general. An attempt to improve a subsystem
or a set of factors may affect another subsystem negatively (Sinha & Van de Ven, 2005). For
instance, the case of Palestine, a change in taxation policies for foreign investment may lead to
improvements by encouraging foreign investors to invest more in startups in the ICT sector, but
may pose a challenge to existing local businesses that have limited resources. The interaction and
complexity between the different subcomponents can make the comparison of different
configurations more difficult in an empirical study.

One solution to this challenge that was proposed at an organizational scale by (Sinha &
Van de Ven, 2005) is to use a frontier analysis. A frontier analysis targets an outlier in a sample
rather than the average cases; which could set the ceiling or basement levels for impacts. It starts
by identifying outliers on certain dimensions and then selecting one of those outliers for a deeper
analysis to understand the contingencies of the outliers. The understanding of an outlier helps in
understanding how the different factors or subsystems interact together in extreme cases. Usually,
a frontier case is an outperforming system in terms of maximizing outputs subject to inputs and
constraints that is studied to understand its deviation from other configurations.
With the same reasoning of frontier analysis, an outlier was selected for the case to get a deeper understanding of the factors and the subsystems that contribute to the ICT sector. The case of choice for this study is an underperforming outlier, namely the case of Palestine, which offers a unique opportunity for study because of the additional constraints and complexities it faces compared to other average developing countries. The uniqueness of the Palestinian case is discussed further in Chapter 4. The additional constraints caused by the political reality of Palestine add to the complexity of its particular configuration. A deep understanding of the unique case of Palestine constitutes a unique opportunity to get additional insights on how those additional complexities can be managed and manipulated to improve ICT sector’s performance. These insights can contribute to the academic and practical knowledge for developing countries that may face some of those constraints.

Another opportunity that contributes to the choice of Palestine as a study case for the purpose of this research is that one of the researchers is uniquely qualified, being a Palestinian, and therefore had an insider view that helps understand the sociocultural perspective of the country. In addition, he had strong contacts throughout the academic, industrial, and government sectors in Palestine which constitute the population of the potential informants for this study.

1.2. Research Problem and Research Questions

Our research study is grounded on a synthesis of the different models from the literature to create a superset of critical factors and their effects on building an information economy. This synthesis is represented in a higher-level framework that reflects both commonality and variation between studies, countries, and regions. This framework is based on existing literature and is elaborated upon and refined based on the secondary and primary data collection. The superset of
factors and general framework guided the current investigation in our case study, to identify the most promising areas of improvements or *sweet spots* to make progress in the path of an information economy.

The particular country studied is Palestine, which is a developing country trying at this stage to build an information economy with the help of private sector funding and foreign aid. Palestine offers an interesting case context because of its unique political, historical, and geographical situation, and therefore it can serve as a useful source of data for comparison and testing of the synthesized framework. Palestine is extreme on several country characteristics because of its unique political situation that poses a challenge to policymakers.

The proposed research questions for this study are:

RQ1. What are the factors affecting the ICT Sector in a developing country that is on the path of building an information economy?

RQ2. How to best model critical factors of an information economy in developing countries?

RQ3. In the case of Palestine, what are the unique aspects of the country that are particularly enabling or inhibiting the development of the ICT sector to set the path to an information economy?

RQ4. In the case of Palestine, what are the promising areas of improvements in the current configuration to help build an information economy?

RQ5. In the case of Palestine, how can the current configuration be changed to capture the opportunities in the promising areas identified?

This dissertation addresses the research questions in three studies. RQ1 and RQ2 are covered in the first study where a decision framework is built based on the identified potential
factors from prior literature. The second study answers RQ3 and RQ4 using the decision framework to guide the collection of secondary data for the case of Palestine, which is used then identify sweet spots in the framework to be improved. Finally, study three uses the identified sweet spots to guide primary data collection to answer RQ5.

1.3. Dissertation Structure

The goal of this dissertation is to develop and test a decision-making framework to help researchers and policymakers analyze the current status of an ICT sector in a developing country and then help build a roadmap for further improving and developing of the ICT sector to contribute towards creating an information economy.

Chapter 2 presents the first study in this dissertation, which is designed to answer RQ1 and RQ2. It starts with a literature review to introduce several issues related to Information and Communication Technology for Development (ICT4D), beginning with an investigation of the different classifications used by three international organizations to classify countries according to their development status. This is followed by additional topics within ICT4D such as digital divide, transfer, and diffusion of ICT innovations, and finally the contributors to ICT4D from academic literature. Three types of contributors are identified: factors, supply chain view of ICT, and stakeholders which contribute to the production of different types of ICT outputs (hardware, software, and contents) that are produced by an ICT sector.

The contributors to ICT4D identified from the literature review are then incorporated into a unified ICT4D decision framework, where the different factors are categorized into super factors and set to one dimension, and the supply chain view on the other dimension. Finally, different ways to use the unified decision-making framework are discussed in the last section.
The research design is discussed in Chapter 3. It starts with a review of the findings from study one. Next, the framework from that study is incorporated into the case of Palestine in two steps. Study two uses secondary data from several sources about Palestine to help evaluate the current status or configuration of the ICT sector within the Palestinian economy and identify sweet spots. Finally, in the third study, the researchers demonstrate the process of doing the interviews with stakeholders in the ICT sector in Palestine to better understand the identified opportunities from the secondary data study, and to find what can be changed to reach those goals. Additional details of the data collection and analysis steps are included in this chapter.

Chapter 4 is the starting point for study 2, where the decision framework is used as a guiding framework to collect information about Palestine and to help answer RQ3 and RQ4. The case of Palestine is discussed in detail, offering an understanding of its current configuration concentrating on the most important contributing factors to its ICT sector including political reality, economy, education, and the current state of ICT sector and infrastructure. The decision framework is then used along with the secondary data in order to find opportunities for change and evaluate the current ICT development path, in addition to offering recommended changes to the current configuration to help build an information economy.

Chapter 5 presents study 3. It starts with an explanation of the data collection and analysis process. Then the interview data is used to get a deeper understanding of specific areas of interest that are investigated through the decision framework. Five different scans of the framework are presented, (Create value chain activities, educational Infrastructure, ICT stakeholder’s roles, exogenous factors, and Make value activities). Each of the scans is followed by a SWOT analysis table summarizing the main findings.
In Chapter 6 a general discussion of the results and the implications of the dissertation are presented. The anticipated contribution of this research is presented in Chapter 7, in addition to future research plans based on the decision framework.
CHAPTER 2: LITERATURE REVIEW AND FRAMEWORK BUILDING

This chapter is divided into two main parts:

- The literature review: which covers a number of areas related to this study starting with a general understanding of the development classification used by several international organizations, in addition to a number of relevant topics for the purpose of the study, such as ICT4D, digital divide and the transfer and diffusion of ICT innovations.

- Framework building: starts with a survey of the academic literature to find the different contributors and factors to the success of an ICT sector. Those factors are used then to build an information economy decision-making framework. Finally, a number of ways to make use of the introduced model are discussed in the last section.

2.1. Understanding Development

About 75% of the world population lives in developing countries, and it is also estimated that most growth in human population will be in those countries (Jreisat, 2011).

The concept of development can be traced back to the mid-20th century. After an era of colonization, newly independent countries started investigating ways to build/adjust their political, economic and social structures for building their states. The initial view followed “modernization theory” where the idea was that less developed countries should follow the steps of more developed
countries in their path for advancement through the employment of advanced technology and science by the state to control the physical and social environment of people through a comprehensive development plan or (blueprint). This view was criticized for not taking into account the sociocultural and history of those developing countries in addition to the time gap between the development of the developed (model) countries and the time of development of the new states (Jreisat, 2011).

2.2. **Countries Development Classification**

The divide between countries in term of development can be a controversial one since it depends on the organization that makes such classifications (OECD, 2015). Some of the world organizations that make such classifications are World Bank, United Nations (UN), and the International Monetary Fund (IMF). Each of these organizations has its own criteria and classification and even its own naming convention. Although economists may easily categorize certain countries as being either developed or developing such as the United States (US) or Japan as being developed countries, other countries are more difficult to categorize such as Russia, which may fall into any of the categories. The categorization depends on what can be meant by the level of development, and what threshold is used to make such a classification. One of the most basic indicators used is the Gross National Income (GNI) per capita which is used mainly by the World Bank that categorizes economies to low and middle-income countries as developing countries, and high-income countries as developed countries.

The United Nations uses a more complex index that was developed to measure development from a more detailed perspective, namely the Human Development Index (HDI). The index reflects the capabilities of the people in a particular country, rather than just the growth
rate of an economy. This approach, therefore, helps policy makers compare two or more economies with a deeper understanding. The index is composed of three dimensions, health measured by life expectancy, knowledge measured by years of schooling of adults and children, and standard of living measured by gross national income per capita (Jahan, 2015).

Finally, the International Monetary Fund uses per capita income level, export diversification, and degree of integration into the global financial system to determine a country’s classification. (World Bank, 2015).

Table 1: Developed\Developing Countries Classification (Nielsen, 2011) summarizes these three different classifications system. It also includes information about the various thresholds and naming conventions.

The use of one or other classification system depends on the purpose of the classifications, Palestine is considered among the three classifications to be a developing country, and according to the World Bank, it is considered among the lower middle-income countries. Therefore, it is regarded as a developing country throughout the dissertation.

2.3. **Information and Communication Technology for Development**

The potential role that ICT can play in development (ICT4D) has been an open area of research in many disciplines including Information Systems (Baliamoune-Lutz, 2003; Heeks, 2008; Techatassanasoontorn et al., 2011) and development studies. Many studies assume that improving ICT would help in development at many levels (Avgerou, 2010; Mann, 2003; Walsham, Robey, & Sahay, 2007). Such as GDP growth (Baliamoune-Lutz, 2003; Dedrick, Gurbaxani, & Kraemer, 2003; Jalava & Pohjola, 2002; Kraemer & Dedrick, 1994), in addition to the reduction
of poverty, increase productivity, economic growth, improve accountability and governance (The World Bank, 2012).

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<tr>
<th>Name of 'developed countries'</th>
<th>IMF</th>
<th>UNDP</th>
<th>World Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of 'developing countries'</td>
<td>Advanced countries</td>
<td>Developed countries</td>
<td>High-income countries</td>
</tr>
<tr>
<td>Development threshold</td>
<td>Not explicit</td>
<td>75 percentile in the HDI distribution</td>
<td>US$6,000 GNI per capita in 1987-prices</td>
</tr>
<tr>
<td>Type of development threshold</td>
<td>Most likely absolute</td>
<td>Relative</td>
<td>Absolute</td>
</tr>
<tr>
<td>Share of countries 'developed' in 1990</td>
<td>13 percent</td>
<td>25 percent</td>
<td>16 percent</td>
</tr>
<tr>
<td>Share of countries 'developed' in 2010</td>
<td>17 percent</td>
<td>25 percent</td>
<td>26 percent</td>
</tr>
<tr>
<td>Subcategories of 'developing countries'</td>
<td>(1) Low-income developing countries and (2) Emerging and other developing countries</td>
<td>(1) Low human development countries, (2) Medium human development countries, and (3) High human development countries</td>
<td>(1) Low-income countries and (2) Middle-income countries</td>
</tr>
</tbody>
</table>

A few other researchers argue that this is not the whole story, and the development that results from ICT does not benefit all sectors of the community equally or doesn’t affect developing countries in the same way as developed countries (Baliamoune-Lutz, 2003; Yousefi, 2011). Therefore some researchers argue that other sorts of development should be prioritized and that developing countries should concentrate on the use rather than the production of ICT (Avgerou, 2008).
The assumption that ICT is beneficial for development is shared among many international organizations such as the Organization for Economic Co-operation and Development (OECD) (OECD, 2010) the UN (Celik, 2007), the World Bank (The World Bank, 2012), and the European Union (Piatkowski, 2005). This assumption is based on the observations of the effects of ICT on the development of both developed and developing countries. Many of those international organizations have projects in developing countries to improve ICT diffusion and use to contribute to the overall development.

The role of ICT for development has changed over time, starting with what can be called ICT4D 0.0 where the role of ICT was totally ignored or isolated in development. Moving towards ICT4D 1.0 where the potential role of ICT in development was seen in the effects of ICT diffusion in a country; and in attempting to gap the digital divide and improve infrastructure to maintain a continuous supply of ICT products for users, in addition to increasing awareness (Heeks, 2008). This version of ICT4D sees ICT as a tool to be used to improve productivity in various sectors. See Figure 1: Changing ICT4D Issues Over Time © [2008] IEEE adapted from (Heeks, 2008).

More recently the ICT has been playing a more advanced role in development. See Figure 2: Changing Strategic View on ICT and Development © [2008] IEEE adapted from (Heeks, 2008).

ICT4D 2.0 views ICT as a platform for development that starts with a higher level of implementation and applications of ICT towards innovation that can produce an impact on social and economic development goals.

The research area of ICT4D is broad and includes different development areas in a society such as education, health, agriculture. In fact, each one of these subareas opens further doors to study how ICT can affect development.
Given the general consensus among scholars and international organizations as discussed above, this study adopts the assumption that ICT is beneficial for the growth and development of developing countries.
2.4. Digital Divide

Digital divide is a term that has been used in its most basic definition to refer to the gap in the accessibility to the internet between different groups. The term has been used broadly to refer to various technologies, at different levels, and at different utilization levels of technologies. For instance, the term “global digital divide” has been used to refer to the difference in accessibility to technologies mainly the internet between different countries, while the term social divide is used to describe that gap when it occurs within a particular country in the society (Norris, 2001). Other levels of digital divide include individuals, organizational and regions. (Hilbert, 2011).

Although narrowing the accessibility gap can be seen as a goal at the different levels, it may not be enough to help describe and understand the development gap. Therefore many researchers include other important dimensions to the problem. For example, bridging the gap in the knowledge and utilization of the different technologies (Hilbert, 2011) may pose more challenges than bridging the accessibility gap.

Therefore, for the purpose of this dissertation, the focus is on finding ways to bridging the gap of effective utilization of Information Technology between countries which is assumed to help in the development of those countries.

2.5. Transfer and Diffusion of ICT Innovations

Realizing the existence of a digital divide between countries, and understanding the role that ICT can play in development, the next step would be to understand the mechanisms for effective transfer and use of those technologies. This opens a door to another discussion about the possibility of transferring those technologies along with the knowledge and the mechanisms in which those technologies operate.
The main challenge here is that the transfer of technologies in most cases happens between two different environments. Therefore the process may not be seen as a process of just transferring ICT innovations between two environments, but as a process of giving birth to a similar ICT innovation that fits the new environment, that can adapt to the different parameters and conditions of this new environment. The term social embeddedness is sometimes used to refer to this perspective (Avgerou, 2008) compared to the concept of transfer and diffusion of ICT innovation.

The social embeddedness perspective agrees with the premises of contingency theory (Fiedler, 1967). ICT for development should not be thought of as merely a transfer of ICT innovations between two different countries. It should instead start from an understanding of the contingencies of the developing country understudy, and then work on “constructing new techno-organizational structures within a given local social context and places research emphasis on exploring local meanings and working out locally appropriate techno-organizational change”.

The social embeddedness view can be thought of as the highest level of ICT4D discussed earlier. It goes beyond diffusion and integration of ICT towards encouraging innovation that gets born within the socio-cultural context of the developing country.

2.6. Critical Success Factors

This takes us to our specific context of this study, namely understanding the factors that contribute to the success or failure of building an ICT sector that would help in the development of a country.

There are several ways to look at the factors contributing to building an ICT sector and its relation to overall development, and several studies looked at this problem from different perspectives. A summary of those papers was compiled by (Techatassanasootorn, Huang, Trauth,
& Juntiwasarakij, 2011) and is adapted and summarized in Table 2: Prior studies adapted from
(Techatassanasoontorn et al., 2011)

Some studies looked at the factors affecting IT industries in developed countries including
(Asian Pacific Countries, Israel, India, Singapore, Ireland, Russia, China, Finland, and New
Zealand), and those studies and the factors that they found are discussed below.

In a paper that studies the factors influencing investment in information technology, and
the payoffs from investment in IT use on productivity and economic growth (Dedrick & Kraemer,
1995), it was found that there is a positive correlation between growth in IT investment and growth
in GDP and productivity in 12 Asia-Pacific countries over the period of seven years. The study
also found that a number of factors contribute to the development of computer industry, namely
(human resources, complimentary industries, R&D investment and government plans). It is also
suggested that IT use (as opposed to IT production) may have a better economic effect that would
be reflected in increased productivity and growth. They argue that for a country to be able to
produce it needs sophisticated users as a market and to interact with developers to improve
development. Also, the study reflected on the success of certain countries (Singapore, Taiwan, and
Korea) in investing in IT production, by stating that they succeeded in attracting foreign
investments in production facilities (Dedrick & Kraemer, 1995).

In two studies (Ein-Dor et al., 1997; Ein-Dor, Myers, & Raman, 2004) authors argue that
small countries are not at an economic disadvantage to larger countries in regards to the
development of IT industries. Both studies develop a theoretical model to find factors that
contribute to the success of an IT industry in small countries.
Table 2: Prior studies adapted from (Techatassanasoontorn et al., 2011)

<table>
<thead>
<tr>
<th>Study</th>
<th>Focus</th>
<th>Country</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedrick &amp; Kraemer (1995)</td>
<td>Computer hardware and software industry</td>
<td>Asia-Pacific countries</td>
<td>Human resources, complementary industries, R&amp;D investment, and government plans are important to the development of the computer industry</td>
</tr>
<tr>
<td>Ein-Dor et al. (1997)</td>
<td>IT industry</td>
<td>Israel, New Zealand, Singapore</td>
<td>Government policy in promoting IT production, supporting IT industry R&amp;D, and in educational policies are critical to the success of IT industry</td>
</tr>
<tr>
<td>Ein-Dor et al. (2004)</td>
<td>IT industry</td>
<td>Finland, Israel, New Zealand, Singapore</td>
<td>Technology infrastructure, R&amp;D, firm strategies, and capital availability are important to the development of IT industry</td>
</tr>
<tr>
<td>Heeks (2006)</td>
<td>Software industry</td>
<td>India</td>
<td>Advanced skills base, strong skills development institutions, clustering, domestic competition, and government policy are the important sources of competitive advantage of India’s software industry</td>
</tr>
<tr>
<td>Heeks &amp; Nicholson (2004)</td>
<td>Software industry</td>
<td>China, India, Ireland, Israel, Russia</td>
<td>International and domestic demands, national policies, a skilled workforce, technological infrastructure, financial incentives, and R&amp;D investment influence software industry development</td>
</tr>
<tr>
<td>Tan &amp; Leewongcharoen (2005)</td>
<td>IT industry</td>
<td>Thailand</td>
<td>Geographic location, IT related foreign direct investment, and human resources influence the success of the IT industry</td>
</tr>
<tr>
<td>Trauth (2000, 2001)</td>
<td>IT industry</td>
<td>Ireland</td>
<td>Explicit and flexible public policies linking ICT and economic development, coordinated educational and employment policies, developing both physical and human infrastructures, leveraging unique cultural and contextual characteristics of the country are critical to the success of Ireland’s IT industry</td>
</tr>
<tr>
<td>Wong (1998)</td>
<td>Information industries</td>
<td>Singapore</td>
<td>Four stages of information industry development corresponding to the policy emphasis on ICT good industry, content industry, network infrastructure, and ICT use</td>
</tr>
</tbody>
</table>

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In the first study (Ein-Dor et al., 1997) compare three small developed countries (Israel, New Zealand, and Singapore) to understand the factors that helped in building a successful IT production industry. They developed a model to compare those three countries and to understand the factors that contribute to their success. See Figure 3: Factors Affecting IT Industry Success
(Ein-Dor et al., 1997) The study found that Government IT Policy, Government Education Policies, Supporting IT Industries R&D were key enablers. Also in the case of Singapore that government intervention in promoting the domestic use of IT had a positive effect on IT production.

![Figure 3: Factors Affecting IT Industry Success (Ein-Dor et al., 1997)](image)

In the next study, seven years later (Ein-Dor et al., 2004) further developed the model and used longitudinal and time slice data between 1994 and 1998, and included one more country (Finland) to their list. The model incorporated an additional perspective from New Growth economics to the original model. See Figure 4: IT Industry Success Model (Ein-Dor et al., 2004). The study found that in addition to the factors mentioned in earlier studies, Capital Availability and Firm Strategies were additional significant factors contributing to the success of the IT industry. On the other hand, it found that domestic IT use and education had little impact. This may be due to the fact that local IT markets are not the targeted by the sector. Therefore domestic IT use may not be that significant. Regarding education, the study attributed the little impact to small sample size and to the nature of one country (Israel) that had many immigrants.
The studies above all looked at the IT industry as a whole, while other studies made some distinction between the different subsectors within IT sector. For instance, (Heeks, 2006) viewed the IT sector to be comprised from several overlapping subsectors (content, services, goods, software and Infrastructure), and adopted a topology from previous studies of the IT subsectors showing the overlap between the different parts. The topology can be seen in Figure 5: Typology of IT sector (Heeks, 2006). This distinction is of importance for this study since it looks closer into the subsectors in a supply chain model. The study looked closer into the software industry subsector in India, using competitive advantage theory (Porter, 2007) to understand the success of this industry in India. It found that the following factors are the sources of the competitive advantage in India: advanced skills base, skill development institutions, clustering (supporting locational clusters through infrastructure investments), domestic competition, and government policy.
In another study (Heeks & Nicholson, 2004) about the success factors of the software export industry in what it called the three largest software followers the 3Is (Ireland, Israel, and India). The study developed a “Software Export Success Model” and then used it to help analyze other second-tier follower countries namely Russia and China. Using ‘template analysis’ from interviews and secondary sources the author identified five main category factors, that are listed below:

- Global and local Demand.
- National vision and strategy: Goals and interventions
- International linkages: reputational effects and trust.
- Software industry characteristics: size, competition, clustering, and collaboration
• Supply factors and infrastructure: Human capital, technology, and finance.

These factors were incorporated into the model in Figure 6: Software Export Success Model (Heeks & Nicholson, 2004). The model was then used to analyze the software industry in both Russia and China using interviews and secondary data, and weaknesses points identified for instance in government interventions and lack of trust from western clients for both countries. The study also used strategies such as low-cost, differentiation and re-scoping from business literature (Porter, 2007). Regarding intervention, the study offered intervention recommendations based on 6 points (People, Technology, Finance, R&D, Information, and other).

Another stream of studies tries to understand the factors that affect developing countries. Although some factors are effective for both categories, research, in general, concentrated on developed countries. The developing countries IT industry success is relatively a newer stream of research. A review of a number of studies in developing countries follows.

Many studies make use of the developed countries literature as a starting point to understand some of the factors that may affect both categories. For instance (Tan & Leewongcharoen, 2005) uses the model from (Ein-Dor et al., 1997) model that was earlier to develop it further and adapt it to fit developing countries instead.

The model first recognizes that there are exogenous and endogenous factors that would affect the IT industry success, and then some factors were added since they were more relevant to developing countries such as political stability (Katz, 1988) as a control variable.

Also in this model, the five mediating factors influence the FDI, which in effect would affect the IT industry success. Firm Strategies factor was removed from the new model since this factor was not found to be significant, in addition to the fact that there is difficulty in generalizing
a firm strategy for a whole country. R&D was included under Government Policy, and Education Policy under Human Resources factor, Infrastructure became a separate factor because of its importance in this context. Finally, Foreign Investment was added as an additional factor.

![Software Export Success Model](https://example.com/model.png)

This model was then tested on one developing country, Thailand. Success was measured in terms of Production and Export of IT goods. Each category of factors was divided into subfactors, and then for the sake of operationalizing “table shells” were used to match factors, with subfactors with measurable variables. Those variables were populated using interviews and secondary data. The results of testing this model can be seen in Figure 7: Thailand’s IT Industry Success (Tan & Leewongcharoen, 2005).
The model shows that five factors directly support FDI, which in effect affects IT industry success. However, in terms of direct effect, it seems that only Location and FDI directly affected the IT industry success. It can also be noted that Location appeared to be a significant factor for developing countries, while it was not relevant to developed countries. One of the limitations of this study as recognized by the authors was that the success was measured using IT production and exports without considering the depth of technology and breadth of production.

One of the general models that is used in the literature to explain the process of technology interaction with other factors within a society is the Influence-Impact model of technology-society interaction (Trauth, 2000, 2001). See Figure 8: Influence-Impact Model (Techatassanasoontorn et al., 2011).

This model suggests the process of creating an information economy is reciprocal, where (Policy, Infrastructure, Economy, and Culture) factors interact together to build and influence an information economy which would, in turn, affect those same factors. Those four factors are
considered high-level concepts that are operationalized into measurable variables identified in the (Trauth, 2000) study that depends on the specific country.

![Figure 8: Influence-Impact Model (Techatassanasoontorn et al., 2011)](image)

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A different view for developing ICT sector can be seen in an older study (Wong, 1998) that uses a supply chain model that looks at the creation of information economy in Singapore, see Figure 9: Conceptual Framework of Information Economy (Wong, 1998). The model first recognizes three different types of products of ICT, namely (network infrastructure, ICT goods, and content industry).

The significance of this model is that it incorporates different dimensions of the ICT industry, and there seems to be a certain value at every level of the supply chain. It can be seen from studies discussed earlier (Kraemer & Dedrick, 1994) that the use of ICT has its own added value on growth, and that some countries may choose to make better use of technology to improve productivity rather than create or produce ICT products. Within this process, each country can decide to make a contribution to the global economy based on its capabilities.
The model also looks at the information economy as a supply chain, where the following different phases of the supply chain are used:

- **Create**: Refers to the first step in the process, to innovate and design artifacts whether it was software, hardware, or content.

- **Make**: The actual process of making or manufacturing of concepts created. Ex: manufacture hardware, software.
• Move: Logistics that would enable the delivery of product and services to target. Ex: exporting/importing.

• Integrate/Transact: integrating components, work on applying ICT. Ex: consultancy, offer technical support.

• Use: Making effective use of the ICT services and products, therefore enhancing productivity. Ex: adopt and use of ERP or a government system.

2.7. SWOT Analysis

One tool that is used in the literature for analyzing the external environment and the internal strengths and weakness at different levels such as sector, organization, or project, is the Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis and planning method (A. S. Humphrey, 2005). It has been used for instance to analyze the ICT sector in India (Nair & Prasad, 2004), and to analyze e-commerce adoption in southeastern Europe to make policy recommendations (Papazafeiropoulou, 2004).

SWOT analysis is used therefore along with the ICT4D decision framework, to understand the external and internal factors affecting developing countries by finding:

• Strengths – Characteristics of the country for the given activity, factor, and stakeholder that gives it an advantage over other countries.

• Weaknesses - Characteristics of the country for the given activity, factor, and stakeholder that places it at a disadvantage relative to other countries.

• Opportunities - Characteristics of the country for the given activity, factor, and stakeholder that can be exploited to give it an advantage over other countries.
• Threats - Characteristics of the country for the given activity, factor, and stakeholder that can cause trouble or provide other countries the advantage.

Based on control theory, two further items for analysis were added (Ouchi, 1979):

• Control: The amount of control the country has to manipulate the factors in this cell.

• Impact: The expected cost/benefit of manipulating the factors in this cell.

Those tools are used in two phases, in the first phase SWOT analysis is used to analyze the current situation and direct environment surrounding a specific set of factors under study. The second phase (CI) is used to find specific controls (changes) that potentially have high impact for improving the ICT sector.

2.8. Framework Building

The problem of building an information economy, as can be seen from the previous studies, is that it has different dimensions, such as:

• Factors related to the IT sector or one subsector (Ein-Dor et al., 1997, 2004; Kraemer & Dedrick, 1994)

• Subsectors such as contents, services, goods, software, and infrastructure. (Heeks, 2006; Wong, 1998)

• Markets: including international and national markets (exports and imports). (Heeks & Nicholson, 2004)
- Value chain: looking at the different roles that can be played including by an ICT sector such as to Create, Move, Transact and Use. (Wong, 1998)

- Process: Namely society and technology interaction that goes in both directions. (Trauth, 2000)

Finally, it is important to identify the essential stakeholder classes for the country under study. For the purposes of this research, the ‘triple helix’ of innovation stakeholders – academic, industry, and government (Etzkowitz & Leydesdorff, 2000) was adopted.

Therefore, the challenge was trying to capture all or most of those dimensions of the problem in a single unified model that can be used to help decision makers identify potential opportunities and points of weakness where they can make a change in their ICT sector.

Some of the models from the literature had a hybrid nature in the sense that it was able to capture more than one dimension. For instance, (Wong, 1998) was able to capture the value chain view which contained the subsectors of ICT in addition to the process view and the international\national market view. However, his model did not include other factors that can enable the information economy which were identified in other studies.

This challenge was approached by incorporating a superset of factors to the value chain model by (Wong, 1998), creating a decision framework to help policymakers analyze their local economy. The next step was in identifying points of strengths, weakness, opportunities and threats in the current position and understood the points of impact within reach. The next section discusses the proposed decision-making framework.
2.9. Decision Framework

There are mainly three dimensions for the framework: (1) a value chain view of the problem adopted from (Wong, 1998); (2) the factor view; and (3) stakeholders.

The main idea behind the first dimension is that it looks at the ICT sector as a value chain, and identifies five dimensions for an information economy, namely (Create, Make, Move, Transact, Use).

The second view of the framework is the factor view. Based on previous research, a superset of factors was identified as being relevant, see Table 3: Decision Framework Super Factors. These factors were arranged by the level of control a country can exercise on each of the factors. A more detailed list of factors identified in the literature and their theoretical basis can be found in Appendix A. Also, a more comprehensive map between the superset factors and identified factors can be seen in Appendix B.

Table 3: Decision Framework Super Factors

<table>
<thead>
<tr>
<th>Control</th>
<th>Superset Factor</th>
<th>Examples of Subfactors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less Control</td>
<td>Government Policy</td>
<td>Economy, taxation, trade policies, ICT policies, educational and employment policies, vision and strategy.</td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td>Human resources, telecommunication, ICT infrastructure, R&amp;D expenditure.</td>
</tr>
<tr>
<td></td>
<td>Sociocultural Factors</td>
<td>History, culture (including innovation culture), unique factors.</td>
</tr>
<tr>
<td></td>
<td>Global Markets</td>
<td>Trust, FDI, global demand.</td>
</tr>
<tr>
<td></td>
<td>Exogenous Factors</td>
<td>Location, political reality, country size.</td>
</tr>
</tbody>
</table>
The third dimension used for building the framework was the stakeholder view, as identified above, the potential role of three main stakeholders, namely: Academic, Industry, and government are studied.

For every country, there are a unique set of factors that can affect its position in the global market. For each factor and value chain step, countries need to find the opportunities, enabler, constraints and choice that can make the most impact on the economy.

A definition of those terms is given below.

- **Opportunity [O]:** A Chance to make a positive difference that has an Impact, based on the unique factors affecting the country.
- **Enablers [E]:** Are the factors that act in the favor of an emerging country. (Ex: Human Capital, location, language)
- **Constraints [X]:** Are the realities that act against an emerging economy, and that cannot be changed. (Ex: Political Reality, location, natural resources)
- **Choice [C]:** Is the area where an emerging country can make a difference to build its information economy.
- **Impact [I]:** The expected effect of that choice\area on the overall economy.

Based on the above, our proposed framework can be seen in Figure 10: Proposed ICT4D Decision Framework. Next section presents different ways to navigate the decision framework to analyze the ICT sector of a developing country, to find opportunities for change.
Figure 10: Proposed ICT4D Decision Framework
2.10. Walking the Framework

To put the framework into work, we walk through a set of factors in the value chain. There are several ways that an investigator can walk the framework to identify potential areas of change to build an information economy using the SWOT-CI analysis and also to attempt to find the most influential stakeholders that could help make the change.

It is possible to scan the framework either horizontally or vertically based on a general understanding of the current state of a country.

1. **Vertical Scanning**: To scan each row vertically up-down (vertical scanning) to identify a value chain process to concentrate on by manipulating the different super factors (vertically), therefore trying to find the most effective value chain processes to try to improve, and the stakeholders that would contribute to making these improvements.

2. **Horizontal Scanning**: It is also possible to walk the framework horizontally left-to-right (horizontal scanning) trying to find opportunities by changing some of the super factors to improve the value chain processes. By fixating on each of the super factors at once and trying to think about possible changes to improve some or all of the value chain processes.

3. **Cell Scanning**: A more thorough analysis is possible that would require studying each cell separately to find potential opportunities in each cell find opportunities.
2.10.1. Vertical Scanning

One way to walk the framework is by starting with a general understanding of the economic situation and the general restrictions for building an information economy. Having this picture in mind, it would be possible then to form questions using vertical scanning at the framework to identify potential opportunities for change.

This method would require an understanding of the current position and economic situation of a given country including the different exogenous factors, global markets, sociocultural factors, infrastructure, and the current policies of the particular country.

With this understanding in mind, an investigator would then try to identify one of the value chain processes (rows) to elect for improvement by changing one or more of the factors. Therefore concentrating on that particular process to try to understand deeply the possible ways to make changes and the potential impact that it may yield, a question can be formed in the following manner:

*Based on the current understanding of the state of the country and its economic situation, what are the value chain processes among (Create, Make, Move, Integrate, and Use) that have the most potential to generate a positive change towards an Information economy by manipulating one or more of the super factors?*

Further analysis of the potential of each row can lead to more specific question for each row, in the following manner:

*Based on the current understanding of the state of the country and its economic situation, what are the possible opportunities to make changes by manipulating the different factors*
(horizontal factors) that would have an impact to facilitate the CREATION of new ICT products and services that would contribute towards building an information economy?

The same method can be used to ask a similar question on each of the other rows, trying to find the most suitable role\'s that a country can play in the value chain based on the current situation. Therefore, more questions would emerge in the following manner:

*Based on the current understanding of the state of the country and its economic conditions, what are the possible opportunities to make changes by manipulating the different factors (horizontal factors) that would have an impact to facilitate making previously designed/created ICT products and services that would contribute towards building an information economy?*

More questions can be formed in a similar manner by plugging-in to the question each one of remaining value chain processes (Move, Integrate, and use) in place of the bolded text.

**2.10.2. Horizontal Scanning**

Horizontal scanning requires the investigator to move horizontally through our framework scanning through the different super factors trying to find potential opportunities to improve some or all the value chain processes. As an example, we navigate through one of the columns. We use the policies set of factors as an example. Policies may be among the easiest tools of control among all the other set of factors at least from a policy maker’s point of view. Policies also can have a significant impact on the development of the ICT sector on the long run. Some of the most relevant policies are economic, taxation, trade, ICT, educational and employment, vision, and strategy. To use the decision, framework a number of experts can start by reading and understanding the framework, and selecting the most promising areas. Then they need to go through each item of the
value chain and evaluate it in terms of the opportunities, enablers, constraints, choice, and impact. We can start with Create, a question can be asked for each cell:

**Policy and Create: Creating or designing ICT products**

What are the opportunities that may arise from changing the current policies (such as economic, taxation trade,) to enable or improve the creation or design of new ICT products including (Software, Hardware, Content, and Infrastructure), and what are the expected impact of those policies given the current constraints?

The question can also be rephrased to start with a SWOT analysis for the position of that particular value chain using a question like:

What is the current position regarding Strengths, Weaknesses, Opportunities, Threats for creating new or improve the creation of ICT products?

How can the policies that need to be changed to take advantage of those opportunities, given the constraints and the expected impact of those changes?

**Policy and Make: Manufacturing or implementing the designs**

What is the current position regarding Strengths, Weaknesses, Opportunities, and Threats for manufacturing/implementing new ICT products?

How can we change the current policies in order to take advantage of those opportunities, given the constraints and the expected impact of those changes?

**Policy and Move: Logistics that includes exporting/importing**

What is the current position regarding Strengths, Weaknesses, and Opportunities, and Threats for exporting or importing or moving ICT products?
How can we change the current policies in order to take advantage of those opportunities, given the constraints and the expected impact of those changes?

Policy and Integrate: Integrating and supporting services locally or abroad

What is the current position regarding Strengths, Weaknesses, and Opportunities, and Threats, for integration services locally or globally (consultation or Technical support)?

How can we change the current policies in order to take advantage of those opportunities, given the constraints and the expected impact of those changes?

Policy and Use: Local utilization of Technology

What is the current position regarding Strengths, Weaknesses, and Opportunities, and Threats, for improving the utilization of technology?

How can we change the current policies in order to take those opportunities, given the constraints and the expected impact of those changes?

In fact, each one of those questions requires a deep analysis starting from the current situation trying to identify the potential opportunities; policy makers would need first to go over the table to determine general areas of interest rather than answering all the questions in all the cells.
CHAPTER 3: RESEARCH DESIGN

The purpose of this dissertation is to help understand the role of ICT sector in development in a developing country on the path to an information economy and to help decision makers make changes to the current setting to achieve that goal. This is done in three consecutive studies. The first study reviews the academic literature to identify factors that can contribute to building an information economy, which is then incorporated into a decision framework. The second study uses that framework to analyze the unique case of Palestine using secondary data to find possible sweet spots. Finally, the third study uses primary data from interviews to find what need to be changed in the factors to achieve the goals identified to set the path to building an information economy. A summary of the dissertation plan can be found in Table 4: Dissertation Studies.

3.1. Study 1: Decision Framework

After reviewing the literature, the factors affecting an ICT sector were synthesized into five super factors (Exogenous Factors, Global Markets, Sociocultural Factors, Infrastructure, and Government Policies), each having a different possibility of control by the developing country. Combining those factors with a supply value view of the ICT processes leads us to build a development decision framework. See Table 4: Dissertation Studies.

The existing theoretical models from the literature review were synthesized to create a comprehensive and parsimonious framework that better supports the understanding of the different factors that interact to strengthen the ICT sector in a country. Effective use of this new framework
can help identify areas of improvement to facilitate the creation of an information economy that employs technology widely in its various sectors, and would be able to offer value to the global market.

### Table 4: Dissertation Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Purpose</th>
<th>Data Sources</th>
<th>Research Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision Framework (presented in Chapter 2)</td>
<td>Identify the factors that contribute to building an information economy.  Build a decision framework based on those contributors.</td>
<td>Academic Literature</td>
<td>RQ1 &amp; RQ2</td>
</tr>
<tr>
<td>The case of Palestine:</td>
<td>Investigate the case of Palestine to understand the current configuration. Identify potential opportunities.</td>
<td>Secondary data</td>
<td>RQ3 &amp; RQ4</td>
</tr>
<tr>
<td>Identifying the sweet spots (presented in Chapter 4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The case of Palestine:</td>
<td>Get a deeper understanding of those sweet spots. Identify possibilities of change to capture those opportunities.</td>
<td>Primary data from interviews</td>
<td>RQ5</td>
</tr>
<tr>
<td>Opportunities for change (presented in Chapter 5)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3.2. Study 2: The Case of Palestine, Finding the Sweet Spots

In the second study, the decision-making framework is used as a roadmap to collect secondary data to understand the current configuration of factors affecting the ICT sector in Palestine, and the ICT sector itself. This data were drawn from existing secondary sources of country indicators such as the United Nations, the World Bank, Palestinian Bureau of Statistics, and academic and media articles.

The data collected from this phase is used along with the methods discussed at the end of the framework building section above to find opportunities that have the highest potential impact on one or more of the value supply chain processes. The focus then turns into how the current
configuration affects the discovered opportunities. For this purpose, the academic literature is used to understand how each of the super factors affects the value chain process. Also, potential changes or configurations are explored that can act as a guide to policymakers for them to exploit the identified opportunities.

3.3. Study 3: Opportunities for Change

A number of ICT stakeholders in Palestine were interviewed to validate the results found in the secondary data analysis. For the purpose of identification of possible candidates for the interview, one of the researchers had strong contacts throughout the academic, industrial, and government sectors in Palestine which constitute the population of the potential informants.

Based on the contacts the researcher had, interviewees were selected based on a convenience set of key informants to including all three types of stakeholder mentioned above, the targeted set included is described in Table 5: Key Informants.

Potential stakeholders according to the criteria determined above were contacted to inquire about their willingness to participate in the study, willing participants were sent the consent form to understand the objectives of the research and were asked to read and sign it if they agreed to the terms, the consent form can be seen in Appendix D.

Also, an interview protocol based on the research questions and proposed framework was prepared and used for those interviews. See Appendix E.

Phone and/or Skype interviews were conducted by the researchers with the selected stakeholders from each quadrant. Each interview started by trying to identify possible goals and opportunities for the ICT sector in Palestine, in addition to the different factors relevant to the identified opportunities from the second study, such as the motivators and inhibitors for those
opportunities. This helped find possible opportunities for change in those factors that would have an impact on the ICT sector in and the Palestinian economy.

Table 5: Key Informants

<table>
<thead>
<tr>
<th>Informants from international companies such as (Cisco, HP, Microsoft)</th>
<th>Informants from local software development startups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Sector (Industry)</td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td></td>
</tr>
<tr>
<td>Informants from local software development startups</td>
<td>Officials from the Palestinian government and the Palestinian Information Technology Association (PITA)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Academic in an ICT department in Palestinian universities</td>
<td></td>
</tr>
</tbody>
</table>

The interview questions started with a holistic approach giving the interviewees the opportunity to verify and expand on the pre-determined factors from the second study to help refine the framework. Then the researcher asked questions that were guided by the predefined factors that the interviewees did not cover to assess their importance to the opportunities in question. The final set of questions covered the interviewees’ views on the decisions that need to be made in the different factors to capture those opportunities, in addition to understanding the degree of freedom allowed by the inhibitors and motivators for those choices. The full interview script can be found in Appendix C.

Some of the specific questions that were asked to the interviews are:

- What are the most relevant factors in the Palestinian case that contribute to helping the ICT sector support the creation of an information economy?
• Among the different supply chain processes, where do you see the opportunities that can have the biggest impact on the improvement of the ICT sector and the Palestinian economy?

• What are the inhibitors to capturing those opportunities, and what degree of freedom do you see in manipulating those inhibitors?

• Can you think of any critical incident that your organization faced where you felt the existence of those inhibitors or motivators?

• What needs to be changed in the current configuration in Palestine to help make use of the potential opportunities in general, and to creation and innovation in specific?

  The data obtained from this primary data collection were then compared to the results obtained from the secondary data, which helped in verify and fine tuning the decision framework, and come up with specific recommendations for policy makers in Palestine to help them reach their goal of building an information economy.
CHAPTER 4: THE CASE OF PALESTINE, FINDING THE SWEET SPOTS

In the second study, the decision framework is put into work by collecting secondary data about Palestine, as discussed earlier.

For that purpose, vertical scanning method was used to find potential areas of development among the value chain processes based on an understanding of the current state of the Palestinian economy. The first step is to answer the following question:

*Based on the current understanding of the state of the Palestine, what are the value chain processes among (Create, Make, Move, Integrate, and Use) that have the most potential to generate a positive change towards an information economy by manipulating one or more of the super factors?*

After identifying opportunities in one or more of the value chain processes, the focus turns into one of those opportunities, by reviewing the literature to understand how it is affected by the different factors. This leads to another question on ways to manipulate changeable factors to capture the identified opportunity.

This section investigates the current state of the ICT sector in Palestine by covering in some detail the factors discussed in the first study, see Table 6: Super Factors in Palestine. The discussion begins with some cases that were covered in different media outlets before going into more details on each super factor.
Table 6: Super Factors in Palestine

<table>
<thead>
<tr>
<th>Superset Factor</th>
<th>Subfactors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Policy</td>
<td>FDI and trade policies</td>
</tr>
<tr>
<td></td>
<td>Corporates policies and Taxation</td>
</tr>
<tr>
<td></td>
<td>ICT policies</td>
</tr>
<tr>
<td></td>
<td>Educational and employment Alignment</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Human capital</td>
</tr>
<tr>
<td></td>
<td>Institutional infrastructure</td>
</tr>
<tr>
<td></td>
<td>Telecommunication</td>
</tr>
<tr>
<td></td>
<td>Financial</td>
</tr>
<tr>
<td></td>
<td>ICT infrastructure</td>
</tr>
<tr>
<td></td>
<td>R&amp;D expenditure</td>
</tr>
<tr>
<td>Sociocultural Factors</td>
<td>History</td>
</tr>
<tr>
<td></td>
<td>Economy</td>
</tr>
<tr>
<td></td>
<td>Cultural factors</td>
</tr>
<tr>
<td></td>
<td>Unique factors</td>
</tr>
<tr>
<td>Global Markets</td>
<td>Global demand</td>
</tr>
<tr>
<td></td>
<td>Global competition</td>
</tr>
<tr>
<td></td>
<td>Trust</td>
</tr>
<tr>
<td></td>
<td>FDI</td>
</tr>
<tr>
<td>Exogenous Factors</td>
<td>Political Reality</td>
</tr>
<tr>
<td></td>
<td>Location</td>
</tr>
<tr>
<td></td>
<td>Country size</td>
</tr>
</tbody>
</table>

4.1. Specific Cases: Palestinian ICT Companies

Next, we discuss some of those companies and some of the challenges and opportunities they faced to get a better understanding of the status of the industry.
4.1.1. Pinchpoint

Pinchpoint is an innovative gaming studio trying to create new kind of mobile games. One of those games (Spermania) got some media attention describing the story and the challenges the company faces such as movement and travel restrictions and costs associated with the occupation. These issues minimize the opportunity to exchange experiences with other gaming studios abroad or even to receive visitors from abroad, a nonexistence talent pool, and some technical restrictions because Palestine is not globally recognized as a country (Parkin, 2014). Therefore, there was no Apple store for Palestine and Palestinian credit cards were not accepted, so for some time Palestinian companies could not sell their apps online.

According to the CEO of the company, there are also many restrictions on the import\export hardware and in some cases on the production by Israel. Palestine has one startup accelerator, and a few incubators, and one venture capital fund, investors find it risky to invest in the Palestinian markets due to the political and economic uncertainties. On the other hand, some of the opportunities\advantages also come from the proximity and partial exposure to the Israeli ICT sector, some other startups even received funds from Israeli investors and were able to share experiences. (Sullivan, 2014). Another advantage is the shared culture with the Arab and Muslim world which opens a niche market, in addition to the ability to create software and apps for the North American and European market (Reidy, 2014).

4.1.2. Yamsafer

Yamsafer is another Palestinian startup company that helps customers book hotels around the Middle East without necessarily using a credit card. This required an innovative algorithm to evaluate the trustfulness of customers since the main challenge to the company was the penetration
rate of credit cards in the Middle East is relatively low, but the company received 1 million dollars’ fund from Sadara and is the most successful startup company so far (Curley, 2012). It is expanding fast in many Arab countries, and it built a mobile application to help customers book hotels on the move. In addition, it specializes in booking packages of events in addition to the hotels.

4.1.3. Souktel

A service connecting employers with job seekers through mobile using text messages, in addition to helping aid people in times of conflict to help save lives, mobile phones has high penetration rate (80%) among Palestinians compared to continuous internet access (33%). Souktel expanded to 15 countries since its inception. Some of the difficulties that the founder faced were the lack of financing at first, in addition to “legal barriers, an uncertain tax climate, outdated intellectual property rights laws and bureaucracy”. Other important factors include political reality and the cultural reality since people generally prefer less risky jobs (Berretta, 2013).

4.2. Government Policies

Government policies play a major role in the ICT sector in Palestine, some of the major factors according will be discussed next.

The Palestinian legal system is missing different laws that should be in place to regulate electronic services and to offer protection for intellectual property, some of the missing laws are listed below according to (Barreto et al., 2013; Palestine Trade Center, 2014):

- Intellectual property rights protection, this has a negative effect on attracting investments in the Palestinian ICT sector, in joining some international organizations like the World Trade Organization.
• E-services and e-commerce There are no laws that in Palestine, however there is a draft of such laws.

• Data protection laws, in addition to treaties to help protect and regulate offshore data storage.

• There are no Standards for ICT in Palestine.

• Corporate and tax laws need improvements.

• More Trade agreements are needed to help with international market access, and to protect the interests of Palestinian ICT companies interested in exporting their products and services.

The government coordination and commitment towards ICT is another issue that emerged from the reports above. There seems to be a vision at high levels in the government towards empowering the ICT sector as a means for economic development. However, there is a lack of commitment and political alignment across the ministries, and at lower levels within each ministry. On the other hand, influential organizations such as the ministry of telecommunications has limited capacity to make a change. The potentials of the ICT sector for development is not appreciated at different levels in Palestine.

4.3. Infrastructure

4.3.1. ICT Infrastructure

Although some form of an ICT sector was present in Palestinian territories prior to 1994 in the form of a number of software and hardware companies and retailers, the Oslo Accords and
formation of the PNA was an important turning point for the ICT sector. Palestinian universities and government offices were connected to the Internet, and the Palestinians were able to import directly for the first time (J. White, Saul, & Davenport, 2012). In addition, the establishment of the PNA led to the establishment to a government body, non-governmental organizations, banks, and new companies, which boosted the demand for ICT products, and therefore the ICT sector. The PNA and its government bodies including municipalities and utility companies are the biggest end users today of ICT products (Palestine Trade Center, 2014).

A number of small private Palestinian ISPs were established in the years after, which opened a number of doors for further expansion of the ICT sector in Palestine. The addition of a growing number of other newly founded software development companies led to a rapid growth in the ICT sector for the next decade (Tucker, 2012; J. White et al., 2012).

The ICT sector in Palestine contributed in 2008 with less than 1 percent of GDP, and it has grown fast to contribute to about 6% of the GDP in Palestine in 2012. The services offered by those companies range from selling and assembling hardware products, software development, consultancy, internet services, and office automation equipment (Palestine Trade Center, 2014).

The ICT sector like the rest of the other Palestinian economic sectors struggled from the political unrest and the fluctuations in available foreign aid, and this significantly slowed down the economic growth in general. However, on the bright side, it encouraged the Palestinians to consider changing their economic strategy and plan to be more dependent on building a human capital and encouraging investment and the private sector. One of the important recognized untapped potentials was the ICT sectors. In fact, in 2005 the Palestinian Ministry of Telecommunications and Information Technology in its “National Strategy for
Telecommunications and Information Technology” had mentioned that the ICT was one of its main tools to achieve economic growth and social development (Tucker, 2012).

The Palestinian Information Technology Association of companies (PITA) oversees the development of the ICT sector in Palestine and works as an advocate for the sector trying to shape government policies. It is also in contact with several stakeholders of the ICT sectors in Palestine (Palestinian Information Technology Association of Companies, 2015). The ICT infrastructure in Palestine was evaluated through some indicators from several sources.

Palestinians have relatively high internet penetration rate (32%) compared to other middle eastern countries in the region (Berretta, 2013). There is also high mobile phones penetration rate of about 96%, about 51% computers penetration rate, other ICT tools availability are illustrated in Table 7: Availability of ICT tools by Region. (Palestinian Central Bureau of Statistics, 2014a).

For the Palestinian market, in general, the internet is provided using fiber optics, Symmetrical and asymmetrical DSL and microwave connectivity through neighboring countries such as Israel, Egypt, UK, and Jordan (Palestinian Information Technology Association of Companies, 2015).

It is estimated that there are about 5,000 employees in the sector, and 15,000 indirect employments, working in about 250 ICT companies in different areas, including hardware distributors, software development, office automation, Internet service providers, Telecommunication companies and ICT consulting and training. 50% of the companies work in software development, consulting and online services (Palestinian Information Technology Association of Companies, 2015).

In terms of competitive advantages of Palestinian companies in export markets, a study conducted in 2013 found that there were competitive advantages both in terms of quality of
services and labor costs. Other competitive advantages as perceived by those companies were input costs, and common business language (Barreto et al., 2013).

\[\text{Table 7: Availability of ICT tools by Region} \]
\[\text{(Palestinian Central Bureau of Statistics, 2014a)}\]

<table>
<thead>
<tr>
<th>ICT Tools and Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palestine</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>51.4</td>
</tr>
<tr>
<td>Telephone Line</td>
<td>40.0</td>
</tr>
<tr>
<td>Internet at Home</td>
<td>32.1</td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>95.7</td>
</tr>
<tr>
<td>TV Set</td>
<td>97.3</td>
</tr>
<tr>
<td>Satellite Dish</td>
<td>95.0</td>
</tr>
<tr>
<td>West Bank</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>55.2</td>
</tr>
<tr>
<td>Telephone Line</td>
<td>42.7</td>
</tr>
<tr>
<td>Internet at Home</td>
<td>34.3</td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>96.2</td>
</tr>
<tr>
<td>TV Set</td>
<td>98.8</td>
</tr>
<tr>
<td>Satellite Dish</td>
<td>96.6</td>
</tr>
<tr>
<td>Gaza Strip</td>
<td></td>
</tr>
<tr>
<td>Computer</td>
<td>44.2</td>
</tr>
<tr>
<td>Telephone Line</td>
<td>34.8</td>
</tr>
<tr>
<td>Internet at Home</td>
<td>27.9</td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>94.7</td>
</tr>
<tr>
<td>TV Set</td>
<td>94.3</td>
</tr>
<tr>
<td>Satellite Dish</td>
<td>92.1</td>
</tr>
</tbody>
</table>

On the other hand, there were many disadvantages that hurts the competitiveness of Palestinian companies such as: Intellectual Property Laws, lack of alignment between the different governmental bodies, and having weak banking and financial institutions. Those companies also did not believe that geographical location, quality of labor, level of innovation, and trade agreements were among their competitive advantages (Barreto et al., 2013).

Understanding the current state of the Palestinian ICT sector, and competitive advantages and disadvantages is beneficial to identify opportunities for improvements.
4.3.2. Educational System and Human Capital

Even though it is estimated that over 2,000 ICT graduates annually which should be enough, this number is not adequate in terms of skills, many companies complain about low labor productivity levels, from technical, business and project management skills. (Palestine Trade Center, 2014). There is a demand in the private sector for skilled workforce such as software developers. This gap was mentioned by several reports as one of the important issues (Palestine Trade Center, 2014; Spark Consulting Services, 2014).

Some of the most important missing skills are critical thinking, and self-learning skills, this gap in skills is currently by partially fulfilled by the private sector (Spark Consulting Services, 2014).

A report by (Spark Consulting Services, 2014) contrasting the Palestinian educational system with the need of the Palestinian ICT private sector found some issues in the Palestinian human capital, such as:

- Students did not know their potential opportunities after graduation in terms of future career.
- The existence of an information gap regarding soft skills.
- Palestinian universities did not have a plan for practical training for students and graduates.
- The educational system is still depending on old-style teaching methods and memorization rather than more effective learning such as interactive learning.
• Students are required to make self-efforts to learn the necessary skills and knowledge relating to their environment since universities do not have enough partnerships with the ICT private sector.

• Lack of government input on the current plans for the ICT industry.

Comparing the curriculum of Palestinian universities with Stanford University gave an excellent perspective on some of the deficiencies of the Palestinian educational system in universities, some of those identified issues are summarized in Table 8: Benchmarking Stanford University vs. Palestinian Universities adapted from (Spark Consulting Services, 2014).

From a students’ point of view, there was a high level of dissatisfaction among students from the educational systems regarding ICT education in terms of skills, and specializations shortages. Students criticized the educational system from many angles (Spark Consulting Services, 2014):

• Having little match between the curricula and technological development and needs of the private sector.

• Lack of practical training.

• The imbalance between theory and practice towards theory.

• Lack of soft skills.

• Instructors lack teaching skills and delivery methods, and knowledge of research methods and practical knowledge from the private sector.

• The university systems do not teach critical thinking, creativity, and brainstorming.

• Students complained from unemployment.
From the university officials and instructors point of view, on the other hand, there was an agreement on having a match on the relevance of the curricula and local ICT market need, and slightly less agreement on the relevance of the curricula to prepare students for global ICT market. However, there was an about 50% disagreement on the universities having sufficient evaluation procedure of the current curricula to the market needs.

Table 8: Benchmarking Stanford University vs. Palestinian Universities
(Spark Consulting Services, 2014)

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Stanford University</th>
<th>Palestinian Universities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of Courses</td>
<td>Customized</td>
<td>General</td>
</tr>
<tr>
<td>Soft Skills Topics</td>
<td>Much Higher</td>
<td>Less</td>
</tr>
<tr>
<td>Core Courses Theoretical Sciences</td>
<td>Higher (Focuses on technology)</td>
<td>Less (Focuses on Theoretical Science; such as Maths)</td>
</tr>
<tr>
<td>Interactive Methods of Teaching</td>
<td>Much Higher</td>
<td>Less</td>
</tr>
<tr>
<td>Possibility of Course Selection</td>
<td>Higher</td>
<td>Less</td>
</tr>
<tr>
<td>Linking with Modern Technology</td>
<td>Higher</td>
<td>Less</td>
</tr>
</tbody>
</table>

In relation to specific skills, there seems to be an agreement on weakness in communication skills, English proficiency, creative thinking, In addition to business skills such as marketing and
management, and project management. See Table 9: Business and Soft Skills that Universities Provide adapted from (Spark Consulting Services, 2014).

Table 9: Business and Soft Skills that Universities Provide (Spark consulting services, 2014)

<table>
<thead>
<tr>
<th></th>
<th>Weak</th>
<th>Fair</th>
<th>Good</th>
<th>Distinguished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication skills</td>
<td>66.7%</td>
<td>33.3%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Team Work</td>
<td>33.3%</td>
<td>16.7%</td>
<td>50%</td>
<td>-</td>
</tr>
<tr>
<td>Proficiency in English Language</td>
<td>66.7%</td>
<td>33.3%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Technical Writing</td>
<td>16.7%</td>
<td>50%</td>
<td>33.3%</td>
<td>-</td>
</tr>
<tr>
<td>Creative Thinking</td>
<td>16.7%</td>
<td>83.3%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Presentation skills</td>
<td>33.3%</td>
<td>50%</td>
<td>16.7%</td>
<td>-</td>
</tr>
<tr>
<td>Planning Skills</td>
<td>33.3%</td>
<td>50%</td>
<td>66.7%</td>
<td>-</td>
</tr>
<tr>
<td>Marketing/Sales Skills</td>
<td>50%</td>
<td>50%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Project Management</td>
<td>33.3%</td>
<td>66.6%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>33.3%</td>
<td>50%</td>
<td>16.7%</td>
<td>-</td>
</tr>
</tbody>
</table>

Finally, in terms of ICT technical skills, universities indicated that there were problems (50% or more agreement on being fair-weak) in the following subjects (Spark Consulting Services, 2014):

- Programming in C#
- Programming in C++
• Programming visual basic
• PHP
• ASP.net
• Windows Platform
• JSON
• Oracle DB platform
• Mobile platforms programming
• HTML5
• Multimedia applications

From companies in the ICT sector point of view, there were apparent problems in practical, technical, and business skills, as can be seen in Table 10: Skills of Graduates as Perceived by ICT companies adapted from (Spark Consulting Services, 2014).

The ICT companies identified specific soft skills that are missing from the Palestinian ICT graduates such as (customer service, marketing, and sales, project management, business skills, and problem-solving).

4.4. Sociocultural Factors

4.4.1. Diaspora

The role of Diaspora in helping in the development of ICT sectors in their countries is recognized in the literature (Archibugi & Coco, 2004; Heeks & Nicholson, 2004; Heeks, 2006). One of the potential enablers in the Palestinian ICT sector is the existence of Palestinian and Arab
professionals in international ICT firms. This particular enabler can help overcome the image of Palestine in the global market. Palestinians overseas hold senior management roles in different startups and ICT companies after gaining experiences abroad (N. White, 2010). This enabler is understood in the ICT sector.

Table 10: Skills of Graduates as Perceived by ICT companies
(Spark Consulting Services, 2014)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical know-how</td>
<td>5%</td>
<td>10%</td>
<td>85%</td>
<td>-</td>
</tr>
<tr>
<td>Practical skills</td>
<td>15%</td>
<td>50%</td>
<td>30%</td>
<td>-</td>
</tr>
<tr>
<td>Business and soft skills</td>
<td>20%</td>
<td>70%</td>
<td>10%</td>
<td>-</td>
</tr>
<tr>
<td>Needed induction time</td>
<td>15%</td>
<td>55%</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>Technical skills</td>
<td>5%</td>
<td>65%</td>
<td>30%</td>
<td>-</td>
</tr>
</tbody>
</table>

The Palestinian Information Technology Association of Companies (PITA) has created the Palestine Global ICT Network, which is a diaspora and friends of the State of Palestine network that is serving all pillars and stakeholders (Palestine Trade Center, 2014). In fact, it can be seen as the other side of the coin (an opportunity) from the threat of brain drain of ICT professionals.

The role of the Diaspora in the Palestinian ICT sector can be particularly significant in overcoming another threat, namely the brand image of the ICT sector by bringing business opportunities through their personal network, and to help expand global market access.
Some of the other potentials include:

- Invite the Palestinian diaspora to open branches for their organizations and private businesses.
- They can offer Consulting and advice given their global market knowledge.
- Use their connections to bring in outsourcing contracts to local software companies.
- Invest in the Palestinian ICT sector or bring in global investments.

4.5. **Global Markets**

Next, a discussion of some subfactors under the Global Markets super factor is presented. The most relevant to this study are (target markets, brand image of the Palestinian ICT sector internationally, and physical presence). Each will be discussed briefly in the following sections.

4.5.1. **Target Markets and Competition**

From a creation and exporting point of view, Palestinian ICT companies are exporting to different countries in different regions: (Palestine Trade Center, 2014), such as:

- Africa (Togo, Nigeria, Gabon, Cameroon)
- North America (Canada and the United States),
- Europe (Malta, Germany, the Netherlands, Cyprus, Norway, Italy, France, the United Kingdom, and Northern Ireland)
- Israel and the Middle East (Saudi Arabia, Jordan, Egypt, Iraq, Oman, Libya, Morocco, the UAE, Lebanon and Algeria).
The Palestinian ICT sector faces competition from other countries around the world. Palestinian companies were surveyed about their major competitors on a global scale. Many countries were identified such as: Jordan, Egypt, Israel, the UAE (Dubai), the Syrian Arab Republic and Lebanon in the Middle East. The United Kingdom, Ukraine, Poland, Romania and Serbia in Europe. India and Bangladesh in Asia; and finally the United States. In addition, potential future competitors may include countries such as Sri Lanka and Bangladesh (Palestine Trade Center, 2014).

4.5.2. Image\Trust

The political instability in Palestine has a substantial effect on the brand image of the ICT sector in Palestine. There has been positive feedback from established international partnerships. It is reported that 70% of the clients who had business with the ICT sector in Palestine were willing to expand the level of partnerships (J. White et al., 2012) by having more challenging and higher added value projects. In fact, many Palestinian companies such as ASAL and Exalt that had successful partnerships with international enterprises like Cisco, now have expertise that was recognized internationally. They were able to sign additional contracts with international companies such as Oracle and EMC.

4.5.3. Physical Presence

One of the issues identified by (Palestine Trade Center, 2014) that hinders access to global markets is the lack of physical presence in target markets. Some stakeholders in the Palestinian ICT sector indicated that there needs to be a representative office in Silicon Valley, in Europe, and in the Gulf region. This can open opportunities to capitalize on previous outsourcing success stories with companies such as Cisco, Microsoft, and HP, and can help channel more business
opportunities to the Palestinian markets, in addition, to promote better understanding the needs of the global markets in general. In fact, some companies have indicated that they have lost export business because of the lack of physical present in the international market.

4.6. Exogenous Factors

4.6.1. Palestinian Economy

Since the foundation of the Palestinian National Authority (PNA) after the Oslo Accords in 1993, the term Palestinian economy took a more formal and structural meaning. The PNA took the responsibility of building and developing the economy of the newly formed entity. The new Palestinian economy was met with a number of challenges due to the political and geographical situation, and the fact that a big part of the Palestinian economy has been dependent on foreign aid.

In recent years, the Palestinian economy faced continuous challenges that prevented it from taking off due to the political uncertainty and the restrictions on movement which led in the past four years to a decelerating growth, and entering a recession in 2014. Some statistical data including GNI, Population, GDP, and GDP growth can be seen in Table 11: World Bank Data for Palestine 2009-2013.

Table 11: World Bank Data for Palestine 2009-2013.

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNI per capita, PPP</td>
<td>4,350</td>
<td>4,350</td>
<td>4,670</td>
<td>5,300</td>
<td>..</td>
</tr>
<tr>
<td>(current international $)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population, total</td>
<td>3,702,218</td>
<td>3,811,102</td>
<td>3,927,051</td>
<td>4,046,901</td>
<td>4,169,506</td>
</tr>
<tr>
<td>GDP (current US$)</td>
<td>7,268,200,000</td>
<td>8,913,100,000</td>
<td>10,465,400,000</td>
<td>11,262,141,134</td>
<td>..</td>
</tr>
<tr>
<td>GDP growth (annual %)</td>
<td>21</td>
<td>2</td>
<td>8</td>
<td>14</td>
<td>-4</td>
</tr>
</tbody>
</table>
The PNA receives foreign aid from different countries, but the amount of aid is volatile which creates a lot of uncertainty. In addition, recently it has shifted towards supporting the PNA’s budget rather than supporting development. On average the PNA received the equivalent of 15% of its GDP in foreign aid. (International Monetary Fund, 2013).

The main sectors contributing to the Palestinian economy can be seen in Figure 11: Palestinian Economy by sector 2013. It is noteworthy that the information and communication sector is the least contributing sector in the Palestinian economy, contributing to the GDP by 8% in the West Bank, and about 0.4% in Gaza. (Palestinian Central Bureau of Statistics, 2014b).

Some of the major characteristics of those sectors aggregated for both West Bank and Gaza can be seen in Table 12: Main Economic Activities by Major Characteristics. It can be seen from the table the ICT sector has the highest value added to GDP per employed person in Palestine. The value added per employed person in a sector is an important indicator to help understand the
efficiency and effectiveness of employees in terms of productivity to the GDP of employees in each sector.

Due to the unstable economy, the unemployment rate in Palestine is high. It is exceptionally higher in Gaza because of the blockade: unemployment rate in Gaza is around 30%. Unemployment is around 19% in the West Bank with an average for the Palestinians of 24%. A historical view of unemployment can be seen in Figure 12: Unemployment in Palestine 2005-2013 (Palestinian Central Bureau of Statistics, 2014b).

### 4.6.2. Political Reality

Palestine, also known as West Bank & Gaza or Palestinian territories refers to a geographical region in western Asia in the Middle East that has borders with Israel and Jordan. Palestine obtained an observer state status from the UN in 2013 and is since officially called “the
State of Palestine”. Palestine has been in a political conflict with Israel since the Israeli occupation of the Palestinian territories that were controlled by Jordan and Egypt in 1967.

The State of Palestine is divided into two separate regions, namely West Bank which includes East Jerusalem, and Gaza. Each region is controlled by a different political party after an armed conflict in 2007. There have been many attempts for reconciliation since 2007 which resulted in a unity government in 2014 (BBC, 2015).

The Palestinians have no sovereignty over their own airspace or borders. Palestine also has no seaport, and therefore all export\import activities have to go through Israel.

There are also limitations on the movement of Palestinians within the Palestinian territories due to the existence of Israeli settlements and security checkpoints within the Palestinian territories. In addition to a total geographical separation between the West bank and Gaza, these restrictions of movement on people and goods is a major challenge to the Palestinian economy (International Monetary Fund, 2013).
Although Gaza is controlled internally by one Palestinian faction, namely Hamas, it is considered occupied by Israel according to the UN (United Nations, 2014) and other international organizations. This is due to the fact that Israel has major control over Gaza’s airspace, crossings, and borders (therefore over people and goods movement). In addition to most of its infrastructure and resources, including electricity, water, telecommunication, sewage system, tax system and population registry. Furthermore, Gaza has been under a blockade since Hamas took control of Gaza in 2007, additional restrictions were imposed on the Gaza Strip by Israel (B’Tselem, 2011).

The geographical and political separation between Gaza Strip and the West Bank results in having two separate and different political realities; and, therefore two different sub-economies, with the West Bank economy performing better due to less restriction, more foreign aid, and better international relations.

4.6.3. International Support

Recognizing the potential of the Palestinian ICT sector in developing the Palestinian economy, in 2010 the U.S. Agency for International Development started the Palestinian Information Communications Technology Capacity Building Initiative with the help of some of the leading technology companies such as (Cisco, Intel, HP, Google) to help develop the ICT private sector in Palestine (U.S. Department of State, 2010).

Over the course of 3 years, the initiative led to pumping $78 million dollars into the ICT sectors, in addition to the establishment of the first venture and growth capital investment fund in Palestine “Sadara” in 2012 (J. White et al., 2012). The goal of this venture capital fund was to contribute towards building the ICT sector through new technology and services startups. The existence of venture capital funding for entrepreneurs was planned to help improve innovations
through new startups (Karol, 2013). In fact, three out of four of the new companies that took advantage of this fund made headlines.

Cisco contributed to this initiative by outsourcing part of its R&D activities to Palestinian companies, and invested US $15 million in the ICT sector, in addition to additional VC funds for Palestinian entrepreneurs in the ICT sector (Cisco, 2013).

The original plan for development by international organizations of the ICT sector in Palestine was headed towards outsourcing, but there were many difficulties related to the political instability and, therefore, posed a high risk to companies abroad. The Palestinians are now seeking a new direction further to develop the ICT sector, namely, entrepreneurship and startups (Berretta, 2013; Sullivan, 2014).

Other organizations contributed to the ICT sector in Palestine, such as the German development agency (GIZ), which supported the development of PITA’s current three-year strategy, it is also the main development partner of Expotech, the yearly Technology Week in Palestine.

4.7. Back to the Framework

Next, we plug the information from the secondary data into the framework, in addition to additional factors mentioned in the reports above into a summary table. See Table 13: Enablers and Constraints for the Case of Palestine. This leads to the next question in our analysis to find the potential areas of improvement:

*Based on the current understanding of the state of the Palestine, what are the value chain processes among (Create, Make, Move, Integrate, and Use) that have the most potential to*
generate a positive change towards an information economy by manipulating one or more of the super factors?

It is clear from our analysis of the Palestinian current state that there are many restrictions on the Palestinian economy for activities such as exporting and importing actual products due to the political reality, location, and the economic and political uncertainty and the restrictions on movement.

There is very little control over those realities, and it has been shown that there is much uncertainty even to attempt to adapt to this situation in order to do activities such as (Make, Move, Integrate).

On the other hand, there is potential in outsourcing, which can be thought of as part of the (Make) value chain process, however, the political uncertainty and the risks associated with it, did in the past affect the outsourcing arena, with international companies moving to less risky countries for outsourcing.

There seem to be many opportunities in relation to the “Create” value chain activity. Regarding economic impact, “Create” is expected to lead to more value by creating new products and services and selling them in different markets, as in the case of Pinchpoint Company discussed earlier in this Chapter.

In the next Chapter, those two value chain activities (Create and Make) are analyzed in more details from the point of view of the interviewees, to understand whether there is agreement on their potentials for the development of the ICT sector in Palestine.
<table>
<thead>
<tr>
<th>SF*</th>
<th>Sub Factors</th>
<th>Enablers</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF</td>
<td>Location</td>
<td>Access to middle eastern markets</td>
<td>Restricted access to ports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proximity to Israeli ICT Market</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proximity to Europe</td>
<td></td>
</tr>
<tr>
<td>Political Reality</td>
<td></td>
<td></td>
<td>Political uncertainty, Geographical discontinuity, Limited movement</td>
</tr>
<tr>
<td>Economy</td>
<td></td>
<td></td>
<td>Dependency on volatile foreign aid, High unemployment</td>
</tr>
<tr>
<td>GM</td>
<td>Trust</td>
<td>Good level of trust in Palestinian products</td>
<td>Lack of investment trust due to conflict</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good level of customer satisfaction.</td>
<td>Branding issue</td>
</tr>
<tr>
<td></td>
<td>Investment</td>
<td>Palestinian ICT Capacity Building Initiative, Some Israeli investment</td>
<td>Low level of private investors</td>
</tr>
<tr>
<td></td>
<td>Global Competition</td>
<td>Established relations with many companies in different regions</td>
<td>High Competition from countries in the region</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some companies have expertise recognized internationally</td>
<td>Lack of physical presence in markets</td>
</tr>
<tr>
<td></td>
<td>FDI</td>
<td>Competitive advantage is driven by international agencies</td>
<td>Low attractiveness to FDI.</td>
</tr>
<tr>
<td>SCF</td>
<td>Culture</td>
<td>Shared culture with Arab World, Innovative culture</td>
<td>Risk averse culture</td>
</tr>
<tr>
<td></td>
<td>Unique Factors</td>
<td>English proficiency, Openness to international markets, Diaspora</td>
<td>Technical restrictions</td>
</tr>
<tr>
<td>InS</td>
<td>ICT Infrastructure</td>
<td>ICT organizational body (PITA)</td>
<td>Limitation on building and using infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High computer &amp;internet&amp; mobile penetration</td>
<td>TSI network lack of capacity and influence</td>
</tr>
<tr>
<td></td>
<td>Supporting Industries</td>
<td></td>
<td>Lack of financial investment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weak financial sector.</td>
</tr>
<tr>
<td></td>
<td>Coordination</td>
<td></td>
<td>Refusal to finance ICT projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of coordination</td>
</tr>
</tbody>
</table>
Table 13: Enablers and Constraints for the Case of Palestine (continued)

<table>
<thead>
<tr>
<th>SF*</th>
<th>Sub Factors</th>
<th>Enablers</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Human Capital</td>
<td>Untapped ICT workforce</td>
<td>Gap between ICT Market and Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low input costs</td>
<td>Low Productivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low labor costs</td>
<td>Lack of business and managerial skills.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>innovation abilities</td>
<td>Inadequate training on Critical thinking, creativity and problem-solving</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Brain drain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low Marketing and sales skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Limited labor force mobility</td>
</tr>
<tr>
<td>GP</td>
<td>Technology Policy</td>
<td>Commitment to ICT development strategy at Presidency</td>
<td>Outdated and unenforced IP protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of political alignment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low commitment from ministries</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not operationalized Palestinian Telecommunications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Regulatory Authority</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No e-commerce regulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No standards for the ICT industry</td>
</tr>
<tr>
<td></td>
<td>Investment Policy</td>
<td>Tax breaks for the ICT sector</td>
<td>Legal barriers,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Considered Priority sector</td>
<td>Bureaucracy,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>uncertain tax climate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>more tax breaks are needed</td>
</tr>
<tr>
<td></td>
<td>Trade policies &amp;</td>
<td></td>
<td>No agreements for market access.</td>
</tr>
<tr>
<td></td>
<td>Agreements</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are a number of opportunities towards creating new products and services, particularly software productions, some of those opportunities that were found from the study of the Palestinian case are:

- A general direction by the government, the ICT sector, and international organizations to encourage entrepreneurship and creativity.
- The existence of international support through the U.S government and companies such as Cisco, HP, and Microsoft to invest in the ICT sector.
- Palestinians are reported to be innovative when given the right motivation and support.
- An openness to the international market with good English proficiency in Palestine, in addition to access to the Middle Eastern market.
- An exposure and partial proximity to the successful Israeli ICT sector which opens the door for exchanging ideas and for partnerships.

On the other hand, there are a number of challenges facing the “Create” process as was shown in the case of some of the startups, such as:

- General risk averseness attitude in the Palestinian culture and a preference towards regular jobs rather than startups.
- In times there was a lack of investment money for the creative ideas.
- The existence of an information gap between the ICT market and academic institutions.
• Movement and travel restrictions imposed by the political reality which restricts the movement of people and goods in and out of the Palestinian market.

• Some legal and policy latency such as the outdated and little enforcement of copyright protection.

Regarding control, the Palestinians have more control over most of the factors that pose challenges to the “Create” process than for the other processes. Those changes can be in the form of policy changes in different areas, such as the legal, taxation, education policy, in addition to possible attempts to affect the cultural aspects of innovation such as encouraging the innovation culture, and risk management skills associated with it.

Now that one of the value chain processes was identified as having a potential impact the Palestinian economy and contribute towards building an information economy, we need to form a better understanding of the changes that need to be made to encourage an innovation and creation culture, and to try understand the success factors identified in the literature to make that happen. This is the purpose of the next section.

4.8. Create and Super Factors Interactions

This section starts answering the following question: How does the “create” process interact with the Super factors introduced in our framework?

Answering this question can help understand the changes that need to be made at a country level in different areas such as policies, education, culture. A horizontal scan of the framework is presented next, to understand how “Create” value process interacts with the several super factors introduced by our framework. Some of those factors can be thought of as limitations that can not
be changed and need to be understood instead, many of those factors are covered by the software export success framework that was discussed in Chapter 1.

4.8.1. Exogenous Factors:

Location: The location of a country plays an important role by acting as a challenge or opportunities to the economy in general and the ICT sector in specific. Each country is unique in that sense. For instance, the location of a country determine the proximity to certain global markets or to supply factors from other countries including human capital, and other factors of production. Also, the existence of seaports or another kind of ports can facilitate the movement of people and goods (Tan & Leewongcharoen, 2005).

Political Reality: can play a significant role depending on the unique case of every country. For instance, a country in conflict with its neighboring countries, or a country that is unstable politically for any other reason can face major obstacles in getting foreign investments and to creating a stable environment for new and existing business.

Country Size: Both small and large countries have different advantages and disadvantages in relation to the ICT sector, while small countries may have the advantage of easier and less costly ICT infrastructure (Tan & Leewongcharoen, 2005), larger countries may have advantages in relation to additional capabilities geographically or demographically such as China, USA, and Japan (Heeks & Nicholson, 2004).

4.8.2. Global Markets

Global Demand: One of the important success factors for improving ICT creation is an analysis and an understanding of global demand particularly in this time of global competition
between the different countries that are trying to find a spot in the world market. In the study by (Heeks & Nicholson, 2004) it was mentioned that Israel, Ireland and India (3Is) were able to utilize a global software demand growth of about 20% between the years 1983-2003. This came at the same time as their own software production growth. The rise in demand resulted in a huge gap in supply, which posed a unique opportunity for the (3Is) countries to fill this demand gap.

Trust and International Linkages: Building bridges and partnerships and trust relationships with other countries is an important part of the recipe for success in the global market. This should start with identifying potential long-term partners. In addition to building a good reputation in the international markets (Heeks & Nicholson, 2004).

4.8.3. Infrastructure

Software industry characteristics: such as size, competition, clustering, and collaboration. A healthy structure for the software industry includes a number of factors such as the existence of a number of powerful firms within the industry that can help build a good reputation for the ICT sector. Clustering refers to the existence of a hot spot for software developer companies in a certain area that can facilitate coordination and collaborations. Finally having a number of small to middle size competing firms is reported to improve innovation and drive up quality (Heeks & Nicholson, 2004).

Infrastructure and supply factors: the strength of those different supply factors and an infrastructure to support the creation of new products and service is essential (Heeks & Nicholson, 2004).

Human capital: The continuous flow of both innovative entrepreneurs and skilled workforce, in addition, the supporting services, is considered the most important supply factor
since human capital is the main production factor in ICT creation and especially for software development (Techatassanasoontorn et al., 2011).

**Technology infrastructure:** The Internet, digital telecommunication, Software and hardware infrastructure need to be available for the development and the creation of any new product. Limitations in technology infrastructure can act as the main obstacle in development, as is in the case of Palestine that is not able to operate a 3G or higher cellular network due to restrictions posed by the political reality.

**Finance:** Having financial institutions and investment funds available is an important part of the recipe for a successful ICT producing sector.

**Research and development:** One of the important success factors for creativity is having a strong R&D program, this can be facilitated by direct funding from the government or international organizations to R&D, and tax breaks to ICT companies that carry R&D to encourage innovation.

**Other supporting Infrastructure:** Supporting services are essential such as the existence of transportation services, and other utilities.

### 4.8.4. Government Policy

**National vision and strategy:** A national strategy driven by the government in cooperation with private business in the ICT sector is a key to driving the ICT growth in the required trajectory. The vision and strategy should be translated into a continuous policies evaluation and development to respond to emerging opportunities in the local and global market.
4.9. Potential Opportunity

The decision framework was applied to the case of Palestine, where secondary data from various sources were used to understand the current setting or configuration of the Palestinian case.

The secondary data helped in understanding various restrictions imposed by some of the factors (such as the political reality, and the location, lack of skilled workforce), In addition to some of the opportunities such as the availability of global aid and support from a number international companies, and an innovative culture, and proximity to a niche market (the Arab world).

Based on the secondary data analysis, and the identified opportunities and risks, it became apparent that among the different supply value processes Create was one of the most suitable processes for the Palestinian case. This choice agrees with a number of concepts discussed earlier in this dissertation, such as social embeddedness (Avgerou, 2008). Social embeddedness views the role of ICT for development not as transfer or diffusion of technology, but rather as a facilitator to the creation of new techno-social organizations that operate better within the sociocultural context of the country and improves development. It also agrees with the ICT4D 2.0 view discussed earlier (Heeks, 2008) which sees that the role of ICT in development is for ICT to be a platform for development rather than just a tool, and sees that the highest level of ICT for development is using innovation.

The results of this study pave the path for study 3, which helped in identify specific changes for the Palestinian case to get a deeper understanding of those opportunities.
CHAPTER 5: OPPORTUNITIES FOR CHANGE

This primary data collection was performed via interviews with industry, government and academic experts on ICT in Palestine. Qualitative analysis of the interview data reveals important insights about the opportunities for actionable development of ICT in Palestine.

5.1. Data Collection and Analysis

Interviews with key informants on the current state and desired future of ICT development in Palestine were conducted from October to December 2015. All the interviews were conducted by one of the researchers who is Palestinian with ICT experience, and thus was an ideal person to interact with the interviewees. Interviewees include individuals from the private industry sector, government, and education. While all could speak to both global and Palestinian issues in ICT development, interviewees were chosen who have primarily a more global perspective as well as those who have more experience in ICT in Palestine. See Table 14: Interviewee’s Experience.

Each of the eleven in-depth interviews lasted one hour or more. Audio recordings of the interviews were transcribed and entered into NVIVO for analysis. Exploratory analysis began with coding the interview transcripts against the coding scheme developed from the literature review and secondary data study reported above. Coders also used open coding, in that additional concept that emerged from the interview data were added to the coding scheme; see Appendix F: Coding scheme, and Appendix G for coding examples. This mixed approach to data analysis leverages prior research on key factors in ICT4D but adapts techniques from the grounded theory method in
order to add relevant constructs. This mixed approach produces a framework that is very close to the data and is an initial step in the path to scaling up to a macro level theory (Urquhart & Fernandez, 2006).

The coding scheme is shown in Appendix F and indicates both the original concepts and those that were identified by open coding. Two researchers, including the person who conducted all of the interviews, performed this coding. As new concepts were identified, they were shared between coders. Inter-coder reliability is high, and any disagreements were reconciled to form a final set of coded interviews.

*Table 14: Interviewee’s Experience*

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Type of Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Government</td>
</tr>
<tr>
<td>1: Academic &amp; Government Official</td>
<td>X</td>
</tr>
<tr>
<td>2: NGO Founder</td>
<td>X</td>
</tr>
<tr>
<td>3: Academic</td>
<td>X</td>
</tr>
<tr>
<td>4: USAID Officer</td>
<td>X</td>
</tr>
<tr>
<td>5: Entrepreneur</td>
<td></td>
</tr>
<tr>
<td>6: Entrepreneur</td>
<td>X</td>
</tr>
<tr>
<td>7: Outsourcing company founder</td>
<td>X</td>
</tr>
<tr>
<td>8: Entrepreneur</td>
<td></td>
</tr>
<tr>
<td>9: Global IT Company Executive</td>
<td>X</td>
</tr>
<tr>
<td>10: Academic</td>
<td></td>
</tr>
<tr>
<td>11: PITA Official</td>
<td>X</td>
</tr>
<tr>
<td>Total for Each Category</td>
<td>3</td>
</tr>
</tbody>
</table>
The definitions of the experiences used in Table 14: Interviewee’s Experience are:

- **Government**: A person who held a government position in the Palestinian Authority (PNA), in relation to the ICT sector.

- **Global Development Agency**: An individual who held a position at an international agency for the development of the ICT sector in Palestine.

- **Local Development**: An individual who worked for a local Palestinian organization that is involved in the development of the ICT sector in Palestine.

- **Local Private Business**: A person who created and/or was a partner in a local private ICT business in Palestine.

- **Global Private Business**: A person who is part of an international company that works directly with the Palestinian ICT sector.

- **Academic**: A person who held an academic position or who is involved directly in the educational system in Palestine.

The final stage of analysis was based on a comparison of the coding results with the proposed ICT4D decision framework and the results of the secondary data analysis. Data on factors identified by the interviewees and from the secondary data are organized by the decision framework. Particular attention is given to this issue of control since that aspect of the factors point to actionable opportunities that Palestine can pursue as well as constraints that can only be minimized, but not eliminated. The NVIVO analysis tool also enabled a deeper understanding of the relationships between those factors deemed most critical by the interviewees and other concepts.
Some examples of the relationships that helped guide further investigation can be seen in the following tables. In Table 15: Enablers-Hurdles vs. Super Factors we looked for the number of times there were intersections in coding between Enables-Hurdles on one side and each of the Super factors on the other. This helped in understanding which of the super factors were considered by interviewees to be important. It was found that a large number of the hurdles were coded under infrastructure, looking deeper into the Infrastructure Sub-Factor, it appeared that Human Capital was the most mentioned Sub-Factor. See Table 16: Enablers-Hurdlers vs. Infrastructure Sub Factors.

**Table 15: Enablers-Hurdles vs. Super Factors**

<table>
<thead>
<tr>
<th>Super Factor -&gt;</th>
<th>Exogenous Factors n</th>
<th>Global Markets n</th>
<th>Government Policy and regulations n</th>
<th>Infrastructure n</th>
<th>Sociocultural and Unique Factors n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabler (Point of Strength)</td>
<td>7</td>
<td>26</td>
<td>11</td>
<td>56</td>
<td>15</td>
</tr>
<tr>
<td>Hurdle (Point of Weakness)</td>
<td>41</td>
<td>35</td>
<td>42</td>
<td>134</td>
<td>32</td>
</tr>
</tbody>
</table>

**Table 16: Enablers-Hurdles vs. Infrastructure Sub Factors**

<table>
<thead>
<tr>
<th>Infrastructure Sub Factors ↓</th>
<th>Enabler (Point of Strength) n</th>
<th>Hurdle (Point of Weakness) n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Infrastructure</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Funding and Venture Capital</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Human Capital</td>
<td>34</td>
<td>86</td>
</tr>
<tr>
<td>ICT Infrastructure</td>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td>Institutional Infrastructure</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Supporting Industries</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Each Super Factor was then crossed with “Opportunities for Change” to get any idea about possible opportunities, and it was found that “Infrastructure had the most number of phrases coded as Opportunities for Change. See Table 17: Opportunities for Change vs. Super Factors. Looking at a lower level at the Sub Factors, it was found that Human Capital was mentioned more times
having an Opportunity of Change. See Table 18: Opportunities for Change vs. Infrastructure. The importance of “Human Capital” Sub-Factor was supported by both the literature and secondary data.

**Table 17: Opportunities for Change vs. Super Factors**

<table>
<thead>
<tr>
<th>Super Factors →</th>
<th>Exogenous Factors n</th>
<th>Global Markets n</th>
<th>Government Policy and Regulations n</th>
<th>Infrastructure n</th>
<th>Sociocultural and unique Factors n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity for Change</td>
<td>11</td>
<td>43</td>
<td>31</td>
<td>86</td>
<td>29</td>
</tr>
</tbody>
</table>

**Table 18: Opportunities for Change vs. Infrastructure**

<table>
<thead>
<tr>
<th>Infrastructure Sub Factors →</th>
<th>Electricity n</th>
<th>Financial Infrastructure n</th>
<th>Funding and Venture Capital n</th>
<th>Human Capital n</th>
<th>ICT Infrastructure n</th>
<th>Institutional Infrastructure n</th>
<th>Supporting Industries n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity for Change</td>
<td>0</td>
<td>3</td>
<td>16</td>
<td>57</td>
<td>15</td>
<td>18</td>
<td>0</td>
</tr>
</tbody>
</table>

The triangulation on key factors and related concepts from both the primary and secondary data reveal the best opportunities for improving ICT development in Palestine, given the specific nature of that country’s situation.

A complete scan of every cell using a SWOT-CI analysis is beyond the scope of this dissertation. Instead, this chapter discusses five intelligent framework scans that explore one of the three dimensions of the framework in areas of higher control.

5.2. **Scan 1: Create Value Chain Activities**

In Chapter 4 the secondary data insights about the Create value chain activity are described. This scan focuses on “Create” value chain activity since it is less constrained by the realities of the
Palestinian situation and has the potential for very high economic impact. The primary interview data reinforce the importance and potential in this value chain activity. This section addresses several key issues that are prominent in the interviews, starting in the areas of intellectual property and corporate regulations.

For a developing country such as Palestine, the SWOT-CI characteristics for the Create value chain activity is discussed. Many developing countries without extensive natural resources hope to take advantage of their store of human intellectual capacity to develop an economy based on creative work. It is possible first to collect information on each of the five factors (policies, infrastructure, sociocultural factors, global markets, and exogenous factors) as related to creative economic activities. The third dimension of stakeholder is flattened for this initial scan. Thorough analyses of these five cells would provide an overall picture of whether resources should be invested in building a creative economy. Also, the country would be able to identify which of the factors provide the highest levels of choice (e.g., control) and potential impacts. Narrowing the search to one of the most promising factors (say, Policies) then allows the scan to continue across the country’s key stakeholders. Further SWOT-CI analyses are performed for the selected factors in each of the contexts of academic, industry, and government players. What are the expectations for involvement of each stakeholder group for that factor to be impactful in the creative economy the country hopes to build? The result of the full two-pass scan would be an informed decision of whether resources should be devoted to building a creative economy with an understanding of how each key stakeholder will be involved and will be impacted. The ICT4D framework scan can be viewed in Figure 13: Scan 1-Create Value Chain Activity Focusing on Policies.
5.2.1. Intellectual Property (IP) Laws

IP laws are essential for an economy that innovates and creates new products and services to protect the intellectual rights of innovators, as Interviewee 6, an Entrepreneur (see Table 14: Interviewee’s Experience) noted:

“I see the institutional weakness mainly at the PA [Palestinian Authority] eco-system level in terms of IP rights, it is a big sore point that the PA continued to discuss over the years but we are not seeing actual legislation and that would be a bottleneck for a lot of foreign countries to do business with us or even for our own companies to be able to safeguard their intellectual property as they take it to the market. That is a major constraint.”

Although this was initially considered a controllable factor since it requires a higher decision, further investigation from the interviews indicated that it might be less controllable in the short run, even though potentially it has a significant impact. The internal political situation,
having a separation between the West Bank and Gaza and not having a parliament since 2006 is a major part of the problem:

“One problem is that we do not have a parliament since 2006, so the president issues laws if it is related to emergency. According to our by-laws the president himself could issue laws, and he could not sign new laws unless it is an emergency. Intellectual property law, IT investment law and all laws related to development or supporting it could not be considered emergency, so it is stuck until the parliament functions again” Interviewee 2, NGO founder

Other interviewees saw this as a problem that could be overcome in the current time, although this workaround moves the entrepreneurial activity with IP protected outside Palestine, which reduces the positive impact on ICT development in-country.

“The IP law is not good. It is not effective. It is an old law. They are working on a new one, but it is not approved yet because we do not have a parliament. But more or less I did not see it really affecting the operations of companies; still, companies can register outside and protect their IP there, so that is available, no problem with it. “Interviewee 4, USAID officer

5.2.2. Corporate Regulations

A major constraint that also appeared in both primary and secondary data, which is essential for a Create economy, is the business environment in Palestine. It was reported that Palestine is ranked low on the indices of ease of doing business (Palestine Trade Center, 2014) The process of registration of a new company is costly and challenging (36 days on average), Palestine ranks 129th out of 189 economies in ease of doing business (World Bank Group, 2014)
Reporting from primary data, this issue appeared among the most recurring hurdles mentioned by interviewees. It was noted that one of the startups had to register their company in the U.S to avoid major delays:

“We had to register our company in the US to enable investors to invest in our company because the legislative system in Palestine is not investor-friendly and it does not have the aspects that the investors need to secure their IP and their investment, for example, share classes or stock classes so mainly preferred shares versus common stock or voting rights in the boards... Palestine is still using the Jordanian rule of 1962 which no one else is using which forced us to register outside of Palestine and we registered in the US. The effect of that is that if we make it the biggest chunk of return will be in the US not in Palestine because it is like a US entity was paying taxes in our revenues and Palestine it is just an offshore office that is owned by that company and what we pay here is the income taxes on the salaries we pay to the employee but the big chunk if a startup made it will be outside of Palestine, and it is a shame because we are doing this to help the economy, but this limits how far we can help. And this is totally in our control as Palestinians to change it and come up with a better legislative system.” Interviewee 5, entrepreneur

Another stakeholder involved in the development of the ICT sector in Palestine also mentioned:

“The policies are affecting investments and that is the problem, it is affecting startups for example the issue of double taxation. The current companies’ registration laws do not support external parties in a convenient way. Companies have to get waivers from the minister of the economy to have a US firm or a Virgin Island startup, take 99% of the stocks of the Palestinian
firm. So startups end up registering several companies inside and outside. So that is a major issue that is very hard to solve.” Interviewee 4, USAID officer

One of the foreign investors was able to overcome this by sharing the company ownership with his lawyer:

“The laws that are on the books we are still used in 1965 French laws for our business, there is no such thing as sole proprietorship, you cannot establish a company and own it as an individual because the word sharikeh in Arabic (company), means more than one person so you cannot be a sole proprietor so when I set up my company I had my lawyer, so we are using very antiquated law” Interviewee 7, outsourcing company founder

Finally, one of the ICT sector leaders in Palestine discussed the efforts to change the laws:

“Definitely, we always need change. I always criticize our company registration, that it is a joke, sometimes we say that you have to have two partners at least to register a company regardless of their percentage. This is what we are trying to change now, we need to register a company even if I am one person, why should I have another person for 1% and I own 99%? This is one of the problems that we are talking about. Yes, I can register a company but I do not have to have a partner if I want to do a business by myself. This is a problem but these kinds of problems are minor in my opinion.” Interviewee 11, PITA official

5.2.3. SWOT Analysis

From multiple perspectives, it appeared that the key issues of IP protection and industry regulation are controllable factors that may have a significant impact on ICT development. Even though some entrepreneurs can adapt, other entrepreneurs end up opening their companies in
different countries. Table 19: SWOT Analysis of the Create Activity presents the SWOT analysis of this framework scan.

Table 19: SWOT Analysis of the Create Activity

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunity</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palestinian government and private ICT sector support</td>
<td>Risk adverse culture</td>
<td>Develop an innovation culture</td>
<td>Discussion of need for improved law, especially IP protection, but no legislative action</td>
</tr>
<tr>
<td>International, and organizations support</td>
<td>Lack of venture capital and investment funding</td>
<td>Training in risk management</td>
<td></td>
</tr>
<tr>
<td>English language proficiency</td>
<td>Skills gap between ICT market and ICT graduates</td>
<td>Improve funding for ICT entrepreneurs</td>
<td></td>
</tr>
<tr>
<td>Proximity to successful Israeli ICT sector</td>
<td>Movement and travel restrictions</td>
<td>New IP and corporate laws to improve the ease of doing business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outdated legal policies and protections, especially IP laws</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2.4. Controls and Impacts

This section describes some of the direct actionable opportunities or objectives analyzed in terms of the expected level of control by stakeholders, in addition to their anticipated impact on the efforts to improve the ICT sector in Palestine, each opportunity is described as High Control (HC) or Low Control (LC), High anticipated Impact HI or Low Impact LI.

Some of the controls and impacts for Scan 1 are mentioned below:

- The private sector should exert more pressure to change regulations IP and corporate laws. (LC-HI).
• A long-term plan is needed to decrease the level of dependence on international aid by improving VC fundraising skills, and looking for, angel local investors or investors from the Palestinian and Arab Diaspora (HC-HI)

• There is a need to improve training in risk management. (HC-HI)

• The Create value chain may be more suitable for regional market making use of shared culture with Arab world and accessibility, and this can help in gaining global market experiences on the long run. (HC-HI)

• The Create for regional or global markets can also be a good starting point, especially mobile phone apps, software in Arabic.

5.3. Scan 2: Education Infrastructure Factors

A second example of using the ICT4D decision framework to identify high control/high impact (CI) actions to help ICT development is described briefly below and shown in Figure 14: Scan 2-Educational System. This example focuses on human resources subfactor within the Infrastructure super factor. This focus is a point of interest in the secondary data analysis and was well supported by the primary interview data as discussed here.

A developing country establishes a commission to study and make recommendations for educational policies for future economic growth. Education is widely seen as an essential priority for economic advancement. For this scan of the decision framework, the factor dimension is fixed on human capital in the Infrastructure value under which education policies are considered. The first pass would scan across all the value chain activities with SWOT-CI analyses to determine which of the activities provide the most choices and impacts. It is possible also to flatten the
stakeholder dimension for the initial pass. Then, a closer study of the top activities (say, Create and Transact) would call for a scan across the stakeholders to determine who would be able to make the greatest contributions to the educational success for those activities and who might be impacted by decisions to devote educational resources to those activities.

Figure 14: Scan 2-Education Infrastructure Factor

The result of the two-pass scan, in this case, would be an informed decision of how to allocate resources to education levels of primary, secondary, university, and post-graduate to best support future growth of the value chain niche identified as having the most potential for economic development.

In the case of Palestine, a high control/high impact factor for ICT4D in Palestine is the education system that provides ICT knowledge and training. The data show that despite a large number of graduates with ICT degrees, they lack key skills deemed essential by ICT industry. This problem is attributed to an outdated higher education curriculum and lack of partnerships with the private ICT sector and other international universities (Spark Consulting Services, 2014). The
interviewees discussed the needs for curriculum reform as well as other major areas of need for better skills education.

5.3.1. Need for Curriculum Reform.

There is a need to reform the ICT curriculum in Palestinian universities, and in particular via partnerships with other universities and the ICT industry sector.

“Of course, universities have to take part and look at the curriculum and make a reform in it, to align it with the current situation and what is needed to change. Second part is the companies themselves, they need to get more involved in the academic life, in the training and to offer more training programs in the universities and also internship; we at Al-Quds University started with what we think can be a part of a solution with a degree with dual system where students do part of their studies in the university and the second part they go to the industry, and they do training there. “Interviewee 3, academic

Also, there is a limited number of qualified educators as mentioned by one interviewee:

“From a human resource perspective in the university system, there is a weakness, and it is multifaceted, I mean the doctors or the Ph.D. professors who got their Ph.D. in the late 80s are now up for retirement but we see that there has not been an investment in producing another generation of researchers to be able to teach so you find a lot of the universities hiring Master’s degree students, sometimes from the same university to teach students. And this in education is called inbreeding, and it is one of the most detrimental factors to lowering the quality of education.” Interviewee 6, entrepreneur

The occupation of Palestine plays a role in this limitation by the restriction on movement:
“I need to mention again the occupation because it prohibits foreign teaching staff from freely accessing the occupied territory and that reduces the ability for us to pick up on this human resource weakness by complementing it with foreign teaching staff. I was on the board of Birzeit University back in 2006, when Israel cracked down on foreign nationals and their ability to get visas, and we ended up losing half of our foreign teaching staff, we had about 50 and about 25 left the country because they could not deal with the ambiguity that the occupation created in their ability to get visas” Interviewee 1, academic & government official

One of the recommendations to overcome these problems was to create global partnerships with international universities:

“You have good universities in Palestine, but they are not as connected to the universities globally or to what is happening to the world as Israeli or American universities.” Interviewee 9, global IT company executive

“It is true that we have 13 universities, we have 3000 graduates yearly, but we still need to have partnerships between our universities and international universities. For two reasons: first we need to have a real upgrade to the Palestinian professors, including upgrading to the latest trends of teaching and what is going on. We talk about IT, you know it is not about textbook, it is what is going on, in the world. The private sector by default should be active and know what is going on but still cannot fill the gap between the industry and the academia. We have cooperation between the private sector and the academia, but I am not satisfied about it. For the local universities also we need partnership from their side with the international universities.” Interviewee 11, PITA official
In fact, one initiative is already taking place to overcome those problems in one of the Palestinian universities.

“Al-Quds University has an excellent joint program with a German university. The program is called “Dual Studies” where students study 3 years at the University and then work for 2 years at the private sector. Our local companies and we are part of one of them accepted to take 3 students every year. So we started with 25 students as a piloting and next year we hope to have it for more than 50 students so we are trying, not to bridge the whole gap between academia and industry, but the private sector and the academia are in a continuous discussion “how can we help our graduates to be, not ready to go to the market, but to be semi ready,” because our oil is our human resources.” Interviewee 11, PITA official

There is also need to bridge the gap between the academic and the private ICT sector:

“I think that in universities there is a gap between industry and academics and it really affects the level of students and the level of training. So when students graduate, they lack a lot of skills which are needed in the industry and also the curriculum is not developed in the way that it should be. So on that level there should be some development and reform in the curriculum and the way they teach in universities in order to cope with the need of the software industry in the country.” Interviewee 3, academic

“So we need to give them the education they need based on the IT sector needs and requirements. We should not give too much theoretical deep knowledge on something that is not used in the industry. Now this issue is getting more attention, the gap between industry and education, many universities are getting closer to closing the gap but still it needs more initiatives from the ministries and the government to close it.” Interviewee 11, PITA official
5.3.2. Need for Better Skills Education.

The interviewees also elaborated on the specific skills identified in the secondary data as lacking, but also identified a need to help students in be more innovative. As was pointed out by the USAID officer, this was more challenging as Palestine joined the global ICT market:

“The universities have to match the skills of the young graduates with the market needs. This was fine when most of the ICT activity was happening in the local market. But once ICT companies started signing contracts with international companies we are shifting this demand to the universities. So they need to upscale the quality of output to match the needs of the international companies. Universities now are failing to provide the right talent.” Interview 4, USAID officer

There was wide agreement that technical skills are lacking, and this had a direct impact on the development of the ICT industry:

“There is no diversity in the output, companies are asking, for example PITA, there is not a lot of developers in PITA. For example, good talent in animation is extremely lacking here. Still there are 5 animation companies that are struggling to do business. So the universities are not giving the talents needed, there are missing skills and also the basic skills like JAVA.” Interviewee 4, USAID officer

In some aspects the interviewees judge graduates as strong in some areas but weak in other key skills:

“In general I would say that our graduates today come out of universities with very solid hard skills: sciences, math, they are probably second to none when it comes to those kinds of hard skills. Where they are weak is in the soft skills whether it is communication, marketing even
planning in a sense. These skills are not well developed at a young age and it continues with the higher education that the focus remains on the higher skills. That is changing but it is changing very slowly. That is some place that needs focus, in a general sense the math and science are excellent.” Interviewee 6, entrepreneur

Some of the most important missing skills were identified as problem-solving as well as soft skills:

“That is where we need to help them, some training in soft skills, in team level work, exposing them to other problems or ideas, how other people solve it and work on it.” Interviewee 11, PITA official

Another issue was related to developing skills in innovation, which were particularly challenging given the restrictions on movement:

“There are two factors for our problem with innovation in Palestine, the first one is the teaching system, especially schools, they do not encourage innovation. We need to work on teachers and the educational system. The other aspect is the current political situation, to be innovative you have to be open to the world, to have a free mind where you can think freely and imagine, this happens if you are exposed to other cultures. People in Palestine do not travel enough so the experience of meeting other people and seeing other things is not there. People are limited to their cities so this kind of restriction limits innovation.” Interviewee 3, academic

One initiative to help with developing innovation at Al-Quds University was a new department called Development of Innovation:
“This department actually focuses on taking the project work of students and turning it into spin-offs at the end. So we search for smart ideas for projects that the students created and help the students to build their prototypes. Afterwards we make a selection of these ideas and incubate them at Al-Quds ICT center which is called SKITCE and once the incubation is successful we start to search for funding to help the groups behind the projects to find the funders and sponsors to start a company. We were successful to initiate two companies at the University, both in ICT. So the companies are registered and they were helped.” Interviewee 10, academic

On a more general level, what the ICT industry wants and needs are life-long learners:

“as long as you have good universities that teach graduates how to learn new things, you are good. I think we have this to a certain degree and now it is the turn of the entrepreneurs and startups to push these graduates to learn more.” Interviewee 5, entrepreneur

5.3.3. SWOT Analysis

The development of human resources to better support an ICT economy requires an open and innovative educational system. While there is much work needed, as seen in the interviewee comments, it appears that most issues are controllable by key stakeholders from government, academia, and industry. See Table 20: SWOT Analysis of the Education Infrastructure Factor.

5.3.4. Controls and Impacts

The controls and impacts in the education infrastructure are all considered. Some of those opportunities are mentioned below:

- Create an immediate effort for curriculum reform in ICT departments to help improve:
  - Technical skills
• Soft skills
• Global knowledge
• Critical thinking and problem-solving
• Innovation

• Create partnerships with international universities
• Create partnerships between private sector and universities
• Create global partnerships possibly through Diaspora.
• Improve e-learning policies to encourage e-learning. This can help overcome the problems associated with the movement restrictions, such as bringing in international foreign faculty.

### Table 20: SWOT Analysis of the Education Infrastructure Factor

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of graduates with ICT degrees</td>
<td>Limited number of qualified educators</td>
<td>Partnerships with international universities</td>
<td>Movement restrictions limit</td>
</tr>
<tr>
<td>Motivated students and graduates</td>
<td>Curriculum does not match ICT, business and soft skills needed by industry</td>
<td>Collaboration with the ICT sector to improve practical and soft skills.</td>
<td>Limited access to foreign educators</td>
</tr>
<tr>
<td>Relatively good quality basic curriculum in math and science</td>
<td>Gap between academic and industry ICT sectors</td>
<td>Initiatives to reform the ICT curriculum</td>
<td>Limited innovation because of political situation and educational culture</td>
</tr>
<tr>
<td>Diaspora can help in human resource development</td>
<td>Online certificates are not accredited</td>
<td>Improve e-learning policies.</td>
<td>Limited Global business experience for Palestinians</td>
</tr>
</tbody>
</table>

### 5.4. Scan 3: ICT Stakeholders

The final example of using the ICT4D decision framework is to identify high control/high impact (CI) actions analyzes the critical issue of stakeholder cooperation to achieve ICT success. In this scan we focus on the range of stakeholders, across the more controllable factors, across the
viable value chain activities, see Figure 15: Stakeholder View. The secondary data on stakeholders discussed reiterates concerns already revealed in earlier scans (e.g., needed government support via legislation). These data also point out a need for professional ICT standards, tax policies that favor startups, private ICT sector complaints about inadequate government action in ICT4D, and the need for greater overall coordination among stakeholders. These stakeholders include various government bodies, global and local development agencies, as well as academic and private sector organization. Particularly relevant stakeholders include the Palestinian Ministry of Telecommunications and Information Technology (MTIT) and the non-government organization, Palestinian Information Technology Association of Companies (PITA). The secondary data revealed that a key ingredient to the success of ICT4D initiatives requires some level of coordination among the different stakeholders.

![Stakeholder View of Area of High Control/High Impact](image)

*Figure 15: Scan 3-Stakeholder View*
5.4.1. Coordination Among Stakeholders

The interview data call for more interaction and coordination among the principal ICT stakeholders and provide much greater detail on what needs to be done, what coordination efforts have already been made, and where there are opportunities. Overall there is somewhat of a mixed view of the importance of this problem. Moreover, while on one level there seems to be an agreement that the government has good intentions to improve the ICT sector, actions are only slowly implemented.

“We need better communication skills, effective teamwork and working in teams, delegation of authority. This is missing on all levels: graduates, government institutes or in the government itself etc... We always tried to work on the public-private partnership but we do not have that in Palestine and it is a pity because it is such a good model, there should be such partnerships.” Interviewee 1, academic & government official

“There is an intention but I do not see that they are really working towards implementing. As you put it, the implementation is very slow but there is an intention, at least they realize that the ICT is important and that it can be a tool to prosper the economy but I do not see that they are doing anything serious with it. They need to move it to the next level.” Interviewee 3, academic

“We really need to build good data centers, and this is very much lacking. For example, today I was in a meeting trying to persuade the ministry to build data centers for higher education, they have a lot of data, but they do not have a unified data base there. People also do not appreciate data security, so you find a lot of hacking so you need to build good data centers with trusted security. Governmental institution lacks good and healthy infrastructure, for so many years they have been talking about e-government, but I do not see that it is coming to life, maybe there are
bits and pieces here and there but nothing real. I think that a lot of work needs to be done for enhancing the infrastructure as well as building the trust of people in such IT systems as well. Some companies are well developed in IT; they have very good systems like banks, but this is different.”. Interviewee 3: academic

A limiting factor was that there is no country-level agenda and plan:

“If we as a country want to improve our economy through ICT, we need to have an agenda. We want to have this number of companies; we have to put the indicators on the country level. So if we focus on the success stories that we want to make, this will bring new agreements with international companies, it will convince the government to sign these agreements. So if PITA unites and thinks global not only local and puts a target and an agenda, and they need to force the government to help them and put the software development economy on their table, give it a priority and say that this is one of the only chances or resources that Palestine have to boost the economy and decrease unemployment. Because this is true, we have smart and skilled Palestinians who can be the good resources for the ICT, but you need the governmental movement and initiatives, so you increase the reliability of these companies here and reduce the effect of the political factors.” Interviewee 10, academic

“I think that it is poor planning on the government side. They do not have a long-term plan, and even if they do, when the government changes, they drop whatever the previous government did, and they come up with new and focus on something else. This is the case in Jordan for example also, the last two years were very bad for the ICT sector because the government came in, they added more taxes, a lot of startups were led to Dubai because there they relaxed their regulations of policies and they became more friendly for startups. So, unfortunately, poor
planning from the government is causing this. And what is happening in the private sector is leading the change not the government.” Interviewee 4: USAID officer

A view shared among other stakeholders was the problem of internal political instability:

“So you have to deal with the new reality. All the time you have changes, you do not have stability so how can you have a long term planning and we know very well that changing and reforming in education is not like reforming in a small private company.” Interviewee 2, NGO founder

Finally, the CEO of a startup sees that this problem is global in general:

“There is almost no cooperation between them, and this is a problem. Everyone is singing his own song. So if you talk about the government and its organizations they are way behind, I think that now they are trying to pick up but still there is a gap even in the vocabulary and ideas in the discussions we had we could tell that there is a big gap. But again this is normal, it happened in Europe when at the beginning these clusters of startups and entrepreneurs started to appear, government will always be behind and it is the same with universities who will not move until they actually start to see the opportunity. In other bodies the collaboration ranges, VCs for examples are way ahead in helping and understanding because it is their business they want to invest and make money.” Interviewee 5, entrepreneur

5.4.2. Coordination Efforts

An interviewee who is directly involved in the development of the ICT sector in Palestine mentioned coordination efforts through a coordination council:
“So almost on quarterly basis we have a meeting between the private sector and the main 7 ministries, the head of this meeting is the Prime Minister himself, talking about the relationship between the private sector and the government. We have a coordination council in which its members consist of all the business associations from IT up to Marble & Stone to pharmaceutical and construction etc., so it is a very regulated market in terms of industry.” Interviewee 11, PITA official

“There is actually a Palestinian private sector coordinating council, and that council has trade associations as its members, PITA is one of these associations. So there is an open channel between the trade association and the government which meets regularly and raises issues regularly. And actually there is a line of communication that is open, the ICT sector holds every year an expo-tech which is a landmark exhibition conference which brings together private sector, civil society and the government to talk about the ICT sector and showcasing so that is another opportunity for debate and conversation to happen so I do think that there are channels open for cooperation but I must differentiate between cooperation in terms of having conversations and cooperation in terms of moving legislation and putting it in practice.” Interviewee 6, entrepreneur

In contrast, a previous government official indicated that attempts at coordination do not always work:

“People should work more as a team towards the national good. At the time of Salam Fayyad, DR. Mashhour forced every minister to have an advisory board which consisted of the academia, private sector and the government institutes. I found this a very good idea because when you want to do the strategy, you think together and you think of everyone. We had many fights of the different things that the government wanted or the private sector wanted or the academia
wanted. So when you have these things on the table, you will have a good result for the country. The board stopped, in all the ministries they did not do a good job. “Interviewee 1, academic & government official

5.4.3. Opportunities

The lack of stakeholder coordination was seen by many as a weakness that created an opportunity for change that could have very high impact. This opportunity can be realized by a political decision at a higher level to pursue an Information Economy, which was similar to what happened in Jordan:

“In the case of Jordan, 8 years ago when the King said that he needed to develop the ICT sector, they went, and they brought multinationals: Microsoft, Oracle...and told them “here are millions of dollars, and you need to work with the local companies” and it boosted the situation, right now they have 11 or 16 thousand hired, they gained a knowledge that they were able to take and expand to the regional market (the Gulf and Africa), and they advanced really well in the last two years. Unfortunately, we do not have this here; in economics, government spending is a major component of the GDP development in the country.” Interviewee 4, USAID officer

Another potential approach at least among the different government bodies was a bottom-up approach as described by one government official:

“it is so hard to work with people in other ministries, it was so hard to convince people to come on board, and then we stopped doing that, we just worked with those who wanted to work and we thought that the others will follow, we had success stories with that, people wanted to be a part of it. The OECD mentioned this and called it a success story for them. We were not following people; they came to follow us.”
We worked bottom up because we did not ask the ministers to decide, we convinced the technical team, and we started working with them. Whoever wanted to join was welcome, so we started to go to higher and higher people until when I became a minister I did this committee from a higher level. We worked on 5 levels: the infrastructure so the government network, then having the network there we worked on the security level, we had some information security training and some base lines, what should each university have at least for having some information security in the institutes, then we worked on interoperability, how they can exchange data between ministries. The fourth level was the legal level, so we worked on preparing some drafts and regulations like the e-transaction law and also on the top level we prepared the policy document and the road map and then the ministerial committee.” Interviewee 1, academic & government official

On a question on whether restructuring can be of value to improve coordination one interviewee answered:

“Not restructuring - because I do not want to think of it as a structure. More as a collaborative effort, something less structured but more collaboration where together they support and encourage young entrepreneurs, they even go into the universities and help bring the whole concept of innovation to students and encourage them to come up with ideas and you know, be part of it. Help the eco-system evolve but it does not have to be a structure it has to be more of individuals that come together and collaborate to make it more alive.” Interviewee 9, global IT company executive
5.4.4. SWOT Analysis

Coordination among stakeholders seems obvious but making it happen is very difficult as evidenced by the secondary data and, particularly, in the comments from the ICT experts interviewed. Table 21: SWOT Analysis of Stakeholder Coordination Issues presents a SWOT analysis of this framework scan.

5.4.5. Controls and Impacts

Some of the most important HC\HI opportunities are

- Repeat successful coordination efforts and make use of existing coordination efforts.

- Improve coordination on all levels (between ministries, and across the stakeholders).

- Utilize the shared vision and motivate lagers to get onboard

*Table 21: SWOT Analysis of Stakeholder Coordination Issues*

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared vision among stakeholders</td>
<td>Weak and poorly enforced laws</td>
<td>Repeating successful coordination efforts</td>
<td>Internal political instability</td>
</tr>
<tr>
<td>International support</td>
<td>Lack of commitment to ICT development by some governmental bodies</td>
<td>Improving coordination with both higher-level leadership decisions (top-down) and lower-level initiatives to cooperate (bottom-up)</td>
<td>Dependency on foreign aid</td>
</tr>
<tr>
<td>Existence of different coordination bodies and initiatives</td>
<td>Influential organizations have limited means</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No country-level agenda and plan</td>
<td></td>
<td></td>
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</tbody>
</table>
5.5. **Scan 4: Exogenous Factors**

In the fourth scan, the focus is turned to two exogenous factors to understand how such low control factors can affect building an information Economy. Low control factors can act as opportunities or threats. By understanding those factors, a developing country can attempt to make use of the opportunities on one hand and to avoid or adapt to the threats. It is also possible to find some High control, High-impact opportunities. For an illustration for this scan based on our model See Figure 16: Focus on Exogenous Factors.

In the case of Palestine, two of the most important exogenous factors are the Israeli Occupation: which acts as a threat; and International Support, which acts in general as an opportunity. Both factors were discussed earlier in Chapter 4 from secondary data sources.

The secondary data revealed that the political reality and the occupation in specific poses a number of threats to the development of the Palestinian economy, in general, such as the restriction of movement of people and goods, inaccessibility to ports, and geographic discontinuity. The ICT sector is affected by additional threats posed by the occupation; for example, technical restrictions such as the delay in allowing cellular service providers to offer 3G services. The interviewees mentioned many of those issues, in addition to others, the next section discusses the effect of the occupation on the development of the ICT sector.

On the other hand, international support by foreign governments and development institutions acts in many cases as an opportunity for Palestine and other developing countries. As discussed earlier in Chapter 4, there has been an international interest in the Palestinian ICT sector by several foreign governments including the United States through its international development
organization, the USAID. In the next section, the interviewees’ view on the role of International support on developing the ICT sector is presented.

5.5.1. International support

The interviewees had a split view on the role of International support in the ICT sector in Palestine. Some saw the international support as a unique opportunity and as an enabling factor to help establish new firms, or even help existing firms to get funds at a critical stage. Others pointed to some of the risks associated with the dependency on foreign aid in terms of sustainability, and the possible market distortion based on the potential conflict of focus between the international aid goals and other local stakeholders.

One interviewee, the founder of a startup company funded by international aid, indicated that the availability of international fund motivated some companies owned by Palestinians abroad to move to Palestine to make use of the funds:

“In Palestine there is a lot of money and at a certain period people were saying that there is more offer than demand so it is an opportunity and I have seen Palestinians who have companies
outside of Palestine because of this movement they moved most of its operation to Palestine to make sure they become capable of receiving this kind of investments. “Interviewee 5: entrepreneur

However, interviewees did not agree on a positive effect of international aid money; it is perceived by some as “political money” that needs to be replaced on the long run by internal unconditional funding.

“I am really working very hard to make breakthroughs to have unconditional funds with no political money which is very hard to find in Palestine. USAID money is political money; European money is definitely political money so what I am trying to do is to convince Palestinian philanthropies to start taking their social responsibility and funding this process and to invest to reach beta level.” Interviewee 2: NGO founder

One of the problems that arise from dependence on International aid money is the uncertainty associated with the volatile nature of such funds:

“we cannot build an economy based on donations because the Congress can vote to stop the aid any minute, so we need to build our own economy.” Interviewee 7 Outsourcing Company founder

One consequence of this vitality is the difficulty of making long-term plans based on a future budget:

“The problem is that we don’t have a status quo, we are not protecting the current situation, every day we are going down, every day we have reduction in something even when you are designing the government budget on this amount of money, the other day there will be a political decision like the speech of The Palestinian president or other and the Americans cut 45%
of the budget. So you have to deal with the new reality. All the time you have changes, you do not have stability so how can you have a long-term planning “. Interviewee 2: NGO founder

An interviewee also pointed out the problem of sustainability of companies that depend initially on international aid and support:

“So in a certain period there were a lot of funds and NGOs that help companies in the outsourcing sector and encourage foreign companies to do outsourcing deals with local companies but as soon as this help starts to wither you can see that the cooperation also starts to shrink because of the cost. “Interviewee 5: Entrepreneur

“we cannot depend on the USAID to build these companies because this is not sustainable. The time the project is ending, the funding is not there, and the company will fail if they do not have the access to the right market which is not only in Palestine but outside.” Interviewee 10: Academic

One problem with the dependence on international aid is that it creates some “laziness” and incompetence in raising internal for funds projects,

“donors have become more stringent in how much funds they give and how funds are dispersed. We find ourselves with higher education institutions which are for the first time in their life thinking of creating advancement and fundraising departments, they became very lazy during the first 20 or 30 years of their existence with hands out that they actually have not established advancement departments so from a financing perspective there is a weakness “Interviewee 6: entrepreneur
“I think that one of the problems that we have in Palestine is all the NGOs, they encourage people to have their hands out, and we need to stop that.” Interviewee 7: outsourcing company founder.

International support usually comes with many restrictions and rules; donors may have their own vision and target that is not necessarily in line with the that of other stakeholders in the ICT sector. therefore, donation money may be limited in nature:

“Maybe there is a certain fear from investing in this sector. The problem in Palestine is that any kind of initiative comes from a donor and this is not a good way to start an industry because donors have a specific target, they are limited. For example, there were many projects done on incubators but they did not have a big success, it comes from donors who put rules and money is not really good spent there. So you need an investor who wants to make money and believe in investing in the ICT and you need people who can build such an industry, who have the skill, the willingness and the expertise. “Interviewee 3: academic

Finally, the restricted nature of international aid may distort the market by concentrating on specific projects; an interviewee noted that the international aid might push the companies towards a “wrong direction” as an interviewee puts it:

“There is some market distortion happening: long assistance given to companies that pushes them to the wrong direction. This happened because of some donors but now it is changing. Every couple of years they coordinate the activities and projects in order to avoid the market distortion which is happening sometimes. There is some information about that in World Bank reports that talk about this.” Interviewee 3: academic
In conclusion, many interviewees see some value and opportunity in international aid, however many agree that it cannot be the main vehicle to the ICT sector development because of its restricted nature, and that it should be replaced by other sources of funding that are either motivated by profit or by government funding for start-up companies in line with the national goals.

5.5.2. Occupation

The Israeli occupation plays a major role in creating a unique reality to the Palestinians compared to other developing countries, since it seems to add additional restrictions to the development of the economy as a whole. Different economic sectors are affected to various degrees by this reality. Most of the interviewees saw the occupation as a source of many obstacles to the ICT sector.

Some of the interviews see the reality of occupation as one of the greatest obstacles that may always limit and slow down the development of the ICT sector in Palestine:

“It is very difficult for me to separate Palestine from the occupation because the occupation is very oppressing and I think of why in Egypt or other Arab countries you did not have many startups. I think that part of it is it is not a democracy, you are not free there and I think you need this kind of freedom of expression, of ability in order to be creative and I think that the occupation is very oppressive. For instance, what we did in Palestine and what we started doing with the ICT sector was good but it was just a good beginning and for it to flourish and succeed you need to move the occupation and you need ability and access to the market and ability of movement. I am sorry but this is really difficult otherwise.” Interviewee 9: global IT company executive
“The overarching restriction is the occupation but underneath the cloud of occupation there are many dynamics happening, some of them we can be doing better with even under the occupation.” Interviewee 6: entrepreneur

The reality of the occupation played a major role in delaying the progress of the ICT sector in Palestine in several ways, such as the restrictions on movement of people and goods, technical constraints, which is summarized in the following quote from one of the interviews:

“we were challenged by establishing the first telecommunications company within the constraints of the Oslo Accords, specifically Article 36 of the Accords which defined what we were allowed and not allowed to do. The Oslo accords gave us the right to separate and independent telecommunication networks but all the tools required to do that remained in the hands of the Israeli military. Although we had the right to build a network we had to go back to the Israeli side and request frequency allocation and they remained the unilateral party who would assign and not assign frequencies. And that is a battle even today, last week they allocated part of the 3G frequencies to us after almost 11 years of a debate. That is a very clear example of how they ultimately are in charge of the pace and technological development of the sector not only this sector but the economy at large. So basically they have been delaying our technological development by restricting access to frequencies, importation of goods, the ability for staff or foreign persons to come and go freely and ultimately all of those collectively restrict how development can happen or even more important: apply a tremendous additional cost to what we are able to develop so it is a double hit for us. “Interviewee 6: entrepreneur

It can be seen that reality of occupation played an important role in slowing the down the development of the Palestinian economy and the ICT sector from early days A more thorough
discussion of those two general obstacles under the umbrella of occupation; namely restrictions on movement of people and goods, and technical restrictions is presented below.

5.5.2.1. Restrictions on Movement

As mentioned earlier in Chapter 4, one of the most significant hurdles caused by the occupation are the ones related the limitations on the movement of Palestinians within the Palestinian territories due to the existence of Israeli settlements and security checkpoints. In addition to a total geographical separation between the West Bank and Gaza, in addition to restrictions on the movement of people and goods across borders.

Different sectors may be affected by varying degrees by those limitations. The ICT sector may be among the least affected by the restriction of movement among the other sectors, especially for outsourcing activities that depend on internet connectivity.

“we cannot ignore that outsourcing IT solutions is the best way to raise our economy and GDP. we don’t have other opportunities. Why? Because we are not controlling anything, the only thing that Israelis are not controlling is the connectivity; coding and outsourcing with no Israeli control this is the only thing that we can be free with. All other traditional industries should go through Israel. We are not controlling any border, not the air, not the underground, not the checkpoints, we do not have any open borders with any neighbor country so how to import how to export if they are not allowing us to do so. And I think that now everyone is convinced that this is the only way to have a breakthrough in our economy.” Interviewee 2: NGO founder

That is not to say that those restrictions have no effect on the ICT sector in Palestine. In fact, restrictions on movement affect the ICT sector on several levels, such as education, access to global markets, opportunities to host or participate in conferences, and many other.
At the educational level, it is sometimes difficult, to import tools and research materials that students can use for their projects, and to hire foreign educators’ staff to help with the human resources weaknesses mentioned earlier.

“being close to Israel is a hindrance; they try to block universities from getting research material. I trained students from the 3rd year and a part of them has to do a project and a couple of times where I had to take chips and materials from here with me, and I had to travel back there 5 times a year for the students to build the project because they could not get them in the country otherwise. So being close to Israel did not help at all.” Interviewee 7 outsourcing company founder

“I need to mention again the occupation because it prohibits foreign teaching staff form freely accessing the occupied territory, and that reduces the ability for us to pick up on this human resource weakness by complementing it with foreign teaching staff. “Interviewee 6: entrepreneur

Living in a closed society that is limited in movement can also affect the level of innovation negatively because of the limited exposure to the outside world

“The other aspect is the current political situation, to be innovative you have to be open to the world, to have a free mind where you can think freely and imagine, this happens if you are exposed to other cultures. People in Palestine do not travel enough, so the experience of meeting other people and seeing other things is not there; people are limited to their cities so this kind of restrictions limits innovation. “. Interviewee 3: academic

On another level, movement restrictions affect the ability of companies to host events in Palestine or participate in conferences abroad, as the CEO of a startup company notes:
“Of course being under occupation has also its own limitation of course it is minimal in ICT, it is not like other sectors because we do not have to import and export but it starts to show when you try to grow, and you need to bring foreigners to help you or to host events or join conferences, the cost becomes really higher.... The biggest problem however for us is when we try to host events in Palestine for gaming like Palestine Game Week, and it was not easy for people from outside to come because they could not go to the Israeli embassy and ask for a visa to come to Palestine. And even when they come they have to make sure they know what to say, so all these things make organizing these events much harder.” Interviewee 5: entrepreneur

Finally, restrictions on movement may limit certain ICT activities, such as e-commerce:

“Also if you want to go with e-commerce, you have to deal with shipment, the siege and economic restrictions which can be a kind of a problem, but there is an opportunity to use the internet to sell different products and exchange services” Interviewee 3: academic

5.5.2.2. Technical Restrictions

Another issue that has arisen from occupation is technical restriction, posed by the lack of sovereignty of the Palestinians:

“We can connect through satellite because it is a phone it is supposed to be very confidential and very close and then we realized that according to Oslo satellites are forbidden, you cannot install any satellite receiver or transmitter with no special permission from the Israeli authorities. Even in the coordination office between Israelis and Palestinians, there is a captive calls telecommunication and IT captive. So if you want to import a router like ADSL or any kind of router you have to have the Israeli officer permission for that router to be imported. So hardware
is really closed, policies and public sector involvement is very limited because of the occupation”

Interviewee 2: NGO founder

One of the major and most mentioned technical restriction is the lack of control over frequencies which prevented 3G/4G for a long time just until the date of conducting the interviews:

“most other countries have a strong cellular network and you know Jawwal which is the largest operator there, had 3G equipment installed for years and years they just needed to push the switch and they could not do that and that is a huge problem. And with them blocking WIFI, there are a lot of WIFI companies, Israel tries to block that. Israel did not help at all, back in the old days, universities had a T1 line that Europe used to pay for but the infrastructure inside the Palestinian Authority, Israel does not contribute to that at all, on the contrary they block it at any chance they can get. Things would have been better had they allowed 3G and 4G frequencies,

“Interviewee 7: outsourcing company founder

The issue of the limitation on the 3G/4G frequency was mentioned by many of the interviewees, it was seen as a major hurdle to the development of the mobile applications market, which is a major ICT market at global scale:

“We have companies now who invested around 200,000 dollars each in application based on 3G if we do not receive the permission for the 3G technology from Israel in 2, 3, 4 months’ maximum they will lose the money and close and brain drain. People cannot understand that the IT industry without connectivity everywhere through cellular networks it’s useless. So how do you want to open a new market for applications: navigations, marketing, and all the taxes application, you know all the applications that people could use and pay for if they are limited by WIFI? Will you go to a coffee shop to order a taxi? “Interviewee 2: NGO founder
The technical restrictions were also paired with strong competition from Israeli telecommunication companies which is considered another challenge to the Palestinian ICT sector. Israeli companies have a competitive advantage over Palestinian companies,

“Of course Israel is not allowing Watanya to go in to Gaza neither to build the infrastructure nor to provide service. Another important obstacle for the GDP and the ICT contribution which is the illegal coverage of Israeli mobiles for Palestine. They are providing access to their mobile networks…. they have at least 5 companies, anyone can buy their sim cards and have access to 3G so they are still stealing from the Palestinian market about 150 million dollars a year. Because they are covering the Palestinian areas through settlements, we have a law in Palestine that any product from the settlements is prohibited so we consider telecom a product from the settlement because they are transmitting and covering the Palestinian areas from the settlements. “Interviewee 1: academic & government official

5.5.2.3. Opportunities

While many interviewees agree that occupation poses a number of critical challenges, others see an opportunity, for instance, the restriction on movement forces Palestinians to find innovative ways to overcome the political reality of occupation:

“I think that overall, the constraints that we are living under are motivating our younger generation to adopt quicker ICT literacy and utilizing it not only for the sake of knowledge but for the sake of actually solving problems. One example we always give is the use of video conferencing, I would imagine Palestine has the largest video conference usage in the region. Not because we are leaders in the sector but because the constraints that the occupation has put upon us have pushed us to find technological means to remain connected specifically between Gaza and
the West Bank or Gaza and East Jerusalem. So we have become many times first adapters of technology for the sake of solving applied issues mostly related to the constraints that we live under.” Interviewee 6: entrepreneur

Also proximity to Israel can have potentially some benefits in the future for the Palestinian ICT sector:

“if we are talking scientifically and professionally speaking, we have Israel beside so if we will have a good cooperation between Palestinians and Israelis in terms of R&D and development and working through Palestinians or working together to open Gulf countries and Gulf markets because we are close to it” Interviewee 2: NGO founder

Also the current restrictions force the Palestinians to be more innovative and to make use of technology such as e-learning and video conferencing in order to overcome some of the obstacles posed by the occupation

“Using ICT in Palestine is not a luxury, it is obligatory, for example now in the university we have most of our courses online because many of the students cannot reach the university because of the blockades. So having these courses online was driven by the occupation, we are obliged to have it. The same for the e-government electronic services because of the problems of movement from one city to another, for example if someone in Jenin wants a government service from Ramallah, he can have the service at home or in a local office in Jenin. Palestinians are known to have high literacy rate. “Interviewee 1: academic & government official
5.5.3. **SWOT Analysis**

This section presents the current SWOT for both International Support and Occupation. See Table 22: SWOT Analysis for International Support Factor, and Table 23: SWOT Analysis for Occupation Factor.

**Table 22: SWOT Analysis of International Support Factor**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunity</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of international aid from international organizations.</td>
<td>Dependency on international aid poses a challenge on developing fundraising skills</td>
<td>Availability of international funds</td>
<td>Available funds are usually conditional</td>
</tr>
<tr>
<td>Success Stories that made headlines</td>
<td></td>
<td>International organizations encourage outsourcing to Palestine</td>
<td>Volatility and uncertainty of funds</td>
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<td></td>
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<td></td>
<td>Funds are not sustainable after starting a project</td>
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<td>Market distortion</td>
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**Table 23: SWOT Analysis of Occupation Factor**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunity</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation encourages innovation by forcing Palestinians to use technology to solve problems. Israel’s technological advancement had some positive effects on the ICT sector.</td>
<td>Brain Drain</td>
<td>Motivates younger generations to improve their ICT literacy</td>
<td>Restriction on movement of people</td>
</tr>
<tr>
<td></td>
<td>Competition from Israeli companies</td>
<td>ICT Connectivity is the least restricted among other industries.</td>
<td>Restrictions on market access</td>
</tr>
<tr>
<td></td>
<td>Political unrest hinders investment efforts.</td>
<td>In the case of a political resolution, there is an opportunity for coordination with Israel.</td>
<td>Restrictions on imports and exports which affect business and academia</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Technical Restrictions on technology</td>
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</tbody>
</table>
5.5.4. Controls and Impacts

The main control and impacts for this section are related to international aid rather than occupation, some of the HC, HI opportunities are:

- There is a need to find other sources of Funding on the long run. It is possible to encourage investment in the Palestinian ICT sector by marketing success stories possibly through Diaspora.
- Improve fundraising skills to utilize venture capital funds. (HC, HI)
- Improve the utilization of available funds. (HC, HI)
- Get unconditional local government funding for startup projects. (LC, HI)
- Coordinate better with donor community to avoid market distortion. (HC, HI)

5.6. Scan 5: Make Value Chain Activity

One of the important pillars of the ICT sector in Palestine is software outsourcing which is represented in the second row of our framework (Make). Therefore, the final scan presented in this section discusses two of the most relevant factors that emerged from our secondary and primary data analysis that affects this value chain process.

The first one of those factors is (Trust\Image) under the Global Markets super factor. The other one is the Palestinian Diaspora from the sociocultural super factors Both factors were discussed earlier in Chapter 4 from secondary sources. See Figure 17: Make Value Chain Activity. This section discusses those factors from the point of view of the interviewees’
Palestinians living in foreign countries who might be interested in developing the Palestinian ICT sector in several ways play an important role in the development of the ICT sector in Palestine. For example, by bringing outsourcing businesses to Palestine by either starting their own businesses, or by signing contracts with Palestinian ICT companies or developers.

Another important factor that relates to outsourcing is the image of the ICT sector in the global market, and the level of trust in the quality of services offered by the Palestinian ICT sector. There appear to be mixed opinions among interviewees on the image of the Palestinian sector in global markets. Some saw it as a point of strength; while others saw it as a point of weakness. In all cases, this seems to be a potential area of improvement which may be essential if the Palestinians are to build an information economy that can contribute to the global ICT market.

The two factors are an interesting point of focus in this study because of the potential relation between them. As a point of strength, the Palestinian Diaspora can help improve the image of the Palestinian sector through their international relations by marketing the ICT sector abroad and bringing more global business to the Palestinian ICT sector.
5.6.1. Brand Image and Trust

The political instability in Palestine has a substantial effect on the image of the ICT sector in Palestine. The negative image is driven by news reports about the political situation that affects the trust in the sustainability of services that can be supplied by the Palestinian ICT sector.

“We lack market access because of the constraints that we live in, both image constraints if the news every day is coming out from Palestine in a negative fashion, companies are unable to overcome that negative news by pitching their companies only. So they are forced to not only pitch their products and services but also mitigate the negative stereotype that Palestine has in the international community, for IT specifically because we are selling a service. That is of utmost importance because the image risk will create a sense in the international community that Palestine is not a place that can have a stable environment to provide sustainability of services. “Interviewee 6: entrepreneur

Major events like the different wars on Gaza reduce the attractiveness of having partnerships with the Palestinians significantly:

“the Gaza war which happened last year affected the perception of the ICT companies, unfortunately. We were labeled as risky partners, so some companies lost business after the war. This keeps happening every now and then, and companies have to cope with the risks that come from losing the contracts and try to convince the companies that they are stable they do not have problems and that they still can work. “Interviewee 4: USAID officer

There has been positive feedback from established international partnerships, where 70% of the clients who had business with the ICT sector in Palestine were willing to expand the level
of partnerships according to a Cisco report (J. White et al., 2012) by the attraction of more challenging and higher value added projects.

It has also been reported that the brand image of the Palestinian ICT sector has been increasing over the time in the past five years. In fact, many Palestinian companies such as ASAL and Exalt that started with Cisco developed expertise that is recognized internationally, were able to sign additional contracts with international companies such as Oracle and EMC.

This also has been supported by the interviews:

“Palestinian companies are doing, in a subcontracting, outsourcing and this has a good impact on the level of maturity of the Palestinian sector on working on the international standards. We have many success stories; Cisco shifted a lot of their work from many countries to the Palestinian companies based on the performance and the cost” Interviewee 11: PITA official

Another problem that is directly related to the trust image is the competition with more stable and more developed countries that may be perceived as less risky

“It is not trust but high risk they do not trust the system because there are high risks of failure. You need to give the stability, I mean look at India, they have the best internet, infrastructure, so that is an assurance. You could do online meetings the whole day with them; the internet is there. You can do all the work via virtual machines; you can run on servers in Europe. We do not have this here; the infrastructure is not strong enough. The risks of the infrastructure and of the political situation, you need more involvement from the ministry and the government to help. “Interviewee 10: academic

This affects the marketing efforts, for example, those by Palestinian diaspora attempting to bring outsourcing business into Palestine:
“I am having a hard time trying to convince people to outsource to Palestine. The advantage is the smart people who are part of the solution and are there, and they are not leaving the country. I struggle with that when I try to come up with a marketing brochure. Why is it better to outsource to Palestine than to India or to Jordan or to Egypt? India is not a competition; the biggest competition is Eastern Europe: they have decent quality, and it is much cheaper to outsource to them than to Palestine.” Interviewee 7: outsourcing company founder

Palestinians have some sociocultural advantages that stem from the shared religious and language culture with other Arab countries and the Muslim world, which can be fostered to overcome some of those restrictions:

“One of the things that is good for us is branding us as a company from the Holy Lands; this is important for call centers. Other sectors like outsourcing it is more about the quality, the ideas, the niches that they develop. We have a good quality of Arab-speaking, we have good proximity to Europe and the Gulf.” Interviewee 4: USAID officer

Another way to overcome the negative trust image is to have success stories to tell that can make international headlines or be used to promote the Palestinian ICT sector. It is also possible to improve the market accessibility by having Palestinians participate in more conferences.

“I think that we have to start by doing a good job with the startups that we have so the main thing would be the actual results of the startups that started in Palestine. So if you have startups that create products, grow and maybe some of them can be acquired, this is the most trustful way to do it. Other ways would include helping startups by taking them to conferences outside of Palestine and of course doing conferences inside of Palestine and working with all the problems that come with it” Interviewee 5: entrepreneur
“We should show what we have and not exaggerate or talk about things that are not there. I tell people in the US, please come here and see what is going on. For example, the chairman of Cisco visited us and donated 10 million dollars to help the ICT sector. We used 4 million of them to build partnerships with Palestinian companies and projects inside Cisco. The other 6 million are in VC; there was no need to use those as a donation, and it was a successful story.” Interviewee 11: PITA official

5.6.2. Diaspora

The role of the Diaspora in the Palestinian ICT sector can be particularly significant in overcoming the weakness of the brand image of the ICT sector. Palestinians abroad can use their personal, professional network to open business opportunities, and to help expand global market access.

“we have a Diaspora community that is spread around the world, and that is a natural benefit if we are able to make use of it because that Diaspora community can become either clients to Palestinian ICT service provisioning or they can open doors for us in various markets. Like I said earlier, given market access is one of our key constraints, that Diaspora community can help us mitigate that constraint” Interviewee 6: entrepreneur

It is easier to promote the services offered by the Palestinian ICT sector to Palestinian Diaspora than to foreigners who may have no motivation to do business with the Palestinians. As one of the Palestinian Diaspora indicated in one of the interviews:

“what we have been trying to do is to go to Palestinian expats, look for people who are like me… in Palestine had someone come to me and said “hey! There are outsourcing companies in Palestine” they would not have had to sell me! So I need to look for people like me, Palestinian
people in the US and Europe that are in a position to make outsourcing decisions because I do not have to sell them, not only that, you get the fact that they would be very happy to outsource to you so they have a motivation.” Interviewee 7: outsourcing company founder

Although the Diaspora is usually defined as Palestinian nationals living abroad, it can be further expanded to include Arab nationals who may be seeking ways to support the Palestinians:

“That is the best contribution that Palestinians, expats and not just Palestinians but Arabs in general in the Diaspora, if you want to help Palestine, do not donate, again if we woke up tomorrow with a state, we do not want to live on donations because it cannot survive, we cannot build an economy based on donations because the congress can vote to stop the aid any minute so we need to build our own economy. IT is a big chunk of that, we do not have enough olive oil to export and live on that so IT and outsourcing in general needs to be a big chunk of it.” Interviewee 7: outsourcing company founder

There are potentially many other roles that the Palestinian Diaspora can play besides bringing in business to the Palestinian ICT sector. As previously discussed in Chapter 4, this was supported by one of the interviewees:

“Another positive point is that there are talented Palestinians living outside of Palestine who are willing to help, and this ranges from simple advice or actually to get deals for Palestinian companies or to invest time or money or connections. This is very important; not many people realize how many Palestinians occupy key positions in big technology companies around the world especially in the US, and it is a very helpful resource that all the startups can tap into and use to grow. “Interviewee 5: entrepreneur
The role of the Palestinian diaspora was recognized by different stakeholders, for instance, their role in marketing the Palestinian ICT sector:

“we can do business in Palestine, and we can have very successful partnerships because the Palestinian Diaspora is doing a good job in marketing and doing business with American companies, so it is a win-win in building dealerships for the whole region” Interviewee 11: PITA official

Another potential role for Palestinian Diaspora is to become investors in the ICT sector. This can help overcome some of the threats associated with international aid that was discussed earlier.

“The current number of investors is not good enough, but it is adequate for the time being. It is growing very fast as we move along, so we need more and more investors, and there are some projects to mobilize investment from Diaspora.” Interviewee 4: USAID officer

Some of the Palestinians who lived abroad come back to Palestine to open businesses or branches for their businesses in Palestine making use of their successful experiences:

“Also one of the good things that happened and we have some examples is Palestinians in Diaspora living in the US and have successful companies, come back and have shops or open branches for their companies. They have the vibe line ready in their firms already open in the US or somewhere else. “Interviewee 4: USAID officer

One of the success stories was mentioned in one of the interviewees:

“There are some success stories, I work with one company in Chicago who is a Palestinian software developer, his marketing arm in face is in Chicago but his back office is in Ramallah
and I sent many clients his way and they are all coming back with raving reviews that they feel that they are getting a top-notch quality service especially because half of this company is in the States so there is a face-to-face and there is a back office which benefits Palestinian ICT sector.

*Interviewee 6: entrepreneur*

The level of utilization of Palestinian diaspora is sometimes viewed as an opportunity that can be utilized more, and especially open new markets in some of the important ICT hubs in the world such as the Silicon Valley in the U.S:

“The other thing is yes we have a relationship with the Palestinian Diaspora but it is limited we need more, we need to be connected to the Silicon Valley not only in the region because young people have ideas but you need to have the right place which is going to the Silicon Valley or to a similar place that can go further with these ideas. So these are some of the obstacles that we have in my opinion. Another major one is branding Palestine, to show Palestine as a land of IT” *Interviewee 11: PITA official*

This opportunity is recognized by different stakeholders in the ICT sector, and there are initiatives to tap into this opportunity:

“there is a lot of work now on how to tap the Diaspora community not necessarily to come back but to make use of the networks in the facilities where they are operating business wise around the world.” *Interviewee 6: entrepreneur*

**5.6.3. SWOT Analysis**

Finally, SWOT analysis of the Make activity factors discussed above can be seen below in Table 24: SWOT Analysis of Make Activity Factors.
Table 24: SWOT Analysis of Make Activity Factors

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Threats</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous successful international partnerships</td>
<td>Lack of market access</td>
<td>Competition from other countries</td>
<td>Creating success stories</td>
</tr>
<tr>
<td>Shared culture with the Arab world.</td>
<td>Lost business after wars</td>
<td>Political</td>
<td>Diaspora who can</td>
</tr>
<tr>
<td>Being in the holy lands</td>
<td></td>
<td>Instability has a bad effect on Trust's image</td>
<td>• bring business to the Palestinians</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• invest in the sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Bring expertise</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Open businesses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Arab Diaspora are potential opportunity</td>
</tr>
</tbody>
</table>

5.6.4. Controls and Impacts

Finally, the controls and impacts for the make value chain activities are summarized below:

- Marketing for the ICT sector is needed, efforts to change the view of Palestine to become an IT hub. (HC, HI)

- Diaspora can play key role (HC, HI) in the following ways:
  
  - bring business to the Palestinians and improve marketing
  
  - invest in the sector
  
  - bring expertise
  
  - open businesses
• Widen the definition of the diaspora to include Arab and Muslim nations making use of the shared religion and culture. (HC, HI)

• Make (outsourcing) may be an important intermediate step to understanding global market and improve different skills. (outsource to global market). (HC, HI)
CHAPTER 6: DISCUSSION AND IMPLICATIONS

The decision framework for ICT4D developed in this research provides a novel structure for studying how information and communication technology is, and can be used to help grow a stable and sustainable economy. While this study focused on developing countries and Palestine in particular, this 3-dimensional view is applicable to economies regardless of development stage. We argue that this structure organizes investigations into the factors that impact ICT development, in relationship to the different ICT activities in the value chain and the various stakeholders in that development in a way that enables systematic analyses in any context. The factors are classified on a spectrum of what any one country can control, since that is central to identifying the best opportunities for a country providing high levels of control and impact. Moreover, by considering the value chain and stakeholder perspectives, analyses consider not just the factors in overall ICT development, but also what is the focus of that development in terms of value chain and who is involved in or impacted by that development.

The three dimensions offer multiple starting points to begin investigations. Drilling down in a specific factor, the framework enables consideration of whether that factor aids development of ICT across the value chain or in one particular activity, as well as which stakeholders are relevant. For example, an intelligent scan of the framework was demonstrated that began with the factor of human resource educational systems across the value chain, but also included data from multiple stakeholder types to investigate convergence on what is needed with an emphasis on the roles of multiple actors. In the case of Palestine, this scan revealed the importance of government,
industry, and academic cooperation, and our attention to the value chain view helped identify the need for education to develop students with innovation skills for Create activities.

Thus, starting with a specific value chain activity enables greater specificity in factor impacts and which players must be considered. The scan in this research that began with a focus on the Create value chain activity because of its potential for high impact revealed that for this activity both intellectual property and corporate laws about starting new ICT businesses are factors that in the case of Palestine are inadequate and thus significant limitations to development. Here it was critical that our study included key informants from the ICT sector, who were the interviewees with the best understanding of these restrictions, and to some extent, how they have been minimized or overcome these limitations.

An intelligent scan along the stakeholder dimension focuses attention on the unique contribution of each role to ICT development. Including this dimension in the decision framework effectively guides the primary data collection required for a good understanding of ICT4D, since, as already noted, specific types of stakeholders may be the best or sole informants on an issue. This is especially important since secondary data is often produced by government sources who may want to minimize what are important concerns of the private ICT sector. In the case of Palestine, the scan across stakeholders on a variety of factors reveals that much greater coordination across the industry, academic, and government stakeholders are critical for ICT development. Some stakeholders are critical of government inaction in this area, but most agree that a country-level plan and greater coordination efforts (both top-down by government actors and bottom-up by individuals) are needed to realize the opportunities for ICT development in Palestine.
Once an investigation is structured by the decision framework and guided by starting with a specific dimension or dimension component (as illustrated by the examples of scans used in this research), that smaller space in the whole area of ICT4D can be analyzed in detail for the context’s strengths, weaknesses, opportunities, and threats. In this research, in which we focus on the most controllable factors, we identify high impact and actionable ICT4D in Palestine.

Our data analysis points to a number of critical issues that may be impeding the Palestinians advancement towards an information economy, in addition to several opportunities for change and future directions that the Palestinians can take on the path to building an information-based economy.

The recipe for creating an information economy involves a wide set of interrelated factors that are affected by a number of factors such as the government, private sector, and educational sector. Some of the most important factors were mentioned in Chapter 5 and will be further discussed in this section.

One of the most important factors to help build an information economy that can contribute to global or regional markets is having a critical mass of skilled human capital. Even though there is a relatively high number of computer science graduates, the level of skills of those graduates does not fulfill the needs of the private sector. As discussed in Chapter 5, some of the most important skills include soft skills, technical skills, and global market knowledge. Improving the educational system seems to be a high impact and high control factor that can help overcome this gap. This can be done on a macro scale at the government level and universities, or in smaller initiatives led by the ICT sector.

The other main area of weakness is related to government policies. For example, outdated Intellectual property laws as discussed earlier discourages mainly the creation activities, since
innovators may become less motivated to create new products or services if they are not able to protect them in Palestine. It is possible to either adapt to this issue by registering corporations outside Palestine to get protection, and on the long to push the government towards changing those laws. Although this was initially thought to be a high control factor, it turned out to be related to the internal political instability in Palestine. Changing laws usually requires an active parliament to pass the new laws, which has been inactive for a long time now; and only laws that are considered an emergency can be passed by the president.

The other main obstacle is the corporate regulations. Many interviewees complained about the difficulty of starting companies especially when foreign investments are involved, and this forces some businesses to register outside Palestine and in some cases to pay double taxation. Some entrepreneurs who are interested in the Palestinian ICT development may take that burden. However it may discourage others including foreign investors to create their startups in Palestine.

In our third scan, we focused on stakeholders’ view to study their coordination. Even though there is a national vision at many levels to support the ICT sector in Palestine, many interviewees noted that there was not enough coordination between the different stakeholders such as (government, the private sector, development agencies, and educational system) towards a national goal to support the ICT sector in Palestine. Several initiatives and organizations are working on this issue. However it was not seen as sufficient or effective.

This is among the most controllable factors in the hands of the Palestinians, and it seems to be of high value and impact. There were several calls for more partnerships between the private sector and the educational system, and more coordination efforts.

We also investigated less controllable factors (exogenous factors) which may be viewed mainly as threats or opportunities for the ICT sector. The factors investigated were international
aid and occupation, since they were the most mentioned in both secondary and primary data. Our findings show that many stakeholders see international aid as an opportunity to some extent, which is limited by its volatility and unsustainability. In addition such resources may be targeted towards different goals than required on the long run, and so it may be necessary for the Palestinian ICT sector to be self-sufficient and self-dependent. Foreign and local investors should find it profitable to invest in the ICT sector in Palestine.

On the short run, more coordination can help better utilize the opportunity of international aid, which can lead to a successful ICT sector which may bring more investments in the future that may be more sustainable. Also, some of the interviewees suggested that the government should also invest in the ICT sector from its own budget.

The occupation is one of the biggest threats to the Palestinian economy as a whole and for the ICT sector in Palestine. There were mixed opinions on the severity of occupation on the ICT sector compared to other economic sectors in Palestine because ICT is viewed as a service industry with less dependence on freedom of movement and more dependent on connectivity which is affected less by the occupation. Others saw the restrictions posed by occupation on movement of people and goods as a major obstacle for Palestine to become part of the global ICT community, managers and employees have more difficulty participating in events abroad of to bring guests from overseas to Palestine in many cases. The restrictions on movement also affect the educational sector, since it is harder to import educational equipment and materials, or to bring foreign faculty members to teach in Palestinian Universities.

Also, the occupation poses other kinds of hurdles, such as technical restrictions, competition, and armed conflicts that negatively impact investment opportunities and trust in the ICT sector and the Palestinian economy.
Ironically, the occupation also forces the Palestinians to be more innovative to overcome some of the restrictions in many cases using technology, such as video conferencing and e-learning. In addition, the lack of opportunities and movements for young people arguably motivates them to seek opportunities in the ICT industry. An interviewee from the academics pointed out that many young Palestinian developers started making mobile applications from their homes, which can be something to capitalize on in the future.

The occupation is among the least controllable factors; however, it is useful to learn some of the ways that Palestinians adapt to uncontrollable factors and their impact.

In our final scan we looked at two factors more related to “Make”, since outsourcing is one of the promising areas in the Palestinian ICT sector, the trust\Image, and the Diaspora, both are important in the Palestinian case.

On one hand, the level of trust in the Palestinian ICT sector seems to be relatively good for existing and past customer to some extent, however, the political situation makes it difficult to market the ICT sector for outsourcing for instance to new customers\businesses. One point of strength on the other hand that can help overcome this issue is the Palestinian diaspora who hold positions in international companies. There have been successful stories of Palestinians living abroad opening an outsourcing business in Palestine and bringing contracts in to be implemented in Palestine, or just have partnerships with existing Palestinian software companies. However more can be done on that front. For instant the Palestinians can open offices in Silicon Valley or the Gulf to help in the marketing efforts and to bring more business and contracts. There are promising points of strength such as a good level of English proficiency, time zone when it comes to the western world. On the other hand, there is a shared religion\culture with the Arab and Muslim world that Palestinians can use to make products targeting those markets.
Based on the observations made by our secondary and primary data analyses, there were some high control/high impact actions for ICT4D in Palestine that are summarized in Table 25: Opportunities for Change after plugging them back into our framework.

To summarize, some of those most significant opportunities are:

- Create an innovation culture to enable Create value chain activities.
- Improve funding opportunities for ICT entrepreneurs.
- Enact legislation that improves corporate laws on starting businesses and protection of intellectual property.
- Create partnerships between Palestinian universities and universities in other countries to improve students’ educational outcomes.
- Create partnerships between Palestinian universities and the private ICT sector to enhance students’ preparation and inform the curriculum.
- Reach out to Palestinian and Arab Diaspora for help with advice, investment, partnerships, and to bring in contracts to help overcome the limited global market access.
- Make Efforts to market the Palestinian ICT sector by opening offices abroad, and to capitalize on the current success stories of the Palestinian ICT sector.
- Target the regional market (Arab world) for creating new software and mobile applications making use of the shared religious and cultural background.
- Target the global market for outsourcing capitalizing on current partnerships and the diaspora and current success stories.
- Build a global market knowledge by learning from outsourcing actives and by improving the educational system, also by creating global partnerships. This can help in the future to build software products and services for the global market.
Table 25: Opportunities for Change

<table>
<thead>
<tr>
<th>Value Chain</th>
<th>Opportunity</th>
<th>Strength</th>
<th>Weakness</th>
<th>Threats</th>
<th>Control\Impact</th>
<th>Actor</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>National Vision</td>
<td>Coordination</td>
<td></td>
<td>More partnerships and coordination efforts.</td>
<td>All</td>
<td></td>
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<tr>
<td>Create</td>
<td>Tax Deductions</td>
<td>Corporate Laws</td>
<td>Political Instability</td>
<td>Adapt by registering outside Palestine Government policy change</td>
<td>PS  Gov</td>
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<td></td>
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<td>IP Laws</td>
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<td></td>
<td>Labor Laws</td>
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<td></td>
<td>Number of graduates</td>
<td>Educational system</td>
<td>Occupation</td>
<td>Educational Reform Partnerships</td>
<td>Gov  PS  Ed</td>
<td></td>
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<td></td>
<td>Innovative Culture</td>
<td></td>
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<td></td>
<td>Investment</td>
<td>Aid volatility</td>
<td></td>
<td>Gov Policies change Angel Investors</td>
<td>Gov  PS</td>
<td></td>
</tr>
<tr>
<td>Make</td>
<td>Diaspora Success Stories</td>
<td>Trust\Image</td>
<td>Political Instability</td>
<td>Marketing the Pal ICT sector</td>
<td>PS  Gov</td>
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<td></td>
<td>Shared Culture</td>
<td>Occupation</td>
<td>Occupation Compeition</td>
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<td></td>
<td>Access to Global Market</td>
<td>Occupation</td>
<td></td>
<td>Partnerships through Diaspora Open offices abroad</td>
<td>PS  Gov</td>
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<tr>
<td></td>
<td>Global market knowledge</td>
<td>Occupation</td>
<td></td>
<td>Educational partnerships</td>
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CHAPTER 7: EXPECTED CONTRIBUTION AND FUTURE RESEARCH

7.1. Contribution

The central contribution of this study is the development of the 3-dimensional decision framework for ICT4D guided by applications of contingency theory and control theory. The use of the framework in the context of a developing country, Palestine was demonstrated. The framework was useful for guiding research, since it emphasized the need for data collection that included multiple stakeholders, and that elaborated on the information that elaborated on the information that could be gleaned from extant secondary data sources. The framework organized investigations, since by focusing on one dimension or aspect of a dimension, a smaller space is created that, while still multi-dimensional, facilitated detailed analysis. In this study, our goal was to find development actions that could be more easily controlled by a country, and so we focused on more controllable factors and then employed a SWOT analysis of those smaller spaces to identify the highest impact development actions.

The second major contribution of this research was the actionable ICT4D opportunities we identified for the state of Palestine. The outcomes of this research have the ability to frame and inform economic development decisions that could define the future of the ICT sector in Palestine. Our access to key thought leaders in the Palestinian community provided a unique platform for understanding, analyzing, and proposing strategic development directions. This approach was not based solely on statistical demographics and trends but includes primary data from knowledgeable leaders with a deep-seated awareness of the country context and the SWOT (Strengths,
Weaknesses, Opportunities, Threats) that apply to Palestine. The value of the SWOT analysis was that critical threats to actually realizing these initiatives for ICT development were identified, and so decision makers have knowledge of opportunities that they can control and that have a high impact on economic development.

7.2. Limitations

We recognize that our study has several limitations. The dimensions of the ICT4D framework are characterized by a limited number of values that could easily be extended. For example, the Factors dimension values as shown earlier were drawn from previous literature. A more thorough examination of the main country factors might find additional factors and sub-factors that are essential for ICT development. Likewise, we limited our study of stakeholders to the triple helix of government, industry, and academia. An extension of this study might add values of other internal (system users, initiative beneficiaries) and external (e.g., foreign) stakeholders to the framework. The inclusion of the additional internal stakeholders is particularly important if the ICT4D initiative process is to avoid suppression of users’ and beneficiaries’ voices in development discussions and decision making (Díaz Andrade & Urquhart, 2012).

Our evaluation of the ICT4D framework focuses on a single developing country, Palestine. Application of the framework to other countries both developed and developing is important to establish the generalizability of the framework’s contributions.

Finally, our selection of the 11 interviewees for primary data collection was opportunistic in that the researcher who performed the interviews called upon his contacts within the Palestinian ICT community to identify the most appropriate thought leaders for this study. An extended study could explore other more formal and official channels for ICT contacts in Palestine.
7.3. Future Research

Our immediate future research directions are to explore more completely the rich set of primary data collected from our interviews. In Chapter 5 we present five intelligent scans of the data leading to actionable ICT directions in the areas of the Create activity, the Educational Infrastructure, and Stakeholder Coordination, Exogenous factors, and Make activities. We are in the process of identifying and performing additional scans on the framework that have potential to realize equal or greater control opportunities and impacts to the Palestinian ICT sector. Appendix F presents our coding scheme for the data and demonstrates the range of possible scans we can perform on the data.

Also, by collecting more data through additional interviews, we can target specific value chain activities. It is possible to investigate the Transact, or Integrate value chains to identify potential opportunities for change, or “use” to find ways to improve the utilization of technology in Palestine by the private sector or the government.

It is also possible to focus on a specific super factor or subfactor, for instance, a deeper analysis of the government policies or educational system, or ICT infrastructure.

Longer term, we plan to apply the ICT4D framework to other countries with interesting and challenging ICT development environments. We also plan to use our decision framework as a basis for comparing different developing countries.

Another important extension of this research is action research since this research is related to a real life problem. It is possible to conduct a project by communicating the findings with stakeholders and policy makers, to attempt to make the recommendations presented a reality and then follow the path of change and its actual impact on the ground. This process includes setting
certain measurable goals and measuring them at different intervals reporting back to academic literature as well as to the actual context. For instance, it is possible to focus on the educational system, trying to follow the path of change and its impact on the ICT sector.

In summary, some of the possible future research directions are:

1. A deeper analysis of any of the super factors or subfactors.

2. A deeper analysis for any of the value chain activities (Create, Make, Transact, Integrate, Use).

3. Apply the model to other countries by collecting secondary and primary data related to the given country.

4. Comparative studies among different countries using our framework as a basis for the analysis.

5. Action research by applying our findings to real settings in Palestine.


# APPENDICES

## Appendix A: Theoretical Basis for The Factors

*Table A1: Theoretical Basis for the Factors*

<table>
<thead>
<tr>
<th>Study</th>
<th>Factors</th>
<th>Theoretical Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Ein-Dor et al., 1997)</td>
<td>ICT Infrastructure, R&amp;D, Firm Strategies, Capital availability</td>
<td>New growth economics (Romer, 1990)</td>
</tr>
<tr>
<td>(Heeks, 2006)</td>
<td>Advanced Skill Base, Skill Development Institutions, Clustering, Domestic Competition, Government Policies</td>
<td>Competitive advantage theory (Porter, 2007)</td>
</tr>
<tr>
<td>(Tan &amp; Leewongcharoen, 2005)</td>
<td>Geographic Location, ICT FDI, Human resources</td>
<td>Based on the model by (Ein-Dor et al., 1997)</td>
</tr>
<tr>
<td>(Trauth, 2000)</td>
<td>ICT Policies, Coordinated educational and ICT policies, Human and physical Infrastructure, Leveraging unique sociocultural aspects</td>
<td>Influence-Impact model of technology-society interaction</td>
</tr>
<tr>
<td>(Techatassanasoontorn et al., 2011)</td>
<td>Policy, Culture, Infrastructure, Economy</td>
<td>Influence-Impact model of technology-society interaction</td>
</tr>
</tbody>
</table>
Appendix B: Mapping Factors to Super-factors

*Table A2: Mapping Factors to Super-factors*

<table>
<thead>
<tr>
<th>Super Factor</th>
<th>Factors</th>
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<tbody>
<tr>
<td>Exogenous Factors</td>
<td>Geographic Location</td>
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<tr>
<td></td>
<td>Country Size</td>
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<td></td>
<td>Political Reality</td>
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<tr>
<td>Global Markets</td>
<td>ICT FDI</td>
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<td></td>
<td>International Demand</td>
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<td></td>
<td>Trust and reputation</td>
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<tr>
<td>Sociocultural Factors</td>
<td>Economic Situation</td>
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<td></td>
<td>Culture</td>
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<td></td>
<td>Leveraging unique sociocultural aspects</td>
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<td></td>
<td>Firms Strategies</td>
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<td></td>
<td>Domestic competition</td>
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<td></td>
<td>Domestic demand</td>
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<tr>
<td>Infrastructure</td>
<td>Human Resources</td>
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<td></td>
<td>Advanced Skill Base</td>
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<td></td>
<td>Complimentary Industries</td>
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<td></td>
<td>ICT Infrastructure</td>
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<td></td>
<td>Capital availability</td>
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<td></td>
<td>Skill Development Institutions</td>
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<td>Government Policies</td>
<td>R&amp;D Investment</td>
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<td></td>
<td>Government Plans</td>
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<td>ICT Policies</td>
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<td></td>
<td>Educational Policies</td>
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<td></td>
<td>Clustering</td>
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<td>Government Policies</td>
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<td>Financial Incentives</td>
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</table>
Appendix C: Interview Script

A Decision Model for Building an Information Economy in Developing Countries: The Case of Palestine

Interview Scripts
USF IRB Study #18910

by

Hasan Z. Nuseibeh

Research Protocol
Department of Information Systems & Decision Sciences
College of Business
University of South Florida

Co-Major Professor: Alan Hevner Ph.D.
Co-Major Professor: Rosann Collins, Ph.D.
Donald Berndt, Ph.D.
Jamil Jreisat, Ph.D.

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Introduction

First I would like to thank you for taking part in this study. I am the principal investigator Hasan Nuseibeh. Prof. Rosann Collins my advisor is also present here, first if we have your permit we will be taping this interviews for further analyses purposes as indicated in the consent form. Do you agree to tape this interview?

The purpose of this study is to help identify the factors (inhibitors and motivators) that can be used to leverage the Information and Communication Technology (ICT) sector in a developing country to build a sustainable information economy that benefits other sectors of the economy in order to Build a thriving information economy.

In the coming 45-60 minutes we are going to ask you questions about the Palestinian ICT sector.

Phase I – Relevant personal experiences

Q Could you tell me about kinds of experiences you had with information technology in your career?

Q Do you have experiences with ICT sectors other than the Palestinian ICT sector? If yes in which other countries/regions? What roles did you have in those experiences?

Q How do you see that the Palestinian ICT sector compares to other ICT sectors you have experiences with?

Phase II – Questions related to the ICT sector in Palestine in General

Q What is your overall evaluation of the ICT sector in Palestine?

Q What do you think are the most important enablers that led to this status of the ICT sector in Palestine? Example of enablers (Skilled work force, increased demand, etc.)

Q Can you think about a critical incident from your experience where this particular factor played an important role in the development of the sector?

Q What do you think are the most important obstacles that faced the ICT sector in Palestine? Examples (lack of funding for startups, stability)

Q Can you think about a critical incident from your experience where that particular factor played an important role?

Q What factors are easier to control that may have the highest impact?

Phase III – Questions related to factors (Diverge)

Interviews will be asked to elaborate on specific factors, and to reflect on some of the pre-determined factors identified from our secondary data.
• What is the current status?
• What are the most influential changes that can be made? And How?
• Who can help make those changes?

1. Human Capital: At this point we would like to discuss the current status of the human capital and if/how it may need to be changed in order to support the future goals.
   a. Technical Skills
   b. Project Management
   c. Entrepreneurship skills
   d. Managerial Skills
   e. Marketing and Business Relations Skills
   f. Innovation skills
   g. Productivity
   h. Communication Skills
   i. Global market knowledge (exporting, business relations)
   j. Brain Drain
   k. Financial skills

Q How do you evaluate in general the adequacy of the Human capital in terms of numbers and necessary skills in the ICT sector?
Q What are the main skills needed to enable the creation of software systems for export in the Palestinian ICT sector? Do you have specific examples from your experience?
Q What skills are needed for Entrepreneurship in Palestine in your opinion?
Q How do you evaluate the level of knowledge of the ICT graduates in relation to the market need?
Q What specific skills do you find missing from ICT graduates? Examples?
Q What specific skills do you find missing from the ICT workforce including management?
Q How can those skills be developed, and who can help making those changes, private sector or educational system?

2. Infrastructure: At this point we would like to discuss the current status of the Infrastructure supporting the ICT sector and if/how it may need to be changed in order to support the future goals.
   a. R&D
   b. Financial
      i. Availability of funds
      ii. Financial tools and services
   c. ICT infrastructure
      i. Telecommunication (internet, Mobile networks)
ii. Energy
d. Structural and Institutional (is the current structure healthy?)
   i. Existence of needed institutions (educational, training, governmental)
   ii. Efficiency and effectiveness of those bodies and level of commitment
   iii. Clustering (ex: technology parks)
   iv. Coordination and cooperation (alignment)
      1. Between Educational and private sector
      2. Between Government and private sector
      3. Among the private sector including PITA
      4. Among different government bodies
      5. Partnerships with global companies
      6. Between funding agencies and (government and private sector)
      7. Between local financial institutions and local private sector.

Q How do you evaluate the current infrastructure in Palestine given future goals in mind?
Q What are the important things missing from the Infrastructure that can enable the creation of software export culture? And who can help make those changes?
Q What changes need to be made to the current structure of the ICT sector to make it more effective?
Q How can the Palestinians improve R&D to help create innovative products?

3. Policies: At this point we would like to discuss the current status of the policies supporting the ICT sector and if/how it may need to be changed in order to support the future goals. (Creating a support environment)
   a. National Strategy and vision
   b. International Agreements
   c. IP policy
   d. Startup Policies
   e. Global relations policies
   f. Tax policies
   g. Standards

Q How do you evaluate the current policies in place in Palestine in terms of the current goals?
Q How can the Palestinian state create a support environment to a creative ICT sector capable of creating and exporting software?
Q Are the current tax policies adequate for the creating of new software products?
Q Is the current national strategy in line with the stated goals?
How can the IP policy be changed to enable software production?

4. Global Markets – At this point we would like to discuss the current status of the Global market and how can the Palestinians position themselves in this market.
   a. Positioning
   b. Trust
   c. FDI
   d. Global Competition
   e. Understanding of global market and potential market
   f. Branding (awareness and credibility) and possibility of using diaspora
   g. Global channels

What are the most important competitive advantages that the Palestinian ICT sector has in global market?

Where do you see the Palestinians position in the global market value chain? Where can they contribute?

How do you see the global competition in the ICT sector and what are the main challenges facing the Palestinian ICT sector in that aspect?

What is the current brand image of the Palestinian ICT sector, and how can it be changed?

How can we increase awareness of the Palestinian ICT sector?

What needs to be made to increase the global trust in the ICT sector?

Key respondents: International companies, development agencies

Phase IV – Finishing the interview

Do you have any other comments/feedback that you would like to add before finishing the interview?

The interviewee will be thanked for his/her time, and will be reminded that the researchers will share the findings of the research with them.
Appendix D: Consent Form

Informed Consent to Participate in Research Involving Minimal Risk
Information to Consider Before Taking Part in this Research Study

Pro # 00018910

You are being asked to take part in a research study. Research studies include only people
who choose to take part. This document is called an informed consent form. Please read this
information carefully and take your time making your decision. Ask the researcher or study
staff to discuss this consent form with you, please ask him/her to explain any words or
information you do not clearly understand. The nature of the study, risks, inconveniences,
discomforts, and other important information about the study are listed below.

We are asking you to take part in a research study called:

A Decision Model for Building an Information Economy in Developing Countries: The
Case of Palestine.

The person who is in charge of this research study is Hasan Nuseibeh. This person is called
the Principal Investigator. However, other research staff may be involved and can act on
behalf of the person in charge. He is being guided in this research by Prof. Alan Hevner and
Prof. Rosann Collins.

The interview can occur by phone or Skype depending upon your schedule. Ideally, each
session will occur while you are in a comfortable, quiet office-type setting of your choosing.
The researchers will call in for the interviews from the Communication and Information
Sciences Building at the University of South Florida, Tampa Campus in Florida.

Purpose of the study

The purpose of this study is to help identify the characteristics of Palestine that can help
or hinder the development of the Information and Communication Technology (ICT)
sector in Palestine. Such ICT development is important to any developing country,
especially since the draw on physical resources from many ICT activities is low (e.g.,
programmers don’t require raw materials like a steel mill or manufacturing plant does).
In addition, a vibrant ICT sector benefits other economic sectors, since organizations and employees can leverage the use of ICT in their work to improve productivity. This research is being conducted in part to support the dissertation of the principal investigator, a doctoral candidate at USF.

To help in the research we have already surveyed the academic literature related to this issue. From this survey we identified several key factors affecting the ICT sector in any developing country. In addition, we collected secondary data from sources such as the United Nations, the World Bank, and the Palestinian Bureau of Statistics. This data on Palestine revealed some of the unique aspects of the country that are particularly enabling or inhibiting in the development of the ICT sector.

Now we are conducting interviews to validate what we have found; see what, if anything needs to be revised, deleted or added; and identify promising areas of improvements in the current Palestinian ICT sector. Analysis of this primary data will lead to recommendations about building an information economy in developing countries in general, and specifically in Palestine.

**Why are you being asked to take part?**

We are asking you to take part in this research study based on your experience and knowledge about the ICT sector in Palestine and/or other developing countries in general. Our group of study participants includes experts with academic, business, and development backgrounds.

**Study Procedures:**

If you take part in this study, you will be asked to:

- Be interviewed for 45-60 minutes by a researcher who will ask specific questions about the ICT sector in Palestine. This process should occur over one session. Each interview can occur by phone or Skype depending upon your schedule. Ideally, each session will occur while you are in a comfortable, quiet office-type setting of your choosing. The researchers will call in for the interviews from the University of South Florida in Tampa Florida.

- The interview questions will ask about your background, your knowledge and perspectives on the current state of the ICT sector in Palestine, and your views on what decisions Palestine must make to capture ICT opportunities.

- The research will be conducted by one or two researchers (Hasan Nuseibeh and Rosann Collins) each of whom will take notes. In addition, with your permission we will conduct an audio recording of each interview. Access to notes and recordings will be strictly
limited to the researchers in this study. All identifiable information will be coded and separated from the data when published or presented, so that the name and organization will be held in strict confidentiality.

- Written information will be shredded not more than seven years after the interview. Digital recordings will be maintained on one USB “thumb” drive that will be re-formatted not more than seven years after the interview.

**Total Number of Participants**
About 6-8 individuals will take part in this study.

**Alternatives / Voluntary Participation / Withdrawal**
You do not have to participate in this research study

**Benefits**
You will receive no benefit(s) by participating in this research study.

**Risks or Discomfort**
This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

**Compensation**
You will receive no payment or other compensation for taking part in this study.

**Costs**
It will not cost you anything to take part in the study.

**Conflict of Interest Statement**
The Principal Investigator, research staff, or their family members have no known conflicting interest associated with this research.

**Privacy and Confidentiality**
We will keep your study records private and confidential. Certain people may need to see your study records. Anyone who looks at your records must keep them confidential. These individuals include:

- The research team, including the Principal Investigator, study coordinator, and all other research staff.

- Certain government and university people who need to know more about the study, and individuals who provide oversight to ensure that we are doing the study in the right way.
Any agency of the federal, state, or local government that regulates this research.

The USF Institutional Review Board (IRB) and related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance.

We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

You can get the answers to your questions, concerns, or complaints

If you have any questions, concerns or complaints about this study, or experience an unanticipated problem, call Hasan Nuseibeh at +1 813-965-8018.

If you have questions about your rights as a participant in this study, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638.

**Consent to Take Part in this Research Study**

I freely give my consent to take part in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

__________________________________________ Date

Signature of Person Taking Part in Study

__________________________________________

Printed Name of Person Taking Part in Study

**Statement of Person Obtaining Informed Consent**

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.

__________________________________________ Date

Signature of Person obtaining Informed Consent

__________________________________________

Printed Name of Person Obtaining Informed Consent
Appendix E: Interview Protocol

1. **Rationale for the study, area of current scientific concern and why the research is needed.**

   Building a thriving information economy is a goal for many developing countries. This research helps identify the factors (inhibitors and motivators) that can be used to leverage the Information and Communication Technology (ICT) sector in a developing country to build a sustainable information economy that benefits other sectors of the economy. This is done by studying the current literature on this topic and then synthesizing the theoretical models to create a unified decision model to help developing countries set their path to build a sustainable information economy. This decision model is then used to study the case of Palestine, where secondary and primary data are used to compare the critical success factors for Palestine with the general model. This synthesized model and critical success factor superset is expected to advance the field’s understanding of how both controllable and non-controllable country characteristics have contributed to or inhibited the growth and development of an ICT sector in developing countries. The findings should also help stakeholders see if the challenges to developing an ICT sector in Palestine are the same as those for any developing country, and where they are truly unique. The outcomes of this research have the potential to frame and inform economic development decisions that could define the future of the Palestinian state.

2. **Background information, description of existing research and information that is already known.**
Building a sustainable information economy is a goal for many developing countries across the globe (Brynjolfsson, 1993; J. Humphrey et al., 2003; Lichtenberg, 1995). These countries observe the success of other developing countries that have leveraged a strong ICT sector to drive economic productivity. Studies have shown that there is a strong link between the production and use of ICT and the development of a sustainable and effective information economy (Techatassanasoontorn et al., 2011).

Building an information economy is particularly urgent for countries that do not have sufficient natural resources upon which to base an export economy. Such countries can choose to invest in and later utilize their human capital to offer value to the global information market in the form of technical support, software development, and hardware development (Masten & Kandoole, 2000). Also a developed ICT sector would play an important role in supporting and enhancing other sectors of the economy, and therefore help further the country’s overall economic development process by improving productivity and increasing the return on investment in other sectors (Kraemer & Dedrick, 1994).

The importance of building a developing country’s information economy stimulates academic interest in understanding the different factors that can influence the success or failure of this endeavor. Several countries provide successful models such as India, Israel, Thailand, Malawi, and South Africa (Indjikian & Siegel, 2005; Masten & Kandoole, 2000; Moodley, 2002; Paul & Siegel, 2001). The study of these countries creates an opportunity for academics, since the enablers and inhibitors to building an information economy in the model countries can be identified, compared, and contrasted to better understand the critical success factors for developments of this type. Prior research has established that there are a wide range of factors that can play a role at a country level, including political, economic, geographical, and sociocultural
factors (Ein-Dor et al., 1997; Tan & Leewongcharoen, 2005; Techatassanasootorn et al., 2011). Some of these factors can be changed or influenced by governments or the private sector to facilitate the transition, and others can be considered as exogenous factors that need to be understood and adapted to (such as geographical location and country size) (Tan & Leewongcharoen, 2005). The sum of factors synthesized from the literature can help determine the development path that a country can take to build a sustainable information economy (J. Humphrey et al., 2003; Masten & Kandoole, 2000).

A number of studies have been done on how growth in the ICT sector affects the economic growth in developed countries positively (Colecchia & Schreyer, 2002; Daveri, 2002; Jorgenson et al., 2002; Lightfoot, 2004; Oliner & Sichel, 2000; Van Ark et al., 2002). However, when it comes to developing countries, there seems to be inadequate studies as reported in the literature (Baliamoune-Lutz, 2003; Tan & Leewongcharoen, 2005).

Models of information economy enablers and inhibitors have been developed in a number of studies for different regions and environments (J. Humphrey et al., 2003; Indjikian & Siegel, 2005; Masten & Kandoole, 2000; Moodley, 2002; Paul & Siegel, 2001; Techatassanasootorn et al., 2011). However, it has been argued that there is no single model available for understanding information economy development in developing countries (Tan & Leewongcharoen, 2005). Therefore, it is important to study every country as a separate case to understand what specific factors contribute to its economic development process (Techatassanasootorn et al., 2011). We posit that this may be a particularly important approach when a country has one or more extreme characteristics, including both exogenous factors that cannot be controlled as well as those that are influenced by a country’s government or private sector.
3. **The research questions, objectives and purpose;**

Our research study will be grounded on a synthesis of the different models from the literature to create a superset of critical factors and their effects on building an information economy. This synthesis will be represented in a higher-level model that reflects both commonality and variation between studies, countries and regions. This initial model is based on existing literature and is elaborated upon and refined based on the secondary and primary data collection. The superset of factors and general model will guide the current investigation in our case study, to identify the most promising areas of improvements or *sweet spots* to make progress in the path of an information economy.

The particular country to be studied is Palestine, which is a developing country trying at this stage to build an information economy with the help of private sector funding and foreign aid. Palestine offers an interesting case context because of its unique political, historical, and geographical situation, and therefore it can serve as a good source of data for comparison and testing of the synthesized model. Palestine is extreme on several country characteristics because of its unique political situation that poses a challenge to policy makers.

The proposed research questions for this study are:

**RQ1.** What are the factors affecting the ICT Sector in a developing country that is on the path of building an information economy?

**RQ2.** How do we best model critical factors of an information economy in developing countries?

**RQ3.** In the case of Palestine, what are the unique aspects of the country that are particularly enabling or inhibiting in the development of the ICT sector to set the path to an information economy?
RQ4. In the case of Palestine, what are the promising areas of improvements in the current configuration to help build an information economy?

RQ5. In the case of Palestine, how can the current configuration be changed to capture the opportunities in the promising areas identified?

This dissertation will attempt to answer the research questions in three studies, RQ1 and RQ2 are covered in the first study where a decision model is built based on the identified potential factors from prior literature. The second study answers RQ3 and RQ4 using the decision model to guide the collection of secondary data for the case of Palestine, which is used then identify sweet spots in the model to be improved. Finally, study three uses the identified sweet spots to guide primary data collection to answer RQ5.

4. The study design including information that is needed to answer the research questions

The purpose of this dissertation is to help understand the role of ICT sector in development in a developing country on the path to an information economy, and to help understand what possible changes need to be made achieve that goal. This is done in three consecutive studies, the first study reviews the academic literature to identify factors that can contribute to building an information economy, which is then incorporated into a decision model. The second study uses that model to analyze the unique case of Palestine using secondary data to find possible sweet spots. Finally, the third study uses primary data from interviews to find what can be changed in those factors to achieve the goals identified to set the path to build an information economy. A summary of the dissertation plan can be found in Table 4: Dissertation Studies
Study 1: Decision Model

After reviewing the literature, the factors affecting an ICT sector were synthesized into 5 super factors (Exogenous Factors, Global Markets, Sociocultural Factors, Infrastructure, and Government Policies), each having a varying possibility of control by the developing country. Combining those factors with a supply value view of the ICT processes leads us to building a development decision model.

The existing theoretical models from the literature review were synthesized to create a comprehensive and parsimonious model that better supports the understanding of the different factors that interact to strengthen the ICT sector in a country. Effective use of this new model will help identify areas of improvement to facilitate the creation of an information economy that employs technology widely in its various sectors, and would be able to offer value to the global market.

Study 2: The case of Palestine, finding the sweet spots

In the second study, we make use of the decision making model as a road map to collect secondary data to understand the current configuration of factors affecting the ICT sector in Palestine, and the ICT sector itself. This data is drawn from existing secondary sources of country indicators such as the United Nations, the World Bank, Palestinian Bureau of Statistics, and academic and media articles.

The data collected from this phase is be used along with the methods discussed at the end of the model building section above to find opportunities that have the highest potential impact along one or more of the value supply chain processes, then try to understand how the current configuration affects this opportunity. For this purpose, we go back to the academic literature to
understand how each of the super factors affect the value chain process and explore potential changes or configurations that can act as a guide to policy makers in order for them to exploit the identified opportunities.

**Study 3: Opportunities of Change**

A number of ICT stakeholders in Palestine will be interviewed to validate the results found in the secondary data analysis. For the purpose of identification of possible candidates for the interview one of the researchers has strong contacts throughout the academic, industrial, other sectors in Palestine which constitute the population of the potential informants. More information about the population and the sample of the study is detailed in the next questions, the information that needs to be collected is detailed below.

Phone interviews will then be conducted by the researchers with the selected stakeholders. Each interview will start by trying to identify possible goals and opportunities for the ICT sector in Palestine, in addition to the different factors relevant to the identified opportunities from the second study, such as the motivators and inhibitors for those opportunities. This should help find possible opportunities of change in those factors that would have an impact on the ICT sector in and the Palestinian economy. The interview questions will start with a holistic approach giving the interviewees the opportunity to verify and expand on the pre-determined factors from the second study to help refine the model. Then the researchers will ask questions that are guided by the predefined factors that the interviewees may not have covered to assess their importance to the opportunities in question. The final set of questions will cover the interviewees’ views on the changes that need to be made in the different factors to capture those opportunities, in addition to understanding the degree of freedom allowed by the inhibitors and motivators for those choices.

Some of the specific questions that will be asked to the interviews are:
• What are the most relevant factors in the Palestinian case that contribute to helping the ICT sector support the creation of an information economy?

• Among the different supply chain processes, where do you see the opportunities that have the most impact for the improvement of the ICT sector and the Palestinian economy?

• What are the inhibitors to capturing those opportunities, and what degree of freedom do you see in manipulating those inhibitors?

• Can you think of any critical incident that your organization faced where you felt the existence of those inhibitors or motivators?

• What can be changed in the current configuration in Palestine to help make use of the potential opportunities in general, and to the creation and innovation in specific?

The data obtained from this primary data collection will be compared to the results obtained from the secondary data, which will help us verify and fine tune our decision model, and come up with specific recommendation for policy makers in Palestine to help them reach their goal of building an information economy.

5. **Sample size; & Study population inclusion and exclusion criteria;**

Based on the contacts the researcher has, interviewees will be selected based on a convenience set of key informants. Interviews will be conducted with individuals in Palestine who are familiar with the use of information technology in Palestine. These individuals include information technology developers and managers, as well as information technology academics and global development agency employees. The specific individuals have not yet been identified.
Potential stakeholders will be contacted to inquire about their willingness to participate in the study. In addition, an interview protocol based on the research questions and proposed model will be prepared.

6. The expected results of the research, such as reports, papers, and contributions to theory;

There are two areas of research contributions expected from this study. First, the synthesized model and critical success factor superset will contribute to the field’s understanding of how both controllable and non-controllable country characteristics have contributed to or inhibited the growth and development of an ICT sector in developing countries. The overall picture is intended to identify both points of commonality and variation between countries. Second, the comparison of the critical success factors in Palestine for ICT sector development is expected to highlight how a developing country with one or more extreme characteristics creates new factors of influence, and/or exacerbates the impact, positive or negative, of already well-known factors. In a kind of frontier analysis, what could be an outlier sets the ceiling or basement levels for impacts.

The ultimate goal of all research is to have beneficial impacts on individuals, groups, countries, and global societies. This research has the potential to have broad impacts at all of these levels. In particular, for stakeholders in the future development of Palestine, the country-specific findings of this study should help those stakeholders to understand what is currently being done in building an Information Economy and to what effect. The findings should also help stakeholders see where the challenges to developing an ICT sector in Palestine are the same as those for any developing country, and what is truly unique.
7. Name of the Principal Investigator and Faculty Advisor if applicable

Principal Investigator: Hasan Z. Nuseibeh

Faculty Advisors:
Co-Major Professor: Alan Hevner Ph.D.
Co-Major Professor: Rosann Collins, Ph.D.

8. Any potential risks to the subjects;

None

9. Any potential benefits to subjects;

The research results will be shared with the subjects which may help them better understand what is currently being done in building an Information Economy and to what effect. The findings should also help stakeholders see where the challenges to developing an ICT sector in Palestine are the same as those for any developing country, and what is truly unique.

10. Human subjects’ considerations including • description of the informed consent process; • if applicable include a discussion of safeguards that are in place to protect potentially vulnerable subjects such as children, prisoners, the cognitively impaired, institutionalized or critically/terminally ill;

The interviewees will be sent a scanned informed consent document by email before scheduling an interview, the interviewees will be asked to read the document carefully, and sign it if they agree, and then send a scanned copy back to the researchers via email. After receiving the consent, the interview will be scheduled.
Appendix F: Coding Scheme

Note: Codes show in boldface and italicized are codes that emerged from the data based on open coding. All other codes were a priori and based on the literature review and secondary data analysis.

*Table A3- Coding Scheme*

<table>
<thead>
<tr>
<th>Value Chain</th>
<th>Stakeholders</th>
<th>Strength\Weakness</th>
<th>Opportunity\Threat</th>
<th>Super Factors</th>
<th>Global Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create</td>
<td>Education</td>
<td>Strength</td>
<td>Threat</td>
<td>Exogenous Factors</td>
<td>Competition</td>
</tr>
<tr>
<td>Integrate/Transact</td>
<td>Government</td>
<td>Weakness</td>
<td>Opportunity of Change</td>
<td>Foreign Aid</td>
<td>Global Demand</td>
</tr>
<tr>
<td>Make</td>
<td>Industry</td>
<td></td>
<td>Recommended changes</td>
<td>Geographic location</td>
<td></td>
</tr>
<tr>
<td>Move</td>
<td></td>
<td></td>
<td>Current Initiatives</td>
<td>Political reality and occupation</td>
<td></td>
</tr>
<tr>
<td>Use</td>
<td></td>
<td></td>
<td>Future Goals</td>
<td>Geographical discontinuity</td>
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<td></td>
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<td></td>
<td>Success stories</td>
<td>Internal political instability</td>
<td></td>
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<td></td>
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<td></td>
<td>Regional political instability</td>
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<td></td>
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<td></td>
<td>Restriction on movement of people and goods</td>
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<td></td>
<td>Technical restrictions</td>
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</tbody>
</table>
Table A3- Coding Scheme (continued)

<table>
<thead>
<tr>
<th>ICT Foreign Direct Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Global Partnerships</em></td>
</tr>
<tr>
<td><em>Physical presence in Europe\ Silicon Valley</em></td>
</tr>
<tr>
<td>Trust and reputation</td>
</tr>
<tr>
<td>Government Policies</td>
</tr>
<tr>
<td><em>Access to Information Law</em></td>
</tr>
<tr>
<td><em>Commitment towards ICT</em></td>
</tr>
<tr>
<td><em>Coordination</em></td>
</tr>
<tr>
<td>Business and tax policies</td>
</tr>
<tr>
<td>Clustering</td>
</tr>
<tr>
<td>Educational Policies</td>
</tr>
<tr>
<td><em>E-Government regulations</em></td>
</tr>
<tr>
<td><em>E-Learning regulations</em></td>
</tr>
<tr>
<td><em>ICT Policies</em></td>
</tr>
<tr>
<td><em>IP Laws</em></td>
</tr>
<tr>
<td><em>Labor Laws</em></td>
</tr>
<tr>
<td><em>Telecommunication regulations</em></td>
</tr>
<tr>
<td><em>International Agreements</em></td>
</tr>
<tr>
<td>Infrastructure</td>
</tr>
<tr>
<td>Human Resources</td>
</tr>
<tr>
<td><em>Brain drain</em></td>
</tr>
<tr>
<td><em>Business Skills</em></td>
</tr>
<tr>
<td><em>Communication and teambuilding</em></td>
</tr>
<tr>
<td><em>Cost competitiveness</em></td>
</tr>
<tr>
<td><em>Critical Thinking and problem solving</em></td>
</tr>
<tr>
<td><em>Educational system</em></td>
</tr>
<tr>
<td><em>Global markets knowledge</em></td>
</tr>
<tr>
<td><em>Innovativeness</em></td>
</tr>
<tr>
<td><em>Managerial skills</em></td>
</tr>
<tr>
<td><em>Marketing skills</em></td>
</tr>
<tr>
<td><em>Mobility</em></td>
</tr>
<tr>
<td><em>Number of graduates</em></td>
</tr>
<tr>
<td><em>Productivity</em></td>
</tr>
<tr>
<td><em>Technical skills</em></td>
</tr>
<tr>
<td><em>Work ethics</em></td>
</tr>
<tr>
<td><em>Electricity</em></td>
</tr>
<tr>
<td>Financial infrastructure</td>
</tr>
<tr>
<td>Capital Availability</td>
</tr>
<tr>
<td>ICT infrastructure</td>
</tr>
<tr>
<td>Institutional Infrastructure</td>
</tr>
<tr>
<td><em>Resistance and conflict of interest</em></td>
</tr>
<tr>
<td><em>Coordination</em></td>
</tr>
<tr>
<td>R&amp;D</td>
</tr>
<tr>
<td>Complimentary Industries</td>
</tr>
<tr>
<td>Sociocultural and Unique Factors</td>
</tr>
</tbody>
</table>
Table A3 - Coding Scheme (continued)

<table>
<thead>
<tr>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique sociocultural aspects</td>
</tr>
<tr>
<td>English Proficiency</td>
</tr>
<tr>
<td>Diaspora</td>
</tr>
<tr>
<td>Shared culture and language with the Arab world</td>
</tr>
<tr>
<td>Entrepreneurship and risk aversion</td>
</tr>
<tr>
<td>Culture</td>
</tr>
<tr>
<td>Domestic Competition</td>
</tr>
<tr>
<td>Domestic Demand</td>
</tr>
<tr>
<td>Economic Situation</td>
</tr>
</tbody>
</table>

*Factors with *italic* formatting are new factors that emerged from coding.*
Appendix G: Coding Examples

Table A4: Coding Examples

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value Chain</strong></td>
<td></td>
</tr>
<tr>
<td>Create</td>
<td>There should also be a kind of mechanism where we can identify potential areas where we produce software that can be marketed and that really needs a large team of people who are business-minded market-minded and can identify potential areas where we can produce a software that can be labeled a Palestinian software and be marketed in the world or at least in the region and the Gulf states</td>
</tr>
<tr>
<td>Integrate/Transact</td>
<td></td>
</tr>
<tr>
<td>Make</td>
<td>Most of the industries, I am talking about companies, they do not produce software to the local market because it is limited, so they rely on outsourcing so most of their income comes from outsourcing but this production requires different kind of criteria, different kind of specs and it mostly relies on good documentation and cooperation and English</td>
</tr>
<tr>
<td>Move</td>
<td>The big private sector companies in Palestine are the boxes movers so they are buying from outside and selling inside, maintaining outside so they don’t need any technical capacities to be developed inside the country. It’s easier to trade, to work in trading approach and not in industrial approach even if it’s IT.</td>
</tr>
<tr>
<td>Use</td>
<td>Also the new generation in Palestine is interested in the IT so most of them like the new technologies, they work with Facebook and with other kinds of social media, and they are exposed to technology.</td>
</tr>
<tr>
<td><strong>Stakeholders</strong></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>For the local universities also we need partnership from their side with the international universities.</td>
</tr>
<tr>
<td>Government</td>
<td>Even always need change. I always criticize our company registration, that it is a joke, sometimes we say that you have to have 2 partners at least to register a company regardless of their percentage. This is what we are trying to change now, we need to register a company even if I am one person, why should I have another person for 1% and I own 99%?</td>
</tr>
<tr>
<td>Industry</td>
<td>We need to work to provide jobs to those graduates because in IT, it is good to have a degree but it is not enough to work with the degree. You need to</td>
</tr>
</tbody>
</table>
Table A4: Coding Examples (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>go for training and many other things. The private sector and the government have limited capacity to absorb or employ them. The private sector should also have a more active role like road shows, participate in exhibitions, and send delegations. I participated in the last year in 2 road shows in the US but it is not enough. We did a road show with the American Consulate here, the Consul traveled with us, we visited Washington DC, Chicago and other places, talking about the ICT sector in specific and doing business in Palestine in general.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strength\Weakness</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength</td>
<td>The fact that we have a lot of graduates is good because we can use them to produce software and also because salaries here are lower than Europe or USA, this is an advantage.</td>
</tr>
<tr>
<td>Weakness</td>
<td>The third main problem in this issue is the entrepreneurship approach: we don’t have real entrepreneurs to be honest maybe we have one or two in this country. You cannot pick up a fruit from a non-existent tree. They are trying to tell us that you can just go in a street in Palestine and you can just pick up entrepreneurs you will find them everywhere and it is not true I spent the last 12 years looking for them.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunity\Threat</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threat</td>
<td>25 years of an unstable situation and an unstable educational process and with brain drain and with hundreds of problems we cannot use the same statement that we used in the seventies and eighties so we have 25 years of dropping or the general situation has been going down and down all the time so we cannot ignore that. It’s lovely for the media to say that we are still there but to face the reality and to try to put solution we have to face this new reality.</td>
</tr>
<tr>
<td>Opportunity of Change</td>
<td>Also we are a developing country and there is a great need for the technology and the development so there is an opportunity for the software development but you need the right environment and people who have good initiative, take all these factors into hand and try to build a different kind of business there. There is an opportunity for development as we are a developing nation but we need leaders who can take the initiative.</td>
</tr>
</tbody>
</table>
Table A4: Coding Examples (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended changes</strong></td>
<td>The education. It is true that we have 13 universities, we have 3000 graduates yearly but we still need to have partnerships between our universities and international universities.</td>
</tr>
<tr>
<td><strong>Current Initiatives</strong></td>
<td>In Ramallah the municipality has an initiative to have a smart city, they are working towards that and they are offering free internet in certain places especially in the center. This is a good initiative but it is very limited but at least it is a good start.</td>
</tr>
<tr>
<td><strong>Future Goals</strong></td>
<td>Development for Innovation, this department actually focuses on taking the project work of students and turning it into spin-offs at the end. So we search for smart ideas for projects that the students created and help the students to build their prototypes. Afterwards we make a selection of these ideas and incubate them at Al-Quds ICT center which is called Skitzi and once the incubation is successful we start to search for funding to help the groups behind the projects to find the funders and sponsors to start a company. We were successful to initiate two companies at the University, both in ICT. So the companies are registered and they were helped. The project that sponsored them is about incubation by the USAID.</td>
</tr>
<tr>
<td><strong>Super Factors</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Exogenous Factors</strong></td>
<td></td>
</tr>
<tr>
<td>Foreign Aid</td>
<td><em>Ibda</em>‘ which is a company created by a USAID project to help universities in incubating and kicking off some spin-offs. <em>ibda</em> is a supporter of such initiatives but now we are identifying other international and local sponsors to sustain this initiative.</td>
</tr>
<tr>
<td>Geographic location</td>
<td>In terms of experience, to get an idea about the Palestinian ICT sector, you need to compare it with the bordering countries.</td>
</tr>
<tr>
<td>Political reality and occupation</td>
<td>Because we are not controlling anything, the only thing that Israelis are not controlling is the connectivity; coding and outsourcing with no Israeli control this is the only thing that we can be free with. All other traditional industries should go through Israel. We are not controlling any border, not the air, not the underground, not the checkpoints, we don’t have any open borders with any neighbor country so how to import how to export if they are not allowing us to do so.</td>
</tr>
</tbody>
</table>
Table A4: Coding Examples  (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Geographical discontinuity</strong></td>
<td>there are laws in the WB but from Gaza they try to change these laws. Also for these reasons we cannot have a regulatory body, because where will it be applied? In Gaza or in the West Bank?</td>
</tr>
<tr>
<td><strong>Internal political instability</strong></td>
<td>There was a new government, I was changed and with the new Minister unfortunately they did not continue the efforts. This is also a problem: there is no political stability concerning the Palestinians themselves, we keep changing governments…</td>
</tr>
<tr>
<td><strong>Regional political instability</strong></td>
<td>Also because of the security situation, we are losing markets one after the other, like the Iraqi market, Syrian market, Yemen market, which are all very big. But still since the spending in these countries is extremely high, there is a chance for the Palestinian companies to grab a small part of this market</td>
</tr>
<tr>
<td><strong>Restriction on movement of people and goods</strong></td>
<td>The ability to move freely in and out of the country because in high-tech industry you need the ability to be free and to connect with other. It is very much about getting to know other people, to know the market, the inventors, the potential inventors and other entrepreneurs, you have to be a part of the eco-system so the limitations on travel and mingling and meeting other is hurting.</td>
</tr>
<tr>
<td><strong>Technical restrictions</strong></td>
<td>Of course Israel is not allowing Watanya to go in to Gaza neither to build the infrastructure nor to provide service. Another important obstacle for the GDP and the ICT contribution which is the illegal coverage of Israeli mobiles for Palestine. They are providing access to their mobile networks: Celcom and Orange they have at least 5 companies, anyone can buy their sim cards and have access to 3G so they are still stealing from the Palestinian market about 150 million dollars a year. Because they are covering the Palestinian areas through settlements, we have a law in Palestine that any product from the settlements is prohibited so we consider telecom a product from the settlement because they are transmitting and covering the Palestinian areas from the settlements.</td>
</tr>
</tbody>
</table>
| **Global Markets**                     | We always have competition from Jordan and Egypt etc. but it is a fact, if you go to the Saudi market, the Palestinian developers give them higher rate than others. It is not because I am a Palestinian but it is a fact that can be
<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Demand</td>
<td>double checked based on performance and commitment, we believe in delivery, it is a commitment.</td>
</tr>
<tr>
<td>Global Demand</td>
<td>This is an opportunity for Palestinian companies and other companies but in the Palestinian companies the mentality is doing development also which is different than other Arab countries that focus on marketing. So in a joint venture content that needs the Palestinians to be addressed and going to the international companies and present the human resources that they have. We have to address this issue from the private sector, the government and many international organizations that are working here to help in this also. This raises a very important point to expand and going to global.</td>
</tr>
<tr>
<td>ICT Foreign Direct Investment</td>
<td>The projects that are being applied to are weak in terms of planning and that is why I go back to the planning part. And it is also an opportunity for foreign direct investment to leverage that extra capital by partner with Palestinian to tap it.</td>
</tr>
</tbody>
</table>
### Table A4: Coding Examples (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>to information from the public sector to be able to develop many services. We do not have the law for the access of information</td>
<td></td>
</tr>
<tr>
<td>Commitment towards ICT</td>
<td>unconditional fund, coming from government and this is what I am trying to convince. We are starting now with 6000 dollars through the prime minister office. I hope they will approve them and we will start giving them to young people to start new companies. But we are not in the stage where we can invest private money in IT sector; we have to build our capacities through unconditional fund coming from social responsibility or any donor but for a very short period of time.</td>
</tr>
<tr>
<td>Business and tax policies</td>
<td>For example, registering a company in Palestine, it is a matter of one day, you go to one place which is the ministry of economy and register the company. The only thing they do is make sure that the name is not there, that it is not a trademark for another international company, they also check the names of the partners etc. But as I said in one day you can register it.</td>
</tr>
<tr>
<td>Educational Policies</td>
<td>Not the general education at schools and not the higher education at universities. Now I am serving at the Prime Minister’s office as focal point for curricula reform and I know from within so I received this position before three months because of the new government and the new minister of education and I started to see things from within, to see the curricula, to see the universities,</td>
</tr>
<tr>
<td>E-Government regulations</td>
<td>we were trying to have an e-government in Palestine and that will open an opportunity for people and companies to develop the services. ICT entered in every field: health, education and other sides of our life so this is from the demand side which increased also.</td>
</tr>
<tr>
<td>E-Learning regulations</td>
<td>I am involved with a committee in order to put a policy for e-learning, to approve online certificates because until now in Palestine online certificates are not accredited so now they are trying to change the regulation of accreditation of certifications or degrees from abroad including the online ones. So this is encouraging, it encourages the universities to do online courses that they can offer abroad, so they can generate the income and go outside the university</td>
</tr>
<tr>
<td>ICT Policies</td>
<td>Ramallah the municipality has an initiative to have a smart city, they are working towards that and they are offering free internet in certain places</td>
</tr>
</tbody>
</table>
Table A4: Coding Examples (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
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<tbody>
<tr>
<td>especially in the center. This is a good initiative but it is very limited but at least it is a good start</td>
<td></td>
</tr>
<tr>
<td><strong>IP Laws</strong></td>
<td>The IP law is not good, it is not effective, it is an old law, they are working on a new one but it is not approved yet because we do not have a parliament. But more or less I did not see it really affecting the operations of companies; still companies can register outside and protect their IP there so that is available, no problem with it.</td>
</tr>
<tr>
<td><strong>Labor Laws</strong></td>
<td>When we established the company there, the laws that are on the books we are still used in 1965 French laws for our business, there is no such thing as sole proprietorship, you cannot establish a company and own it as an individual because the word <em>sharikha</em> in Arabic (company), means more than one person so you cannot be a sole proprietor so when I set up my company I had my lawyer so we are using very antiquated laws. When I compare labor laws to US labor laws they are too much pro-labor, if you graduate from college in the US you get two weeks’ vacation plus 7 or 8 days that are national holidays otherwise you will not get any work done. In Palestine you graduate and you start after 30 business days which is crazy. You cannot build an economy when your young people are taking 10% of the time off.</td>
</tr>
<tr>
<td><strong>Telecommunication regulations</strong></td>
<td>As far as I see it is not a priority. For so many years they were trying to make regulations for telecommunication since 2005, 2006 and until now it has not yet passed.</td>
</tr>
<tr>
<td><strong>International Agreements</strong></td>
<td>We also have a trade agreement with most of the world of no taxes in general because most of the international companies are trying to help from US and Latin America, so we have good trade agreements with them. I think that all these items are infrastructure to come and do business and invest in Palestine in IT and other businesses.</td>
</tr>
<tr>
<td>Human Resources</td>
<td>For example, Al-Quds University has an excellent joint program with a German university. The program is called “Dual Studies” where students study 3 years at the university and then work for 2 years at the private sector. Our local companies and we are part of one of them accepted to take 3 students every year. So we started with 25 students as a piloting and next year we hope to have it for more than 50 students so we are trying, not to bridge the whole gap between academia and industry, but the private sector</td>
</tr>
<tr>
<td>Coding Scheme</td>
<td>Sample Quote</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Brain drain</td>
<td>The second thing is the university professors themselves: in our Palestinian universities professors are paid really badly they are not well paid. You are talking about 1500 or 1600 dollars a month for a PhD holder so anyone who is good in producing IT software will stay outside the country and work for international companies or they will go to the private sector because they can make much money.</td>
</tr>
<tr>
<td>Business Skills</td>
<td>Yes, beside technical skills, also programming, lack of managing large software programs, but also as you mentioned entrepreneurship or marketing, the ability to start your own business, students are not well prepared to go to the market or start their own business and even if they go to work, there is a lack of communication skills.</td>
</tr>
<tr>
<td>Communication and teambuilding</td>
<td>Our education system focuses on knowledge and not soft skills which is not only communication and writing but leadership, team building and others. The private sector invests to overcome this, it can be a cooperation between the private sector and the academia in the second or third year to overcome this problem. This is a reality we have to face it.</td>
</tr>
<tr>
<td>Cost competitiveness</td>
<td>I also think that they are well priced from a competitive global perspective. Today in London to get a good developer you have to pay 1000 per day.</td>
</tr>
<tr>
<td>Critical Thinking and problem solving</td>
<td>I always say that a beginner is a beginner wherever you graduate from and regardless of the name of the university, you need training. But there are certain things that you should have, for example the critical thinking, how to think, how to do research, being good in mathematics, the basic talents: chemistry or physics etc. These are basics in my opinion other than doing coding using this or that technology using JAVA or other.</td>
</tr>
<tr>
<td>Educational system</td>
<td>I am meeting every couple of weeks with the Academic Higher Council and they always blame the output from the general education from the secondary schools is not good enough to raise the level in the universities and then to raise the level of the higher education and the engineering faculties in particular. On the other hand, the general education and the schools blame the teachers that the universities produce for the general education are not good enough to teach students math and physics and English. These are the...</td>
</tr>
</tbody>
</table>
### Table A4: Coding Examples (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>three problems, English, math and physics so from where to begin I don’t know it’s like the chicken and the egg so I am meeting them they said the teachers are not good and then when you are going to the universities the students are not good enough to raise the level</td>
<td></td>
</tr>
<tr>
<td><em>Global markets knowledge</em></td>
<td>The problem is that the companies do not know what their niche is. The concept and the process of determining the niche was not there in the companies. The companies lack the management function within the company that handles international business, for the past years it was the CO doing all the international sales.</td>
</tr>
<tr>
<td><em>Innovativeness</em></td>
<td>They can be innovators if they are pushed but innovation cannot be taught, it comes from inside the person. You can work on this kind of innovation and make it happen, maybe we do not work enough on this, and maybe there are students who are innovative.</td>
</tr>
<tr>
<td><em>Managerial skills</em></td>
<td>You can find people who have experience in the traditional business model and marketing methodology but if you are looking for people who have understanding of business models that work in startups or marketing and understand online marketing and user acquisition outside the printed media marketing and the advertisement through TV channels you cannot find these people, they are also missing.</td>
</tr>
<tr>
<td><em>Marketing skills</em></td>
<td>Marketing is a practice and not science, if you put someone in the best marketing training; still it is not enough for them to go to the US market the next day and grab it. It needs more practical experience that is not there.</td>
</tr>
<tr>
<td><em>Mobility</em></td>
<td>The other factor is that we have 13 local universities in West Bank, Gaza and East Jerusalem; in them we have almost 3000 ICT graduates per year.</td>
</tr>
<tr>
<td><em>Productivity</em></td>
<td>There is productivity, there is commitment and determination to do something, it is there. But it is also about how to be more efficient. Someone can sit for 8 hours behind a laptop and program something but the problem is that if it was bad they need to do the work again while if you have the right talent they will be able to do the job in a much less time. It is about efficiency, there is not a lot of right coaching and I am talking about companies that are not exporting.</td>
</tr>
<tr>
<td><em>Technical skills</em></td>
<td>my mission was to change the curricula into multi-track curricula. So students can have a core background in computer science and can also</td>
</tr>
</tbody>
</table>
Table A4: Coding Examples  (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
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</thead>
<tbody>
<tr>
<td><strong>Coding Scheme</strong></td>
<td><strong>Sample Quote</strong></td>
</tr>
<tr>
<td>specialize in software</td>
<td>specialize in software engineering, information system, games… Also we have other tracks like the networks which was under IT now we put it under computer science so every student has a solid background in computer science and he can choose networks.</td>
</tr>
<tr>
<td>Work ethics</td>
<td>And then work ethics, in general it is very good, it is amazing, the really smart people have amazing work ethics, the average workers have average work ethics. So if you are lucky to get one of those really smart guys, not only do they do a good work but they do a lot of it because they love what they are doing. I was there last May and we are trying to solve a problem for the US health care, I cannot talk too much about it but it is a big problem. The problem is being solved in Palestine! I was sitting with my developers’ team and they talk about artificial intelligence and Game Theory. The potential is huge.</td>
</tr>
<tr>
<td>Electricity</td>
<td>For Gaza yes, we need to solve the power issue; you cannot have a company in Gaza working 3-8 hours a day it is hard to scale companies with these problems. But in the West Bank the infrastructure is ok, companies are able to work with it without any problem.</td>
</tr>
<tr>
<td>Financial infrastructure</td>
<td>In terms of financial system, we have an excellent tax system: any company in IT that started business in Palestine and that will employ 25 employees or above will be tax free for 13 years which is no income tax for 13 years. While if you go to our neighbors in the Israeli market, you will pay 35% income tax.</td>
</tr>
<tr>
<td>Capital Availability</td>
<td>I can tell you that raising money in the region is still a very difficult task. Now they say that it is getting easier.</td>
</tr>
<tr>
<td>ICT infrastructure</td>
<td>I think that the infrastructure we have whether it is the general infrastructure or the ICT infrastructure in terms of internet and accessibility is very good. I believe it is better than many other neighbor countries, of course it depends on where you are in the West bank or Gaza but at least there are these hubs in the middle of the big cities, for example for us PinchPoint we have a fiber optic cable coming to our building so internet is not a problem.</td>
</tr>
<tr>
<td>Institutional Infrastructure</td>
<td>there is almost no cooperation between them and this is a problem. Everyone is singing his own song. So if you talk about the government and its organizations they are way behind, I think that now they are trying to pick</td>
</tr>
</tbody>
</table>
Table A4: Coding Examples (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resistance and conflict of interest</strong></td>
<td>Honestly it’s a conflict of interest because the big private sector companies in Palestine are the boxes movers so they are buying from outside and selling inside, maintaining outside so they don’t need any technical capacities to be developed inside the country. It’s easier to trade, to work in trading approach and not in industrial approach even if it’s IT. So if you have new small companies starting to compete in the market it’s a problem.</td>
</tr>
<tr>
<td><strong>Coordination</strong></td>
<td>Yes, exactly there is an intention but I do not see that they are really working towards implementing. As you put it, the implementation is very slow but there is an intention, at least they realize that the ICT is important and that it can be a tool to prosper the economy but I do not see that they are doing anything serious with it. They need to move it to the next level.</td>
</tr>
<tr>
<td><strong>R&amp;D</strong></td>
<td>I was one of the people who contacted Intel to convince them to have R&amp;D unit or to have a hub here and again some of the reasons are security reasons but the core of the problem is to have the relevant mental capacities of Palestinians to deliver and to produce.</td>
</tr>
<tr>
<td><strong>Complimentary Industries</strong></td>
<td>So for us for example the biggest challenge was finding artists that have experience in the gaming industry and are willing to join.</td>
</tr>
<tr>
<td><strong>Sociocultural and Unique Factors</strong></td>
<td></td>
</tr>
<tr>
<td><strong>English Proficiency</strong></td>
<td>this sector is playing a major role in the Palestinian economy sector because it is borderless, it has one language which English which is standard. We in Palestine teach English from KG, the new generation has a better accent than I do, much better English command, so this helps a lot.</td>
</tr>
<tr>
<td><strong>Diaspora</strong></td>
<td>Because Palestinians in general have a strong Diaspora, either in the Arab countries or Europe or the US and a good part of them 10:32. So this Diaspora 10:38 in building the network, the Palestinian ICT sector in doing business outside. This also helps the ICT</td>
</tr>
<tr>
<td><strong>Shared culture and language with the Arab world</strong></td>
<td>So if we do some effort on Arabization for the internet you have to remember that we have 400 million people talking in Arabic and the content in Arabic on the internet is less than 1%. So developing products for 400 million people is a lot of work and we need partnerships with international</td>
</tr>
</tbody>
</table>
### Table A4: Coding Examples (continued)

<table>
<thead>
<tr>
<th>Coding Scheme</th>
<th>Sample Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>companies that have experience not only in business applications but many applications that we can put on the internet.</td>
</tr>
<tr>
<td>Entrepreneurship and risk aversion</td>
<td>The culture is putting a pressure on any young man or woman but in different ways. On the young man the culture is pushing him to build a house on his parents’ house and to get married at the age of 25 26. So he wants to work very hard to collect the amount of money to start a family and work on developing it and investing in the kids and the family. And you know that if you have entrepreneurial idea maybe you will spend all of your life trying to make it. So to find a good job and to be hired by a company, any company not related to what you had in the academic field and to get a salary this is the most important thing that the culture or the community is putting pressure on.</td>
</tr>
<tr>
<td>Culture</td>
<td>Because of the culture and so on, with IT you can be a female and have a full-time job, it is much easier if you are a software developer. You can also get married and still have a full time job. I know a female engineer who got married and she moved to Saudi Arabia and she is still a full time employee, all she needs is a laptop and internet.</td>
</tr>
</tbody>
</table>


Appendix H: IRB Approval

October 5, 2015

Hasan Nuseibeh
Information Systems & Decision Sciences
Tampa, FL 33612

RE: Expedited Approval for Initial Review
IRB#: Pro00018910
Title: A Decision Model for Building an Information Economy in Developing Countries: The Case of Palestine

Study Approval Period: 10/5/2015 to 10/5/2016

Dear Mr. Nuseibeh:

On 10/5/2015, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol
Document(s):
Protocol V1.0 Sep21

Consent/Assent Document(s)*:
Nuseibeh Consent Form V1 09252015.docx.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).
It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638. Sincerely,

Kristen Salomon, Ph.D., Vice Chairperson
USF Institutional Review Board
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<th>Reprint Permissions/Information</th>
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<td>Table 1: Developed vs. Developing Countries Classification (Nielsen, 2011)</td>
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<td>Figure 1: Changing ICT4D Issues over time (Heeks, 2008)</td>
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<td>Figure 2: Changing Strategic view on ICT and Development (Heeks, 2008)</td>
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<td>Table 2: Prior studies adapted from (Techatassanasoontorn et al., 2011)</td>
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<td>IGI Global</td>
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<td>Figure 8: Influence-Impact model of technology-society interaction (Techatassanasoontorn et al., 2011)</td>
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<td>Figure 6: Software Export Success Model (Heeks &amp; Nicholson, 2004)</td>
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<td>Figure 9: Conceptual Framework of Information Economy (Wong, 1998)</td>
<td>Informs</td>
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<td>Table 9: Business and Soft Skills that Universities Provide</td>
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<td>Table 10: Skills of Graduates as Perceived by ICT companies</td>
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<td>Figure 11: Palestinian Economy by Sector 2013</td>
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<td>Table 12: Main Economic Activities by Major Characteristics</td>
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Figure 1: Model of IT industry success factors.


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<td>Country of publication: United Kingdom of Great Britain and Northern Ireland</td>
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