ICTs for improving national competitiveness, case study of Iranian SMEs

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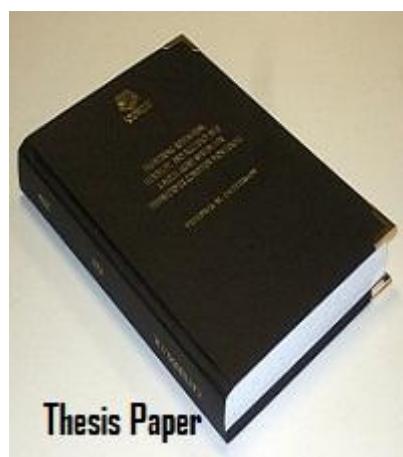
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List of Abbreviations

C2B	Customer-to-Business
C2C	Customer-to-Customer
EDI	Electronic Data Exchange
ERP	Enterprise Resource Planning
EU	European Union
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
HRM	Human Resource Management
KM	Knowledge Management
R&D	Research and Development
SME	Small- Medium Enterprise
TIMES	Telecommunications, Information, Multimedia, Entertainment and Security
WEF	World Economic Forum

Abstract

There is fierce competition among firms to target larger markets. Countries, like firms, are in competition to stand out in global competitiveness and world market. Effective competition and achieving advantage over competitors are closely associated with the concept of competitive advantage. Various sources of competitive advantage are found in the literature. However, Information and Communication Technologies (ICTs) are increasingly becoming the center of attention for creating competitive advantage both at firm and country level. A large group of firms in every country are Small and Medium Enterprises (SMEs). SMEs are widely known as enablers of business and economic growth; nevertheless, they constantly face challenges in competition. In this study, ICTs are introduced as a strategy for SMEs to improve their competitiveness. It is suggested that promoting competition among SMEs could lead to a higher performance in competitiveness at country level. This is investigated through focusing on Iran as a country case study. The present research finally concludes by the strong potentiality of ICTs to improve Iran's national competitiveness through making the home market more competitive for its SMEs.

Keywords: ICTs, Competitive Advantage, National Competitiveness, Porter's Diamond Model, SMEs.

Chapter 1. Introduction

The initial chapter provides a concise explanation of the concepts that will be frequently used throughout the dissertation. Terms such as competition, competitiveness, sources of competitive advantage, ICTs and SMEs will be briefly explained. Moreover, this chapter introduces the knowledge gap that led to this research and will end with a brief explanation of the structure of the research paper.

1.1.   Background

Businesses and industries operate in a competitive environment. There is fierce competition among firms to gain a larger customer-base by providing them with the best possible value. Competition is known as the driving force of the market that has impact on productivity growth (Porter & Sakakibara, 2004; Olper *et al.,* 2014), economic efficiency (Mukhopadhyay, 2012), productivity and market power (Bridgman, 2010; De Loecker & Van Biesebroeck, 2015), supply chain (He *et al.,* 2013), management quality (Bloom *et al.,* 2015), and innovation (Tang, 2006; Godfrey, 2008; Bos *et al.,* 2013).

Competitiveness is the ability or level of performance of a firm or country to stand out when competing with other firms or countries. Promoting effective competition and achieving distinct advantage are so closely aligned that they inevitably lead to a concept called 'competitive advantage'.

Competitive advantage is a complicated concept that is used in numerous areas and its definition depends on the aspects of the approach towards it (Matei, 2013). Wangner and Hollenbeck (2014) explain the words **'competition' and 'advantage' in simple** terms. Competition occurs when other firms aim to do what a company does, but better. Advantage is gained by doing something that is difficult for competitors to imitate or duplicate. Competitive advantage is, therefore, created when competitors cannot obtain a special ability or perform at the same level.

An important category of firms are Small Medium Enterprises (SMEs). SMEs are known as essential parts of the economy owing to their adaptability to rapidly and constantly change business environments (Telegraph, 2014). They are also enablers of business success since they possess the capacity to face barriers and challenges that could impede business growth (UKBIS, 2013). However, SMEs are constantly encountering competition challenges (Parnell *et al.,* 2015). While competition among a firm rises, SMEs struggle to survive in a severely competitive environment both at a national and global scale (Gbolagade *et al.,* 2013 cited in Uchegbulam & Akinyele, 2015).

The literature mentions various ways for obtaining competitive advantage. Sources of competitive advantage are linked to various contexts, from human capital to technological attainment. What is notable in the sources of competitive advantage is that resources cannot be easily imitated (the quality of being imperfectly imitable or hard to imitate), substituted, and be commonly used by competitors (Henkel *et al.,* 2014; Pearson *et al.,* 2015).

With the rapid growth of Information and Communication Technologies (ICTs), they are increasingly becoming the centre of attention for delivering competitive advantage and the literature acknowledges the adoption of ICTs as a significant source of competitive advantage (Ong & Ismail, 2008; Rohrbeck, 2010; Sakchutchawan *et al.,* 2011; Kushwaha, 2011;

Sweeney & Viehland, 2011; Adebambo, & Toyin, 2011; Mihalic & Buhalis, 2013).
According to the Organisation for Economic Co-operation and Development (OECD, 2014),
ICTs have been adopted by all sectors of the economy to extend market reach, increase
productivity, improve performance and reduce operational costs. Firms frequently integrate
ICTs to redesign business processes and bolster their competitive advantage (Phan, 2003).

One of the strategies that could be applied for SMEs to deal with challenges is the adoption of
ICTs in a way that will boost the efficiency and competitiveness of such enterprises (Ongori
& Migiro, 2010). Facilitating business processes, managing and optimizing resources,
information and decision-making, ICTs are considered as an important source for competitive
advantage in enterprises. Therefore, it is essential that SMEs are encouraged to use new ICT
solutions and applications so as to achieve competitive success (Donrrosoro *et al.,* 2001 cited
in Cuevas-Vargas *et al.,* 2015).

ICT has also been at the centre of attention for a nation's competitiveness at global level. As
will be explained in the chapter 3, it is one of the pillars of the global competition framework,
and is implicitly related to the other pillars. Countries, like firm, are in competition in hopes
of standing out in world markets and global competitiveness. In some economies, like the
U.S. economy, competition is even known as the backbone of economic policy (Stucke,
2013). Maintaining a good level of competitive performance in firms within a country would
be reflected in the country's status in national competitiveness.

Although plenty of literature resources on firm competitiveness and nation competitiveness could
be found, there seems to be a gap in knowledge and deep analysis of the connection between the
two. Porter's famous theory and model of national competitiveness, the Diamond Model (
Porter, 1990), is a highly-regarded theory in academia and industry and business as it investigates
the drivers of national competitiveness. According to the theory, strong domestic

rivals and highly localized processes within a country could lead to creating and sustaining national competitive advantage in global competition.

In the literature, a research gap can be found in applying the diamond model as the analytical framework for explaining its own theory, *i.e.* explaining the link between competitiveness at firm level and national level. The present research aims to provide a method for investigating such a gap. To achieve this, the choice of a specific case study seemed reasonable due to the fact that countries considerably differ from each other in terms of competitive position, conditions, endowments, domestic market, business/industry sector, government and the level of progress and development.

As it will be later in this dissertation, Iran is an example of a country that lacks sufficient competitiveness at its national level as well as among its SMEs. Iran ranks 83 out of 144 countries in the 2014-15 in the WEF report - losing one place compared **to the previous year's** report and is in a continuing path of decline in ranking from 2011 to 2015 (WEF, 2011, 2012, 2013, 2014). Due to **the lack of sufficient literature regarding Iran's relatively** poor performance in national competitiveness, another information gap in research was spotted.

Moreover, the existing literature on the case study is not thorough enough to illustrate the link to low competitiveness or to address the reasons and solutions for this. Another research gap regarding my case study was that there is not an adequate amount of literature on the adoption of ICTs by SMEs in Iran, particularly regarding competitiveness. The current research has been done regarding the mentioned gaps in knowledge and literature. Therefore, this research is centred at investigating how the adoption of ICTs by Iranian SMEs would improve the **country's national competitiveness.**

In order to answer the main question, I adopted a qualitative approach in order to maintain an open design for the stages of the research process, which will be discussed in detail in chapter 2, such as data collection and data interpretation. Qualitative research allows the reader to understand a given problem or research topic and will allow the researcher to generate findings and solutions that have the capacity to work with problems in realistically (Guest & MacQueen, 2008; Corbin & Strauss, 2014). Therefore, a qualitative methodology will best match my research nature, question and topic area.

This study finds that Iran's performance in national competitiveness could be heightened by promoting competitiveness within the country by a vast majority of its firms *i.e.* SMEs. This occurs by encouraging the adoption of ICTs at enterprise level due to the fact that ICTs are enablers of high competitiveness and are regarded as significant sources of competitive advantage (Ong & Ismail, 2008; Rohrbeck, 2010; Sakchutchawan *et al.,* 2011; Kushwaha, 2011; Sweeney & Viehland, 2011; Adebambo & Toyin, 2011; Mihalic & Buhalis, 2013). As claimed by Kushwaha (2011), ICTs enable SMEs to survive intense competition with large companies and in the globalization pathway. This influence is to such a degree that it is claimed that competition is not possible without maintaining a successful application of ICTs in a company**'s business strategy (** Rodgers *et al.*, 2002).

1.2. Research Outline

Chapter 1 is aimed at providing a brief and general introduction to the topic area while introducing the reader to the content of the research in the upcoming chapters of the research.

Chapter 2 focuses on the research methodology. It describes the steps taken for designing the present research, including how the research goal, objectives, questions, conceptual framework and research methodology were all formulated.

Chapter 3 relies on the existing literature related to the research topic. The purpose of this chapter is to explain the main theory, national competitiveness model, and the related areas by which the core analysis of this research is to be done.

Chapter 4 contains the main analysis of this research. It is built by applying the analytical model introduced in chapter 3 to the case study.

Chapter 5 reviews the purpose of the research. It synthesizes the findings from the analysis in chapter 4 with a global framework for national competitiveness to answer the research questions and reach a sound conclusion.

Chapter 2. Methodology

This chapter explains the design and methodology for the present research. It is structured around a proposed strategy for my research based on the models obtained from the literature. Within this chapter, I have clarified the research questions, aims and objectives, data collection, data analysis, conceptual framework and the process of the research design for the dissertation.

2.1. Research Design

The complexity of human experience poses challenges to researchers as they attempt to integrate qualitative measures into data (Roller & Lavrakas, 2015). Research designs that incorporate dependability, validity and trustworthiness are useful in qualitative research. Research design is the plan and roadmap for the entire research project that includes clear procedures for conduction to help researchers overcome the challenges of qualitative research (Myers, 2013; Roller & Lavrakas, 2015).

In this section, we draw upon two models in the literature in order to propose a combined model which incorporates both models for designing qualitative research. The first model is a straight-line model for qualitative research design (Figure 1) proposed by Myres (2013), and the second is an interactive model (Figure 2) suggested by Maxwell (2012).
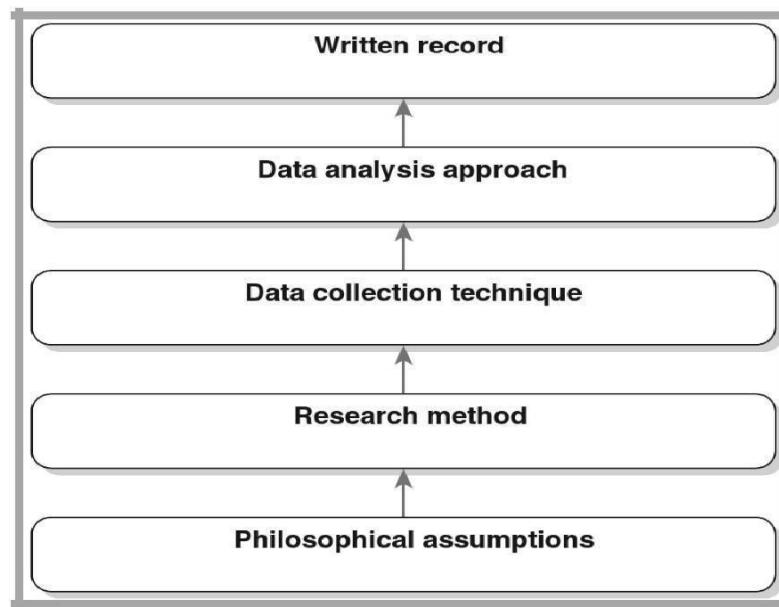
Figure 1- A Model for Qualitative Research
Design **"Source:** Myers (2013)**"**
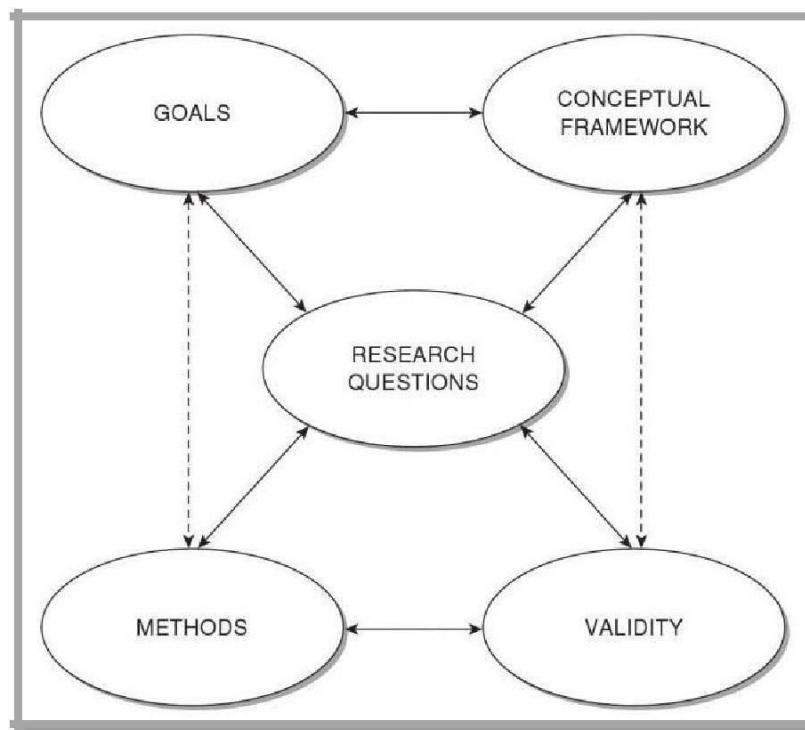
Figure 2- An Interactive Model for Research
Design **"Source:** Maxwell (2012)**"**

Myers introduces a model consisting of five components for research design, *viz.* philosophical assumptions, research method, data collection techniques, data analysis approaches and written work. These elements are in a linear pattern in which the stages of the design are completed. One limitation that could be considered regarding this model is the rigidity of it so that it does not involve interactions or constant changes between the steps. However, as research progresses, revisions might be needed at different stages.

The model presented by Maxwell is a flexible design in which the research process does not start from a pre-determined point. This interactive model involves interactions between the components of research design that do not proceed through fixed steps and, therefore, is flexible enough to involve ongoing changes in research process.

Although Maxwell (2012) introduces strategies for considering logical and practical relationships among the elements of the design model, such a flexible model might lead to inefficiency in terms of wasting time and effort by taking large steps backward. Figure 3 illustrates a proposed model that combines the two aforementioned designs in a way that they could complement the one another; *i.e.* eliminating the limitation of the straight-line model and improving the efficiency of flexibility in the interactive model. Figure 3 is followed by the explanation of each element in the model.
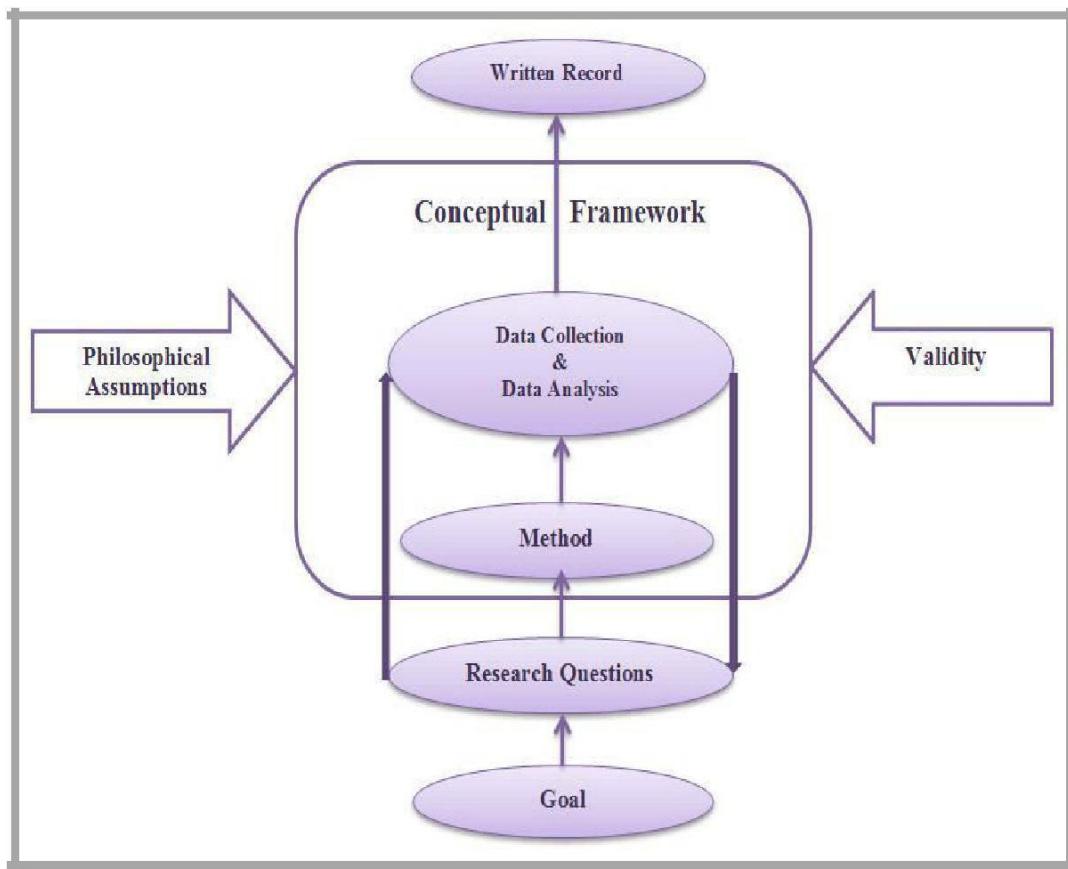
Figure 3- A Proposed Model for Research Design

2.1.1. Goal

This is the first stage of a research design. The research body and process builds on the main goal which is to be achieved in the end. The aim of this research is to set the stage for taking **practical steps towards improving Iran's competitive status. The goal of this project is** formulated as:

Goal: Improving Iran's competitiveness at national level.

This study introduces ICTs as enablers for enhancing competitiveness at a national level; this **would in turn heighten Iran's position in global competitiveness ranking. In order to meet the** main purpose of the study, the following objectives have been set out:

Objectives: Enhancing competitiveness at firm level in Iran.
Improving the effective use of ICTs for competitiveness.

2.1.2. Research Questions

The literature reviewed for this dissertation suggested various ways to prepare research questions. One type of classification is described by Flick (2015) who defines three types of research question: exploratory, descriptive and explanatory. Explanatory questions examine the relationship between factors or their influence on a given context, descriptive questions focus on describing a specific issue, state or process, and finally, exploratory questions target a given situation.

In chapter 1, I presented the knowledge gaps and justification for selecting the research question. Considering the purpose of this research, the exploratory question form can best present the perspective of this research. I have formulated the following questions:

Q1: How does the adoption of ICTs by Iranian SMEs improve the country's national competitiveness?

During the research process, the following questions have also arisen:

Q2: What forms of ICTs can lead to improving national competitiveness?

Q3: How can ICTs motivate Iranian SMEs to be more competitive?

Q4: To what extent can the government contribute to national competitiveness?

2.1.3. Conceptual Framework

Conceptual framework is the researcher's position to plan studying a phenomenon. Maxwell (2012) **interprets conceptual framework as a 'tentative theory'** of a phenomenon that is to be investigated. The functions of such a framework are to justify the research, give information about the research design, questions, methodology as well as the validity of the research result (*ibid*).

In addition to conveying the direction of the research, conceptual framework shows the connection between the main elements of the investigation; this can be seen in Figure 4. Here, I have used the diamond model and Global Competitiveness Index (GCI) as two frameworks for carrying out the analysis. The diamond model is used for linking the concept of competitiveness at firm and national level and investigating the role of ICTs in bringing about suitable conditions in the diamond dimensions. I have then used the global competitive framework for national competitiveness to bolster and further the results of the analysis.
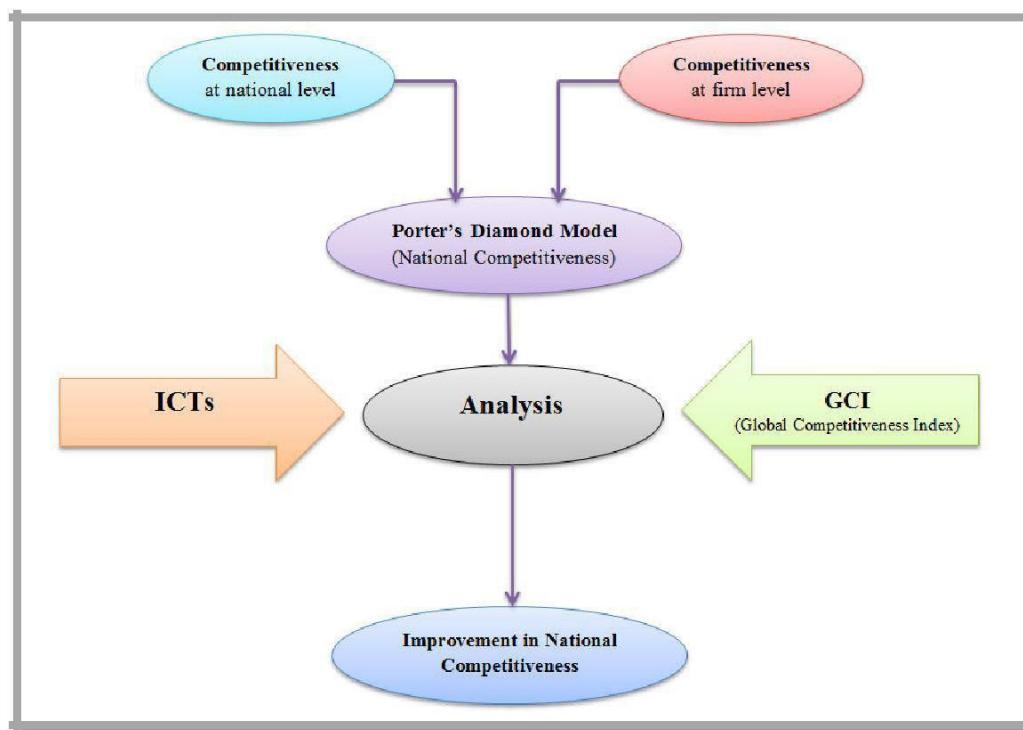
Figure 4- Conceptual Framework for the Present Research

Here, the use of Porter's diamond model in a case study of enterprises might raise scepticism since the common model for analysing competitiveness at firm level is ***Porter's Five Forces Model***. Although the five forces model analyses competition in an industry at firm level, the scope of our research goes beyond the enterprise level within a particular industry to reach national competitiveness.

As it will be explained in detail in chapter 3, the philosophical nature of the diamond model is that nations achieve global competitiveness through maintaining competitiveness in their home market. These are in fact firms, not nations, which compete in the international market (Porter, 1990). This, therefore, makes it possible to use the diamond model as a suitable framework to study the relationship between competition at enterprise and country levels.

2.1.4. Validity

Validity does not convey a solid, single and universal conception; it is **"rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects"** (Winter, 2000: 1 cited in Golafshani, 2003). Researchers should make reasonable judgements about the integrity and soundness of their research regarding the appropriateness of the applied methodologies and obtained conclusions (Noble & Smith, 2015).

In this research, two aspects of validity have been considered; the semantic and the comparison case. Semantic validity is related to the reconstructed meaning of the materials used for the research and the quality of these materials being expressed and interpreted appropriately (Kohlbacher, 2006). Therefore, in the present study, the focus has been placed on reconstructing and recreating the materials obtained from the literature while entailing its original meaning and/or conception.

The comparison case is introduced in the literature as a strategy for ensuring the trustworthiness and validity of the findings in qualitative research (Noble & Smith, 2015). In this research, the comparison was conducted to seek differences and similarities of **interpreting and criticizing Porter's diamond model in order to ensure that various** perspectives will be presented. Moreover, in cases that few or no Iran-specific literature was

found, similar cases from other countries, particularly developing ones, were studied to increase the truth value of the research.

2.1.5. Data Collection Techniques

There are various approaches for data collection in research. In qualitative research, the most common techniques for data collection are individual interviews, questionnaires, observations, study of archival records, documents and audio-visual materials, examination of physical artefacts, field-work and self-study (Williams, 2007; Myers, 2013; Fellows & Liu, 2015). The main source of data collection in this research has been the review of published books, papers in academic journals, reports provided by international organizations, archival records and self-study.

In order to identify the literature review for this research, I have endeavoured to maintain effective literature searching methods. The literature search is a thorough search of various types of literature so as to make a breadth and depth of good quality references that are relevant to the research subject (LHU, 2012). This is a critical skill which is important in activities related to gathering information later in the study. The aims of the searches for this dissertation have been identifying existing research findings on the area, critically reviewing data and relevant theories and making comparisons within the scope of the research to draw logical conclusions.

The steps I have taken to conduct the literature search are:

1) background reading and preparation;

2) identifying search terms based on the title and related areas;

3) using search techniques such as including phrases, word endings, keyword/subject terms, advanced search, *etc.;*

4) identifying dependable and reliable resources; and

5) collating the results.

The background reading and preparation was mainly done by reading various resources including journal articles, textbooks, newspapers and websites on the following topics:

- ➢ (Sources of) Competitive advantage.
- ➢ ICT solutions/applications.
- ➢ Competitiveness at firm level.
- ➢ National competitiveness.

After getting a grasp of the subject area and context, I worked with the title to identify suitable search terms and terminologies associated with the topic. Some of the used search terms were:

- ➢ **Porter's national competitiveness theory.**
- ➢ (Critiques on) diamond model.
- ➢ SMEs competitiveness/competitive advantage.
- ➢ Information and communication technology/ICTs and competitiveness.
- ➢ **Iran's (global ranking) competitiveness.**
- ➢ ICTs and Iranian SMEs.
- ➢ Competition/competitiveness in Iranian SMEs.

The main search resources for this study were found through online libraries and journal/publisher databases at the University of Manchester. The university has access to the full text of their articles. Google scholar was used to gain access to e-books and more journal articles, papers and published works. Moreover, data on organizational reports and statistics were found through Google search engine.

The decision on whether to include or exclude the literature resources and materials found through the research was based on their relevance to the subject area or the potentiality and suitability for being related to the scope of the research.

2.1.6. Data Analysis Approach

In my research, I have used classical content analysis and theme analysis as the approaches for data analysis (two of a set of analysis types mentioned by Onwuegbuzie *et al.*, 2012). In terms of the classical content analysis for the present research, multiple resources were systematically reduced to create codes deductively *i.e.* conducting literature analysis based on the templates of codes existing in the literature. The analysis was done in most parts whereby a single notion draws upon more than one resource to be supported. A further use of this approach was in integrating the conceptual frameworks available from the literature so as to propose a model for my research that was previously explained in section 2.1.3.

In addition to this, I involved thematic analysis which discovers themes that already exist and searches for the relationships among the domains and how they are connected to an overall context (Onwuegbuzie *et al.*, 2012; Braun *et al.*, 2014).For the current study, I focused on two core themes, *i.e.* ICTs and competitiveness, as the overall context and tried to find materials within the scope and domain of my research (*e.g.* solutions of ICT that contribute to firm level/national competitiveness).

2.1.7. Philosophical Assumptions

Every research project conveys certain ideas or beliefs of its author. These ideas and beliefs **include the researcher's philosophical assu**mptions. Philosophical assumption is a framework that researchers use to gather, analyse and interpret the data collected or used in their research. In fact, the data gathered throughout the research is not the only thing that is important; it is also important how the data is interpreted (May, 2011).

In this research, the philosophy I followed would be best explained as a combination of interpretivism and pragmatism. Although there are similarities and differences between interpretivism and pragmatism, the elements from both can be combined in qualitative research in areas related to information systems (Goldkuhl, 2012). Table 1 shows the differences between the two paradigms, this helps to explain the combination of the two.

Table 1: Differences between Pragmatism and Interpretivism

	Pragmatism	Interpretivism
Ontology	Symbolic realism	Constructivism
Type of knowledge	Actions and changes	Beliefs (socially constructed cognition)
Type of knowledge	Constructive knowledge	Understanding
Role of knowledge	Useful for action	Interesting
Type of investigation	Inquiry	Field study
Data generation	Data through assessment and intervention	Data through interpretation
Role of researcher	Engaged in change	Engaged in understanding

"Source: Goldkuhl (2012)**"**

In this research, the empirical focus has been placed on ideas and beliefs obtained from the literature which is then followed by proposing actions and changes. The research carries the key feature of interpretive knowledge *i.e.* understanding. The role of knowledge would be useful for action as it has the potential impact for policy-makers and research users. Data in this research has been generated mainly through analysis and interpretation. Moreover, the investigation type has been based on the field/case study which is the main type of investigation in interpretivism (Klein & Myers, 1999 cited in Goldkuhl, 2012). The researcher has also aimed at engaging both understanding and change.

2.1.8. Research Methodology

2.1.8.1. Research Nature

This study relies on secondary data *i.e.* reviewing the available and already gathered data and literature. The nature of the present research is exploratory with the objective of identifying an issue and its variables. Exploratory nature is the approach for research with little or no literature on the topic (Collis & Hussey, 2013). Exploration in this context could be associated with perspective or **"**a state of mind, a special personal orientation**"** (Stebbins, 2001: 30 cited in Jupp, 2006) towards approaching an issue.

Exploratory research discovers or clarifies situations that can be potential opportunities (Zikmund *et al.,* 2012; Collis & Hussey, 2013) as in this research the adoption of ICTs is introduced as a source of competitive advantage that creates an opportunity to improve a **country's ranking in global competitiveness. The features of this research that make it fall** into the exploratory category are providing insight where a relatively small amount of information exists, exploring a new approach to a phenomenon which may help researchers in gaining better understanding, and testing the feasibility of a more extensive study on a case study.

2.1.8.2. Research Strategy

The case study approach in qualitative research facilitates the exploration of a particular phenomenon within its context (Baxter & Jack, 2008). Case study ensures that the subject has been well explored and that the nature of the phenomenon is uncovered.

The case study of this study is particularly SMEs in the developing country, Iran. The research focuses on SMEs for the following reasons:

1) they have an integral role in the economy of the developing countries;
2) low complexity and rigid bureaucracy; and

3) rapid growth of new technologies in the enterprise (Hanafizadeh *et al.,* 2012).

Therefore, SMEs prove to be suitable enough as the focus is on the adoption of ICT as a technology with a variety of uses and applications.

2.1.8.3. Research Method

This research is conducted based on a qualitative approach which is one of the two major approaches to research. The other is a quantitative approach which mainly relies on numerical data and statistics. However, qualitative research provides in-depth insights into problems, reasons, ideas, and solutions and, in some cases, hypotheses for quantitative research.

By adopting a qualitative approach, this research has utilized an open and flexible research design for collecting and interpreting data, therefore, making the researcher a part of the research process. The topic and area of the present research has some characteristics whereby the best method for its development could be qualitative. These characteristics, which are compatible with the features of qualitative research mentioned by Corbin and Strauss (2014), are curiosity, imagination and creativity, sense of logic, open to take risk, having the capability of working through problems in the area, and not to mention, an acceptance of the self as a research element.

The present research can be described as somewhat risky since it was conducted despite there being very little literature on the research subject. Therefore, levels of creativity, based on reasonable logic, have been involved. From this point of view, the researcher can be considered as a part of the research process. As previously mentioned, the current research was conducted with the intention to work through the real case problem and to give way to further realistic actions.

Qualitative research is not only restricted to providing knowledge or insight. Its objective can be to also generate knowledge or change the matter under research in order for it to be

practically relevant. This means that solutions are created and developed to be relevant to practical problems (Flick, 2007). This fulfils the main goal of this research which is attempting to provide a realistic and practical solution to the low level of national competitiveness of the country case study.

2.1.9. Written Record

This is the presentation of the research and includes different types of publications such as books, theses, journal articles and research reports. This research is being prepared as a **dissertation at Master's level.**

Chapter 3. Literature Review

After explaining the scope and method of this study, I will now move towards a review of the relevant literature considered for this dissertation. This chapter begins with a brief definition of SMEs and their importance. Following the need for SMEs to maintain competition, I mention the two levels at which competition is viewed; firm level and national level. The ***chapter moves on to present and explain Porter's Diamond Model as a linking framework*** *that connects competition at firm and national level. Finally towards the end of the chapter, I will briefly mention how ICTs can create desirable conditions for improving competitiveness based on the model.*

3.1. Definition of SMEs

Although there have been debates on determining the standard thresholds in defining SMEs, a common agreement has not been reached yet (Soomro & Aziz 2015). In fact, there is no commonly accepted definition for SMEs. However, there are several aspects that determine **whether a firm is an SME. These aspects are a firm's number of employees, annual turnover** or balance sheet total, paid up capital and value of total assets (Jeppesen *et al.*, 2012; EU, 2015; Soomro & Aziz, 2015).

The World Bank refers to SME as enterprises with a maximum of 300 employees with annual revenue of \$15 million and total assets of \$15 million. However, international organisations have their own criteria to statistically categorise companies as SMEs (see table 2). Governments have also formulated their own definitions of SMEs; for example, the number of employees varies across countries. In the European Union (EU), the most common upper limit of employees of an SME is 250 while the United States defines SMEs with employees fewer than 500 (OECD, 2005).

Table 2: Various Definitions for SMEs by Multinational Institutions

Institution	Max. # of Employees	Max. Revenues/Turnover (\$)	Maximum Asset (\$)
World Bank	300	15,000,000	15,000,000
MIF-IADB	100	3,000,000	(none)
African Development Bank	50	(none)	(none)
Asian Development Bank	No official definition. Uses only definitions of individual national governments		
UNDP	200	(none)	(none)

Source: " Gibson & van der Vaart (2008)**"**

3.2. Importance of SMEs

The experience of many countries indicates that SMEs can substantially contribute to a **country's industrial and economic development (** Molanezhad, 2010). The role of SMEs as the engine of economic growth has been widely accepted (Katua, 2014). Constituting an important element of industrial activity, SMEs have also played a vital role in national economic growth (Pandya, 2012; Singh & Janor, 2013; Daun *et al.*, 2014; Mahmood *et al.*, 2015). Not only are SMEs becoming increasingly important to the economy of developing countries (Delberg, 2011), but they also play an integral role in the development of the world economy (Lukács, 2005; Soomro & Aziz, 2015).

SMEs contribute to economic development by increasing employment (Kongolo, 2010; De Kok *et al.,* 2011; Garikai, 2011) and providing innovation and sustainability in the economy (Fritsch & Mueller, 2005; Kongolo, 2010). By providing productive employment opportunities and generating income, SMEs can also reduce poverty drastically (Kongolo, 2010). The importance of SMEs in increasing employment is to such a degree that it has even been claimed that the majority of employment is generated only through the growth of SMEs (Ardic *et al.,* 2011).

According to the recent report provided by the European Commission (EU, 2014), SMEs constitute to more than 99% of all the businesses across Europe. The report also reveals that SMEs provide two thirds of jobs in the private sector and contribute to over half of the total value-added that are created by businesses within the EU. In addition to their primary role in innovation and Research and Development (R&D), SMEs have become the spine of the European economy while accounting for a considerable section of economic growth and wealth. Table 3 shows the SMEs and large enterprises in the EU with their contribution to employment and created value-added.

Table 3: Employees, Value-added and Employment in EU20 Enterprises in 2013

	Micro	Small	Medium	SMEs	Large	Total
Number of enterprises						
Number	19,969,338	1,378,374	223,648	21,571,360	43,517	21,614,908
%	92.4	6.4	1.0	99.8	0.2	100
Employment						
Number	38,629,012	27,353,660	22,860,792	88,843,464	44,053,576	132,897,040
%	29.1	20.6	17.2	66.9	33.1	100
Value added at factor costs						
Million Euros	1,362,336	1,147,885	1,156,558	3,666,779	2,643,795	6,310,557
%	21.6	18.2	18.3	58.1	41.9	100

Source: **"**Eurostat, National Statistical Offices and DIW Econ**"** cited in EU (2014)**"**

As shown in table 3, there are considerably higher numbers of SMEs compared to the large enterprises in Europe. It is notable that an increase in SMEs growth has both direct and indirect impacts on the growth of the Gross Domestic Product (GDP[1]). As claimed by (Delberg, 2011), the growth of SMEs directly affects GDP by increasing output, profits and value-added, and indirectly through increasing innovation and macro-economic elasticity.

Although SMEs are considered as a country's backbone in the economy, they face challenges to maintain their effective role in competition both at national and global levels (Cuevas-Vargas *et al.,* 2015). The increasing number of SMEs also poses challenges for competition as they try to maintain their existence as well as expand their business (Anggadwita & Mustafid, 2014). Therefore, it proves to be important enough to investigate how SMEs can benefit from gaining competitive advantage.

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[1] GDP is **"**a key governmental statistic that provides a measure of the total economic activity**"** (Guardian, 2009) and is an indicator for measuring the welfare of an economy.

3.3. Competitiveness

Competitiveness is viewed or interpreted from two perspectives; firm level and national level. As mentioned in the first chapter, at firm level there are various things that could be considered to create competitive advantage and improve competitiveness among enterprises. To get an understanding of competitiveness at national level, I will introduce the framework for st**udying a nations' competitiveness.**

The World Economic Forum (WEF) (WEF, 2014), which provides yearly reports on every **country's position in global competitiveness, defines competitiveness as "**the set of institutions, policies, and factors that determine the level of productivity of a country.**" (p. 4).** WEF ranks countries based on the GCIs. Aspects of competitiveness are understood in a set **of '12 pillars' composing the GCIs.**

These pillars are set as: 1) institutions, 2) infrastructure, 3) macroeconomic environment, 4) health and primary education, 5) higher education and training, 6) efficient goods markets, 7) labour market efficiency 8) financial market development, 9) technological readiness, 10) market size, 11) business sophistication, and 12) innovation (WEF, 2014).

According to the WEF (2014), the pillars do not make impacts independently and are in fact interrelated. To provide an example, we draw upon the relation between technology and innovation. As claimed by numerous literary resources, technology is the trigger of various aspects of innovation (Breidbach & Maglio, 2015; Cui *et al.*, 2015; McPhee *et al.*, 2015; Bhargava *et al.*, 2014; Nambisan, 2013; Hall *et al.*, 2013). Another example is the obvious interdependency that could be found between infrastructure, health and primary education, and higher education and training.

It **has been suggested that a country's performance level in competitiveness is a result of the competitiveness within the country. That is, the competitiveness of a country's enterprises,**

companies and firms is reflected in the country's performance at national level. Therefore, to **investigate a nation's competitiveness, the need for a framework that links the two levels seems necessary. I have used Porter's Diamond Model to carry out the analysis for national** competitiveness and to make connections between competition at enterprise and national levels. The following section describes and explains the diamond model in detail.

3.4. Porter's Diamond Model

A country's level of competitiveness mirrors its ability to provide prosperity through the productivity of its economy (Morschett *et al.*, 2015). Every country should exploit its latencies to create competitive advantage in order to achieve prosperity, long-term sustainable growth and economic wealth (*ibid*). This provides a national, dynamic and competitive environment from which companies can take advantage. Porter (1990) claims that companies benefiting from strong domestic rivals and suppliers and local customers gain the advantage to compete with global competitors. He adds that competitive advantage is generated and sustained through localized processes in a home environment that is dynamic, challenging, innovative and progressive in its competitive patterns.

Although the basic understanding of competitiveness in pillars pertains to economy in general, industries do not share the same patterns of competitiveness (Morschett *et al.*, 2015). **A country's competitiveness could be investigated by analysing** its individual industries and/or clusters of industries[2] in which the principles of competitiveness are applied. Michael **Porter proposed a useful model that assists in analysing a country's competitiveness. His** theory begins from individual industries an**d builds up to a country's economy as a whole.** The reason is that these are in fact firms, not nations that compete in international markets; therefore, the way firms generate and sustain competitive advantage is the key point to

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[2] Michael Porter defines clusters as **"**geographic concentrations of interconnected companies and institutions in a particular field.**"**(Porter, 1998, p: 78).

explain a nation's achievement in competition. Porter (1990) identifies four actors that contribute to competitive advantage at industry level within a nation. These four attributes that foster or impede competitive advantage are:

1) Factor condition.

2) Demand conditions.

3) Related and supporting industries.

4) Firm strategy, structure and rivalry.

Figure 5 illustrates the diamond model that was proposed and developed by Porter (1990, 1998, 2000). **Porter's** theory of the competitive advantage of nations highlights the primary role of a nation in providing a home base for its firms. This home base creates and sustains competitive advantage through technology and advanced skills.
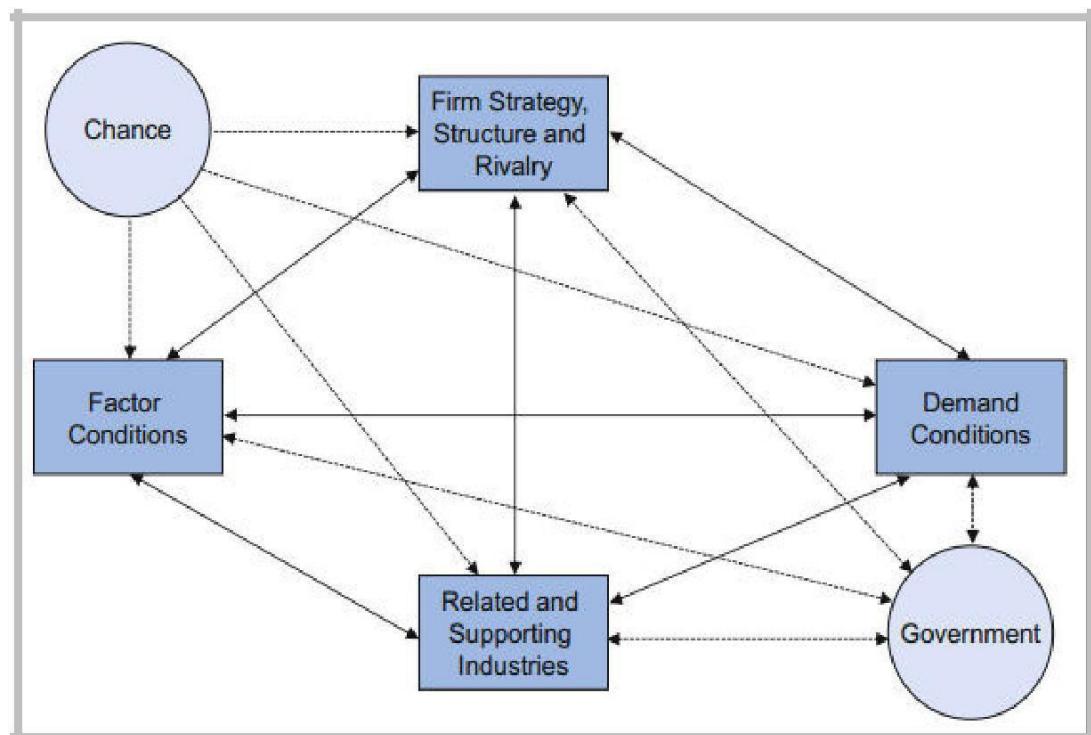

Figure 5- Porter's Diamond Model (the determinants of national competitiveness)
Source: **"Porter 1990a, p. 127"**, cited in Morschett *et al.* (2015)**"**

It is notable that these four determinants are interrelated and the effect of one dimension is dependent on other attributes. In order to understand the model, the following section **provides a description of each dimension in Porter's model.**

3.4.1. Factor Conditions

The first component of the diamond model is a nation's position in production. Porter (1990) found **that that a country's possession of factor conditions, or factor of production such as** infrastructure and skilled labour, is necessary to compete in a particular industry. This could be consistent with the Hechscher-Ohlin model (factor proportions theory) in which patterns of production, commerce and export are predicted and based on the abundancy the endowment factor of a country or trading region. Also, with the endogenous growth theory it is theorized that enriching a nation's human capital through technology, innovation and effective production would result in economic growth.

The number and definition of production factors may vary depending on theoretical concepts or the school of thought[3]. In contrary to the classical schools that generally define factors as land, labour and (human) capital, Porter distinguishes between them. He considers two types of factors; basic and advanced. Basic factors are in fact endowments of a nation and they are identified by **the abundance, quality and accessibility of a country's land, natural and physical resources,** climate, geographic location and unskilled labour. However, the influence of these factors on building competitive advantage depends on the effectiveness of deployment within an industry. As Porter mentions, providing only initial advantages, basic factors need to be supported, improved and reinforced by advanced factors in order to sustain success.

Advanced factors are more complicated that basic ones because they involve the nation's capital of skilled labour, knowledge, transportation and communication infrastructure,

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[3] In some modern perspectives, time, entrepreneurship and technology are also considered as factors of production.

research facilities, innovation power and technological resources. Advanced factors are regarded as important sources of competitive advantage, which can be generated through research, innovation and training. Therefore, the role of investment by individuals, companies or the government might be stated (Porter, 1990; Morschett et al., 2015).

Distinguishing factors of production based on their purpose yields another division; generalized and specialized factors. Generalized factors can be deployed in multiple industries while specialized ones are characterized by a particular field of application due to the requirement of them being customized to the needs of a specific industry such as experienced or professionally skilled personnel. According to Lahti (2010), specialized factors are the most desirable, however, they need to be continuously upgraded and reinvested in.

3.4.2. Demand Conditions

Demand condition refers to the domestic market for an industry in which it acts. The point is **that an industry's production or service is influenced by the demand in the home ma**rket. Owing to such a dependency, the home demand is capable of shaping production and innovation of firms in a nation. Companies are sensitive to the needs of their closest customers (Porter, 1990). As claimed by Porter, countries obtain competitive advantage

when **the demand in the home market provides firms with a clear idea of its buyers' needs in** a particular industry. The main characteristics here are the strength and sophistication of the customer demand in the domestic market.

Pressure on home companies would lead to gaining competitive advantage for them (Hill, 2009). In fact, companies are innovative and efficient, and improve the quality of their products better when they undergo more pressure from their customers in a demanding local market. This will foster gaining sophisticated competitive advantage against foreign rivals.

Therefore, the basic assumption here would be that an increase in consumer sophistication and home market pressure would create competitive advantage for firms.

Porter (1990) states that compared to sophistication, the size of the home market is of far less importance; however, this could be inconsistent with the concept of economies of scale where the **size of the market is a significant determinant of a firm's international competitiveness.** Morschett *et al.* (2015) make the point that in addition to the level of sophistication, the size of the domestic market is also of importance since the large size of the local market acts an enabler for companies to achieve economies of scale and curve advantage. They reason that efficient companies are forced to look for international opportunities at stages when the market in the home country becomes saturated. Therefore, the home market provides its firms with scale advantage that could be also applied to global market place (Hollensen, 2014).

3.4.3. Related and Supporting Industries

In the diamond model, related industries are referred to as industries that can involve complementary products, like technological know-how, or employ similar skills and/or technology in various aspects, like manufacturing, marketing, distribution and services to the core industry (Lathi, 2010). When determining the competitive advantage in an industry, the presence or absence of suppliers and other related industries is an important factor.

Presence of industrial clusters, or related suppliers, competitors and complementary firms is highly beneficial for an industry to build competitive advantage. As indicated by Porter (1990), related industries that are internationally competitive are capable of creating advantage. Firstly, they deliver input, components and machinery in an early, rapid, cost-effective and efficient way. Secondly, these home-based clusters can provide support, innovation and upgrading by making short communication lines that enable suppliers and end-users to take advantage of quick and constant information flows, innovative ideas and

technology interchange. Such an influence is bolstered when the suppliers are global **competitors. This gives a nation the feature of 'self-defeating' when it creates 'captive'** suppliers that are highly dependent on the home industry and, hence, avoid serving foreign competitors.

Likewise, the competitive advantage of nations gives clusters a prominent role (Porter, 2000**). While claiming that the diamond's systematic nature promotes clusters of competitive** industries, Porter (1998) states that clusters affect competition by increasing productivity, innovation and stimulating the creation of new businesses. Domestic competitiveness in clusters provides benefits similar to those related to suppliers, information flow, technical exchange and fostering upgrading and innovation. Home-based related industries are also more capable of embracing new skills and novel approaches towards competitiveness (Porter, 1990).

3.4.4. Firm Strategy, Structure and Rivalry

The way firms in a nation are created, organized and managed is widely influenced by the **nation's context and conditions (** Porter, 1990). These conditions also influence the domestic rivalry in a nation. As suggested by Porter, competitiveness in a specific industry is a result of combining organizational modes and management practices that are dominant in a country.

Porter provides an example of two countries that are world leaders in some of their industries; he contrasts Italian and German leading industries from a management systems perspective.

For Italians, a firm's strategies are centred at customised products, rapid change, niche marketing[4] and outstanding flexibility that fit both with the dynamics of a particular industry and national management systems while for Germans, which work well in technical and

[4] Niche marketing focuses only on specific market needs and products.

engineering industries, complex products with diligent development processes, precision manufacturing and product services are highly integrated in the management structure.

The motivation and goals of a nation's individuals are also important in creating competitive advantage. As claimed by Porter (1990), **"**outstanding talent is a scarce resource in any nation**"** (p: 84). Reasoning that differences are capable of creating advantage, people of a country could be unique sources of talent, skill and effort that could be prominent in global competition. **Domestic rivalry and competition also impacts the company's performance and** position in the global market. As previously mentioned, the presence of powerful domestic rivals stimulates the creation and sustainment of competitive advantage. The fact that managerial systems, organizational modes and goals, individual motivation and achievements, and pressures of local rivalry varies considerably between nations results in "dissimilar international strategies" of the firms (Morschett, 2015, p: 179) and would create competitive advantage for a nation (Porter, 1990).

3.4.5. Government and Chance

In addition to the major determinants, Porter considers two other variables for the diamond model; government and chance. These two factors complement the model but do not build continuing competitive advantages (Smit, 2010). Porter presents the two general points of view regarding the role of government in bringing competitive advantage. Some see governments as significant supporters of an industry that can directly contribute to competitiveness by employing policies. On the contrary, others agree to the system of the

"free market[5]" in which government interventions such as direct and indirect taxes, subsidies, competition policies or other state regulations are not engaged.

Porter stands against both views and proclaims that either of the two would result in perpetually ruining competitive advantage. Pointing out the fact that only firms create competitive advantage, not governments, Porter mentions that governments have an inherently partial role that would lead to success only when they work in tandem with desirable conditions in the diamond model. **Transmitting and intensifying the forces of the model, the government's main role is as a catalyst** that encourages companies to high level of competitive performance.

In contrast to Porter's point of view, Rugman and Collinson (2012) argue that governments **do have critical importance in a nation's competitive advantage. They suggest that actions of** such **'well-intentioned' governments have the ability to 'backfire' and result in creating a** sheltered[6] home industry and can eventually prevent them from competition in the global market. An example of such actions is when a state applies tariffs as an entry barrier and employs subsidies for disciplining foreign companies; this directly creates a disadvantage for foreign companies.

Porter also recognized the role of chance in building competitive advantage. Chance has a part in the creation of innovative ideas or inventions (Morschett, 2015). Examples of chance here could be points such as dramatic change in the global, financial market or exchange rate, major technological advancements, new inventions, disruptions in input costs *e.g.* shock in oil **price, war or foreign governments' political decisions (** Rugman & Collinson, 2012). Although Porter claims that chance events can cancel out the advantages and cause a shift in

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[5] Free market, which is opposed to regulated or controlled market, is an economic system in which vendors and consumers freely transact and determine prices of goods according to mutual agreement.

[6] A sheltered industry is a protected industry that enjoys a non-competitive environment.

competitive level, Rugman and Collinson (2012) argue that it is crucially difficult to foresee the role of chance and guard against it.

3.5. Critiques on Porter's Diamond Model

International competitiveness of nations is an ever-growing issue not only for firms and governments but also for academic scholars (Ketels, 2006). Smit (2010) makes the point that a **nation's** international competitiveness has been misunderstood and misused both in the press and **literature. Porter's Diamond Model for a nation's competitiveness has also been widely discussed** in the literature. Peng (2009) states that the diamond is the first theory that links firms, industries and countries together while previous theories have only considered one or two dimensions. Other scholars have also stated that the diamond model has unprecedentedly provided a broad range of competitive advantage at national level that is presented in a comprehensive model to **formulate a government's national strategy (** Grant, 1991; **Rugman & D'Cruz, 1993**; Moon *et al,.* 1998, cited in " Dang & Pheng, 2015**"**). Others, however, claim that the theory has not yet been subject to careful testing (Hill, 2009).

Criticisms suggest that Porter's model was developed by looking at only ten countries[7], which are developed economies. The cases that were studied were worldwide industrial leaders and the data was aggregated based on their export shares. Considering that most of the countries do not possess such an affluence or economic strength as those studies by Porter, it cast doubt that his model could be applicable to them without modifications (Rugman & Collinson, 2012).

It has been said that the influence of multinational companies' largest trading partners on a nation's success in competitiveness have been ignored in Porter's model. The criticism on ignoring trading partners led to proposing an extended model for Porter's Diamond called the

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[7] Porter conducted a four- year study on Denmark, Germany, Italy, Japan, Korea, Singapore Sweden, Switzerland, the U.K. and the U.S. as important trading nations.

'Double Diamond Model' (Rugman & Verbeke, 1990; **Rugman & D'Cruz, 199**3) in which

the role of a home country's prominent trading partner is included. The double diamond

model then was generalized to incorporate the role of international companies and

multinational activity in competitiveness (Moon *et al.,* 1995; Moon *et al.,* 1998).

Therefore, the extensions of Porter's original diamond have attempted to explain the

international competitiveness of smaller or less industrialized nations. However, in response

to such criticism, Huggins and Izushi (2011) make the point that multi-nationality is

consistent with Porter's model since it provides access to the sources of advantage for

companies and industries through global economies. They add that all leading, multinational

corporations (except some, *viz.* Shell Group, Nestle and Unilver) are hugely influenced by the

nationality of their parent company.

In my opinion, answering the criticisms, although other things could impact national

competitiveness, this does not diminish the importance or influence th**e diamond model's**

elements. To clarify this, for example, the fact that multi-**national companies or countries'**

trading partners play an important role in national competitiveness could be considered

dependent on how a government regulates, encourages or supports the activities or

cooperation of non-national based companies. This could be also investigated in the

government element of the diamond model by furthering the scope of **the government's role.**

Moreover, although it is said that Porter conveyed his analysis based on the countries leading in

trading, this does not necessarily mirror the notion that a country should be an industrial or

economic power to be suitable for the diamond model to be applied. It should be considered that

according to Porter and the WEF's framework, countries are not competitive in all their

industries, sectors or in all the pillars. Therefore, it could be understood that the diamond

model can be applied in a country's competitive or powerful sector, or at least with the potential to be competitive.

Bearing in mind that the criticisms do not weaken the usefulness of the diamond model, I have deemed it as the most suitable, analytical framework for the present study. The next section explains how ICTs could be related to the diamond model and it also provides a brief background to the detailed investigation for the case study in chapter 4.

3.6. ICT and Diamond Model

In the first chapter, we mentioned the use of ICTs for competitiveness and as a source for creating competitive advantage at firm level. At national level, the WEF (2014) explicitly mentions the role of ICTs in explaining the 9th pillar; technology. The WEF mentions that **this aspect of competitiveness measures an economy's agility in technology adoption to** increase its productivity while emphasizing the latencies to leverage ICTs in production processes. It introduces ICTs as the enablers of technological readiness. It also lays great emphasis on the necessity of technological readiness for firms to achieve prosperity and compete in the global market.

Regarding the elements of the diamond model, the role of ICTs in knowledge management, learning and innovation (for factor conditions), role of ICTs in e-business models, Customer-to-Customer (C2C) and Customer-to-Business (C2B), electronic customer relationship management and e-marketing (for demand conditions), and the role of ICTs in creating electronic clustering and procurement (for related and supporting industries) were found. In order for the forth element of the diamond (firms strategy, structure and rivalry) to be accurately analysed, investigations need a specific sector or industry case study in which the role of ICTs could be analysed, which would be out of the scope for this study. The role of

the ICT and the two additional elements, government and chance, regarding the case study is further explained in the following chapter.

3.7. Summary

This chapter mainly aimed at introducing the diamond model as the research framework for investigating national competitiveness. Since criticisms were found in the literature regarding this model, these criticisms were included in the study to ensure that the use of the model would be justified and proven to be suitable. Then, based on the theory of the diamond model, the uses of ICTs that could create compatible condition for each element were mentioned. In the following chapter, I will discuss the details of such uses of ICTs for the case study of this dissertation.

Chapter 4. Iran's Competitiveness

This chapter aims to investigate the potential of improving Iran's** competitive status by focusing on the strategic role of ICTs adopted by SMEs. It introduces the role of ICTs in enhancing competitiveness among SMEs. This present the notion that having highly competitive SMEs within the country could lead to a higher performance of competitiveness at national level. **The analysis here is carried out using Porter's Diamond Model.

4.1. Country's Overview

Iran, officially named The Islamic Republic of Iran, is a country located in the Middle East with a strategic location on the vital maritime pathways for exporting crude oil. It possesses the second largest population in the Middle East, after Egypt, with an estimation of 80.8 million people in July 2014 (World Bank, 2015). Iran is the second largest economy in the Middle East and North Africa, after Saudi Arabia, with a GDP of US$406.3 billion in 2014 (*ibid*). Although large public and quasi-public enterprises are active in the manufacturing and **commercial sectors, Iran's economic system is he**avily dominated and governed by the state.

4.2. SMEs in Iran

There is not consensus on the very definition of SMEs in Iran. Various organizations, institutions and ministries use their own criteria to describe and categorize SMEs connected to them. For instance, the Ministry of Agricultural Jihad and the Ministry of Industry and Mines categorize enterprises those with less than 50 employees as SMEs while the Statistical Office of Iran considers enterprises those with less than 10 e**mployees as SMEs. Iran's** Central Bank recognizes SMEs as having less than 100 employees (Modiriat, 2010). Therefore, this has made it difficult to provide a clear definition and statistics regarding the number and the criteria of Iranian SMEs in general as they vary by sector, industry and organization.

Regardless of the category, SMEs in Iran face barriers similar to those in other developing or even developed countries. These obstacles include poor macro-economic environments with high levels of inflation, an increase from 12% in 2010 to around 45% in 2013, and 23% in 2014 (IMF, 2014), high rates of interest, taxing regulations, tax laws, inefficient labour, long procedures for getting bank loans, inadequate services for business development, foreign currency shortages, high cost of access to information, lack of appropriate information sharing at enterprise level, and not to mention - a common sense of discrimination against small firms (Fathian *et al.,* 2008; Molanezhad, 2010; Kamyabi & Devi, 2011; Tatfi, 2011).

In addition to the above obstacles, the main barrier to the development of SMEs in Iran has been recognized as the lack of access to much required information (Molanezhad, 2010). Such types of information are related to:

  ➢ Marketing (information about the domestic and foreign markets, pricing structures *etc*.).
  ➢ Financial or technological positions of SMEs required to attract appropriate investors.

➤ Fields of science and technology.

➤ Suppliers and buyers (for raw materials).

Bearing the issue of competitiveness in mind, we found that gathering the above information could be improved by a wider and more targeted use of ICT in enterprise. This research, therefore, investigates the potential for enhancing competitiveness in Iranian SMEs without focusing on a specific industry. If this is successfully analysed, the present study also sets the stage for further research in investigating SMEs in specific industry sectors.

4.3. ICTs and Iran's National Competitiveness

After the Vienna Agreement between Iran and the P5+1 group[8] (a group consisting of five permanent members *i.e.* China, France, Russia, the United Kingdom, the United States, plus Germany) on 14 July 2015, there is a strong possibility that an economic transformation is due to occur in regards to the prospective opportunities brought about by lifting sanctions that were placed on Iran over the last decade. Enhancing competitiveness, harnessing human capital and rethinking infrastructures could be considered as building blocks of Iran's post-sanction economy (WEF, 2015a).

Iran's global ranking of competitiveness reflects the country's fall in ranking in recent years.

Iran is ranked at 83 among 144 countries in the 2014-15 WEF report - losing one place **compared to the previous year's report (** WEF, 2014). In order to sharpen competitive edge, Iran can build on its assets of basic and advanced factors, macro-economic level and large market size to secure its place in the global competitive market. In the following sections, the diamond model is used as the conceptual framework to explain how the application of ICTs can create the required conditions regarding each of the dimensions of the diamond model.

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[8] P5+1 is referred to as the group of 6 world powers that joint together in 2006 to make diplomatic efforts **regarding Iran's nuclear program.**

4.3.1. Factor Conditions

According to WEF (2015a), **Iran's insufficient capacity to innovate and inadequately skilled** work forces are identified as problematic factors. The important factors that could be considered regarding SMEs are advanced factors such as skilled and educated labourers, knowledge and innovation. The importance of an educated population and the efficiency of the labour forces have also been stressed in the recent report (*ibid*). Here, we draw upon the fact that the use of ICTs by Iranian SMEs has the potential to heighten the quality of learning, knowledge creation and innovation as well as skilled human capital.

4.3.1.1. ICTs and KM

Being generalized from the micro-level of organizations to the macro-level in a country, Knowledge Management (KM) can be implemented in all sections of an organization, including every department and sub-department in order to foster knowledge-based development (Akhavan & Jafari, 2006; Akhavan *et al.,* 2006). KM can create competitive advantage for Iranian SMEs (Gholipour *et al.,* 2010). However, SMEs in Iran have not been able to manage all the aspects of KM at the same time (Valmohammadi, 2010). Therefore, it is crucial to investigate how KM could be improved in Iranian SMEs.

ICT has the ability to improve KM in Iranian SMEs to a degree that could be considered a competitive advantage. It is important in creating explicit knowledge by providing means of gathering, storage and distribution of quantitative data (Phang & Foong, 2010) as well as tacit knowledge like video-conferencing (García-Álvarez, 2015). Valaei and Aziz (2012) refer to the utilisation of technologies and networking as the executive courses of action to achieve success in KM processes. ICTs have a prominent role in KM by facilitating knowledge sharing and management. Using ICT-based KM also paves the way for organizational effectiveness by:

- ➢ aiding communication (internet access, email, chat, website, web catalogue, discussion forums, video-conferencing);

- ➢ analysing data (data mining, text mining);

- ➢ developing tools specifically applicable to KM (storage support, document management systems);

- ➢ improving internal processes (Human Resources Management (HRM) and Enterprise Resource Planning (ERP)) and enterprise systems;

- ➢ filtering personalized information, developing information systems and knowledge maps;

- ➢ providing learning support (e-learning); and

- ➢ providing external collaborative connections *e.g.* Electronic Customer Relationship Management (eCRM), firm/industry specific applications *etc*. (Subashini *et al.* 2012; García-Álvarez, 2015).

4.3.1.2. ICTs and Learning

The lack of innovation in the education system is considered a major impeding element in the advancement of factor condition, both in the basic and advanced conditions. Tafti (2011) claims that the lack of innovation in Iranian SMEs derives from the low standards of further **education, which does not have the capacity to meet the needs of Iran's society nowadays. He** further

mentions that the education system in Iran is mostly focused on knowledge transfer without sufficient concerns for research and knowledge distribution; hence, resulting in poor cooperation between the universities and professional sectors.

With the global growth in information technology, Iran has tried to keep abreast of the advances brought about by ICTs within academia. The country is now among those that offer its students the opportunity to study off-campus. E-learning in Iran was firstly developed in

the most reputed and high-ranking universities *viz.* Amir Kabir University of Technology, University of Shiraz and K.N. Toosi University of Technology (Varahram *et al.*, 2008).

Iran has made significant progress in education at both high school and further education level; however, some deficiencies can still be found in the use of new technologies within education, particularly e-learning. In a study focused on the ICTs and education in Iran, Abdollahpouri (2014) found that problems are not merely related to the ICTs itself, but rather the main issues were found to be caused by non-ICTs-based factors such as education systems or the national policies and strategies defined in the educational sector. Provided that national strategies and plans support the appropriate implementation of ICT applications, e-learning would improve the quality of and access to education to a degree which is required **for today'**s needs.

ICTs are also known as enablers of organizational learning and staff training (Khalib *et al.* 2015) and their role in having skilled labour is undeniable. E-learning solutions provide a scalable, efficient and fast learning platform for communicating knowledge and information with the capability of being applied to a wide range of learning purposes, styles and environments. The flexibility of e-learning applications gives the employees of the firms and enterprises the freedom to learn what, when and where they want at their own pace.

4.3.1.3. ICTs and Innovation in SMEs

 Kamalian *et al.* (2011) make the point that the uncompetitive nature of SMEs in Iran is a consequence of the lack of innovation in them. In an investigation into the status of innovation in Iranian SMEs, Tatfi (2011) found that the lack of sufficient innovation in key industries (except petroleum and gas) such as petrochemical, steel, textile, food, automobile, electrical and electronics hinders Iranian industries in their efforts to have a significant share in international commerce and even in satisfying demand in the domestic market. He adds

that while there are relatively well-developed manufacturing capacities in various industries such as automotive, telecommunications and pharmaceuticals, enterprises are only involved in production and ignore undertaking activities associated with innovation.

ICT has become an important tool in speeding up innovation (Lunvall & Nielsen, 2007; Spiezia, 2011). Iranian SMEs can take advantage of ICTs to create innovative practices since they are enablers of innovation in production, marketing and services by using real-time data **from the 'Internet of things'. In addition to facilitating service innovation, ICT's market**-oriented applications, such as Web-developing, have the potential to build competitive advantage through product innovation (Gago & Rubalcaba, 2007; Higón, 2012).

Cloud is an example of the application of ICTs that has the ability to foster innovation in productivity and competitiveness while reducing harmful environmental impacts (EU, 2012). For example, great opportunities have been created by adopting cloud-computing in **developing Iran's agriculture sector (** Amini *et al.*, 2013). Iran needs to ensure that a larger number of SMEs benefit from the innovation created by novel cloud applications and services. Ghaffari *et al.* (2014) make the point that Iranian SMEs can dramatically progress in their business trends by adopting cloud technology. They add that lower investment on hardware and infrastructure creates easier scalability and makes more efficient use of computing resources; therefore, these are only some of the benefits Iran can take advantage of via cloud technology.

4.3.2. Demand conditions

Regarding this element of the diamond model, the sophistication of the demand market is not only important but it creates a clear and strong relationship with customers. Sophisticated

demand market is created by customers' high demand for better products and services and their involvement in shaping the demand market.

It should be noted that there is little evidence in the literature regarding the connection between e-business and customer sophistication. In some cases, customer sophistication is described as customers demanding higher levels with immediate services over multiple access channels (Pan & Lee, 2003). Bearing this aspect in mind, ICTs and e-business have provided customers with faster services (*e.g.* online shopping and other e-commerce services) and personalized product and service innovation (Barrett *et al.,* 2015). In addition, the Internet has provided a ubiquitous, accessible and interactive marketing channel that includes marketing communication, transactions and service deliveries (Rowley, 2004).

In addition to what was found in the literature, I have added another aspect of customer sophistication using the aforementioned definitions in the contexts of e-business models. In the following, the focus is on C2C and C2B models that have the ability to heighten creativity and sophistication in domestic markets by involving customers and end-user in commerce and business processes. Moreover, the role ICT solutions and software in improving the CRM is mentioned due to its important role in maintaining effective communication with customers. Likewise, e-marketing and Internet advertising influence customized and sophisticated home markets.

4.3.2.1. C2C and C2B

E-business is the application of ICTs in business activities and processes. In this section, I aim to show the relationship between C2C and C2B e-business models in enhancing **customers' sophistication, needs and expectations. It should be mentioned that such websites** or business networks were identified during the research. Given that there might be instances of such active networks that we have not been able to spot, the number or extent of them may not be adequate enough to be evidenced by media. Therefore, I put forward the notion that creating such business models can favourably influence the desirable complexities in the

home market by providing the unique opportunity for customers to create demand and value on their own.

C2C is an e-business model that enables the relationship between customers to facilitate the transaction of products and services among them. In other words, C2C lets the customers behave as sellers and buyers in a third-party online marketplace. This would result in a demand market consisting of customers who are actively involved in and are aware of aspects of trade and business. A clear example of this is eBay's auction service where person-to-person transactions take place. A C2C model can generate income in various ways such as personal advertising fees, subscription or membership fees, transaction fees and sales commissions (Kumar & Kumar, 2014).

A demand market that keeps such customers is more likely to generate sophistication since it does not serve only ordinary customers. The home market would be a community of informed customers with upgraded expectations and higher demand for better services. This **pushes companies to make effort to target 'advanced customers' that are harder to attract** compared to the ordinary customers.

C2B is another e-business model that plays an important role in creating sophistication. It is a type of commerce in which customers create value and demand by providing products and services to companies. C2B allows extracting value from customers or end-users. On one hand, **companies benefit from consumers' willingne**ss to contribute in pricing and marketing and on the other hand, consumers take advantage of flexibility, direct payment and low-price services and products (Arline, 2013). eBay is a simple example of this when a consumer sells *his/her* used books to a bookstore. Or, when an enterprise sets up websites where a consumer can advertises his/her project and companies review the consumer's requirements such as

budget, and eventually bid on the project. The consumer then reviews the received bids and selects the one that best suits them to complete the project.

A typical form of C2B is online group-buying that forms a cluster of consumers with **common demands for products and services that enhances customers' ability** in price **negotiation while providing better purchasing conditions in accordance with members' needs** (Anad & Aron, 2003; Chou *et al.,* 2014). Another example is when an enterprise facilitates a C2B model by setting forums for discussing prices, product features or suggestions for improving services in a way that would eventually help the enterprise meet the needs of the actively involved customers.

All of the mentioned examples were situations in which customers can act as parties in a business. Therefore, they are no longer ordinary; instead, they are what can be named **'advanced customers' with high involvement in the market while creating value and needs on** their own. SMEs can particularly benefit from setting up platforms and websites that facilitate and improve close and effective relationships with their customers.

4.3.2.2. E-CRM

CRM   is an important factor in knowing customers' needs, handling their increasing expectations and preserving their loyalty. Companies are sensitive towards and motivated by **their customers' demand. Regarding the demand condition element of the diamond model,** the role of electronic CRM in assisting companies in taking proper actions according to their **customers' need should be considered.**
GilaniNia *et al.* (2013) conducted a case study based on evidence from Iranian SMEs to assess the impact of utilizing e-CRM on creating competitive advantage. They found that the low use of e-CRM systems led to low levels of competitive advantage being obtained by the firms. Considering the direct relationship between using e-CRM and generating competitive

advantage (Bahrami, 2012), it is suggested that the use of e-CRM becomes more frequent and properly utilized in enterprises.

Incorporating all the functions of CRM, e-CRM concerns types of CRM by using communication platforms, *viz.* the Intranet, Extranet and Internet (Balakrishnan, 2015). Given the fast-paced competition in e-**commerce environments and customers' expectations for high standard products** and services, an electronically integrated CRM provides real-time and dependable **communication with a firm's customers.**

Iranian SMEs could profit from the advantages created by effectively utilizing e-CRM. These benefits are:

- ➢ Delivering competitive strategy to ensure competitive advantage.
- ➢ Worldwide presence.
- ➢ Cost-effective marketing and promotions.
- ➢ Reduction with transaction and overhead costs.
- ➢ Spotting the necessity for data and communication improvement.
- ➢ Quick and easy access to customer-related documents.
- ➢ Customizing cross-sells and upsells.
- ➢ Delivering better customer service *e.g.* helping customers with checkout processes, (Kumar & Kumar, 2014; Balakrishnan, 2015).

4.3.2.3. E-marketing

According to the definition presented by Chaffey *et al.* (2009), e-marketing refers to the integration of the use of electronic communication platforms, such as the Internet, email, websites, wireless media into marketing activities and processes for delivering services to customers. E-marketing facilitates the close relationship between market actors, *i.e.* buyers,

sellers, suppliers and distributors as well as providing the benefits of large market and broader advertising mediums.

E-marketing strategies increase complexity and sophistication (Iddris & Ibrahim, 2015). Owing to the relatively easy and inexpensive cost of accessing the Internet, companies can create online bases from which their business can be conducted. This allows them to target a vast market of customers and incorporate more service innovation. Therefore, it is assumable that the competition among enterprises increases in order to attract more customers to better services and goods through a widely accessible network, such as the Internet.

Internet advertising, an activity of e-marketing, is widely used among Iranian SMEs. According to the statistics reported by Internet World Stats (IWS, 2015a), over 57% of Iran's population used the Internet by at the end of 2014. Table 4 shows the considerable growth of Internet usage in Iran during the last 15 years; furthermore, Iranian users are ranked second in the Middle East, after Bahrain, in Internet usage (IWS, 2015b). This indicates that Iran is a suitable place for studying the application of the Internet as an information distribution channel in the form of advertisement for SMEs (Hanafizadeh *et al.* 2012).

Table 4: Statistics on the Use of the Intern in Iran

Year	User	Population	% of Population
2000	250,000	69,442,905	3.8
2002	5,500,000	69,442,905	7.5
2005	7,500,000	69,442,905	10.8
2008	23,000,000	65,875,223	34.9
2009	32,200,000	66,429,284	48.5
2010	33,200,000	76,923,300	43.2
2012	42,000,000	78,868,711	53.3
2015	46,800,000	81,824,270	57.2

"Source: IWS (2015a)"

The use of the Internet for advertising is considerable by Iranian SMEs. Given the high cost of advertising, especially through state TV channels, and the lack of sufficient budgets for publishing them, Iranian SMEs look at the Internet as a cost-effective medium for advertising (Hanafizadeh *et al.*, 2012). This can set a stage for more technical and professional uses of the Internet in the areas of business and marketing.

By being able to provide customized information to customers (Lee *et al.,* 2015), Internet advertising is able to create unique interactions between companies and their customers. This provides firms with targeted advertising that lets them maintain a clear and reliable connection with their current and potential customers in the demand market.

Moreover, such a desirable level of access to the Internet can motivate enterprises to optimize the use of other aspects of e-marketing such as web browser optimization, web design, blog, email marketing, social media[9], marketing automation and sales tools in their marketing

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[9] Social media and its activism, scope and influences in Iran are controversial topics that are out of the scope of the current research.

activities. This, therefore, has the potential to upgrade the domestic demand market by providing services to more customers while maintaining an effective customer relationship.

4.3.3. Related and Supporting Industries
4.3.3.1. E-clustering

As mentioned earlier, clusters impact the competitiveness of firms by creating competitive advantage. The fact that ICTs have had impact on the way individual firms do business results in

major changes in **firms' relations as clusters. Technological and com**munication advancements brought about by ICTs have made it much easier for related industries to cooperate effectively. While the obvious benefit of clusters is the physical proximity (DeWitt *et al.,* 2006), ICTs have managed to cut the short distances and have defined new forms of **clusters known as 'e-clusters'.**

Geographical areas covered by e-clusters could be regional, national and international. However, contrary to the traditional benefit of clusters, the concept of e-cluster is not merely characterised by proximity and short lines of connection. E-clusters are important for regional development in order to connect firms, businesses and industrial sectors (Adebanjo & Michaelides, 2010), and so, we expect that Iranian SMEs could take benefit from e-clusters to a degree that creates competitive advantage.

As defined by Brown and Lockett (2001), e-clusters are communities consisting of digital enterprises that are enabled by intermediaries based on inter-organisational systems that are electronically enabled. In another definition, e-cluster is an e-business network that;

1) integrates with companies in Telecommunication, Information Technology, Multimedia, Entertainment and Security (TIMES) sectors;

2) builds e-channels and e-supply for procurement and distribution; and

3) applies innovation, knowledge, intellectual property and national strength to create global competitive advantage (**Davidović, 2014**).

According to this definition, e-cluster provides knowledge, innovation and technology that can be applied within the cluster through nationally-based interactions. KM and innovation, also known as drivers for cluster profitability and productivity, can support and further improve the performance of e-clusters (**Davidović, 2014**). This shows the interdependency and correlation between the elements of the diamond model (factor and demand conditions) from the aspects of innovation and knowledge; hence, a similar justification for the role of ICTs in improving innovation, knowledge and KM could be applied here.

It should be noted that many Iranian SMEs are burdened with financial restrictions. Therefore, utilizing a more affordable way of e-clusters might be suitable in contexts where financial limitations seriously restrain SMEs from investing in new ICTs solutions. Regarding such a common issue with SMEs as a whole, Kawa and Ratajczak-Mrozek (2014) propose e-cluster as a network structure - *i.e.* the use of cloud community in e-clusters. In this way, SMEs are given the ability to automatically capture and exchange information within a particular network of enterprises.

Cloud computing is **"**a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction**"** (Mell & Grance, 2012 cited in Kawa & Ratajczak-Mrozek, 2014). Bearing in mind the relatively low cost of Internet access, SMEs in supply, distribution, manufacturing and retail can closely and effectively work in collaboration across the cloud networks in the clusters.

4.3.3.2. E-procurement

In addition to the importance of e-cluster for related industries, we may also consider e-procurement as another advantageous factor for effective communication between suppliers

and buyers. The importance of suppliers and the efficient communication with their partners has been emphasized in the diamond system. E-business, the application of ICTs in business activities and processes, enables parties in commerce to maintain effective communication as well as managing all components of the supply chain (Mohammadi, 2013). Therefore, it is vital to ensure the successful use of e-procurement which is an essential activity in the supply chain.

Purchasing goods and services by organizations and enterprises is referred to as **'procurement'. Thus, 'e-procurement' relates to conducting transactions and electronic** purchases via the Internet and means of Web-based buying between suppliers and awarding authorities (Corsi, 2006; Gunasekaran *et al.,* 2009). It can be also done via private networks like Electronic Data Exchange (EDE)[10]. Activities within e-procurement, such as searching for suppliers and enabling reverse auctions[11] could be done in private marketplaces as well as public exchanges. E-procurement advantages for SMEs can be the following points:

- ➢ Streamlining purchase process, increasing the productivity of purchase and efficient business processes.
- ➢ Improving contract compliance.
- ➢ Improving price transparency and payment processes.
- ➢ Ensuring on-time delivery, reduced human error and time cycles.
- ➢ Decreasing costs of sale, paperwork and administration, transaction, inventory and order cycles.
- ➢ Improving inventory and supply chain management, decision making, execution and control.

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[10] EDI is a standardized method for computer-to-computer exchange of data and business documents by business partners.
[11] Reverse auction is a type of auction in which sellers compete to gain buyers, as opposed with ordinary auction in which buyers compete with each other.

➢ Lowering the barriers for market entry and improving market intelligence.

➢ Improving the connection between supplier, buyer and intermediaries (De Boer *et al.,* 2002; Kasavana & Singh, 2005; Lai *et al.* 2005; Angelo, 2008; Gupta, 2008; Yu *et al*., 2008; Gunasekaran *et al.,* 2009; Mohammadi, 2013; Turban *et al.,* 2015).

The potential benefits of e-procurement should motivate SMEs to utilize such a system. By setting up e-procurement systems, Iranian SMEs can benefit from reliable access to purchasing networks with a wide selection of products and easily obtainable information. Furthermore, e-procurement processes cut down the costs associated with accessing **information and ordering and purchasing products; this creates a direct solution to SMEs'** concerns of burdened costs.

4.3.4. Firm Strategy, Structure and Rivalry

A vast amount of literature highlights how ICT may impact firm strategy, structure and rivalry. However, regarding the diamond model, this element refers to the way firms are created and organized as well as the organizational and management practices dominant in a country. This requires a narrower insight into a particular industry to find out how ICTs impact such dominant processes and practices. For example, a specific industry might focus on management systems and procedures while another may concentrate on production activities. Apparently, there are various industry or business activities which are centred around a particular strategy or based upon a particular structure. Therefore, the impact of ICTs for each of these should be investigated in regards to the particular area.

Therefore, firm strategy, structure and rivalry can be also considered in close relationship with the government, as the role of government is significant in formulating regulations that **organizes a firm's cr**eation and domestic rivalry. This becomes even more necessary for a country like Iran in which almost all the structures and rules in industry, business and trade

are established by the government. The role of government and its influence is explained in the following section.

4.3.5. Government

As mentioned before, the government is not a source for creating competitive advantage but it can influence the extent to which other elements of the diamond model create advantage. So far, we have reasoned that ICTs can turn each of the four elements of the diamond model into a condition in which competitive advantage could be created for Iranian SMEs.

A similar reasoning here is not conceivable. In other words, it cannot be assumed that ICTs play any role in the way government influences industries. Rather, the logical approach would be to reason that governments can impact the way ICTs are utilized by firms and enterprises. Depending on what extent the government supports or discourages adopting ICTs, the level of the competitiveness created by ICTs would vary.

Effective decision-making, policy formulation and implementation regarding ICTs, being considered as an industry or enabler, require a profound understanding of the dynamics that affect the relationship between technologies and legal, economical and social environments of a country (Javadi & Gharakani, 2008). The government plays an important role, as it is the major authority responsible for policy making. Having an important role in incentivizing competitiveness in the country, government policies and regulations can positively contribute to the progress of the adoption and use of ICTs.

Regarding Iranian SMEs, the problem is the financial limitations the struggle with when wanting to invest in new technologies (Fathian *et al.,* 2008). Fathian *et al.* (2008) make the point that positive changes regarding ICT have been more tangible in private, non-profit enterprises rather than in governmental organizations. They add that e-readiness of such private SMEs is much more advanced in comparison to governmental corporations. The

governments' primary role is to provide enough financial support for encouraging SMEs to effectively use ICTs.

It is worth mentioning that according to the file, in many countries, governments and telecommunication operators collaborate to enhance ICT literacy. Examples of such effective co-operations between the **two can be seen from India's government who launched a** programme to upgrade the literacy of rural publication in order to use data service, a further example of this can be seen in Qatar which ensured digital inclusion by running ICT programmes for different segments of its population (young people, elderly, women and those with special needs or low skills) (WEF, 2015b). This proves to be much more important for Iran where all three major telecommunication operators are dependent on the government[12].

Previously, we discussed the desirable conditions for benefitting from the Internet usage in Iran. In this case, for example, the government can support and even speed up the adoption and process of Internet advertising by SMEs through enacting obligation policies. In other words, the government may consider online marketing and advertising as an obligatory regulation at the time SMEs develop their business plans (Hanafizadeh *et al.,* 2012). It can also encourage the utilization of ICTs by offering loans and promotions to enterprises that have active and effective roles in campaigns for Internet advertising. Such policies could be expanded to other areas that include the use of ICTs by SMEs in order to ensure the optimum use of digital technology in the country.

The government also plays a significant role in improving user capabilities. The lack of traditional and digital literacy is regarded as a key barrier to the efficient use of ICTs and new

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[12] **Iran's first telecommunication company, with the brand name of "**Hamrahe Aval**",** is hold by government. The second and third mobile telecommunication operators are owned by private sectors that are heavily governed by and dependant on the government.

technologies. Traditional illiteracy derives from ineffective education systems. Thus, by incorporating the effective use of the Internet and ICTs applications in the education system can develop ICT literacy and skills. This is associated with the first element of the diamond model *i.e.* the educated and skilled population aspect of the factors conditions.

In addition to its role in supporting the use of ICTs, the government should also ensure an effective level of competition in its active sectors. Although **Iran's government has made** efforts in opening up the economy to competition, this process is very slow. According to Molanezhad (2010), **Iran's** system of subsidies, the allocation of licences and resources, provides only limited competition in the majority of its industries. This has led to the lack of effective competition among Iranian industries to develop new products and services or to even improve the existing ones.

4.3.6. Chance

Chance could be interpreted as a set of events that cannot be controlled, prevented or managed by firms. These events, as mentioned before, include technological advancements, inventions and innovations. We may interpret the role of ICTs here as how foreign competitors use ICTs and to what extent they create advantage through the effective utilisation of it. For example, foreign companies might make huge benefits from producing and commercializing their technological breakthroughs or ICT-related innovations that could disrupt the dominant status of the local market.

The Internet has obviously eliminated geographical boundaries and the constraints of traditional trade that might have been limited to local or regional markets. Foreign firms can, therefore, achieve strategic advantages in global competition by targeting and winning new customers in the home market with the use of Internet marketing or e-marketing tools.

Another assumable case would be the role of ICTs in social media in political movements or decisions made by foreign governments or international authorities. Regarding Iran, heavy sanctions imposed against commerce, imports (including the provision of materials for use in domestics), exports and foreign currency transactions have a significant role not only on SMEs, but also on any active industrial, trade or business entity.

With the aid of digital communication networks, media and Internet channels, such changes that organizations and enterprises do not find respite to adjust themselves to the rapid disruptions are rarely communicated. As a consequence, domestic firms would be exposed to undergo, and not necessarily withstand, the shocks of adversity in the home market.

4.4. Summary

It has been discussed that a good level of competitiveness within the country paves the way for Iran to gain and sustain a stronger position in global market. In this chapter, we investigated how the application of ICTs in Iranian SMEs has the potential to improve the **country's position in global competitiveness. Using Porter's Diamond Model, it has been** demonstrated that by establishing and improving the use of ICTs by SMEs provides suitable conditions in each element of the model that in turn would lead to enhancing competitiveness within the country. In the final chapter, the results of this analysis are linked to the criteria for the global competitiveness to answer the main research question.

Chapter 5. Conclusion

In order to ensure dependable findings, this chapter includes the final part of the analysis before providing the concluding answers to the research questions. This, together with the previous message emerged from the literature review and analysis chapter, builds the answer to the research questions. I will then move on to address the research limitation and provide suggestions for further study.

5.1. Concluding Analysis

In addition to the model for national competitiveness, there is a global framework for **examining a nation's competitiveness on the** international stage. As explained in the chapter 3, this framework consists of 12 pillars, which global rankings are based on. Before I conclude, I will compare the findings of my study to the criteria of the global competitiveness framework defined by the WEF (WEF, 2014).

The first pillar of competitiveness is defined as 'institutions'. One aspect of an institutional environment is the government's attitudes towards private sectors and the efficiency of market operations (*ibid*). This goes back to the government element of the diamond model in

chapter 4 in which I discussed the way the government could influence the environment in which SMEs operate by encouraging and supporting the effective use of ICTs.

The **second pillar is 'infrastructure'; here, the availability of a stable and extensive** telecommunications network is emphasized. Clearly, such a network would allow a free and rapid information flow. This, in turn, would increase the economic efficiency by ensuring that businesses and economic actors effectively communicate while having access to available required information (*ibid*). This particularly proves to be important when taking the clusters and related industries into account.

The stability of macroeconomic environments, which is the third pillar, is important for **businesses as well as a country's overall competitiveness. The government has the influential** role in creating macroeconomic stability by ensuring appropriate rates for interest and inflation (*ibid*). This pillar could be also related to the forth element of the diamond model - firm strategy, structure and rivalry. In regards to the diamond model, the way firms are established and managed in a country shapes its domestic rivalry. In **Iran's case, as** mentioned earlier, the government dominates the creation, organization and management of the businesses, enterprises and economic actors. Therefore, the rivalry and environment in which SMEs act are dependent on the macroeconomic environment generated and controlled by the government.

The fourth and fifth pillars are primary education and higher education and training, respectively. In relation to higher education and training, the quality of education, staff training and constant vocational and on-the-job training are the most important factors that should be considered (*ibid*). The seventh pillar, labour market efficiency, could also be considered relevant to having well-educated labour by enhancing the role of ICTs in

organizational and professional learning. The discussion of the role of ICTs also applied to **the diamond model's first dimension, factor conditions.**

The efficiency of goods market is the sixth pillar of competitiveness. Efficient trade and competition in the domestic market is achieved when the best environment for the exchange of goods is created (*ibid*). Such an environment is created when products and services are **offered in the market in proportion to the country's supply and demand market. This is** in close relationship with the second and third element of the diamond model - demand conditions, and related and supporting industries. As mentioned before, ICTs can develop the sophistication of the demand market as well as creating effective relationships between the customers in the demand market and the product and service providers. Moreover, ICTs have strong potential to create effective communication in the business and industry clusters via e-clustering and e-procurement.

The eigth pillar, financial market development, emphasizes business investments, available capital for private sector and efficient financial allocations to domestic sectors and the economy actors entering from abroad. Again, this goes back to the role and influence of the government in defining regulations for entrepreneurial and business investments. Here, a general view is assumable that government has the most influential role in attracting domestic and foreign investments, and fostering financial development in the market. However, the focus on ICTs and SMEs in investment and financial development of the market has not been considered, as it requires deeper analysis, which is out of the scope of this study. However, relying on the role of the government in providing financial support for SME development might suffice at this level for this study.

The ninth and twelfth pillars are technological readiness and innovation, respectively. The current research was conducted to examine the role of ICTs, as the featured example of

today's technology, in improving national competitiveness. Therefore, all the analysis

conducted in the fourth chapter would apply here. The role of ICTs in innovation was also explained under the factor conditions; therefore, the same analysis applies here for the pillars.

Market size makes the tenth pillar of competitiveness. Although Porter (1990) puts more emphasize on the sophistication of the market rather than the size of it, Morschett *et al.* (2015) highlight the importance of a large market. Market size has also been noted as one of the factors that influences the competition (Melitz and Ottaviano, 2008). Lasch *et al.* (2013) make the point that ICTs are particularly driven by customers and the market and, therefore, the local market size is an indicator of business opportunities. Although SME-specific information about the role of ICTs on market size was not found for Iran nor a developing country, there is more general data that could be drawn upon.

According to a report provided by the Centre for Retail Research (CRR, 2015), e-commerce is the most rapidly growing retail market in Europe with an expanding pace of 14.2 times faster than conventional outlets. However, in 2013, Asia-Pacific had the strongest, worldwide e-commerce network as its turnover of $567.3bn excelled Europe and North America with $482.3bn and $452.4bn, respectively, (ECEU, 2015). Such growth is largely driven by a rapid increase of computer, internet and e-commerce market penetration (Capgemini, 2013; ECEU, 2015**). Therefore, it could be concluded that the role of ICT application has strong capability in creating large markets and this, in turn, affects the competition.

The eleventh pillar is referred to as 'business sophistication'. There are two elements

regarding business sophistication that are closely interrelated; these are the quality of a **country's business network and the quality of the operation of its individual enterprises** (

WEF, 2014). In relation to the present study, the first element is related to the extent to

which a country provides good business networks for its local firms, suppliers and related businesses and industries through the application of ICTs.

The second element relates to the extent to which ICTs create business sophistication at enterprise level. As mentioned by Forman (2005, cited in Sadowski, 2014) a wide variety of new ICT solutions and services indicate the technological sophistication of a firm. Ogrean *et al.* (2010) consider e-commerce and e-business, among all the applications of ICTs, as the most relevant ICT services that can link technological readiness to business sophistication. Therefore, the reasoning could be that technological readiness brings about technological sophistication by providing multiple services at a time. Inevitably, this would lead to business sophistication since each of the services or solutions, particularly e-commerce and e-business, perform a set of business activities or processes.

Table 5 summarizes the whole analysis for this research

Table 5: Summary of the Research Analysis

Competitiveness Pillar	Diamond Element	Explanation
Institutions	Government	Providing financial support and supportive regulations. Encouraging the effective use of ICTs by SMEs.
Infrastructure	Government Related and supporting industries	Ensuring reliable access to communication networks and effective communication across e-clusters.
Macroeconomic environment	■ Government ■ Firm strategy, structure and rivalry	■ Providing an effective competitive environment for SMEs and business/industry factors to compete in.
Primary education Higher education and training	Factors conditions	■ Ensuring effective integration and the use of ICTs in learning, both in higher education and professional areas.
Efficient goods markets	Demand conditions Related and supporting industries	Use of ICTs to increase the level of demand market in terms of sophistication. Use of ICTs for maintaining effective relationships between customers and product/service providers. Use of ICTs for maintaining effective communication between the connected market actors.
Labour market efficiency	Factors conditions	Ensuring the effective use of ICT applications in organizational and professional training in SMEs.
Financial market development	Government	Providing financial support and easy regulation for SMEs entrepreneurship.
Market size	Demand conditions	Exploring larger markets by establishing strong e-commerce marketplaces.
Technological readiness Innovation	All the elements of the diamond	Improving competitiveness both at firm and national level.
Business sophistication	■ Firm strategy, structure and rivalry ■ Related and supporting industries	■ Creating and increasing business sophistication through the application of e-business and e-commerce by SMEs.

5.2. Research Conclusion

Based on the analysis conducted in the previous and current chapter, the answers to the research question can be briefly concluded and given as follows.

*Q1: **How does the adoption of ICTs by Iranian SMEs improve the country's national competitiveness?***

A1: ICT, as a source of competitive advantage, has strong potential to increase competitiveness among SMEs. High competitiveness in firms within the country largely **contributes to the country's overall performance in competitiveness. Moreover, ICTs create** desirable conditions matched with the Diamond Model of national competitiveness; hence, it **can expect to upgrade Iran's ranking in global competitiveness. In** addition to this, the role of ICTs goes beyond the diamond level as it can improve the global criteria for measuring and **ranking a nation's competitiveness.**

Q2: What forms of ICTs can lead to improving national competitiveness?

A2: The use of ICTs in KM, e-learning, e-marketing, e-commerce, e-business, C2C, C2B, e-CRM, e-clustering, e-procurement would meet the requirements of the national competitiveness model and positively influence the pillars of the global competitiveness framework.

Q3: How can ICTs motivate Iranian SMEs to become more competitive?

A3: **ICT is known as a source of competitive advantage at firm level. Given the SMEs'** typical financial restrictions; where the application of its services and solutions are cost-effective, SMEs would be strongly encouraged to implement ICTs in their business activities. Moreover, when regulations support and promote effective application of ICTs, SMEs are more inclined to adopt them in providing their products and services.

Q4: *To what extent can the government contribute to national competitiveness?*

A4: The government plays an important role in non-burdensome regulations and policies for integrating ICTs in nationwide industries and businesses. Moreover, it can foster ICTs growth within the country by providing incentives to SMEs and providing secure financial aids.

This research aimed to provide a solution for Iran's relatively poor performance in global competition. The answer to the research questions indicated that the objective of the research has been achieved, *i.e.* **increasing firms' competitiveness and improving the use of ICT for** upgrading competitiveness.

5.3. Research Limitations

Apart from the findings and answers to the research questions, some limitations of this research may have hindered the achievement of an absolute solution to the improvement of competitiveness in Iranian SMEs as well as national competitiveness. Limited Iran-specific information might have caused the real capacity of SMEs or the country as a whole to not be fully taken into consideration.

5.4. Further Research

This research attempted to focus on the positive potential of ICTs to improve national competitiveness. However, there are, and would definitely be, barriers associated with SMEs implementing ICTs at a wider level in order to increase national competitiveness. Further literature could be found on the existing barriers about the adoption of ICTs by Iranian SMEs (see Hourali *et al.,* 2008; Sameni & Khoshalhan, 2009; Ghobakhloo *et al.,* 2011; Hajli *et al.,* 2014; Yasin *et al.,* 2014).

Although such literature can provide useful insights into the current problems of adopting ICTs by SMEs, they might not be sufficient and thoroughly recognized a wider use of ICTs

to support and promote national competitiveness. For instance, as stated by Sadowski (2014), ICT solutions and the technological sophistication brought by it should be cost-effective in order to make it possible for firms to implement it. Barriers, whether related to cost or technology requirements, are associated with the implementation of e-clusters or e-procurement systems in the majority of SMEs across the country, and thus, require its own study. Therefore, it would be useful for further research be conducted in order to examine the problems affecting ICTs implementation in the forms mentioned in this research.

And, finally, I may put forward a final suggestion for a broader area of research be carried out relevant to the research topic. Combining the concepts of ICTs and competitiveness, the current research could open ground for e-competitiveness (electronic competitiveness). Further research may be done in order to investigate the role of ICTs on various aspects of competitiveness both at firm and national level, and in international competition.

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