THE ROLE OF CLUSTER THEORY FOR ECONOMIC DEVELOPMENT:
DOES PORTER’S COMPETITIVE DIAMOND FAIL TO EXPLAIN DUBAI’S FINANCIAL CLUSTER?

Klaus U. Zumbach

A Thesis
Submitted to the Graduate College of Bowling Green
State University in partial fulfilling of
The requirements for the degree of

MASTER OF ARTS
August 2010

Committee:
Dr. Michael C. Carroll, Advisor
Dr. Kevin J. Quinn
© 2010

Klaus Ulrich Zumbach

All Rights Reserved
ABSTRACT

Dr. Michael C. Carroll, Advisor

The current financial crisis has had significant global impact. Even Dubai, with its constant high growth rates is not exempt from the economic recession. Surprisingly, Dubai’s hit was delayed but still with the full impact of the crisis. This study examines the case of the development of Dubai’s financial cluster and determines which of its problems are self-induced and which can be explained by Porter’s (1998) competitive diamond. With support of the existing literature provided by Krugman (1991), Sölvell et al. (2003), and Weber (1929) and the examination of three financial and IT clusters, it was possible to develop nine characteristics essential for the success of cluster formation that could have reduced the likelihood of an economic failure. The model of nine characteristics serves as a comparison to Porter’s (1998) competitive diamond which was applied aggressively through Dubai’s cluster initiative. Consequently, the nine characteristics exposed significant weaknesses of Porter’s diamond explaining Dubai’s financial problems as an emerging cluster. This paper seeks to explain the current economic situation of Dubai in combination with Porter’s competitive diamond concept.
“My grandfather rode a camel, my father rode a camel, I drive a Mercedes, my son drives a Land Rover, his son will drive a Land Rover, but his son will ride a camel.”

(Sheikh Rashid, 1977)

“Change brings opportunities. On the other hand, change can be confusing.” (Porter, 2001)

“I have spent my whole professional life as an international economist thinking and writing about economic geography, without being aware of it.” (Krugman, 1991)
ACKNOWLEDGEMENTS

I would like to express my gratitude to those who were responsible for the composition throughout the entire thesis process:

To Dr. Michael Carroll and Dr. Kevin Quinn for their support, guidance, and encouragement during the entire writing process. Their interest and ideas made this project very special to me.

To Dayna Herrington who encouraged me to improve my writing and was a great support in the compilation of this thesis.

To my family, friends, and members of the German-American Clubs, who supported me in the experience to study in the United States at Bowling Green State University.

Thanks and Danke!
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>INTRODUCTION</strong>&lt;br&gt;Definition of a cluster</td>
<td>1</td>
</tr>
<tr>
<td><strong>CHAPTER ONE. LITERATURE REVIEW</strong></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Michael E. Porter and the competitive diamond</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Location theory by Weber (1929)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Geography and trade by Krugman (1991)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Summary</td>
<td>19</td>
</tr>
<tr>
<td><strong>CHAPTER TWO. THE SIX CLUSTERS</strong></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>IT cluster</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Silicon Valley</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Bangalore, India</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Silicon Wadi, Israel</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Financial clusters</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Toronto</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>London</td>
<td>23</td>
</tr>
</tbody>
</table>
Dubai’s cluster initiative ................................................................. 41
Porter’s competitive diamond and Dubai’s financial cluster .................. 42
The nine cluster characteristics and Dubai’s financial cluster ............... 44
Risks and weaknesses of Dubai’s cluster ........................................... 48
Summary ........................................................................................... 49

CHAPTER SIX. DUBAI AND THE ECONOMIC CRISIS .................................. 50

Dubai’s authority and its companies ...................................................... 50
Why Dubai’s market crash has been delayed? ...................................... 51
Problems caused by Porter’s competitive diamond ............................... 52
What went wrong? ............................................................................. 53
Dubai’s way out of the crisis ............................................................... 53
Dubai’s future as a financial center ..................................................... 55

CHAPTER SEVEN. CONCLUSION ................................................................. 56

REFERENCES .................................................................................... 57
LIST OF FIGURES/TABLES

<table>
<thead>
<tr>
<th>Figure/Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Porter’s (1929) competitive diamond</td>
<td>5</td>
</tr>
<tr>
<td>2  Weber’s (1929) location triangle</td>
<td>12</td>
</tr>
<tr>
<td>3  Porter’s (1998) competitive diamond in the case of Dubai</td>
<td>45</td>
</tr>
</tbody>
</table>
INTRODUCTION

IT and financial clusters have been a main factor of continuous economic growth. Therefore, in the past decades there has been an increased interest in the role of location in the global economy. Economists agree that clustering and concentration of industries in specific geographic areas is a key driver of regional and national prosperity. The potential role for governments in facilitating this process has been the subject of increased interest in recent years. This promising development leads authorities to high economic spending to achieve sustainable economic growth and independence even in today’s globalized world with increased factor mobility such as human capital, physical capital, and information. It turns out that it is more important than ever to be located in a highly developed cluster. Governments and firms try to coordinate their efforts in cluster initiatives (CIs) to develop a competitive advantage in the global market. Nations and regions concentrate on developing highly specialized skills and knowledge to generate an enduring competitive advantage for the economy. As a reaction to the ongoing globalization process, firms are forced to locate in well-developed clusters to raise their innovation and productivity. This behavior can be observed in IT as well as financial clusters. To provide sufficient background explaining this process of clustering this study surveys the four most common concepts of cluster theory by Porter (1998), Sölvell et al. (2003), Weber (1929), and Krugman (1991).

In general this study uses the existing literature to develop a new cluster analysis model and illustrates its superiority in the case of Dubai’s financial cluster. This study concentrates on six cluster formations, three financial clusters and three IT clusters. This paper examines Silicon Valley, Bangalore, and Silicon Wadi as IT clusters. Toronto, London, and Hong Kong were examined as financial clusters. Primary cluster modeling
was taken from Porter (1998), Sölvell et al. (2003), Weber (1929), and Krugman (1991). From this a listing of nine major characteristics responsible for the success of a cluster formation process were identified. From this starting point, this study attempts to determine the dominant characteristics for a successful cluster in the IT and financial sector. The analysis of the six clusters according to the diamond and the nine characteristics provide similar results. However, it can be concluded Porter’s (1998) competitive diamond is insufficient in the analysis of financial clusters and the application of the nine characteristics is superior especially in the case of emerging financial clusters. By examining Dubai’s financial service cluster, which is strictly formed from Porter’s (1998) diamond principles, it was possible to expose weaknesses in the cluster. The diamond model was not able to detect certain hazards which can destroy essential characteristics of a financial cluster. Therefore, the question arises, “Did Porter’s competitive diamond fail in the case of Dubai?” With this study, it is possible to answer this question. Furthermore, this paper applies the nine characteristics to analyze Dubai’s mistakes and provides possible solutions for Dubai’s problem as a financial cluster.

Definition of a cluster

A cluster can be identified through its size, participants, location, strategy, segment, and boundaries. There are several explanations and descriptions for a cluster provided by the current literature. Unfortunately, these definitions are mainly inconsistent and can lead to confusion rather than to an explanation of clusters. Common definitions include:

Porter (1998) “A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of a cluster can range from a single city or state to a country or even a network of neighboring countries.” (p. 199)
Simmie and Sennett (1999) “We define an innovation cluster as a large number of interconnected industrial and/or service companies having a high degree of collaboration, typically through a supply chain, and operating under the same market conditions.” (p. 51)

Swann and Prevezer (1998) “A cluster means a large group of firms in related industries at a particular location.” (p. 1)

Rosenfeld (1997) “A cluster is very simply used to represent concentrations of firms that are able to produce synergy because of their geographical proximity and interdependence, even though their scale of employment may not be pronounced or prominent.” (p. 4)

Feser (1998) “Economic clusters are not just related and supporting industries and institutions, but rather related and supporting institutions that are more competitive by virtue of their relationships.” (p. 26)

This paper proposes an alternate definition. “A cluster is a network of firms in which the participants compete in a horizontal and cooperate in a vertical way. This competition and cooperation leads to an overall competitive advantage for the cluster participants against rivals located outside the cluster.”
CHAPTER ONE. LITERATURE REVIEW

Cluster theory can be explained by four basic concepts: The competitive advantage of clusters, cluster initiative, cluster location, and geography and trade. This study identifies these four concepts which are the main objective of current literature and are described by authors like Porter (1998), Sölvell, Lindquist, and Ketels (2003), Weber (1929), and Krugman (1991). The following section presents a summary of the four models.

Michael E. Porter and the competitive diamond

The success of clusters is based on its competitive advantage. Therefore, for cluster theory, it is essential to understand how and why clusters develop their competitive advantage compared to other nations, regions, and industries.

Porter (1998) presents the concept of competitive advantage. He is able to point out the importance of competitive advantage for nations, firms, and clusters. Of special note are the chapters, “The competitive advantage of nations” and “Cluster and competition”. Porter illustrates with support of his “competitive diamond” (Figure 1) the idea of the competitive advantage. The competitive diamond explains how a nation and a cluster achieve a competitive advantage. Clusters are driven by competition in three ways. First, it increases the productivity of single firms. Second, it accelerates the innovation process. Third, it stimulates the process of new business formations increasing the overall strength of the cluster.

Porter concludes nations and clusters gain a competitive advantage if its firms are active on a global competitive market. Furthermore, he studied the ten most significant trading nations, which vary in population, culture, government, and geography. In each case, it was possible to determine the competitive advantage of an industry according to the
environment provided by the country. Based on these results, Porter determined four components responsible for the competitive advantage of an industry. The four components are factor conditions, demand conditions, related and supporting industries, and firm strategy, structure, and rivalry. These four components are interacting in a shape of a “diamond” with each other and create the competitive advantage, as shown in Figure 1. In the following, the four components are explained, and the way these four components interact and generate the competitive advantage is illustrated.

Figure 1: Porter’s (1998) competitive diamond

Factor conditions describe all inputs or infrastructure used for the production process such as human capital, physical capital, physical infrastructure, administration, information technology, and research. However, inputs and factors not fulfilling a unique meaning for the cluster and, those that can be easily imported or copied, such as raw material and low-skilled labor, are insignificant. That means, important factor conditions
for the cluster cannot be copied or imported without notable efforts that are crucial in terms of achieving a competitive advantage. Porter argues in the opposite direction. Countries with a lack of natural resources such as Germany and Japan have an increased incentive to achieve higher efficiency, and therefore, have a more extensive innovation process that provides a competitive advantage against other nations and clusters.

**Demand conditions** are factors determined by the market. Domestic and international markets have certain requirements for a product determined by price, quality, and innovation. The domestic market is one of the most important markets for a cluster. The cluster’s environment is mainly responsible for the products in terms of price, quality, and innovation characteristics. Therefore, a strong domestic market is the most important driver that forces firms to produce high quality goods. As a result, the cluster attains a competitive advantage making its products more valuable, superior, and globally competitive.

**Related and supporting industries** are all firms and industries cooperating in a vertical dimension. In the production process, it is essential for the whole industry and cluster to decrease costs and increase efficiency. This means that suppliers and producers are required to be co-located in a geographic area allowing them to reduce transportation costs, enhance information flow, and increase innovation. The agglomeration of a cluster allows the suppliers as well as the final producers, to optimize the production process and improve the products. Consequently, both firms and clusters reach a competitive advantage against other firms and regions located outside of the cluster.

**Firm strategy, structure, and rivalry** are all factors affecting the decision of firms and individuals in the cluster. It is essential for individuals, firms, and clusters to determine their strategy and structure according to the environment. The form of access to the capital
market, individual labor skill opportunities, and the set of company strategies effects the development and success of the cluster.

A firm can only be successful, if its management makes the right decisions and chooses the right strategy according to the environment of the cluster. However, various types of clusters provide different environments. The different predispositions and environment force firms to choose other strategies and consequently develop unique competitive advantages. These predispositions often explain the individual success of a cluster. Nevertheless, the environment of a cluster has to provide some basic structures such as appropriate access to the capital market or access to a skilled labor market. An example of the two different kinds of environments is Germany and the US. In the US, most fast growing businesses are funded through venture capital and the stock market, whereas in Germany the finance possibilities are mostly limited to bank credits. Both environments provide access to capital but in a different way. The US environment supports fast growing businesses such as the IT sector. However, this form of finance also represents a high risk for the investor. In Germany only seriously developed business ideas are eligible for credit. Therefore, the failure rate is lower providing more security for the investors. Both forms of financing provide different environment for business resulting in various structures of clusters. Rivalry represents competition in a horizontal dimension. Firms compete with each other in a cluster and are forced to increase innovation, quality, and efficiency. The increased competition eliminates inefficient businesses. Consequently, rivalry in a single cluster strengthens the competitiveness of firms and the overall competitiveness of a cluster. Additionally, it provides a competitive advantage against market participants located outside the cluster. According to Porter’s concept, this process could not be achieved, if there were no direct competitors in the cluster. Because of
different clusters have different environments and heterogeneous predispositions, firms have the possibility to create individual products that do not compete directly with each other in the same market. This represents a biased competition between firms located in various clusters. Consequently, rivalry within a cluster results in higher innovation, efficiency, and quality.

In chapter four of this study, the function of the competitive diamond is illustrated in a theoretical example. Porter’s diamond is demonstrated on six practice examples, before this paper concentrates on Dubai’s financial cluster.


As already mentioned, clusters have received increasing attention for national as well as regional economies. Therefore, potential beneficiaries of a cluster have an enhanced interest in strengthening the competitive advantage of the cluster. The beneficiaries are national governments, local governments, national and local industries, and academic institutions. All participants of a cluster should be interested in coordinating their efforts to improve the overall cluster. Sölvell, Lindquist, and Ketels (2003) describe cluster initiatives (CIs) and explain which kinds of parties are involved in CIs. They also provide the main objectives of CIs, and with the support of three criteria, competitiveness, growth, and goals, they are able to measure the success of CIs.

CIs are new developed tools to push local economies and to coordinate efforts. Governments and firms are applying cluster theory with the goal of improved competitiveness and growth of local economies. According to Sölvell et al. CIs are defined as “organized efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community.”
CIs coordinate the interest of its involved parties by improving the following six objectives: *Improving human capital, support of cluster growth, business development, commercial cooperation, innovation and technology,* and *improving the business environment.*

*Improving human capital* is one of the main purposes of CIs. The intention of CIs is to insure the existence of an appropriate pool of skilled labor by attracting students through a close cooperation with local education institutions. Furthermore, CIs promote cultural events, work shops, and training programs for managers and companies.

*Support of cluster growth* can be achieved by attracting external firms fitting into the cluster. Therefore, most CIs aim to attract firms supporting a vertical diversification for related and supporting industries. Typically, they are not searching for horizontal diversification because that would increase internal competition. In this case CIs are faced with a conflict of interest. On the one hand, horizontal diversification would increase the overall competiveness of clusters, but on the other hand, it represents direct competition for the firms already existing in the cluster. Therefore, CIs can also be counterproductive.

CIs improve *business development* by identifying new markets and trading partners that have an interest in the cluster and vice versa. International cooperations can provide access to new markets, investments, technologies, and information. An increased set of business partners strengthens the overall competitiveness of clusters.

*Commercial cooperation* can collect and concentrate firms’ actions to decrease costs and increase efficiency. CIs coordinate firms in clusters for skilled labor, common physical resources, and general services. Skilled labor improves through communication in the cluster and coordinated support of education institutions. Moreover, joint efforts
decrease costs for basic physical infrastructure such as roads and communication technology.

CIs increase *innovation and technology* through easy transfer in clusters. Close cooperation and sponsoring of academic institutions with human resources and know-how accelerate the innovation process of firms in clusters. CIs also increase the information transfer between cluster firms through networking and human capital transfer. Academic institutions play a key role as a pool of skilled labor, research, know-how, and information transfer.

*Improving the business environment* is a factor addressed to the local and national governments. CIs are improving working conditions for firms in two ways. First, an improvement of the physical infrastructure provides a competitive advantage for all cluster participants. Second, the legal environment and public institutions created by the local and national governments offer temporary additional support for the cluster formation process. Therefore, the CIs work closely with the local government to provide the best environment for its firms. It is not unusual to see CIs that are created by local governments to improve the local economic situation.

According to Sölvell et al. CIs are directed at least one of these six goals. Through the goals, CIs improve the competitiveness of clusters and stimulate local economic growth, but they have to be shaped to their particular environments to succeed. CIs are most efficient in service and technology clusters because these clusters have a high demand for innovation and information transfer that can only be created by a strong collaboration between private industry, government, and academic institutions. Moreover, CIs are most efficient in already developed clusters because they increase the benefits of the existing economic structure. CIs are a “Turbo” for a highly developed economic cluster.
The six main goals of CIs were illustrated by Sölvell et al. improving competitiveness and cluster growth. They argue that CIs are most reasonable and efficient for service and technology clusters in highly developed economic clusters. CIs provide governments and industrial agglomerations an appropriate tool to improve their local economy and initiate further economic growth and stability.

Location theory by Weber (1929)

An early model of modern location theory is described by Alfred Weber (1929). According to his theory, it is possible to determine the optimal location by minimizing the costs. Weber set up a mathematical model making it possible to determine the optimal production location. His model includes input factors such as labor costs, raw material, and transportation costs. To illustrate the minimization problem of firms for input factors and transportation costs, he used a “location triangle” (Figure 2). “C1” and “C2” represent raw materials transported to the production facility “P.” “M” symbolizes the product market. Weber assumes constant transportation costs per unit of distance. Furthermore, he assumes that labor becomes more expensive the closer it is to the product market “M.” With support of these assumptions it is possible to determine the optimal production location “P” which minimizes the costs.
Figure 2: Weber’s (1929) location triangle

Figure 2.1 presents the basic model by Weber in which the firm chooses its location decision according to the input costs, labor costs, and transportation costs. The distances from “C1” to “P” and from “C2” to “P” show the transportation costs of the raw material. The distance from “P” to “M” represents the labor costs. The farther the production “P” is away from the market “M” the cheaper the labor. However, the transportation costs, presented by the distance from “P” to “M,” are increased. In Figure 2.2 the firm is faced with increased labor costs caused by increased competition or the beginning clustering process. Increased labor costs force the firm to relocate their production facility farther away from the market “M” causing higher transportation costs. However, the firm also benefits from decreased labor costs. Overall, the firm would still make less profit than in the original situation, but the new location would minimize these additional costs.

In Figure 2.3 the firm is faced with an increased price of raw material “C1.” The firm is replacing “C1” with “W,” which has higher transportation costs; the distance from
“W” to “M” is longer than from “C1” to “M.” Due to the higher transportation costs of “C1” compared to “W,” the location decision moves closer to the product market.

The steel industry of the Ruhrgebiet in Germany provides an example. Here the main input factors are labor, iron ore, and coal. In the beginning of the 19th century, the Ruhrgebiet was a highly populated region, making a large labor force available. Additionally, the Ruhrgebiet had a widespread infrastructure of channels and rivers offering adequate transportation costs. The region had abundant brown coal resources that were the most important input factor for industrial production. The Ruhrgebiet developed as a cluster famous for its steel and coal industry. However, in the middle of the 20th century coal became more and more costly due to the increased demand and consumption. Consequently, firms replaced coal from the Ruhrgebiet with coal from America or China. The example of Germany shows that the market moved to the production facility and not vice versa. The closeness of the production facility to the market and the cheap transportation costs prevented a movement of the production facility.

The application of Weber’s location theory explains the horizontal agglomeration of firms and direct competitors seeking to minimize their costs. Firms with similar products choose the same production location. This location decision is important for labor and transportation intensive industries. Furthermore, Weber’s location theory explains the vertical conglomeration of supporting and related industries to decrease transportation costs. The horizontal and vertical settlement of firms leads to a cluster development. However, there are trade-offs that increase the production costs and lead to de-clustering.

As a result, Weber’s model covers important effects of cluster theory. Furthermore, it satisfies observed clustering in the early industrialization of nations and regions.
However, it is not able to clarify the already mentioned effects of information transfer, skilled labor, access to the capital market, and the governmental role of today’s clusters.

Therefore, Weber’s location theory needs to be expanded to illustrate the effects of these factors. Authors such as Malmberg, Sölvell, and Zander (1996) and McCann and Sheppard (2003) provide additional knowledge for today’s clusters. Malmberg et al. (1996) and McCann et al. (2003) noticed in today’s world of high factor mobility such as labor, capital, goods, services, and information, location decisions of firms have become secondary. The high factor mobility provides an enhanced set of locations for firms without respecting these mobile inputs. Moreover, with the ongoing globalization clusters should lose importance. However, Malberg et al. (1996) noticed an increased cluster process. They found, there are still reasons for spatial clustering of industries and firms. The majority of the world production comes from highly developed industrial clusters. Furthermore, there is an increased interest of supporting and related industries to co-locate in these clusters. They determined the main driving force for this agglomeration process is not the concept of minimized transportation and labor costs as described by Weber (1929). According to Malmberg et al. (1996) the main driver is the know-how accumulation within a cluster. In service and technology clusters the know-how accumulation provides firms essential basic inputs such as skilled labor, information transfer, and common laws. This know-how guarantees the required innovation for service and technology clusters. Malberg et al. noticed today’s spatial clustering still plays an important role for economic development. However, the reasons changed from cost minimization to knowledge accumulation. The authors also identified limits of perfect competition and constant returns caused by factors, such as face-to-face interactions, information transfer, and know-how accumulation. In the following paragraph these three factors are explained.
The best know-how transfer is face-to-face interaction that results from spatial clustering. Second, the distribution of knowledge loses power by distance. This means, the environment sets natural borders such as language and law. Finally, clusters create and attract new knowledge generating its highest effect in the initial point of the cluster. As a result, transportation and labor costs play a secondary role in today’s economic location decision. It has been replaced by today’s dominant factors of knowledge accumulation.

Geography and trade by Krugman (1991)

According to Krugman (1991), economic geography is the location of production in space or the part of economic thinking that is concerned with where things happen in relationship to one another. The geographic concentration of production is clear evidence of increasing returns. Therefore, to explain economic location decisions leading to industrial agglomerations, it is important to disregard constant returns and perfect competition. In addition to increasing returns, Krugman identified several reasons for geographic concentration such as multiple equilibriums, history, accident, and self-fulfilling prophecy.

As an example illustrating the effect of these factors of economic activity in space, he chose the case of the US Manufacturing Belt, a small part of the Northeast and Eastern part of the Mid-west. This belt took shape in the second half of the nineteenth century. By 1900 it contained 74 percent of the country’s industrial employment which only slightly decreased by 1957 to 64 percent (p.12). The small change in industrial employment shows that there must be a reason for the remaining high manufacturer concentration which is not linked to natural resources. The established existence of the Manufacturing Belt was reason enough. Moreover, because of the great industrial employment number it also established the region as the country’s main agricultural center. Once the belt had been created, it was
not in the interest of any individual producer to move out of it. During the second half of the 19th century, after new land and new resources in the West were discovered and the initial advantage had shifted, the internal demand of the established manufacturing areas were strong enough to keep the manufacturing core intact. Part of the initial advantage of the manufacturing belt arose from the first railroad lines between the Great Lakes and the East Coast. These railroad lines supplied low transportation costs and basic infrastructure to the region.

*Increasing returns* affect economic geography at many scales and is responsible for the uneven economic development of whole regions. Increasing returns have been responsible for uneven economic development in the belt because of the lower transportation costs by the railroad and the Manufacturing Belt’s increasing demand. In Krugman’s model each manufacturer wants to serve the national market from a single location. The firm chooses a location with large regional demand to minimize transportation costs; this again is largely where the majority of the manufactures are located. Hence, once created, after the initial advantage had shifted, the belt remained the manufacturing and agricultural center.

*Multiple equilibriums* can occur, if two separate markets develop a certain independent demand. Krugman shows a multiple equilibrium example of East and West. If the concentration of production is in the East each firm would want to be located in the East, serving the market in the West from the East and vice versa. However, if both markets develop a strong enough independent demand, the firm would serve the two markets from two locations. As a result, multiple equilibriums could occur.

The role of *history* and *accident* in the location of production is apparent for all economic agglomerations. Since the immigration of labor took place through the East and
the British colonies, the historical movement of labor is the crucial reason for manufacturing location. Today one third of the US population still lives in the original colonies. Other agglomeration processes follow a similar process so that the appearance of clusters can be explained by the first-come first-serve advantage. These clusters exist because of their history and sometimes sheer luck.

*Self-fulfilling prophecies* also play an important role in explaining geographic concentration. Suppose the East initially offers better economic conditions. Thus, geographic concentration should occur in the East. However, if people are convinced the West is the future market because they expect other people to settle there, then people would move to the West. For example the discovery of gold in California convinced people to move to the West even if they did not have the incentive to search for gold. The fact that other people are expected to move there was reason enough. Therefore, the economic development of the West was not limited to gold. After the region achieved a certain population, the economy became self-supporting according to the high demand and growth rates. In this case the expectations of people became self-fulfilling leading to geographic concentration on the West Coast. Several conditions are required for self-fulfilling prophecies: the movement to the region must be easy and fast, there are increasing returns within the region, and the region should not be completely underdeveloped compared to other regions.

Krugman also determined the advantages of *localization*. As already mentioned localization often depends on trivial historical accidents. According to Marshall (1920) and Krugman (1991) provides three individual reasons for localization. Firstly, *labor market pooling* benefits employers and workers. Workers profit by not being dependent on one employer, and firms benefit from a sufficient amount of qualified workers. Therefore,
multiple firms of the same industry create a superior market by pooling qualified workers. On the other hand, single firms have to deal with less qualified market, but also have less competition in the market. Consequently, workers and firms benefit from the clustering process by higher salaries and highly qualified labor force. Secondly, the sharing of specific inputs allows firms to get access to more variety and lower costs. Thirdly, know-how and information flows more easily locally than over great distances. The co-location generates spillover effects and increasing returns.

Krugman also identifies intermediate inputs. A localized industry does not follow a strict hierarchy of producers, suppliers, and sub-suppliers. Localized industries exist of producers that are also suppliers to other producers and vice versa. This effect is also called the “whirlpool effect.” Additionally, when intermediate inputs provide significantly lower transport costs, then final products clustering is efficient. For these two reasons intermediate inputs play a significant role in industrial concentration.

Furthermore, Krugman distinguished between the roles of regions and nations and in geographic concentration. He concludes that a nation is not a region or a single location. National policies affect the price inputs with tariffs or subsidies. Today’s world trade of goods is fairly free, but labor mobility is far less free. Additionally, there exist natural borders such as language and geography. Krugman explains the role of nations and regions by comparing European nations to US regions. National barriers prevent single nations from developing a complete specialization. Although the US is a homogenous society, there is a high degree of regional specialization. With decreasing transportation costs the American market was able to develop highly specialized regions with manufacturing in the Mid-west and agriculture in the South. However, this was not the case in Europe because of tariffs and national independence. On the other hand, as the example of the well-diversified
Porter’s competitive diamond and the case of Dubai

The economies of European countries show, temporary tariffs can also be useful, especially during the establishment of an industry until it is competitive with higher developed regions. Consequently, each European nation has essential industries such as agriculture or automotive within its nation and serves its domestic market.

Thus, Krugman provides plausible explanations of geographic concentration. The concept of increasing returns is crucial in this respect. However, he does not describe how these factors interact with each other such as Porter (1998). Furthermore, he does not supply any solutions, techniques, or tools to direct geographic concentration, in order to increase economic growth.

Summary

Studies summarized above comprise the core elements of cluster theory. Using that literature, it is possible to explain today’s clustering process according to competitiveness, location, geography, and cluster initiatives. The four studies agree and overlap on several points and serve as a base for this paper. Moreover, the authors determine location decisions as a function of costs, inputs, demand, and competition and examine the resulting interaction of firms in clusters in horizontal and vertical dimension. In each case, however, there are lacunae-certain clustering phenomena remain unexplained.

In the following part six clusters are analyzed. Furthermore, this study employs Porter’s (1998) competitive diamond. With support of the six clusters and their examination, it is possible to demonstrate the strengths and the weaknesses of Porter’s diamond. In chapter two this study provides an analysis of these six clusters and identifies the unique characteristic of each.
IT cluster and financial clusters have been important factors in economic growth. To illustrate the range of successful cluster formations, six economic centers were selected. All six clusters are well-known examples for both the information technology (IT) sector and the financial sector. For the IT sector, Silicon Valley is the role model and most famous IT cluster. The Indian Silicon Valley, Bangalore, is examined as well as Israel’s Silicon Wadi. Both clusters represent a significant part of their economy and are well-known for their economic growth. For the financial clusters I selected Toronto, London, and Hong Kong. Toronto symbolizes Canada’s financial services cluster and has a unique meaning for the North American region. London is the second biggest financial market in the world and the most important for Europe. The third example, Hong Kong, represents the most important Asian financial market.

IT cluster

The IT sector is a typical focus for local and regional cluster formation and is a main driver of economic growth. Furthermore, the role of IT clusters in modern economies is growing.

Silicon Valley

To understand IT clustering, it is essential to understand the rise of Silicon Valley. Bersnaha and Gambardella (2004) discuss the case of Silicon Valley in their book. Bersnaha et al. found that in a cluster companies find easy access to capital. It is easy for venture capitalists or bankers to locate new investment opportunities. The universities at Stanford and Berkeley have been able to apply their research in commercial activities. The firms of Silicon Valley compete and benefit from a well-educated labor supply, managers,
capital allocation, and other sharable inputs. Bresnaha et al. discovered that technical
innovations flow more rapidly through the cluster of Silicon Valley than elsewhere. By
providing infrastructure and legal support the local and national government supported the
firms of Silicon Valley. According to the authors, these factors are responsible for the
success of Silicon Valley which has supported continuous regional growth over the last two
decades.

Bangalore, India

The second example given by Bresnaha et al. (2004) is Bangalore, India. In general,
they found Bangalore had characteristics similar to Silicon Valley. In recent years India
became a more notable global player and its economy gained in importance. Consequently,
the IT cluster of Bangalore is well-known for its rapid growth and development over the
past ten years. The cluster process of Bangalore is also driven by the access to the capital
market, easy access to the labor market, and sharable inputs. The large and well-educated
labor market for the IT sector is the biggest strength of India’s IT cluster. Bangalore is
highly competitive regarding labor costs and provides a low cost location for the foreign IT
industry from the US and Europe. However, Bresnaha et al. also indentified some
significant differences from Silicon Valley. Bangalore has not been able to establish an
independent innovation sector yet. Furthermore, there is only a small domestic IT market in
India, which makes Bangalore dependent on foreign demand and standards. Therefore, the
cluster is susceptible to external shocks. India has problems in the provision of appropriate
legal environment. Corruption and undefined legal rights inhibit greater domestic and
foreign investments. Furthermore, the underdevelopment infrastructure and the fast
growing population causing additional problems which the government still has not solved.
Silicon Wadi, Israel

Bresnaha et al. describe Israel’s IT cluster, Silicon Wadi. It provides the typical characteristics of an IT cluster such as high numbers of academics available in the IT labor market. The government puts a lot of resources into research, development, and English language education. In addition, the Israeli economy is strongly supported by US demand. However, industrial and agricultural development opportunities are missing in the country. The development of the IT sector is a result of comparative advantage. The lack of economic development possibilities in heavy industry forces Israel to focus on the service industry such as the IT sector. Consequently, Israel’s IT cluster developed due to the country’s small size, the high human capital, its relationship to the US, and the comparative advantage. These three IT clusters already provide many of the classic characteristics of an economic concentration process.

Financial clusters

For this study three financial clusters were examined, which differ significantly in their development from IT clusters. As already mentioned, three financial clusters, Toronto, London, and Hong Kong, are examined. Financial clusters in general have a longer history than IT clusters and therefore provide another point of view and a deeper insight to the cluster formation process.

Toronto

Toronto is the third largest financial service cluster in North America behind New York and Chicago. The five most important national banks and Canada’s largest stock exchange, the Toronto Stock Exchange (TSX), are located in the city. The financial service sector is in Toronto the most essential part of the economy. Milway, Nisar, Poole, and Wang (2007) explain the main reasons for the success of Toronto’s financial cluster. One of
The main drivers is enhanced credibility due to location within a cluster. Credibility is one of the most important characteristics which a financial institution requires to attract clients. This certain credibility can only be produced in a concentration of financial service institutions because banks are embedded in a financial service cluster, and therefore, part of the financial cycle. Toronto provides the local access to the international financial market to Canada. Milway et al. (2007) also identified some other important factors such as easy access to highly educated labor, accelerated innovation because of competition, and the attraction of clients. Additionally, Canada’s regional and national government provides a well-developed infrastructure, legal stability, and appropriate regulation, for the highly developed financial market. These factors allow the highly developed financial cluster to provide economic growth and stability to Toronto and Canada.

London

London is the largest British metropolis and the country’s financial center. Furthermore, London is the junction between the North American and European financial market and is well-known historically for its banking system. It is the world’s oldest financial market place and is Europe’s biggest financial cluster. Cook, Panit, Beaverstock, Taylor, and Pain (2004) used a questionnaire and interview survey of 1,500 financial service companies to determine banks’ location decisions. As a main reason for the location of a financial service company in London, the authors found that a financial institution that wants to be a global player has to be located in London. Furthermore, they determined that London benefits from the strong, skilled labor market and from the closeness to its customers. Cook et al. found that companies benefit significantly from being close to leading competitors. They also found out that the support of the local and national government and the access to capital plays an important role. Since Great Britain’s capital
market is not regulated heavily and capital inflow is not subject to significant hurdles, London provides an ideal location for the financial industry. For investment companies, such as hedge funds, banks, and financial consultants, it is essential to be located in London because of the legal environment and the easy access to capital. However, they show the high real estate prices are causing de-clustering: companies are trying to relocate services, which are not necessarily needed in the city, such as back office support or IT service, outside London.

Hong Kong

Hong Kong represents Asia’s largest financial center. It has the most important stock exchange in Asia, measured by market capitalization. It is the third largest financial cluster in the world. Porter and Ketels (2008) explain the historical development of Hong Kong as a financial cluster. Hong Kong was a trading port in the 19th century and established itself early as a regional financial center focusing on trade, shipping, finance, insurance, and deposit taker. Under the British administration, Hong Kong was able to create an effective framework for a functioning market economy. Endowed with private property and contractual rights, low regulation on trade, and money transactions, Hong Kong was already a successful financial center under the British administration. After the return of Hong Kong to the People’s Republic of China in 1997, it was perfectly positioned to serve as a financial intermediary between international investors and China’s growing economy. To protect Hong Kong and its unique international position as a financial cluster, China preserved Hong Kong’s economic independence and created the free trade area. Its unique position made Hong Kong attractive for foreign capital. For international investors, it was possible to invest into the Chinese market under the protection of secure property rights and an established economic administration. These factors make Hong Kong the
most attractive financial center in Asia. Porter et al. (2008) determined that the legal situation, the historical development of Hong Kong, and the easy access to the growing economy of China are the main reasons for the success of Hong Kong’s financial cluster.
CHAPTER THREE. CLUSTER CHARACTERISTICS

The previous studies provided enough information to determine nine important characteristics responsible for the cluster formation process. The six clusters show that a clustering process is a combination of certain preconditions. Each cluster requires a different combination of these cluster characteristics which are responsible in each case. Every successful cluster formation has to provide at least some of these characteristics. However, Weber’s (1929) concept of cost minimization finds no approval in today’s service and technology clusters. Today’s clusters are characterized by face-to-face interaction and Krugman’s (1991) increasing-return-to-scale concept. In the following section, nine characteristics are illustrated and explained:

The nine classic cluster characteristics

**Easy access to highly skilled labor market:** The six reviewed clusters provide this characteristic. Easy and sufficient access to a highly skilled labor market is an essential part of a cluster formation and can be observed in every agglomeration process.

**Easy access to the capital market:** For entrepreneurs, it is important to have access to the capital market. A cluster presents an optimal opportunity to locate worthwhile investments for venture capitalists and investment bankers. Easy access to the capital market is essential for the examined clusters, especially Silicon Valley.

**The advantage of close proximity to clients:** A cluster offers a unique opportunity for clients to identify an appropriate service provider. Therefore, a cluster minimizes additional costs for research and negotiation. This effect can be identified in all six clusters.

**Benefit from the credibility within the cluster:** The fact that companies are located in a cluster next to direct competitors enhances its credibility and signals to their clients that
the companies are operating in a successful environment. The cluster’s image carries over to the individual companies. This is a dominant factor in financial clusters. Since banks in a cluster lend to each other, they identify each other as liquid. The lending creates a cycle of trust, which increases the cluster’s credibility. In an industry dependent on the trust of investors-banks especially rely on trust in their liquidity, and therefore, benefit from the cluster’s image, which is essential for the investors’ decisions.

**Benefit from proximity to competitors:** Competition accelerates the innovation process. Firms’ competition, information flow, and fluctuation of employees increase rivalry and results in increased productivity. This characteristic can be observed in all six clusters. However, in highly developed clusters such as Silicon Valley and London the characteristic is more apparent than in smaller clusters such as Silicon Wadi and Toronto.

**Knowledge transfer from cluster atmosphere and density:** Employee fluctuation, innovation, and short distances create a constant knowledge transfer between the cluster participants. In Hong Kong where the distances are short and no employment is available outside the cluster.

**Stable legal situation and supporting public institutions:** For a cluster formation certain legal preconditions have to exist to support the agglomeration process. This support is well-illustrated in the case of Silicon Valley and Hong Kong. For Silicon Valley, the proximity of Stanford and Berkeley provide excellent support for the cluster by generating a highly educated labor force. Furthermore, the institutions provide a sufficient place to create innovation that can be easily implemented in new businesses of the cluster.

**Benefit from proximity to customers:** This characteristic is important for the production and transportation process. It decreases transportation costs and increases the communication between companies and clients. Additionally, it creates social capital. The
high number of social contacts increases the productivity of individuals and companies in the cluster.

**Benefit from historical development and accident:** Some clusters are driven by the first-come-first-serve advantage and the first-mover-advantage. For old-established clusters there is often no other explanation than pure luck. For example, a first company settles and other ones only settle because of the co-location advantage provided by first company. However, IT clusters can often be explained by a concentrated effort of the government. Financial clusters are more likely to be subject of old-established development and accident.

An example for historical development is Toronto. It was favored as the Canadian financial cluster because Montreal was a former French colony and therefore had less access to the North American market than the British-colonized Toronto. Furthermore, other cities were not considered because they were too small or less conveniently located than Toronto. Consequently, Toronto was the only potential candidate to establish a Canadian financial cluster.

For Great Britain, London has been a financial center since the foundation of the British Empire and provides with the Bank of England the oldest financial system, which explains London’s importance in the international capital market.

The historical development under the British authority provided Hong Kong and China a competitive advantage against regional competitors such as Shanghai and Singapore. Hong Kong was in favor of China because of its existing legal structure and its excellent access to the financial markets. These factors gave Hong Kong a first-come-first-serve advantage over its regional competitors.
Characteristics of an IT cluster

In this section the characteristics of an IT cluster are identified. The important characteristics driving the success of any IT cluster are *easy access to a highly skilled labor market*, *easy access to the capital market*, *benefit from proximity to competitors*, *knowledge transfer from cluster atmosphere and density*, and *stable legal situation and supporting public institutions*. The basic example for IT clusters unifies at least these five characteristics in order to be successful. The examined clusters, Silicon Valley, Bangalore, and Silicon Wadi, provide all these five characteristics. Silicon Valley provides higher developed characteristics compared to Bangalore and Silicon Wadi which explains Silicon Valley’s success.

Characteristics of a financial cluster

In this section the characteristics of a financial cluster are identified. The characteristics which are responsible for the success of any financial cluster are *benefit from the credibility within a cluster*, *benefit from historical development and accident*, *stable legal situation and supporting public institutions*, *knowledge transfer from cluster atmosphere and density*, *easy access to a highly skilled labor market*, *easy access to capital*, and *benefit from proximity to competitors*.

This comparison of the three financial clusters Toronto, London, and Hong Kong shows different clusters have different dominant characteristics. A shared set of essential characteristics are responsible for a financial cluster’s success. The historical examples of London and Hong Kong show that the same characteristics may have different historical causes. Consequently, London and Toronto are clusters driven, first, by their credibility and, second, by their historical development. On the other hand, Hong Kong’s cluster success is a result of its unique historical development.
Summary

This chapter examined six clusters in two different sectors. Furthermore, it identified nine classic characteristics of a cluster formation process: easy access to a highly skilled labor market, easy access to the capital market, the benefit from proximity to competitors, knowledge transfer from cluster atmosphere and density, benefit from the credibility within a cluster, the advantage of close proximity to clients, benefit from proximity to competitors, benefit from historical development and accident, and stable legal situation and supporting public institutions.

This chapter identified the dominant characteristics for successful cluster formations in the IT and financial sector. This comparison between the two cluster types shows that common characteristics exist, but for IT clustering easy access to highly skilled labor market and the easy access to the capital markets are most important, whereas financial clusters benefit from their credibility within a cluster, historical development and accident, and the legal situation. Moreover, this chapter noted that the high developed characteristics access to the capital market, the highly skilled labor market, and the close interaction with the Universities of Stanford and Berkeley explain the success of Silicon Valley and result in Silicon Valley’s accelerated innovation process. It also shows that the clustering process in Bangalore is driven by cheap labor supply and foreign IT demand. Furthermore, the reasons for the development of financial clusters are demonstrated by the examples of Toronto, London, and Hong Kong. The dominant characteristics in the three cases were the credibility, historical development, and the legal environment.
CHAPTER FOUR. HOW DOES PORTER’S COMPETITIVE DIAMOND WORK?

In this chapter, the six clusters discussed earlier function as examples to illustrate Porter’s (1998) competitive diamond. In chapter one (pp. 3-7) Porter’s model consists of four components, related and supporting industries, factor conditions, firm strategy, structure and rivalry, and demand conditions, interacting in the shape of a diamond. With support of his diamond, it is possible to determine the strengths and weaknesses of a cluster. Furthermore, the model attempts to identify the driving forces of the cluster formation process.

How does the competitive diamond work?

Porter’s (1998) diamond can be applied to analyze a cluster and its competitive advantage according to its four components. His concept can be used to determine the way the four components interact and create a cluster’s competitive advantage. According to Porter, if one of the four components is sufficiently high developed, it will force the other three components to grow. For instance, if a cluster is endowed with sufficient input factors, such as infrastructure and skilled labor, these factors will stimulate the development of the other three components. Consequently, the whole cluster improves and develops a competitive advantage. In the following section, this process is illustrated at the six previous mentioned clusters. The application of Porter’s diamond shows that each of the four components can be the driving force of the cluster. Furthermore, it is shown that the driving force component creates a spillover for the remaining three components.

Silicon Valley

Factor conditions: Silicon Valley has been endowed with excellent factor conditions. The skilled labor provided by the universities in Stanford and Berkeley, the
well-developed infrastructure, and the access to the stock market have provided Silicon Valley’s entrepreneurs with the required high inputs for a successful IT cluster.

**Firm strategy, structure, and rivalry:** The high level of human capital caused an ongoing spillover effect by founding new businesses which increased the rivalry in the cluster and the diversification of the business structure. This effect is illustrated by the beginning of Silicon Valley’s development described by Bresnaha et al. (2004). As a result, of the failure to manage the employees’ individual research at Shockley Semiconductor, the first commercial research institute of Silicon Valley, eight engineers left the company to found their own successful business (Bresnaha et al., 2004). Gordon E. Moore, the co-founder of Intel, is probably the most famous of these eight engineers.

**Related and supporting industries:** The spillover effect also creates related and supporting industries. This spillover effect continues until today and is responsible for the success of Silicon Valley in competition and diversification.

**Demand condition:** Ongoing technical progress increased customers’ expectations of high quality and low costs. Since 1965 the semiconductor industry has been able to double the number of transitions every two years, Moore’s law. The historical development increased the customers’ expectations, which forced producers to increase innovation and led to increased R&D effort. The factor conditions such as human capital, access to the capital market, and infrastructure significantly stimulated the other three components and resulted in the development of Silicon Valley’s IT cluster.

Bangalore, India

**Demand conditions:** The increased demand in the IT sector from the US and Europe forced the IT industry to discover new facilities for time intense labor. This had significant impact on Bangalore. The domestic demand was insufficient to establish a
cluster independent of foreign demand. However, according to the fast growing Indian economy, Bangalore established its importance for India.

**Input conditions:** Bangalore’s low wages attract foreign investment. The Indian labor market provides sufficient well-educated labor proficient in English and information technology. However, India and Bangalore lack an adequate infrastructure, which still is in the developing phase.

**Firm strategy, structure, and rivalry:** Large foreign IT companies dominate Bangalore’s IT cluster and crowd domestic IT companies out of the market. There is a lack of domestic competitors which weakens the competitiveness of Bangalore’s cluster.

**Related and supporting industries:** Neither related nor supporting industries are developed yet and have no important meaning to Bangalore’s IT cluster. However, the cluster growth attracts national as well as foreign investments, which may be important for the cluster’s future.

Consequently, compared to Silicon Valley, Bangalore is a minor developed IT cluster which lacks an autonomous innovation process. It is highly dependent on foreign demand and therefore subject to external shocks. However, the fact that India’s boom is imminent and the great supply of highly skilled labor illustrates the potential of the Bangalore’s IT cluster.

Silicon Wadi, Israel

**Demand conditions:** Israel has benefited from the high foreign demand. Silicon Wadi cluster’s success is subject to high demand from the US, which prefers to do certain projects in Israel, due to superior property and patent rights, compared to other developing clusters, such as Bangalore.
**Firm strategy, structure, and rivalry:** The government supports the IT industry with high R&D spending which provides firms an optimal environment. This structure improves Israel’s situation compared to developing countries such as India. However, the small size of the cluster allows only limited rivalry and low innovation.

**Factor conditions:** Israel has a skilled, well-educated population with a high English proficiency. It has a developed infrastructure sufficient to serve the needs of an IT cluster and academic institutions provide an appropriate environment for an IT cluster. However, the political situation also represents risks for Israel’s future economic development.

**Related and supporting industries:** The non-existing related and supporting industries are Silicon Wadi’s greatest weakness. There are no related or supporting industries. Moreover, there are rarely any possibilities for the development of other industries.

As a result, Silicon Wadi is a moderate developed IT cluster, which earned its success because of its highly skilled population. The cluster is like Bangalore highly dependent on foreign demand and, compared to India, has only limited future developing possibilities.

**Toronto**

**Firm strategy, structure, and rivalry:** Toronto’s historical development and location results in the city’s unique position as a financial center. The access to the North American financial centers provides Toronto’s firms the required structure. Toronto’s connections to the US provide more investment possibilities and therefore an increased set of strategies. Furthermore, compared to other countries, Canada requires high reserves by law. These required reserves change the strategy of Toronto’s financial institutions and
protect the cluster against external shocks. As a result, Canadian financial institutions prefer Toronto to its national competitors Montreal and Vancouver increasing the rivalry the in cluster.

**Factor conditions:** Toronto’s financial cluster is skilled with high human capital, appropriate infrastructure, and regional support.

**Demand conditions:** Canada has a high demand for international investment. The financial cluster is essential for the country to coordinate capital inflows and outflows. Toronto is Canada’s financial cluster which serves these needs the best.

**Related and supporting industries:** Toronto’s cluster is highly specialized in finance and serves the country’s investment demand through close cooperation with Canadian industry. The financial cluster provides broad domestic and international diversification of financial institutions.

As a result, Toronto provides Canada’s access to the international capital market and ranks third behind Chicago and New York in the North American financial market. However, the legal limitations refuse a greater success but also protect its independence. Toronto’s financial cluster is created to serve Canada and its domestic market with appropriate financing opportunities.

**London**

**Factor conditions:** London is endowed with a highly specialized financial labor market. London’s cluster provides important infrastructure and is strongly supported by the government with low regulation. Furthermore, the cluster’s cooperation with academic institutions is excellent.

**Firm strategy, structure, and rivalry:** The low level of regulation makes London attractive for foreign investment. London serves as a conjunction of the North American
and European financial markets. This structure provides financial institutions an optimal environment to operate and therefore increases rivalry in the cluster.

**Demand conditions:** London not only serves Great Britain’s demand for capital. It is the leading financial center for Europe and provides connections to global financial centers. London claims to be the leading financial center. The introduction of new investment vehicles attracts customers and increases the demand of London’s investment products.

**Related and supporting industries:** In the case of London, no related and supporting industries exist. London’s economy relies on its financial competitive advantage. As with Toronto, there is domestic industry which is served by the cluster. However, compared to the size of London’s financial cluster these industries are insignificant. The missing economical diversification makes London vulnerable to financial crises and external shocks without any protection. The current financial crisis confirms this situation. The lack of tax revenues from the financial industry caused the biggest governmental deficit since World War II.

Consequently, London presents a highly developed financial cluster with all its advantages and disadvantages. London’s cluster is responsible for the economic boom the country experienced in “before-financial-crisis” years. However, London’s financial cluster also is responsible for the country’s economic problems.

**Hong Kong**

**Factor conditions:** Hong Kong achieved its competitive advantage by its legal designation as a free trade area. It has skilled labor with a highly educated population proficient in English and trading. Moreover, the city has a highly developed infrastructure and unique access to the Chinese market.
**Firm strategy, structure, and rivalry**: These conditions offer investors more investment possibilities, which represent a greater set of investment strategies and improves competition.

**Related and supporting industries**: As a traditional trade port, Hong Kong is endowed with a second successful industry, which also supports and demands high investments through the financial market. However, these two highly specialized sectors are the only two industries of Hong Kong’s cluster.

**Demand conditions**: With the rise of China Hong Kong’s financial cluster has gained in importance. The demand has been boosted by the rapidly growing Chinese economy and its demand for capital.

As a result, Hong Kong’s financial cluster is highly competitive and is expanding its position on the international market. Shanghai’s financial cluster represents a growing domestic competitor, which is preferred by Chinese investors, gaining in international importance, and grows fast because of the Chinese economy.

**Summary**

In this chapter, three IT and financial clusters were analyzed using Porter’s (1998) competitive diamond. For financial clusters Porter’s (1998) diamond are inaccurate and misleading. In particular, the importance of high credibility, image, historical development, and accident are underestimated by Porter and do not figure in any of by the four components. Porter’s concept is only limited useful for cluster development and also bears potential drawbacks and risks. For example, some legal situations provide significant advantages, but also make a cluster more dependent and vulnerable to uncontrollable external shocks, such as London. Porter’s competitive diamond is an appropriate tool to analyze cluster formations, and it illustrates the developing process of a cluster. These facts
qualify Porter’s concept as an instrument for developed cluster analysis, but not for cluster development. The competitive diamond works well for the analysis of technology clusters, such as Silicon Valley, Bangalore, and Silicon Wadi. As already mentioned, Porter’s diamond lacks in the determination of risks. For emerging and financial clusters his concept illustrates development possibilities, but conceals future risks and problems. Therefore, the application of Porter’s concept is only appropriate under a due diligence. In the following chapter the drawbacks of Porter’s competitive diamond are illustrated in the case of Dubai’s emerging financial cluster.
CHAPTER FIVE. THE CASE OF DUBAI’S FINANCIAL CLUSTER

In this chapter Dubai’s development during the past decades is examined. It examines the role of Dubai as a financial cluster. To examine Dubai’s financial cluster two methods are applied. First, Porter’s (1998) competitive diamond is used to explain the actions Dubai took to transform its city from an underdeveloped desert state to an Arabian transport and financial center. The role of Dubai’s CI for the financial cluster development is analyzed. Second, Dubai is analyzed using the financial cluster characteristics developed in Chapter three.

The emerging cluster, Dubai

Dubai is a city state and one of seven Emirates of the United Arab Emirates (UAE). With its 2.2 million citizens, it is the largest state in the UAE. One fourth of the population is Arabian. According to Bhatti, Fung, Gavage, and Yoo (2006) approximately 90 percent of the UAE’s land mass is dessert and less than one percent is arable. The Gulf region and UAE are significantly dependent on oil and gas. However, Dubai is a small producer of natural resources and is expected to run out of oil in less than a decade. Consequently, Dubai’s government took actions to shift its economy away from oil to a modern economy dominated by trade, tourism, real estate, and finance. In the 70’s, based on the traditional trade hub, the emirate sought to become an international shipping center. The deep water port was the first established project supported by the authorities. As a second step, Dubai was able to establish its own airline, Emirate, which has become successful and is currently the third largest airline in the world. With the founding of the airline the first hotels were created. In 1997 The government decided to create the CI, Jumeirah group, with the goal of transforming Dubai into a tourist center for high-end hotels such as the only seven star
Porter’s competitive diamond and the case of Dubai

hotel, Burj Al Arab. With its extraordinary projects attracting tourists and celebrities, Dubai became attractive to international investors, who wanted to participate in the growing real estate market. As a consequence, Dubai’s real estate projects, such as “Palm Islands,” became very successful and increased Dubai’s housing demand. In 2008, “The World” followed and further projects were planned, which promised enormous returns and economic success. With the increased demand in capital for the real estate market, the need for an appropriate financial center grew. As a result, the Dubai International Financial Center (DIFC), a cluster initiative, was created to establish a financial cluster formation with the function of financing economic development.

The role models for Dubai’s rise are successful city states such as Hong Kong and Singapore. Both were early trade ports diversifying their economies by attracting foreign investment and later becoming financial centers. As with these two states, Dubai has a history as an important regional trade hub which provides a competitive advantage against its neighbors. Furthermore, Dubai’s comparatively liberal attitude in social and economic policy attracts Western investments and employees. Stability in an unstable region makes Dubai favorable for investment compared to other Arabian states in the region. Dubai is short on natural resources, which explains the government’s increased effort to develop other economic strengths. However, Dubai is facing several risks regarding its growth and future goal as an Asian-European financial connection.

Dubai has a dearth of local human capital and the low education level forces the fast growing economy to attract highly skilled foreign labor. The real estate boom and the missing labor force generate the import of low skilled foreign labor, mainly from Pakistan and India. The improvement of human capital is one of the main challenges Dubai is confronted with. On the other hand, the achieved economic progress compared to its
neighbors makes Dubai more independent of oil and provides an economic future not dependent on the export of natural resources. However, the establishment of a financial service cluster creates future challenges in the labor market.

Dubai’s cluster initiative

The name of Dubai’s cluster initiative is Dubai International Financial Centre (DIFC) which manages Dubai’s capital market and the free-trade zone. The CI’s goal is to stimulate regional economic growth, development, and diversification. Furthermore, the DIFC is responsible for the creation of an investment framework meeting international standards and for the supply of crucial infrastructure. The actions of the CI attracted firms and Dubai became the leading focus of international investments, in Arabia. However, according to Bhatti et al. (2006) the economic boom is dependent on governmental infrastructure spending, the real estate boom, the growth in tourism, and consumer spending which is related to low interest rates and taxes. Moreover, to protect its financial service firms, the market is restricted for international banks, which provides a competitive advantage for Dubai’s banks in the short-run. In the long-run, it is a reasonable risk because of missing international competitors. Dubai’s high cluster initiative activity can be explained by first-mover-advantage. Since Bahrain was the first Arabian state opening its financial market, Dubai had to find a way to compensate for its delayed take off. By attracting companies through increased infrastructure, life style, growth, and profitability Dubai has become the dominant regional center for Arabian finance and ended Bahrain’s hegemony.

Dubai’s CI has applied all available know-how to strengthen its financial service cluster. However, for many economists Dubai’s economic policy is shortsighted in virtue of being only input oriented. Therefore, the question arises: “Is the emerging cluster
Porter’s competitive diamond and the case of Dubai

Porter’s competitive diamond and Dubai’s financial cluster

In this section Porter’s (1998) competitive diamond is applied to Dubai’s financial cluster. To illustrate the importance of the diamond’s role for Dubai Malty et al. (2007) quotes Saeed Al Muntafiq, CEO of Tatweer, which is a subsidiary of the Dubai Holding: “We have made Porter’s theory a reality.” This statement shows that the diamond plays a significant role in the minds of the Dubai’s cluster architects.

**Related and supporting industries:** As described above, Dubai consists of several industries such as trade, tourism, and real estate. Therefore, it seems reasonable to establish a financial cluster to serve these industries with sufficient capital. Dubai is a desert state and therefore has only limited possibilities for industrial development. For example, it is not feasible to create heavy industry. Thus, the state is limited to its existing industries and is not open for further diversification, which would strengthen the financial cluster’s position.

**Factor conditions:** The government promotes the financial cluster with its low interest rate and no tax policy. The authority invests heavily in the expansion of airport, harbor, roads, and entertainment. These actions attract foreign human capital to the region and result in an additional economic boost.

The expatriate inflow has a positive effect on the job market creating additional jobs, but also causes a trade off for domestic human capital and its underdevelopment. Well-known local academic institutions are missing, which might have provided the cluster with sufficient skilled human capital domestically. Another problem is that the subsidized interest rates and tax allow inefficient enterprises to stay too long in business increasing the development sustainable and not just an artificial result of abundant natural resources and governmental spending?”
risks of economic bubbles. Furthermore, the structural development in the city concentrates on roads, but not on public transportation. This can cause future problems for Dubai’s city center.

**Firm strategy, structure, and rivalry:** Dubai’s financial cluster structure is especially attractive to wealthy Arabian clientele. The Arabian investment possibilities enhance the set of investment strategies. Furthermore, the poor development of other regional financial clusters provides Dubai almost a monopoly in this sector. The astonishing speed for project realization is another advantage of Dubai. Furthermore, a liberal culture and openness to the West culture make Dubai attractive to expatriates. In addition, international financial institutions attracted by the DIFC, increased rivalry and opened the market for external investments.

**Demand conditions:** The wealthy region requires a financial cluster which provides various investment possibilities and supports the Arabian countries. The increased numbers of financial institutions improved the demand conditions through international standards and additional investment possibilities. The region’s high oil revenues have to be reinvested, preferably in the region. Dubai’s population is well-known for their high quality expectations and fast delivery requirements, which results in a high demand standard. However, the oil revenues are sometimes unprofitable invested.
In Figure 3 the advantages, italic and outside of the diamond, and disadvantages, inside of the diamond, of Dubai’s cluster are illustrated. Dubai’s unique position in the region, the high public investment, the low taxes, the subsidized interest rates, and high consumer spending led to rapid growth of the financial cluster. Dubai’s CI took action which supported further progress. On the other hand, the Porter’s diamond also identifies risks, but insufficiently for Dubai’s emerging financial cluster. The diamond has led the architects of Dubai’s financial cluster to a wrong conclusion, Dubai has done the most possible to strengthen its cluster and to achieve its competitive advantage as fast as feasible.

The nine characteristics and Dubai’s financial cluster

In this section Dubai’s financial cluster is examined with respect to the nine characteristics described in Chapter three.
**Easy access to highly skilled labor market:** Dubai lacks appropriate human capital and therefore is willing to pay high salaries to expatriates. As a result of the no tax policy, thousands of well-educated internationals came to the country. The real estate boom also attracted a great deal of unskilled construction worker, mainly from India and Pakistan.

Dubai faces the risk that the mobile, highly skilled workers may leave for opportunities elsewhere, whereas the low skilled workers, without such opportunities, are forced to stay. This effect can worsen the situation on the labor market and ethnic tensions can occur. Furthermore, important national academic research institutions crucial to developing domestic human capital are non-existent. As a result, Dubai does not have easy access to the labor market and is confronted with the risk that during a crisis the highly skilled population disappears whereas the low skilled labor will remain causing social tensions in the country.

**Easy access to the capital market:** Dubai, with its low interest rates and no tax policy provides excellent access to capital markets. Furthermore, Dubai and its neighboring states are well-endowed with financial capital. The low regulations expedite the initiation of projects. Additionally, Dubai offers sufficient access to the international financial market and has high capital inflows from Arabian states. However, these factors also cause potential problems. Speculation and fraud may go undetected. Moreover, unprofitable businesses can be approved without appropriate due diligence. In conclusion, an increased credit crunch risk exists in Dubai’s financial cluster.

**The advantage of close proximity to clients:** Dubai’s financial cluster is easy to indentify for its clients and is internationally well-known as a trade port and tourism center. Dubai plays an important role for its Arabian clients and connects domestic and international businesses.
Benefit from the high credibility within the cluster: With its high density of financial institutions, Dubai provides the required credibility in the Arabian region. However, the short cluster history and the immense support by the government create doubts with respect to future development. Since government spending is running out, it is difficult for financial institutions to predict Dubai’s financial future. Consequently, it is important for Dubai to achieve future credibility and trust. Investors fear that after the oil runs out, Dubai is confronted with the risk of regression, to its old economy. Furthermore, the extraordinary investment projects weaken the overall credibility of the cluster and a prestigious project failure such as “Palm Islands” or “The World” could cause sustainable image and credibility damage without recovery.

Benefit from proximity to competitors: Since the creation of the DIFC, Dubai’s regional banks are standing in competition with international rivals. International banks are still restricted in their actions. In the short-run, this benefits Dubai’s firms, but in the long-run, it weakens overall cluster competitiveness.

Knowledge transfer from cluster atmosphere and density: The cluster fulfills the requirements for knowledge transfer because it provides high density of financial institutions. Knowledge transfer possibilities exist through the flexible labor market and the high turnover rate of employees. However, the high level of expatriate labor means that know-how may come into the cluster and to leave the cluster without producing any spillover effects. Expatriates have beside the high salaries no additional incentive to stay and leave the cluster for better job opportunities.

Stable legal situation and supporting public institutions: Dubai provides a stable legal situation in an unstable region. This is one of its competitive advantages it has over local competitors. Moreover, government policy supports the local financial institutions.
On the other hand, the lack of democracy, transparency, and regulation results in uncertainty about the country’s future actions and incentives. The apparently stable legal situation might change quickly, if Dubai and its tourism industry becomes a target for terror attacks.

*Benefit from proximity to customers:* Dubai’s financial center provides credit for local industry such as the trade hub, tourism, and real estate. The fact that all these projects are located in Dubai offers a competitive advantage and economic growth compared to other Arabian regions. However, Dubai is its own best customer and therefore, it is not surprising that these industries are all located there.

Reasonable doubts remain that Dubai can afford to continue this artificial stimulation in the future. If not, the established financial cluster will be forced to shrink, collapse, or disappear.

*Benefit from historical development or accident:* Dubai went through a historical development as a trade hub, which is strategically well-located in the Gulf region. Based on this history, the goal of the authorities is to establish a financial center similar to the development of Hong Kong and Singapore. The financial cluster was deliberately created to achieve the leading financial position in the region and to establish an international financial link between Europe and Asia. Dubai’s short financial history provides significant disadvantages compared to international financial centers; however, it achieves a competitive advantage compared to its regional opponents.

Dubai’s financial cluster attained a regional competitive advantage in energy, real estate, and trade industry. These achievements as the emerging Arabian financial center come with certain costs and risks.
Risks and weaknesses of Dubai’s cluster

Regional political risk: Since Dubai is located in an unstable region with religious and political conflicts, its cluster is confronted with uncertainty. Terror attacks could harm Dubai’s tourism industry and consequently the financial cluster. Furthermore, the broad variety of religions could lead to social tensions. This weakens the cluster position compared to other financial centers.

High dependence on expatriate labor: Dubai’s cluster is highly dependent on expatriates who are not committed to the region. International employees are highly mobile and they will not hesitate to leave the cluster in the case of legal, political, or economic problems. Consequently, Dubai can easily lose its highly skilled labor.

The lack of domestic human capital: The labor market demand cannot be supplied domestically because of Dubai’s insufficient academic institutions. The authorities’ goal to establish English as business language is one drawback the domestic population is confronted with. The population did not achieve a proficient language level yet. On the other hand, English as business language is one of the reasons for the successful import of skilled labor.

Lack of transparency and uncertainty in CI actions: Low regulations with insufficient financial reporting and auditing standards exist. This makes financial institutions non-transparent. Furthermore, the CI’s future actions are unknown and poorly communicated to firms and the public.

High credit default risk: An increased credit default risk exists because of over-exposure and the lack of due diligence in the credit market. Along with the lack of transparency, this over-exposure causes unpredictable risks for Dubai’s financial market.
**Competitive risk from the region**: Not only did Dubai liberalize its market, also other Arabian countries, such as Qatar, Bahrain, and Saudi Arabia, have been open for international investments. The potential regional competition compromises Dubai’s position as leading financial cluster.

Summary

Porter’s (1998) competitive diamond model indentifies strengths and weaknesses of Dubai’s financial cluster. The diamond model serves as an appropriate concept for cluster analysis. Furthermore, it has been used for cluster growth and development. In the case of Dubai, the aggressive implementation of Porter’s concept with low interest rates, no taxes, and massive imported human capital causes also risks which can become serious problems. According to the diamond concept, emerging clusters should concentrate on the improvement of input factors and can then expect the other three components to progress as well. However, the diamond disregards risks and weaknesses which are caused by the input factor improvement itself. Emerging clusters are subject to external shocks. Thus, if the factor-input-component is struggling the whole cluster is subject to external shocks such as the financial crisis. In the case of Dubai, the CI was not able to compensate the impact of the financial crisis.

On the other hand, the nine characteristics are an adequate alternative for cluster analysis. The application of the characteristics facilitates the identification of a cluster’s strengths and weaknesses. The nine characteristics reduce the problem to identify risks. For emerging financial cluster CIs, such as Dubai, the application of the nine characteristics facilities to identify these risks. Thus, CIs can better estimate the consequences of their actions.
CHAPTER SIX. DUBAI AND THE ECONOMIC CRISIS

Since the 70’s Dubai has successfully transformed its economy with ports, trade, real estate, tourism, and finance. With its economic diversification it was able to dwarf its partner city Abu Dhabi, which has nearly all the UAE’s oil reserves. However, its liquidity-fuelled real estate and tourism boom in the last decade might have been too fast and too extraordinary for a sustainable cluster formation process.

Dubai’s authority and its companies

In November 2009, the Emirate itself stated it has $80 billion in debt (Kerr & Hughes, 2009). Insiders say it might be double that number. Dubai’s biggest exposure is the state-owned holding, Dubai World. With liabilities of $59 billion, it holds the main part of the country’s debt (Sharif & Cochrane, 2009). Since the housing market decreased from its peak in 2008 by 50 percent, Dubai World’s subsidiary Nakheel is struggling (Bianchi, 2009). Nakheel is responsible for the real estate projects “Palm Islands,” “The World,” and “The Universe.” The company was forced to announce a standstill for all of its real estate projects because of decreased real estate prices. Dubai World also owns DP World, the successful ports operator. In 2006, DP World experienced a fiasco, when the US government prohibited the purchase of six major American ports because of security issues (King & Hitt, 2006). The ruling family directly owns Emirate Airlines and Jumeirah Hotels which both operate successfully in their industries and are important drivers of Dubai’s cluster.

The analysis of Dubai’s business connections and backgrounds is difficult to determine because the ruling family has an interest in hiding the actual amount of its wealth. The accounting standards do not allow an accurate determination of holdings. With
these actions, the ruling family tries to protect its interest and to hide its real wealth. Consequently, a conflict of interest can be identified that causes mistrust in the authorities and the financial market.

Dubai’s ruling family is involved in every business, directly or indirectly. Because of the lack of transparency, the poor accounting standards, and the family’s connections, it is difficult for international investors to estimate their risks. For example, Nakheel was known to be financially troubled because of the 50 percent decline in the housing market, but investors believed that a state-owned company would not be allowed to fail.

Why Dubai’s market crash has been delayed?

Based on the trust that Dubai’s state-owned companies will fulfill their liabilities, the stock market remained stable and suffered only moderate declines. The statement by Dubai’s officials, who confirmed that its companies will meet their obligations, supported the market during this period. However, it was even more shocking for investors when Dubai World announced on May 30, 2009 that it would seek for a debt standstill, and raised $5 billion from two Abu Dhabi banks (Kerr & Wigginsworth, 2009). On December 14, 2009, the additional aid by Abu Dhabi banks and UAE bonds amounted to $25 billion (Kerr & Hughes, 2009). It turned out that the money received was not used for the bail-out of Dubai World and the actual use of the bail-out money remained unclear. These events precipitated the crash. However, this policy of informing the public after decisions were made only confirmed the lack of transparency and the recent conflict of interest. Evidence for the extent of Dubai’s economic problems is the exodus of expatriates who left their cars behind at the airport. According to a police report in February 2009, during the past four months, more than 3,000 cars were found at the airport, 2,500 at the international terminal,
mainly used by expatriates (Robinson, 2009). The slumping economy forced unemployed or indebted foreigners to leave the country.

Problems caused by Porter’s competitive diamond

Since Dubai strictly applied Porter’s (1998) competitive diamond in hopes of fast economic success, the CI had been surprised by this financial crisis and was not prepared for such a backlash. In accordance with the diamond concept, Dubai pushed its input factors, such as governmental support, infrastructure, and human capital, with support of low interest rates, no tax policy, low regulation, and imported human capital. These actions yielded fast success which resulted in large economic projects, attracting foreign employees and international investors. The tourism industry grew rapidly and international firms brought additional know-how and rivalry into the country, which increased the demand for quality. Porter’s (1998) diamond started to work and pushed the other three components. The real estate market experienced a unique growth driven by low interest rates and minimal credit regulations. In expectation of increasing prices most projects were significantly undercapitalized. The real estate boom resulted in a bubble. One example is the project of “Palm Islands.” Its success and the high demand induced further huge projects such as “The World” and “The Universe.” With the financial crisis the demand for these real estate projects disappeared. “The World” still got finished; however, the constructions for “The Universe” and other projects stopped. The financial crisis hit Dubai’s real estate market hard and had a significant effect on the financial cluster. The financial crisis and the resulting credit crunch were not anticipated when Porter’s (1998) concept was implemented.

The lack of transparency on part of government leaves the real financial situation of the Emirate and its companies unclear, destroying the established financial center’s
Porter’s competitive diamond and the case of Dubai

credibility and trust. The missing transparency and the conflict of interest between Dubai and its ruling family risk the survival of Dubai’s financial cluster. Furthermore, the situation of the Emirate could carry-over to Dubai’s largest creditor, Abu Dhabi, which could lead to a state of serious depression for the whole region.

What went wrong?

To determine the way out of the crisis and to ensure the survival of Dubai’s financial cluster, it must be determined what went wrong and when. Generally, the application of Porter’s (1998) diamond is not the reason for the failure of Dubai’s financial cluster. The aggressive actions to increase the input factors were right and provided the promised success. Achieving the region’s first-mover-advantage justified high government spending, low interest rates, and no tax policy. Furthermore, the establishment of a CI, such as DIFC, has supported the cluster’s growth. These actions stimulated the real estate market resulting in an enormous construction boom. Dubai’s economy became trapped in the real estate boom due to low interest rates, no taxes, and imported human capital. The Porter’s concept and the CI served than rather like a catalyst to worsen the situation. Furthermore, these actions led to fraudulent speculation and caused Dubai’s economic problems.

Consequently, the application of the nine characteristics model could have detected the risks of Dubai’s financial cluster earlier, and the CI could have introduced a change in strategy which would have avoided Dubai’s current debt problem.

Dubai’s way out of the crisis

The goal of Dubai must be to achieve a cluster structure which is independent of high governmental spending and mostly independent of external shocks. It is essential to establish sustainable and realistic economic growth that supports the credibility of Dubai’s financial cluster. As a result, unprofitable enterprises have to be weeded out of the market.
The following actions would help to achieve these goals: higher credit regulations, unsubsidized interest rates, investments in academic institutions, retreat of government from the business sector, increased transparency, and decreased protection for local financial institutions.

**Higher credit regulations:** Credits must be collateralized with sufficient private equity. This action would result a more effective selection of investments. Investments in the region should be preferred. Investments in international projects such as the Premier League clubs and the Queen Mary II are prestigious and improve the image of the Emirate, but are risky and expensive.

**Higher interest rates:** Higher interest rates would on the one hand increase foreign capital inflow and on the other hand decrease unprofitable investments and their failure rates. In this way, Dubai could adapt international standards and benefit in two ways.

**Investments in academic institutions:** In the long-run, Dubai’s investments in academic institutions would allow it to replace foreign employees with domestic workers. Furthermore, it would increase the innovation process and the information flow within the cluster. Another positive effect would be the attraction of excellent international students, who would have a longer period of time to become familiar with the country and culture. As a result, fewer well-educated employees would leave Dubai in the future.

**Retreat of government from the business sector:** A minimization of government action in the financial sector improves competition and avoids interest conflicts. The government could concentrate on its core function and provide an appropriate framework for economic development.

**Increased transparency:** An increase in transparency would improve Dubai’s financial cluster credibility and would remove the conflict of interest the government is
faced with. Furthermore, the CI’s future actions would then be more predictable, which reduces uncertainty and results in higher credibility.

**Decreased protection for local financial institutions:** An additional liberalization of the financial market increases competition and therefore strengthens the cluster’s competitiveness.

These actions cannot be introduced immediately or at the same time. Furthermore, a plan should be devised to take these steps in such a way as to avoid stagnation of cluster development. The CI should permanently adjust its strategy according to the market environment. With these steps, it would be possible for Dubai and its financial cluster to achieve sustainable growth and credibility comparable to other leading international clusters.

**Dubai’s future as a financial center**

Dubai is still seen as the premier place to do business in the Middle East. It is the preferred center for the Arabian world, in light of the political uncertainty surrounding other countries in the region. Furthermore, its liberal attitude to the Western culture makes it still attractive for Europeans and Americans as well. However, the payment standstill of Dubai’s obligations damaged its financial reputation. This can only be restored after adequate changes in transparency and regulations. Furthermore, it is in Dubai’s interest to introduce these changes as fast as possible because in today’s globalized world other clusters such as Bahrain are poised to take Dubai’s place as the leading financial center in the Middle East.
In this study, the four major concepts of cluster theory by Porter (1998), Sölvell et al. (2003), Weber (1929), and Krugman (1991) are summarized and explained. All four theories have common conclusions and overlap in certain areas. However, Porter’s (1998) competitive diamond offers the best combination of these concepts. This study examined six cluster formations, three IT clusters-Silicon Valley, Bangalore, and Silicon Wadi-and three financial clusters-London, Hong Kong, and Toronto. On the basis of the analysis of these six clusters, it was possible to determine nine characteristics responsible for a cluster’s success. Moreover, the paper identifies the dominant characteristics for each industry, IT and finance. The six clusters were examined according to Porter’s (1998) competitive diamond and the nine characteristics. The results of the concepts were similar, but differed especially in the case of emerging financial clusters. It was argued that Porter’s diamond overlooks certain risks and misses the importance of credibility and historical development for financial clusters. These points were established on the basis of a case study of Dubai’s financial cluster.

It can be concluded that Porter’s (1998) competitive diamond has been insufficient in the case of Dubai’s financial cluster. However, the diamond was wrongfully applied. For emerging financial clusters the diamond underestimates the importance of essential financial cluster characteristics such as credibility and historical development. The application of the nine characteristics can remedy this and identify the risks of an emerging financial cluster. Furthermore, with support of the nine characteristics it is possible to take early actions to achieve a successful cluster formation process.
REFERENCES


