SCHOOL OF ECONOMICS
AND MANAGEMENT
Lund University

FEK 591 Master Thesis
June, 2007

To Visualize Knowledge in a Region

– A visualization of Öresund & Shenzhen in the perspective of Knowledge Innovation Zones

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Dear Rearder,

The work you have in your hand is a work of passion, joy and life. It has been a great knowledge learning process of the subject, yourself and human interactions with fellow students, tutors and Chinese bureaucracy representatives. The work you have in your hand at the moment is also a work of sweat frustration and anxiety. We all students know how much pain and suffrage you go through when a work is constantly twisting and turning and the plan you have staked out, never seems to go your way, highly dependent on outer circumstances. This thesis has been an extraordinary example of latter.

With just two weeks before this hand in deadline we felt we needed to do a dramatically change as we thought we were not able to pull this through. Our problem formulation was just too big to grasp. This was well reflected in how one of our interview person, an American researcher, mentioned how the thesis actually should be a subject for a doctorate thesis. Through help and discussion of fellow students, our excellent tutor and understanding girlfriends we decided to have it a go, but it hasn't been easy.

We have the last week been translating our research forms on Alta Vista Babel Fisch genius translating software on the net) to Cantonese to be able to get descent data available from Shenzhen, China. We have called the foreign departments of the Chinese Embassy in Sweden and stressed how important it is to get this data for the thesis, for further relationships between Sweden and China without success. This work has been very time consuming we are therefore not able to present our report in a condition which is fully developed.

Our language is at some parts not very good and sometimes not a very consistent style. During the last days all puzzle pieces has started to fit in our minds but we have not yet been able to fit them well together on paper. There are not enough and well stated linkages on our theory of KIZ and IC to our analysis. There are parts which we will strengthen for example the theory of KIZ with additional interview quotes from made interviews. The theory of IC will be reshaped to better fit our TKL measurements.

Enjoy,

Philip, Henrik and Fredrik

Abstract

Titel:	To Visualize Knowledge in a Region – A Visualization of Öresund and Shenzhen in the perspective of Knowledge Innovation Zones
Seminar date:	2007-06-07
Course:	Master thesis in Business Administration, 10 Swedish credits (15 ECTS)
Authors:	Hansson, Philip Littorin, Henrik Svensson, Fredrik
Tutor:	Edvinsson, Leif
Key words:	Intellectual Capital, Knowledge Innovation Zone, Triple Knowledge Lens, Öresund, Shenzhen
Purpose:	Our purpose is by a literature study examine the theoretical differences between a Knowledge Innovation Zone (KIZ) and a Special Economic Zone (SEZ). Further on, our aim is to design a simplified Triple Knowledge Lens (TKL) for KIZ, and thereafter apply this on the two regions of Öresund and Shenzhen. With empirical research of the regions, combined with our TKL Performance Measurements, we hope to see if and how the regions have adopted the mindset of a KIZ.
Methodology:	
Theoretical perspectives:	
Empirical foundation:	
Conclusions:	

TABLE OF CONTENT

1 Introduction

We will in this chapter present the subject of this thesis and why we found it interesting. We will also discus the background and problem formulation. The chapter will end with our purpose and the disposition of the thesis.

1.1 Background

Knowledge

What do these nine letters consist of; these nine letters that have caused so much drama and discussion between philosophers, scientists and researchers since the antiquity – What is knowledge?

According to Plato, knowledge is divided into what can be regarded as secure and true knowledge, *episteme*, and knowledge that is based on opinions and beliefs, *doxa*. One of Plato´s disciples, Aristotle, thought of this description to be too narrow, and widened the discussion by linking knowledge to a life of reflection and investigation. His view of practical knowledge was one primarily connected to handcraft and creative activities, *techne*, and one associated with a political and ethical life of mankind, *phronesis*. From the mindsets of of Plato and Aristotle, three forms of knowledge derived: (1) epistme, the scientific-theoretical knowledge; (2) techne, the practical-productive knowledge; and (3) phronesis, the knowledge of practical wisdom (Gustavsson, 2002).

Gustavsson (2002) argues that we today live in a world where the most influential knowledge of today is the scientific one, and where practical knowledge has been marginalized. This is a result of the identification of knowledge as a factor of production; as a result of a new world order, where old the factors of production, capital and labour, are facing competition in a more intangible factor, namely knowledge.

Knowledge is worldwide recognized as an asset; as a factor of growth and prosperity for organisations and companies, but also for countries and economies. We have left the industrial era behind, and are now living our lives in a knowledge economy, where technology has made knowledge easily accessible. In this society, human capital is becoming a competitive resource, since knowledge simply flow through technology and machines, but it resides with people (Cannon, 1998).

The knowledge economy has taken us from competition, via cooperation, all the way to collaboration. By bringing talents, companies and science together into collaborative projects, dynamic and knowledge innovation can be achieved. National governments can gain a competitive advantage from organizing its assets into regions, just as a company executive would do in order to improve market share and increase, or maintain a competitive edge (OECD, 2006).

Shenzhen, a Chinese region situated close to the Hong Kong border, was in the 1970s appointed to become a laboratory for economic development; a Special Economic Zone (SEZ). The aim was to stepwise adapt the western mindset of market economy, through trials and errors in an isolated area that wouldn't affect the rest of the Chinese economy. What started out as a small scale testing plant ended up in generating one of the most astonishing economic growths ever seen. In less than three decades, Shenzhen went from being a small fisherman village with less than 20 000 inhabitants, to a vibrant city with more than 8 million inhabitants.

On the other side of the globe, perhaps a similar journey of a region has merely started. Öresund Region, once the scenery of fierce and violent hostilities between two neighbouring Nordic countries, is today a thriving region that similar to Shenzhen experiences an increasing economic growth. The difference would be that Shenzhen started out as a Special Economic Zone offering low cost labour and cheap land as primary attraction. Öresund on the other hand is offering knowledge-intensive industries as a primary attraction, and could be characterized as a Knowledge Innovation Zone (KIZ), where knowledge is the foundation of science, businesses and life quality. Through a series of both strategic as well as random events, the region has today grown to be one of most interesting high tech regions in Europe.

These two regions are both a product of its time. Even though they today are in a phase distinguished by a seemingly never ending growth, there are regions all over the world establishing at a fast pace. They all compete in attracting the best human capital, the largest investments and the most fruitful collaborations. It is therefore essential for zones as Öresund and Shenzhen to constantly keep adapting and developing its intellectual capital. Because this is what eventually will settle the fight; this is what the battle will be all about; this is what decides who stands an increasing worldwide competition. As the intellectual capital of regions forms its very own foundation, it needs to be taken cared of, needs to be challenged as well as stimulated. By measuring its intellectual capital, regions as Shenzhen and Öresund could be able to further cultivate, enrich and improve its main source of – the intellectual capital. Hence, they might just be able to enjoy economic growth and blooming wealth in the following years to come.

1.2 Problem formulation

Disruptive technologies have evolved. Implications for businesses are that the world moves faster and faster. Words as innovations, hyper competition and globalization are the not only buzzwords but becoming the foundation in the 21st century business. For companies to stay competitive it gets harder to stay independent and as the world gets even more integrated business competitiveness is now much based in the area where the business originates and conducts its business from.

It has been stated that intellectual capital is a source of competitive advantage. Measuring this intangible can decide the future success a company, region or country. If now intellectual capital and its belonging knowledge is a significant brick in the new world order, and measuring this brick is a way of gaining competitive advantage, how is it done? How can one measure intangible assets, and is it possible to measure the intangible assets of a region?

Debra Amidon and Brian Davis have studied development in knowledge intensive areas around the world for over a decade. The results of their findings are that they see developments of new areas where knowledge is used as its best potential. The implications are new societies where humans will not have more but they will be more. The business will prosper but also culture, society and the link between these are information infrastructure which is highly developed.

Measuring companies knowledge's has been an important and emerging topic during the last decade and as the new economy based on innovation and knowledge becomes stronger the measurements are as important for nations and regions. Intellectual Capital is one of the most influential theories about knowledge measurements in regions and nations. There has been different studies made trying to measure different nations and regions with different measures of Intellectual Capital but no standard has yet emerged.

Amidon and Davis have made an emerging measurement system for KIZ which is named the Triple Knowledge Lens. It is made to reflect a zones three different perspectives which are the drivers of a knowledge zones: Business, Society/Culture and information infrastructure. According to Debra the theory of a KIZ is emerging and is not fully developed. Debra states that she doesn't even know if a KIZ is able to be measured by IC measurements. She stresses that what is important is to quantitatively se if regions are speaking the "language of a KIZ" which is based on the foundation theory of a KIZ, the knowledge economy.

The regions of Oresund and Shenzhen seem to have a lot of similarities but are very different at the same time. Are those regions in the theory a KIZ or SEZ? What are the distinct theoretical differences of a SEZ and KIZ? Is the TKL differentiating it self from the previous measures of IC measures on regions and if so how? According to Ms.

Amidon and Mr. Davis, to be successful as a KIZ, it is vital that everyone speaks the language of knowledge. Are regions of today speaking this language, and is there interplay between the different parts of society?

1.3 Purpose

Our purpose is by a literature study examine the theoretical differences between a Knowledge Innovation Zone (KIZ) and a Special Economic Zone (SEZ). Further on, our aim is to design a simplified Triple Knowledge Lens (TKL) for KIZ, and thereafter apply this on the two regions of Öresund and Shenzhen. With empirical research of the regions, combined with our TKL Performance Measurements, we hope to see if and how the regions have adopted the mindset of a KIZ.

1.4 Target group

Possible target group for this study are governments, regions and other decision makers that wants to develop there strengths in a knowledge based economy. This study is also suitable for university students.

1.5 Disposition

Chapter 1: Introduction
We will in this chapter present the subject of this thesis and why we found it interesting. We will also discus the background and problem formulation. The chapter will end with our purpose and the disposition of the thesis.

Chapter 2: Methodology
We will in this chapter show the methods used. We will explain our different ways of collecting data; reason about the regions studied and discusses the validity and reliability of this thesis.

Chapter 3: Theoretical Framework
We will in this chapter further examine the different theories we built our research upon. The reader will be acquainted with concepts such as Knowledge Economy, Intellectual Capital, Special Economic Zones, Knowledge Innovation Zone and the Triple Knowledge Lens framework.

Chapter 4: Empirical Research
In this chapter, the reader will be introduced to the reality. We will present our qualitative empirical research in an objective perspective, starting with the two regions

and how they have developed from what they were, till what they are today. Further on, qualitative data from our empirical research of both regions will be examined.

Chapter 5: Analysis

In this chapter we will via our theoretical framework analyze our empirical research. A brief introduction will give the reader an idea of how we will approach our empirical findings, which then will follow by an analysis of the data for each region.

Chapter 6: Conclusions

We will in this chapter clarify and discuss our results that has evolved throughout our analysis. We will start with bringing up some subjective thoughts about interesting issues that we believe are important to stress. Thereafter we will end this chapter with ideas for future research.

2 Methodology

We will in this chapter show the methods used. We will explain our different ways of collecting data; reason about the regions studied and discusses the validity and reliability of this thesis.

2.1 Selection of Method

2.1.1 Qualitative/Quantitative

We have in this study used both a qualitative and quantitative research method. Our main purpose, to measure the regions of Öresund and Shenzhen in numbers is according to Bryman & Bell called a quantitative approach. On the other hand have the qualitative method been used as a way to gain knowledge and understanding about the regions and theories about KIZ and TKL. The ways the two different methods differ are that quantitative collect and analyze data, and the qualitative pay more attention to words (Bryman & Bell, 2003).

2.1.2 Inductive /deductive

In the beginning we searched for theories on which we wanted to create a hypothesis of a KIZ and then test it on the Öresund region. Bryman & Bell (2003) calls this way of performing a study deductive. Since prior studies only had emphasised on regions not considered as KIZ, not much material was found. This put us in a situation were we had to search for empirical founding's to be able to create the theories. This was mainly done by interviewing researchers but also through literature studies. When forming our own theoretical framework on which we conduct our measurements the procedures were likewise. During our research we have combined the two methods.

2.2 Selection of Regions

2.2.1 Öresund Region and Shenzhen

The choice of the two regions was made through brainstorming between the authors and our tutor, Professor Leif Edvinsson. We wanted to write about Knowledge Innovation Zones and since Lund is situated in the Öresund region we found it interesting to study our own society. The reason we choose Shenzhen was due to their fantastic

development during the last three decades. We believe these two regions make a good field to study compare and measure knowledge innovation.

2.3 Data and Information Collection

Data used in this thesis are both primary and secondary. The primary data was collected from interviews and the secondary from other researchers, scientific articles and published information regarding the two regions.

2.3.1 Interviews

To collect data and information needed for this thesis we choose to perform four interviews. These were made for both our theoretical and empirical framework. Our main theory, the Triple Knowledge Lens (TKL) created by Dr Debra Amidon and Dr Bryan Davis were still in its development phase when we started this study. Since not much had been published we needed to collect more information. This was done through three telephone interviews with the authors, two with Dr Amidon and one with Dr Davis. All interviews were booked in advance which enabled both us and the interviewee to be prepared. As far as we understood during the telephone interviews the interviewee's were in his/her office during the entire interview, and we therefore believe that they felt confident and secure.

Our first interview was held with Ms. Amidon. The reason for this interview was to gain knowledge and understanding of Knowledge Innovation Zones and some theoretical background of The Triple Knowledge Lens. Since Ms. Amidon lives in USA we had to have this interview by phone. The interview lasted for about two hours and the entire interview was recorded and transcribed. Since we recorded the entire interview, we were all able to focus on watching and listening to what Ms. Amidon said. To gain even more knowledge and understanding we used software that could allow us to see what was on Ms. Amidons screen and by doing so making the interview much more understandable.

We had no pre written scheme over how we wanted the interview to proceed. We choose this method believing that letting Ms. Amidon speak freely would help us collecting more information. Bryman & Bell (2003) calls this type of unstructured interviews *qualitative interviews*. They differ from the more structured, quantitative interview in a way that they do not force the interviewee to answer a specific set of questions. The interview is in a more generality way and the interviewee can speak more freely and from his/her own mind. Another reason for this choice of method was also done due to the fact that not much was written on the subject and because some of the things that would come up were not published. Though, prior to the interview we did have some thoughts on questions to ask. Some were asked during the interview as the topic came up and some were answered without us asking the question.

Our biggest problem with the TKL prior to the interview was how the twelve different indexes related to the TKL had been created. Since our purpose with this thesis is to measure a region we needed some concrete examples. Unfortunately this was not possible since Ms. Amidons aim is to use her work with the TKL as parts of here consult business.

Our second interview was also held with Ms. Amidon. This time the interview lasted for about one and a half hour. The main purpose of this interview was to gain even more knowledge about the TKL and KIZ. This time we were able to receive information that could lead us on to the right track in creating measurements. The suggestion we got from Ms. Amidon was that she wanted us to in an exploratory way collect information from the stakeholders in the Öresund region, and from that information create our own measurements. Ms Amidon suggested that we used the same key indicators that she and Mr. Davis had used. As with the first interview the second was also done by telephone and recorded.

The third and last interview regarding our theoretical framework was held with Mr. Davis. This interview could be seen as more structured than the first ones, since we by now had a deeper understanding of the theories and we knew what information we needed. This interview was also done by telephone, since Mr. Davis lives in Canada. During this interview we wanted to further explore the thoughts about the development of Mr. Davis framework, especially around the eleven capital drivers of a KIZ. The interview lasted for about two hours and was recorded with Mr. Davis permission.

The fourth interview was held with Bengt Streifert, Director of Öresund University. The interview was held in his office in Lund and lasted two hours. The interview was part time structured and part time unstructured. We had initial questions about our measurements, but we also wanted to have a discussion about the Öresund region and get some thoughts from him about our research. Bryman & Bell (2003) calls this way of interviewing, semi structured interview. Regarding our measurements Streifert was able to help us

When each interview was done we, the authors sat down to go thru the material and transcribe it. Since we did that we had a better understanding when performing the next interview. By putting the collected data together we could in a more efficient way ask the right questions the next time and avoid iteration.

2.3.2 Selection of respondents

According to Bryman & Bell (2003), when selecting respondents for a qualitative interview the importance lice in whom you interview and not in how many as with quantitative interviews. Since Dr Amidon and Dr Davis are the creators of some of the theories that we use the choice of respondents was not hard. When interviewing such key persons the reliability of the information becomes much higher. We choose not to

contact more respondents since we after the three interviews had a good picture of the theories used and the history lying behind.

2.3.3 Secondary Data

The secondary data used in this thesis are mainly scientific articles and books. Many of them were in a premature phase of the thesis suggested by our tutor Leif Edvinsson. The secondary data regarding KIZ and TKL were given to us by Dr Amidon and Dr Davis. Other secondary sources were found through electronic databases (i.e. Lovisa and Elin) available to us through Lund University. Information needed for our empirical study was partly found on websites related to the two regions (i.e. Öresund region and Shenzhen). These were found both from search engines such as Google and from tips from our tutor and representatives from the regions. During our empirical research we held multiple short telephone interviews with respondents regarding statistical information. Some of these respondents were involved in zone activities, or working with statistical data.

2.3.4 Validity and Reliability

Bryman & Bell (2003) mentions three criteria's important for evaluating a thesis. The first is the validity of the results. The main idea with this criterion is that the theories and measurements used must have congruence with what we meant to measure. We do believe that our measurements reflect and in a right way measure a KIZ.

The second criterion that Bryman & Bell (2003) focus on is replication. Our main purpose with this thesis is to measure the regions of Öresund and Shenzhen, but we also se this thesis as a way for other regions to measure and become a KIZ. Because of that we have tried to show the necessary procedures needed for others to use our material.

Third but not least, Bryman & Bell (2003) use the term reliability. As mentioned above we see this thesis as a base for others to use when measuring regions in becoming KIZ's. It is therefore in our most interest to show that this study could be done by any one else. The reliability of the theories used would have been higher if more information from Dr Amidon and Dr Davis had been given us. We do though believe that our own interpretation of the TKL for KIZ has been thoroughly developed. The measurements we used in collecting empirical data are well explained in chapter three. As long as other researchers use them in the same way as we did, misunderstandings should not be a problem.

2.3.5 Criticism of Sources

During our study we interviewed three people who all are vital for the information used in this thesis. We strongly believe that the information given to us were true and correct. One important thing to remember though is that the interviewees are all biased which could affect the way the information is presented. Our interviewees are all victims of there own mindsets, which could effect our own opinion and conclusions about the

topics. A large part of the theoretical framework comes from Dr Debra Amidon and Dr Brian Davis. Most of there theories have not been published and have therefore not gone through any extensive reviews from critics and since they are in its early stage not fully been evaluated. They have though during the last couple of years been highly spoken about in different summits. The researchers have been invited to countries all over the world to speak and explain there theories which could be a sign of acceptance. Governments in India, China, Venezuela etc have all put great emphasis on their work.

Our secondary data regarding the theories used all comes from published books, well renowned articles and websites. We found this important for the reliability and credibility of the thesis. Empirical founding's coming from secondary data are in a majority from statistical institutions related to the regions. We have to assume that these are calculated in a right way, but one must always pay attention that they could have been embellished in order to boost a regions position and reputation. Another risk with statistic data is that they may not be calculated in the same way. Different institutions may use different methods when processing data. We are aware of this and will throughout this thesis examine the statistical data with critical eyes.

3 Theoretical Framework

We will in this chapter further examine the different theories we built our research upon. The reader will be acquainted with concepts such as Knowledge Economy, Intellectual Capital, Special Economic Zones, Knowledge Innovation Zone and the Triple Knowledge Lens framework.

3.1 Selection of Theories

The theories we have chosen for our research are all connected to the new economy, knowledge and intangible assets. The choice of theories was made through discussion with our tutor Leif Edvinsson, as well as through our own research in prior work in the sector. The theories are selected to give the reader a better understanding of the topic and the journey of our interpretation of the triple knowledge lens framework. Below you will find a model of theories used in the process:

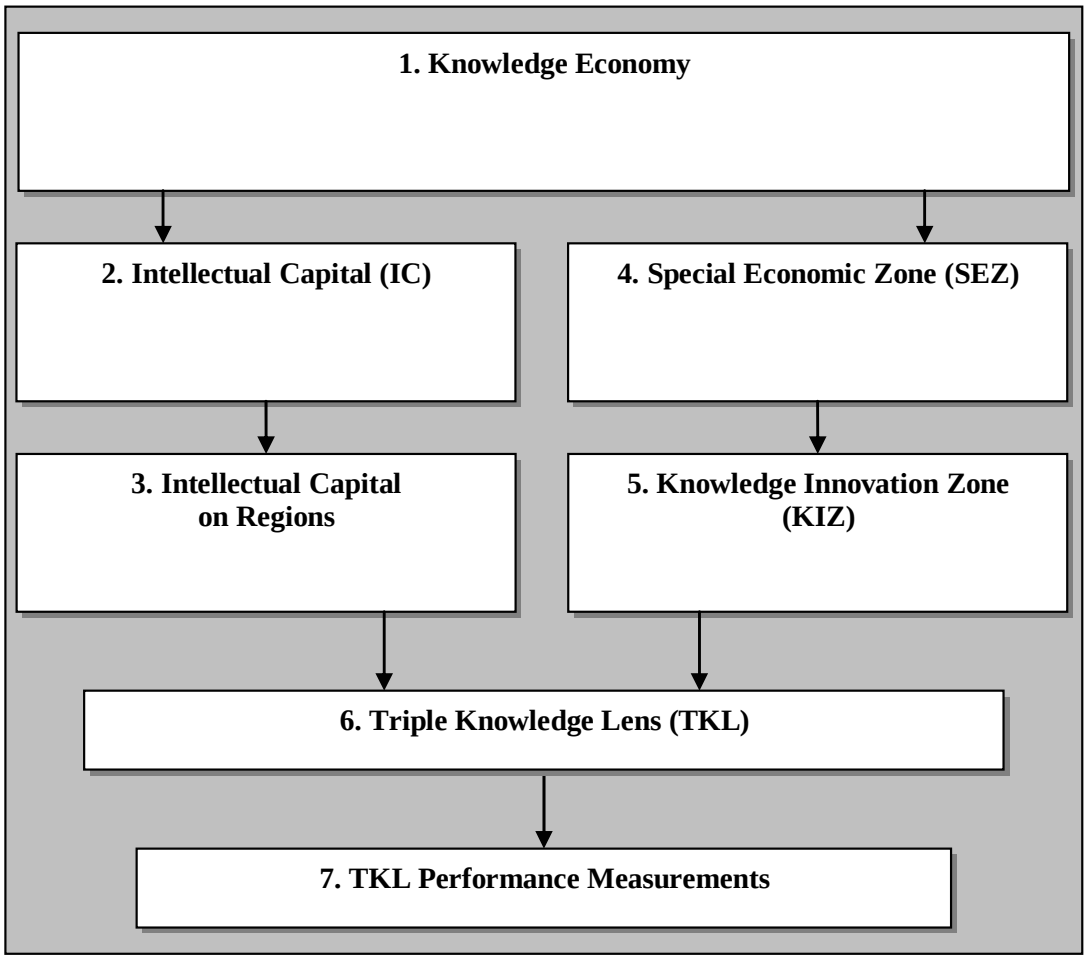

Figure 3.1 Theoretical framework

3.2 Knowledge Economy

"For countries in the vanguard of the world economy, the balance between knowledge and resources has shifted so far toward the former that knowledge has become perhaps the most important factor determining the standard of living – more than land, than tools, than labour."

World Development Report 1998/99

Technological innovation, and thereby knowledge, has been the main source for change and it has had immensely big impact on how business is conducted today. Innovation is the process which turns knowledge and ideas into reality, as in products and services (Sizer, 2001). However, the importance of knowledge has only recently been accepted. For the last two hundred years, the two productivity factors of labour and capital have dominated the theories of neo-classical economics (Frederick & McIlroy, 1999). Intangible factors of production such as knowledge and intellectual capital were seen as exogenous factors, with no direct possibility to affect an economic system. New theories, brought to life by economist Paul Romer, proposed a change in the neo-classical mindset by seeing technology, and the knowledge on which it originated from, as a natural part of an economic system. According to Romer (1986, 1990), knowledge is the third factor of production, in addition to capital and labour. Accumulated knowledge is the basic form of capital on which economic growth is depended. In contrast to capital and labour, knowledge strives to become a public good and as soon as it is made public, there are no costs involved in sharing it with others (Frederick & McIlroy, 1999).

3.2.1 Definition of a knowledge economy

There are two significant forces that have transformed the economies of countries, regions and cities: (1) extensive and accelerating change of technologies and innovation, leading to increased globalization and thereby (2) a better capacity to respond to change and a more profound understanding of customer needs. As a result of these forces, the success of a global economy is increasingly driven by knowledge and innovations. Today, countries are competing to attract and retain the best talents and most successful knowledge-based businesses, clusters and industries (Sizer, 2001). There has been a shift from energy-based economies with the regular factors of production, to information-based economies that are based on knowledge assets and intellectual capital – a knowledge economy (Malhotra, 2003). In this knowledge economy, manufacturing activities are being put aside, in benefit of services; intangible investments in software, education and research are increasing, whilst traditional investments decreases (Aubert in Bounfour & Edvinsson, 2005.

Cowey (2000) argues that the entrance of knowledge economy is one of the biggest changes in the history of mankind. The industrial revolution took more than 100 years to get a foothold. Changes we now see are happening within a fraction of that period, and

this simultaneously all over the world. This change that was driven by the same technological factors that first brought the information era, have now generated a knowledge era.

United Kingdom Department of Trade and Industry define a knowledge economy as "a knowledge-driven economy in which the generation and exploitation of knowledge play the predominant part in the creation of wealth" (Frederick & McIlroy, 1999). The World Bank uses the following sentence to define the term; "a knowledge economy is one where organizations and people acquire, create, disseminate, and use knowledge more effectively for greater economic and social development" (www.worldbank.org).

3.2.2 To become a knowledge economy

A country's capacity to take advantage of the knowledge economy depends on how quickly it can become a learning economy. That is according to Frederick & McIlroy (1999) an economy where new technologies are used not only to access global knowledge, but also used to communicate with other people about innovation. It is essential for a knowledge economy that learning and knowledge-creation becomes of prime importance. Mausyama (in Bounfour & Edvinsson, 2005;167) develops these thoughts and describes five basic elements that are crucial to a knowledge-based economy and in a country's adaptation towards such a one, namely:

(i) *Efficient ICT industries and infrastructure*: Information and communication technology (ICT) forms the platform of a knowledge-based economy, and includes infrastructure, equipment and services for creating and utilizing knowledge.

(ii) *Efficient, international production networks*: Through the use of ICT, coordination and collaboration of activities is possible to a greater extent, which implies that specialized technology and know-how can be shared within networks or clusters in order to generate knowledge innovation.

(iii) *Powerful innovation systems*: Investments in the creation of knowledge and technology is a primary source of economic growth. Thereby, an economy's competitiveness is determined by the capacity of its innovation systems and belonging environment.

(iv) *Human resources*: Human resources incarnate knowledge and support the earlier mentioned elements. Knowledge workers are creative talents that are able to maintain knowledge innovation, assist ICT infrastructure, and constantly challenge existing knowledge in order to obtain new.

(v) *Industrial and organizational renewal*: A knowledge-based economy requires renewal in processes and mindsets within organizations and industries, which can be achieved by more liberalization and deregulation. Outsourcing of non-core functions and the use of ICT to coordinate a new, flatter organization of network are some example of changes that faces actors in a knowledge-based economy.

World Bank and Aubert (www.worldbank.org; in Bounfour & Edvinsson, 2005;62) reasons even further, and defines "four pillars of knowledge economy"; four requisites that needs to be fulfilled in a country in order to fully participate and enjoy the features of knowledge-driven economies. Investments and reforms needs to be made in these following four pillars to build a knowledge economy: Education and training; information infrastructure; economic incentive and institutional regime; innovation systems.

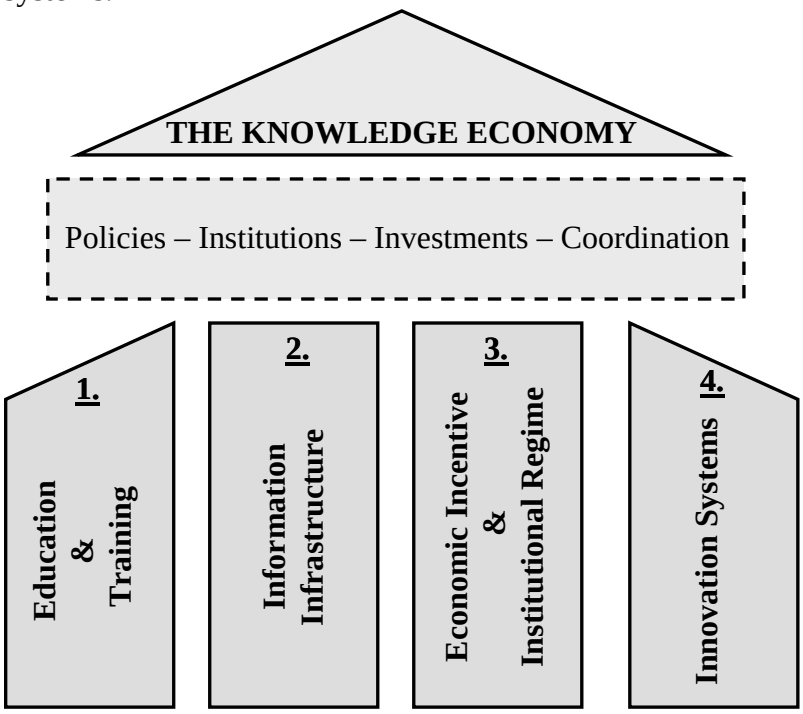

Figure 3.2 The Four Pillars of a Knowledge Economy

In Bounfour & Edvinsson (2005), Aubert explains the four pillars of knowledge economies. According to Aubert and the World Bank (Bounfour & Edvinsson, 2005;63; www.worldbank.org), (1) to be able to create, share and use knowledge, a skilled, educated and creative population is essential. Moreover (2), a dynamic information and telecommunication infrastructure is needed, which ranges from radio to internet, and facilitates the flow of knowledge through effective channels of communication. Additionally, World Bank explains that (3) an economic and institutional regime is central in a knowledge economy; a regime that enables free flow of knowledge, supports hi-tech investments, and provides incentives for an efficient use of existing and new technology. Finally, it is fundamental to (4) have a network of universities, science parks, researchers, private companies and community groups that via collaboration can interact and explore global knowledge and develop new mindsets. Together, these four pillars will help countries to develop strategies for a transition to knowledge-driven economies. However, countries must develop and establish relevant policies, institutions, investments, and coordination across the four pillars to be able to effectively make use of knowledge (www.worldbank.org).

Seizer (2001) is bringing more light onto the question of what makes a knowledge economy successful. Creating sustainable competitive advantages, and thereby business survival, in a knowledge economy also depends on exploiting new knowledge to innovate new products, processes and businesses. A growing knowledge also implies that countries, regions or business no longer can count on its own resources. Collaborations, networks and strategic alliances, in order to develop and exploit innovation and knowledge, are vital to survive in a knowledge economy.

3.2.3 Knowledge economy and the intellectual capital

Frederick & McIlroy (1999) argues that in order to be able to create a knowledge-driven entity, the importance of intellectual capital needs to taken into consideration. Intellectual capital, the value of knowledge, brainpower, know-how, processes etc., and the ability to improve these assets is an important feature to create sustainable competitive advantages in a knowledge-driven economy.

Cowey (2000) emphasizes the importance of integrating and leveraging the intellectual capital. A country's relationship with trading partners, customers and suppliers, distribution networks, intellectual property, patents, processes, image and uniqueness of doing things are all embodied in intellectual capital, and thereby needs special treatment in a knowledge era. However, according to Cowey (2000), this is not enough to become a successful knowledge economy: a country must also align its governmental and managerial processes to support a knowledge culture where knowledge can be shared, as well as investing in enhancing its intellectual capital.

Bonfour and Edvinsson (2005) argue that in the knowledge economy, the value of organizations, corporations and individuals is related to their knowledge and intellectual capital. If we accept that knowledge is the main source for performance of our organizations we have to challenge existing models and explore a new way to view our world. Intangibles are the drivers in knowledge economy and the value of corporations, organizations and individuals should therefore be measured on their knowledge and intellectual capital. This can also be extended to the public sector as to whole nations – knowledge is the main driver for competitiveness and productivity which is as important on corporate level as it is on national level.

3.3 Intellectual Capital, IC

3.3.1 The IC Value Scheme

An IC report was originally made to enlighten a company's value generating resources. These resources are the company's future earning potentialities, which are not shown in

the balance sheet. The value generating resources of IC is instead shown as the market price less the book value. This mark up has earlier been called goodwill.

IC of a firm can be broken down into different segments of intellectual capital assets. i.e a firms: knowledge, experience, customer relations, competences brands etc. The IC tree (see fig 3.3.1) shows how these intellectual capital assets can be divided into different columns which are linked to each other, this to create a better understanding of the IC. To start from the beginning a company's market value can be divided in two parts, its *financial capital* and its *intellectual capital*. The latter can then be divided into the *human capital* and *structural capital*. Edvinsson & Grafström (1998) means that in the human capital lies the ability of the employees to use their knowledge, skills and innovation to perform duties. The human capital is also the culture, values and philosophy of the organization. The structural capital can be explained as the assets that stay within the firm when the employees leave for the day. Structural capital can thus be owned by a firm which is not possible with Human Capital. Structural capital can further be divided into *customer capital* where the relationship's a company has with its customers makes its value. The second part of structural capital is first the company's *process capital* which is a company's work processes and technical solutions and secondly the innovation capital -a company's embracing patents, legal rights (intellectual property) and other intangible assets that are hard to protect i.e. business secrets. (Edvinsson & Grafström, 1998)

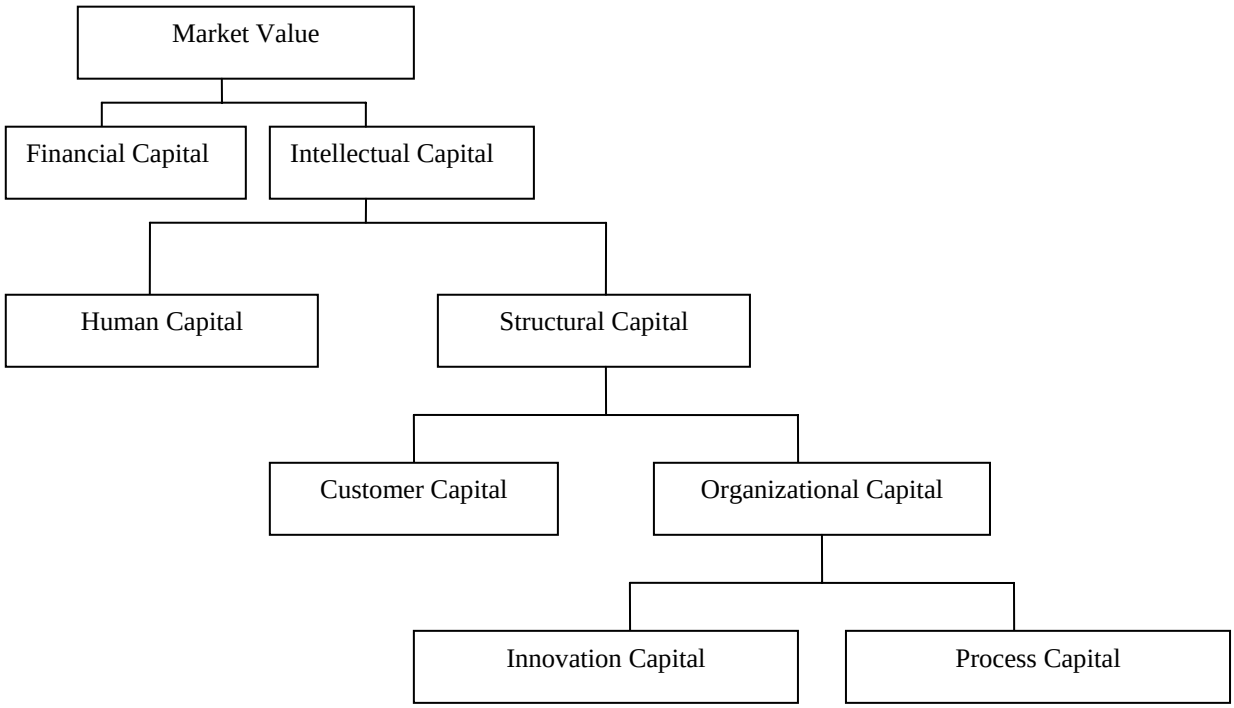

Figure 3.3: The IC value scheme

3.3.2 IC Navigator

Leif Edvinsson was in 1991 the first appointed director in IC at the Swedish insurance company Skandia. During the time at Skandia, Edvinsson developed the IC Navigator which was made to give a picture of a company's both financial and Intellectual capital and their interdependencies. The model shows how the five value creating fields each are focusing on a specific sphere of interest. The financial focus is representing the past performance of the company. The renewal and development focus shows the direction of the company tomorrow. The human focus is the connection between the five focuses and is the link between the past present and future in a company.

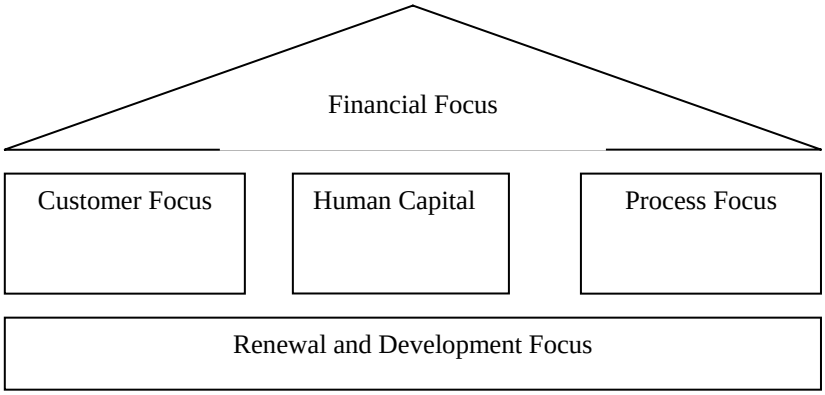

Figure 3.4: The Skandia IC Navigator®

(Edvinsson&Grafström 1998) means that IC is not only a way of assessing intangible assets but also an active process of value generation where you not only see it as a storage of knowledge but as a way to see how it creates and will be creating value to a company. The IC is an assessment of a company's future prospects. (Edvinsson&Grafström 1998)

3.3.3 Measuring intellectual capital

Examples for measurements for the different Intellectual Capital groups are:

Human Capital: leadership index, employee turnover, number of female managers

Customer Capital: market share, days spent visiting customers, satisfied consumer index

Process Capital: laptops/employee, cost for errors administrative/managers revenues or contracts field without error

Innovation Capital: renewal expense/consumer, share of employees under the age of 40, R&D resources/total resources (Edvinsson & Malone, 1997).

When human capital interacts with structural capital value is created in an organization. An organization should transform as much human capital into structural capital as possible. The relationship is showed in the IC multiplier made by Leif Edvinsson (Berglund et al 2002).

IC Multiplier = Structural Capital / Human Capital

The idea behind the multiplier is that structural capital should always be larger than the human capital; if the opposite will occur then erosion in the company will appear. This as the organization doesn't have enough structural capital to match its human capital. A company with low level of structural capital is taking a sever risk as its human capital may leave the capital whenever they want and the company will then only resource will be the less structural capital. (Berglund et al, 2002)

3.4 Measuring IC on regions

This chapter is to be seen as an introduction to prior research on regions. These are used in the process of interpreting the TKL. These theories are meant to give a better understanding of measuring intangibles on regions and will be used as a complement to the theories of knowledge innovation zones.

Shortly after the first theories of IC on firms the first attempt to measure the IC on nations and regions emerged (Bontis, in Bounfour & Edvinsson, 2005). Much of the literature of IC spans from the last decade and the national view is still in its infancy according to Bontis (in Bounfour & Edvinsson, 2005).

Bontis (in Bounfour & Edvinsson, 2005) and Malhotra (2001) are explaining how leaders of large economies and countries are eager to find ways in to measure their knowledge assets to be able to predict future performance. The implications of those measures would be that the leaders in the future could be able to better manage their resources and increasingly be able to determine the success of their economies.

GDP is the most incumbent measure of economic growth and development of regions. According to Ante Pulic (in Bounfour & Edvinsson, 2005) GDP has a number of flaws, first it is measured without no regards to input similar to a company revenue and secondly it is used on a macro level whereas other measures are used on a micro level, even though they are together creating the economic environment.

Bontis (in Bounfour & Edvinsson, 2005) explains that the IC of a nation includes the hidden value of individuals, enterprises, institutions, communities and regions that are the current and potential sources for wealth creation. According to Bontis (in Bounfour & Edvinsson, 2005) are these hidden values the roots for nourishment and the cultivation of future well being. It is therefore essential for a nation which wants to keep itself updated and in line with the present to systematically account and follow the evolution of such IC development.

According to Bounfour & Edvinsson (2005) there is a new "political leadership" which is emerging around the IC of nations and regions which has the focus on how to:

- Visualize the knowledge capital of nations
- Develop intelligence flows within and between knowledge capital clusters;
- Cultivate efficiency and renewal of the knowledge capital of regions; and
- Capitalize on knowledge capital by the new innovative social systems, in terms of the collective wealth of nations

3.4.1 National Intellectual Capital Index NICI ™

In Nick Bontis article (in Bounfour & Edvinsson, 2005) "National Intellectual Capital Index: The Benchmarking of Arab Countries" (Bontis 2005) has made an extension of the IC tree made by Edvinsson Malone (1997) and transformed it from firm level and applied it on a national level. Bontis (in Bounfour & Edvinsson, 2005) theory is used to capture the national statistics to describe the constructs of the national intellectual capital which is illustrated in the modified IC tree for Nations. The changes made are that market value now is national wealth, customer capital is market capital and innovation capital has changed to renewal capital.

Human Capital

Human Capital is according to Bontis (in Bounfour & Edvinsson, 2005) defined as the knowledge competencies of individuals in realizing a nation's tasks and goals. The intellectual wealth of countries citizens is its base of human capital. Bontis (in Bounfour & Edvinsson, 2005) The intellectual wealth can be defined as the citizens multi faced knowledge about fact's, laws and principles but also specialized knowledge about teamwork and communications (Bontis, in Bounfour & Edvinsson, 2005). But these measures of human capital are not completely static and deterministic. According to Bontis (2005) it is both quality and quantity in the human capital performance measurements.

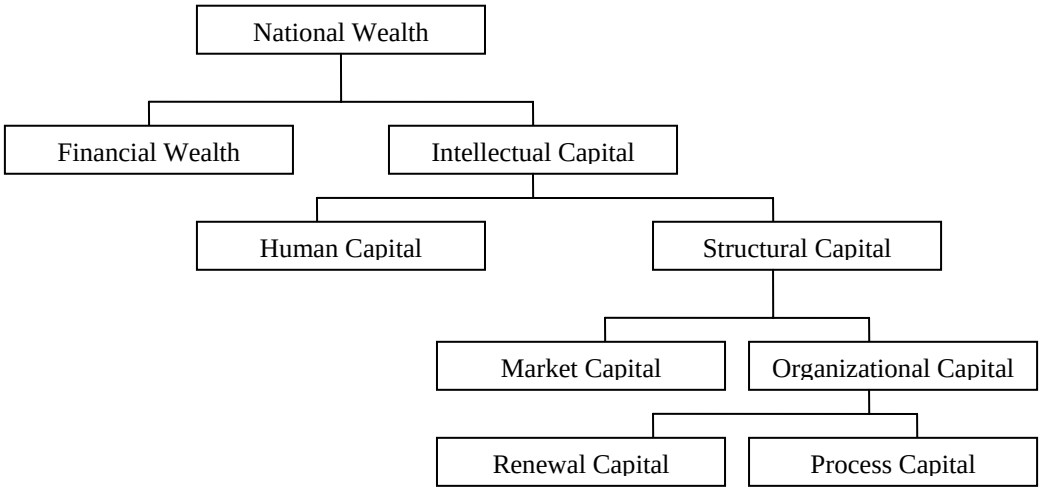

Figure 3.5: Value scheme of intellectual capital on nations and regions (Bontis, in Bounfour & Edvinsson, 2005:115)

Process Capital

The process capital is defined as the non human storage of knowledge's that a nation has inside its technology, information and communications system. Hardware, software databases, laboratories and organizational structures are those factors that sustain and externalize the Human Capital (Bontis, in Bounfour & Edvinsson, 2005).

Market Capital

Market capital can be defined as a country's intellectual capital embedded in its national intra relationships. According to Bontis (in Bounfour & Edvinsson, 2005) the Market Capital represents "A country's capabilities and success in providing attractive, competitive solutions to the needs of its international clients, as compared with other countries". It is also a country's investment and achievements in foreign relations, coupled with its exports of quality products services which is according to Bontis (in Bounfour & Edvinsson, 2005) a significant part of the development of market capital as the products or services are rich in intellectual capital. Additional features of Market capital is a nation's social intelligence created by laws, market institutions and social networks. Bontis (in Bounfour & Edvinsson, 2005) explains that the market capital is very similar to social capital but as it includes systematic qualities with embedded discovery attributes that enhance social capital creation.

One important part of the market capital is a country's international trade but also its ability to create partnerships with other countries. Sullivan (in Bontis in Bounfour & Edvinsson, 2005) means that relationships within countries increase the ability to create knowledge and also create a much better possibility to extract knowledge from a nation. The international trade brings innovative and more efficient methods and practices of making new and improved products and services. According to Bontis (in Bounfour & Edvinsson, 2005) the World Bank in 1999 made a report which mentions how foreign investments in countries make a spill-over effect when overseas workers in the country

share their knowledge. Attracting international summits and a country's ability to keep its newly graduated students in the country are vital for regions (Bontis in Bounfour & Edvinsson, 2005).

Renewal Capital

Bontis (in Bounfour & Edvinsson, 2005) explains this as a country's future intellectual capital. This includes its capabilities in investing in renewal for its country's sustainable competitive advantage. It includes its investments in R&D which is the main force for this measurement.

3.4.2 Regional Value Creation Efficiency Index – VAIC ™

In the traditional management system, tangible assets such as physical and financial capital have been the base when measuring value creation. According to Pulic (in Bounfour & Edvinsson,2005) and as we have seen above intangible assets such as knowledge have become the most important factor for companies and regions when creating value. As written above knowledge is created by the people that live in a region or work for a company, and as with capital, knowledge is only an expression of power when used for creating value. This means that companies have to acknowledge that human capital can not longer be considered as cost in the balance sheet.

To be able to measure the intangible assets for a company, region or a nation a new index has been developed. Pulic (in Bounfour & Edvinsson, 2005) calls it the "Value Added Intellectual Coefficient Index" (VAIC). This index sees knowledge workers and there productivity as the number one must important factor for management decision making. According to Pulic (in Bounfour & Edvinsson, 2005), will VAIC meet the basic requirements for today's economy with where measurement systems are more and more important. With this new system of measurement, companies and regions will be able to compare and benchmark with others and by doing so be able to draw the best knowledge to its company or region. The main idea with this index is to create value buy using both financial capital and intangible assets such as intellectual capital. Pulic (in Bounfour & Edvinsson, 2005) means that "value added is assumed to be the most appropriate indicator for desired business results" and according to the British Ministry of Trade and Industry, is value added "the preferred measure of the wealth created by activities of a company" (UK Department of Trade and Industry, 2004) When measuring value added (VA) you need two parameters. OUT= total sales and IN= cost for buying raw materials etc. The formula is showed in appendix 1.

3.4.3 Cities' Intellectual Capital Benchmarking System (CICBS))

As with companies, cities have, in the past mainly considered tangible assets as the main instrument when setting up visions, objectives and goals. (Viedma Marti, in Bounfour & Edvinsson, 2005) The essence of to day though is that cities leaving the

industrial focus and entering the knowledge era need to have measurements that take intangible assets into consideration. This is not only important for the city itself when benchmarking but also for the national and international interests of comparing cities. According to Viedma Marti (in Bounfour & Edvinsson, 2005) the way people live and work in a city has changed over time, due mostly by the effect of information and telecommunications technology. (Viedma Marti, in Bounfour & Edvinsson, 2005) According to Edvinsson and Malone (1997) this have had the effect that people can live and work all most anywhere and as they say "still enjoy most of the fruit of life in a big city". People can interact in distant world events not having to leave their homes. The roles of workplaces have shifted and are now more portable where virtual offices can be established far from the office building. Viedma Marti (in Bounfour & Edvinsson, 2005) has established due to this affect five questions that city governments have to take into consideration (Viedma Marti, in Bounfour & Edvinsson, 2005)

- *Which facilities must be offered by city governments if the city is to be the most attractive place in which to live?*
- *How can innovative companies be attracted to the city?*
- *How to foster entrepreneurship?*
- *Which organisational structures are required?*
- *How can the city be transformed to face new technological changes successfully?*

Viedma Marti (in Bounfour & Edvinsson, 2005) bases these questions on the effect that new technology changes the way cities have to plan transportation, infrastructure and labour. In the past, technologies as for example steam forced the cities to create railroads, entice emigrants with knowledge and change the infrastructure to mass production. (Viedma Marti, in Bounfour & Edvinsson, 2005) The technology of today has made a shift where microprocessor-based products demand high speed internet, high educated knowledge workers that can move easily and virtual organisations as infrastructure. (Edvinsson and Malone, 1997)

As an effect of what has been said above Viedma Marti (in Bounfour & Edvinsson, 2005) have come up with an index that can help cities determine there position and a way for them to benchmark towards others. He calls this index; Cities Intellectual Capital Benchmarking System (CICBS). This model is divided into two different sets. The first is called CGICM and stands for Cities General Intellectual Capital Model and is based mainly on Edvinsson's (Edvinsson & Grafström 1998) IC Navigator which we have described above. This model sees the city as built up by a set of "micro clusters" and trying to manage these under a certain IC-platform. Viedma Marti (in Bounfour & Edvinsson, 2005) means that a city needs to follow four phases when establishing this platform.

- Phase 1: Creating the vision

In this phase, the main idea is to, through conversation with the different fields in a city, such as business management, students, urban planners etc create a picture of where the city is now and what it wants to become.

- Phase 2: Identifying the core activities needed to realize the vision

When the vision has been set, the planners need to come up with the right actions, projects etc that need to be done to realize the vision.

- Phase 3: Identifying the core competencies needed to realize the core activities

In this phase one has to clarify what knowledge and IC that will be needed to realize the core activities set in phase 2.

- Phase 4: Identifying the indicators for each core activity and each core competence

Simply put, this means identifying the key success factors that will be vital for the core activities and competences. When that is done Viedma Marti (in Bounfour & Edvinsson, 2005) means that it is important to "identify the indicators that best reflect these key success factors".

- Phase 5: Assembling the indicators into different IC Categories

When the previous phases are fulfilled the city planers need to put each indicator into the right category of the IC Navigator.

The second part of the model is called CSICM and stands for Cities Specific Intellectual Model. This model has a more longitudinal perspective and is based on Viedma Martis (in Bounfour & Edvinsson, 2005) Intellectual Capital Benchmarking System (ICBS) addressing; vision, segment demand, output, products and services, processes, core competencies and professional core competencies. If the CGICM sees all the micro-clusters as a whole, the CSICM tries to look into each of the micro-clusters. These clusters can then be dived by looking in to there customer needs, business unit's objective, product and services, processes, company core competencies, professional competencies and company intangible infrastructure of each micro-cluster. (Viedma Martin, in Bounfour & Edvinsson, 2005) When that is done each cluster can be evaluated and measured by certain elements. These are: vision, demand segment, output, product and services, processes, core competencies and professional core competencies.

When the micro clusters have been chosen using the criteria's above, Viedma Martin (in Bounfour & Edvinsson, 2005) suggests a set of indicator's for the clusters. These will then be put together to form the general scheme of the city. These indicators can then be used to benchmark with other cities. An example of Viedma Martin's way of benchmarking regions can be found in appendix 2.

3.5 Special Economic Zone

China, India and Eastern Europe have one thing in common – they are among many countries who all have chosen a fast track to economic exploration, namely the use of Special Economic Zones (SEZ). Special Economic Zones, in the literature also often referred to as Free Trade Zones, Export Processing Zones, Duty-Free Zones, Free Ports, Enterprise Free Zones, exists today in over 120 countries (Knowledge Innovation Zone Research Report, 2006; Ki et al, 2005; Schweinberger, 2003; Haywood, 2000). There are about 3000 SEZs globally, who in total accounts for over $600 billion in exports and 50 million direct jobs (Knowledge Innovation Zone Research Report, 2006). Special economic zones can now be found in almost every part of the world, including developed, developing and transition countries (Li et al, 2005). Amongst countries who have adopted the concept of SEZs are China, India, Kazakhstan, Iran, North Korea, Philippines, Poland, Ukraine, Cayman Islands, Puerto Rico, Bermuda etc. (www.wikipedia.org; Haywood, 2000; Wong and Chu, 1985, p.2).

Background
Special economic zones have been adopted by many countries around the world, mostly in the Asian regions, as a mean to foster and stimulate economic development (Wei, 2000). The first signs of such a zone can according to Haywood (2000) be traced back to 300 BC at the Greek Island of Delos, in the Phoenician city of Tyre; an island which became one of the wealthiest islands in the world for over a century. By the eighteenth century and onwards, the initial free trade concepts in modern history evolved and were given the name Export Processing Zones (EPZ). They were primarily focused on initiating export-oriented industrial development in Third World nations. An EPZ is generally considered as an adaptation of the old Free Trade Zone system, only that they are not always are located adjacent to a port (Wong and Chu, 1984). The definition of an Export Processing Zone is according to United Nations Industrial Development Organization ‘areas involved in the establishment of modern manufacturing plants inside an industrial estate, by offering a suitable package of investment incentives to both foreign and domestic entrepreneurs’ (Wong and Chu, 1984).

According to Wong and Chu (1984), the first successful EPZ was implemented in Ireland 1956. The first countries in the developing world to adopt the concepts of an export processing zone were Puerto Rico in 1962 and India in 1965. They were soon followed by others such as Taiwan, Philippines, Dominican Republic, Mexico, Panama and Brazil between 1966 and 1970. For developing countries, this was a way to accelerate economic growth and bring industrialization to their homes. By attracting overseas companies, their capital and technology, infrastructure and jobs could be generated in the developing countries. At the same time, for political reasons it was important to keep them out of the overall governance of the country, and therefore specific areas, or ‘zones’, were created. In these zones, overseas companies could handle their businesses with as few restrictions as possible.

During the years, the term EPZ has evolved into Special Economic Zones. The first special economic zones in the world was adopted by Peoples Republic of China in late 1970s, and built on the initial ideas of an EPZ; attracting foreign investors by favourable incentives, and thereby industrialize and accelerate economic growth. However, while an EPZ is focused on manufacturing, a SEZ also embraces other economic activities such as agriculture, tourism, commerce and real estate development. Another difference between EPZ and SEZ is that the first one is typically found in countries of market economy, whereas the latter one is a product of open economic policy in a socialist country (Wong and Chu, 1984). In China, a socialist country, the SEZ´s have legislative, executive and sometimes judicial functions and are organised around lines of an autonomous province or state. Here, most SEZ´s have their own customs service, tax collection system and department of foreign affairs (Haywood, 2000).

A SEZ can also work as a laboratory of different economic policy reforms (Wong and Chu, 1984; Reardon, 1996; Haywood, 2000). By allowing foreign investors and money into the zone, tests of what is working well and what is not can be done on a small scale. The very best practices are then launched into the national economy. In the case of China, this was a way for a communist country to become familiar, learn about and experiment with capitalism and the market driven economy. This concept was quite contrary to the planned economy, which was practiced everywhere else in the country. In this sentence, a SEZ allow countries to experiment with new policy frameworks that may lead to more effective development, both economic and sociologic.

Objectives of a zone

For the reader, it may no be quite clear that the objective for a zone such as SEZ is to promote economic development. Wong and Chu (1984) are stating 6 more specific objectives of a special economic zone:

(i) Attract foreign investment
(ii) Expand export and promote foreign exchange earning
(iii) Provide employment opportunities
(iv) Attain a transfer of technology and management skills
(v) More efficiently utilise domestic material resources and create linkages with the domestic sector
(vi) Stimulate economic growth in less developed regions of the country.

There is hereby a deeper meaning of the objectives for countries using the zone methodology. It is not only about the true economic factors, as making money for the country, but also social aspects such as welfare are important too.

According to Wong and Chu (1984), attracting foreign capital seems to be the main objective of most zones. One way to attract foreign companies and investors is to allow

100% ownership of zone enterprises. Other means of investment, such as joint venture, cooperative production, intermediate processing and compensation trade, are also being practised to increase foreign capital. Different incentives, preferential terms and available resources make the zones highly interesting to foreign investors. However, if the country itself is unstable or has an uncertain future, the lack of will to invest is clear (Wong and Chu, 1984).

When it comes to increase export, the zone methodology did not first show any greater success. The zones around the world didn't contribute at any greater extent to the countries export growth, and were only responsible of a small proportion of the total export of a country. Today it is different. Research made by Haywood (2000) shows that the growth rate of total export to EU and US 1993-1996 for countries with free zones increased substantially, especially for lower middle income countries and upper middle income countries. Upper middle income countries (GNP/Capita $3035-9384) with zones increased their export with 62%, whereas countries without just increased their level of foreign export with 33%. For lower middle income countries (GNP/Capita $765-3034), the figures are even more astonishing; countries with zones increased their export to US and EU with 72%, when countries without zones only had an export growth rate of 1% (Appendix 3).

Research has shown (Wong and Chu, 1984) that in terms of employment, the zones have indeed created jobs, especially in the initial and formative stage. However, these job opportunities have not always been long-term. In the early stages, labour-intensive industries such as garment and electronics were very common and demanded no skilled or semiskilled labourers who settled with low wage levels. Mostly young, mobile, female workers have been employed, which has generated a high labour turnover and unstable employment structure. Research made by Wong and Chu (1984) shows that zones are very sensitive to the changes of the world and local economy. The workers at the assembly plants of a zone are often the first to be suspended when a transnational corporation faces production cutbacks because of a declining world demand. Wong and Chu (1984) have also shown that when wages begin to rise as a result of the zone reaching a more mature stage, foreign enterprises either move out and relocate to areas with cheap female labour, or shift to automatic production and more sophisticated technology. Therefore may the employment curve of a mature zone take a downward trend due to high wages and shift from labour-intensive to non labour-intensive production.

For a sustainable economic growth it is vital to have technically skilled workers, who are able to use more sophisticated production methods, as well as scientific management methods. To secure the flow of such technology, production and management methods, zone administrations are encouraging the establishment of more technology-intensive production units (Wong and Chu, 1984). In order to create skilled workers, transfer of technology needs to be made, which demands both time and patience. This involves

according to Wong and Chu (1984) training of local personnel, both on the job and abroad. It also involves technical cooperation between foreign zone enterprises and domestic firms. Thereafter foreign expatriates can be replaced with local technicians and local production and management. Making knowledge and science a part of the zone is an important step to transfer technology and management, and therefore many zones have introduced science-based industrial parks within the zone.

Creating linkage with the domestic sector around the zone has been an important objective (Wong and Chu, 1984). In the initial stage it was difficult because of two main reasons. Firstly, companies within the zone received preferential treatments such as exemption from import duties for raw materials. Therefore these companies could import raw materials for production from abroad and still be competitive against local suppliers. Secondly, most companies in the early stages were assembly-plants, and all components were often sent over from the parent companies, assembled in the zone and shipped out again. Zone authorities have today enforced utilization of local resources to a greater extent and thereby a more effective linkage with the domestic sector. According to research made by Wong and Chu (1984), when a zone gradually shifts towards more technologically-oriented production, the amount of domestic linkage will increase. This because local firms often are subcontracted for production of technical parts and components, while more advanced production is made by zone companies. Another way to promote and encourage domestic linkage is to let local companies set up production units inside the zone. These companies tend to use local materials instead of foreign, as well as the interaction between local and foreign zone enterprises increases. Due to this interaction, local companies will be able to get in touch with modern advanced technology and scientific management methods, and gain knowledge which they can spread nationally.

Stimulate economic growth in less developed parts of the country has been become a major consideration for some governments using the zone policies (Wong and Chu, 1984). The achievement of this has been limited in some cases, and the reason for this is that locating a zone in more remote areas includes the lack of sufficient infrastructure, supporting facilities, trained manpower and access to international ports and airports. Foreign companies have a will to invest in a zone where all of the above is already existent. Therefore governments tend to reject such areas and build zones close to metropolitan areas to avoid the cost of setting up roads, airports and other facilities. In China however, the government has done completely different (Wong and Chu, 1984). Here, even the largest special economic zone has evolved from a small town. This has been done not in order to foster regional economic development, but rather for control and experimental reasons. Since the Chinese economic policies are very different from the more westernized policies of a zone, areas located far away from major population centres are used to not cause any disturbance of the social and economic life in the rest of the country and for a better control of movement in and out of the zone.

Incentives of a zone

For countries making the use of free trade systems such as an economic processing zone, there is as we have seen above a will to create as favourable incentives as possible in order to attract foreign and domestic investments. Wong and Chu (1984) says that types of incentive widely differ depending on country, but these four categories of incentives have been found during research:

1. Preferential treatment
    a. Duties/tax – exemption from customs duties for import of material and export of products; reduced profit tax; extended period of tax exemption, etc.
    b. Land utility cost – rents low but lease period long
    c. Others – accelerated depreciation rat on fixed assets; financial assistance (loans, preferential credit), etc.

2. Freedom given to investors
    a. 100% foreign ownership allowed
    b. Freedom to repatriate and remit profits
    c. No foreign exchange control

3. Local advantage and provisions
    a. Cheap labour cost
    b. Provision of infrastructure and utilities
    c. Provision of standard factories with services at reasonable rate
    d. Provision of housing and various amenties; warehousing and supporting services

4. Administration
    a. Centralised administration to simplify and unify administrative procedures regarding investment and operation in the zone
    b. Anti-strike laws, etc.

Similar research made by Rondinelli (1987) have found that important incentives could be favourable geographical locations to international trade, freedom from custom regulations, first-class sea and airport facilities, infrastructure, cheap sources of energy and water. It could also be prepared industrial plants, warehouse facilities, suitable housing and services for foreign management. More than physical facilities, the most lucrative incentives for entrepreneurs according to Rondinelli (1987) are the availability of low-wage workers, tax reductions or total exemptions, elimination of import quotas, and foreign control of the specific zone. Due to this foreign control, the zone experiences efficient administration and freedom from bureaucracy, delays or corruption, which is what makes a free zone successful. Multinational companies also tend to favour zones with stable economic and political climate, as well as the lack of

aggressive labour unions where the risk of strikes are totally eliminated or at least controlled (Rondinelli, 1987).

Types of zones

According to Haywood (2000) there are 4 specific types of zones, all with different characteristics. The four types are Small Zone, Wide Area Zone, Industry Specific Zone and Performance Specific Zone.

Table 3.1: Types of Zones, with Examples and Representative Countries (Haywood, 2000).

Type of Zone	**Small Zone**	**Wide Area Zone**	**Industry Specific Zone**	**Performance Specific Zone**
Zone Characteristics	Commercial Industrial Mixed Export Processing Service Enterprise/Urban	Special Economic Zones Multi-industry Resident Populations Retail/Hotel	Banking Insurance Gambling Tourism Textile Gems	Technology Based Incubation Centres Export Factories Employment Based Investment Based
Representative Countries	Dominican Republic, United States, Egypt, Kenya, Europe etc.	China, Eastern Europe, Central Asia, Russia, Sudan, North Korea	New York, Bangladesh, India, Cayman Islands, Bermuda, etc.	Mexico, Sri Lanka, Tunisia, parts of India, etc.

Small Zones are typically small scale wise, around 50-500 hectare, and is according to Haywood (2000) the typical economic zone. It has an industrial focus and involves a mix of different assembly and simple processing activities from various industries.

A special economic zone is a typical Wide Area Zones (Haywood, 2000). These zones usually covers around 31.000 km^2 and do often have resident population living inside the zone. One zone may nest smaller special purpose zones inside itself, and therefore the product mix can include any sector. The Chinese SEZ's, from the late 1970s, were some of the first wide area zones ever established and have been very successful.

Industry Specific Zones are mostly known to its lucrative policies when it comes to financial services (Haywood 2000). Tax havens as Bermuda or the Cayman Islands are Industry Specific Zones, as well as places know for gambling, i.e. Monaco, Macao and Las Vegas. These zones specify in one special area or industry, and create own rules, regulations and policies in order to generate economic wealth.

According to Haywood (2000), a Performance Specific Zone contains individual factories that have been granted the benefits of a free zone, provided they meet certain conditions. Such conditions have in the past included export requirements or use of local

material, but more recently technical skill levels and employment commitments have been introduced.

3.5.1 Zones of today

Since the 1960s, a large number of zones such as EPZs and SEZs have been established all over the globe. All of them have not been successful. Much depends on the geographic, economic, social and political background of the countries concerned (Wong and Chu, 1984). In the early 1970s, many zones did not function satisfactory due to some common mistakes made in design, choice of location and implementation of strategies. By incorporating regional development into the choice of location, zones were established at unfavourable, rural and undeveloped areas in the host country, in order to promote a more balanced economic development in the country (Johansson et al, 1997; Wong and Chu, 1984). This has however not always been a mistake, as we have shown the reader above regarding the Chinese SEZs. Other common factors explaining a poor performance of a zone are according to Johansson and Nilsson (1997) poor planning and design, insufficient and inefficient promotion, lack of supporting government policy, and pure mismanagement.

Today, many zones have learned from the past. A successful zone has everything an unsuccessful doesn't: favourable location, political and economic stability, governmental understanding, supporting infrastructure such as housing, telecommunication, electricity and water, etc. (Johansson et al, 1997; Wong and Chu, 1984). According to Entovation Knowledge Innovation Zone Research Report 2006, zones have evolved from only being assembly and simple processing oriented, to include science parks, finance zones and tourist resorts. They have moved from the main industries textile, clothing and electronics, to a much broader product mix that includes almost any sector. There is also a trend of private foreign developers establishing and developing zones, instead of nations.

Haywood (2000) means that zones of today have moved from labour-intensive production to capital and skill intensive research and development centres, global logistics centres and corporate headquarters. Instead of focusing on the incentives, such as preferential treatments, modern zones have reshaped their existence to provide an internationally competitive business environment. The competitive advantage of a zone today is the possibility to provide sophisticated communication, reliable power, infrastructure, well educated workers and efficient zone administration. As seen, zones are changing to high technology logistic hubs, and the future of the zone is going to be on service; providing a continuing service of the tenants (Haywood, 2004). The old free zone phrase was often described as static, labour-intensive, incentive-driven, exploiting. The new zone paradigm should be seen as a dynamic, investment-intensive, management-driven, enabling and integrated tool for economic development (Haywood, 2000).

3.6 Knowledge Innovation Zone

The Model for KIZ is according to Amidon & Davis (Interview) a vision for how our new global society is emerging. It is a society which is beyond the agricultural and industrial eras where intellectual wealth is the Economic engine for prosperity. According to Amidon & Davis flows of services and goods have the new driving element of knowledge and innovation. Because of this new driving element, dynamics of trade flow has changed forever, where old rules do not longer apply and a new economy is emerging. The rules of this new economy have yet to be understood and innovated. The model of this new society is therefore incomplete but is emerging. The research that has been made of innovation initiatives has made to be able to define key trends, evolving principles, core drivers, suggested performance measures, models of stakeholder innovation and a blue print for architecting a viable development strategy. These are measures that can be used to both nations and companies.

The concepts of these Knowledge Innovation Zones are geographic regions, economic sectors or communities of practise where knowledge flows from origin to the point of highest need or opportunity. These KIZ have been named under a numerous different names: Creative City, Science City, Region of the Future Media Village, High Tech Knowledge Corridor, Knowledge Commons, Smart City etc. To have an understanding for the success and sustainability of the KIZ you therefore have to have an understanding for knowledge performance indicators, network structures, knowledge roles and skills, innovation processes and collaborative technologies (Interview Amidon, Davis).

One part of the definition KIZ is that there are bridges between sectors (academia/ government/NGO´s and business). In the new society links are also made between science, technology, cultural parks, and stakeholder constituencies. According to Amidon & Davis these bridges incorporate the cultural and performing arts and business- sectors which traditionally are viewed in isolation. The forces that now appear are more powerful than the previous geopolitical behaviours and structures. According to Amidon & Davis we are now leaving the economy where material has been scarce. Knowledge is according to them a source of abundance and because of that intangible assets will be much more important than tangible ones. The implication is that this new mindset needs new measurements. Traditional audit and financial reports are no longer the optimal way to indicate performance. (Amidon & Davis, 2006)

3.6.1 The foundation of a KIZ

There are according to Amidon & Davis nine core principles that drive KIZ. These are:

- Knowledge Purpose
- Economic Abundance

- Triple Knowledge Line Growth
- Democratic Community
- Knowledge Governance
- Infinite Intellectual Capital
- Knowledge Network Symmetry
- Knowledge Fusion
- Knowledge Enabling Grid

For a KIZ to be able to leverage knowledge and knowledge flow as primary economic drivers, KIZ must have a core purpose that is something cohesive, distinctive grounded in heritage and energized with a share vision and mission. The prime intent for a KIZ is to employ creativity, knowledge and innovation as resources and inputs for growth and prosperity. In addition KIZ's main purpose is to create liveable and thriving cultural communities, as well as smart organizations infrastructures and platforms. Amidon & Davis describes a KIZ as a similarity to a traditional economic trade zone, but with the difference that in a KIZ, intellectual capital is the commodity being commercialised, traded and exchanged. This "commodity" is much more linked to the society and its environment than traditional tangible assets are. This linkage is important since it is the interaction and collaboration that creates and develop the innovation process. The interaction and collaboration become bench learning tools and are to be used instead of bench marking. (Interview, Amidon)

KIZ are governed by three general laws:

Laws of Knowledge Dynamics (Amidon & Davis, 2004):

- 1st Law- Knowledge multiples exponentially when shared
  (from article in knowledge management) "Knowledge is a limitless and expandable source of economic wealth. Intellectual assets- effectively exploited through innovation – are the most valuable resource to manage."

- 2nd Law- "Innovation value is created when knowledge flows from the point of origin to the need of opportunity".

- 3rd Law – Collaboration provides optimal utilization of resources tangible and intangible. "within and across boundaries"

"Collaboration replaces the competitive (win/lose) paradigm prevalent today. Win/win benefits are based on pooling and leveraging competencies; knowledge know-how and skills." (ref)

Initiatives of KIZ can be categorized in five different phases or areas. They all depend on where and how a KIZ is created.

- Green fields *(i.e initiatives built from scratch in undeveloped territory)*

- Brown fields *(i.e redevelopment of previous smokestack industries´ knowledge based initiatives)*

- Hybrid Projects *(i.e redevelopments integrating expansion as well as repurposing of previous industrial sites)*

- Enterprise or Campus projects *(i.e. creation of new knowledge campuses by academic and or corporate learning environment spaces)*

- Virtual Community Projects *(i.e networks collaborating in cyberspace)*

Amidon & Davis (interview) points out thirteen drivers that can be used as a checklist for regions in becoming a KIZ. These were one of the first ground pillars in their research. Through these, more streamlined indicators and measurements have been created, which are useful the more knowledge innovation driven the zone gets. (Interview with Amidon)

1. *"Replacement of obsolete industries and processes, and revitalize old areas with viable alternatives"*.
2. *"Attract investment in new knowledge-based and creative industries"*.
3. *"Increase the research and development, productivity and innovation in a region or area"*.
4. *"Attract highly skilled creative talent to the community"*.
5. *"Ensure the creation of employment for highly skilled workforce"*.
6. *"Assure the area's competitiveness ranked against similar KIZ's world-wide"*.
7. *"Create a healthy, safe and secure, and environmentally friendly community"*.
8. *"Provide a liveable community environment with access to affordable services and an amenity-rich quality of life such as shopping, entertainment, and sports"*.
9. *"Provide educational opportunities for life long learning and high achievement"*.
10. *"Provide access to the most modern facilities and high-technology infrastructure"*.
11. *"Create a positive social and business climate where there is confidence, optimism, trust, effective leadership, and good governance"*.
12. *"Plan and manage so as to avoid or mitigate various risks"*.
13. *"Create a preferred tourism destination for/with cultural and educational opportunities"*.

When the "checklist" has been fulfilled and the region is to be considered on its way to become a knowledge innovation zone it needs to be measured. Amidon & Davis points

out eleven non financial drivers for a KIZ. With the help of these the measuring tool called the Triple Knowledge Lens (TKL) has been created. (Interview with Amidon) The TKL will be explained more thoroughly later in this chapter. The eleven drivers for a KIZ are:

- Reputation Capital
- Leadership Capital
- Innovation Capital
- Diversity Capital
- Brand Capital
- Network Capital
- Cultural Capital
- Technological Capital
- Organizational Capital
- Strategic Capital and Knowledge Capital

Amidon & Davis have in their studies of KIZ found several powerful and consistent trends which are having an impact in business, socio cultural and technological arenas.

The KIZ trends are:

- Increasing pervasiveness of networks
- Growing Velocity of Change
- The next generation internet
- Pioneering of new business models
- Quest for the best talent
- Virtualization of creative and knowledge markets
- Cultural balance of local needs and globalization
- Increasing open source around sharing of ideas
- Growth in the value of intangibles
- Shift from industrial to digital design economy
- Opportunity to better leverage visualization
- Clustering of talent, techniques, teams and technology in KIZ

3.7 Knowledge Innovation Zone vs. Special Economic Zone – a comparison

In the Knowledge Innovation Zone Research Report (2006), Entovation and the Kaieteur Institute are making a comparison between a SEZ and KIZ. By using 8 dimensions, an understanding of differences and similarities can be achieved.

Time dimension

SEZ and KIZ are concepts that evolved from two different époques:

a. SEZ: SEZ is a concept that emerged around 1970 and is still present today. However, the end of SEZ era will be around year 2010.

b. KIZ: the concept of KIZ is already present. It started to emerge around year 2000, and is predicted to be the leading concept until at least year 2050 or further.

Alternate Concepts
Both SEZ and KIZ concepts have other alternate concepts that are very similar:

a. SEZ: Free Economic Zones, Free Trade Zones, Enterprise Free Zones, Enterprise Trade Zones, Export Processing Zones, Free Ports, Foreign Trade Zones, etc.

b. KIZ: City of Knowledge, Knowledge Port, Knowledge Park, Learning City, Smart Community, Intelligent City, Knowledge Ring, Ideapolis, Technopolis, etc.

Variable Geography
The two concepts not only exist in different time sphere, but also in a different geographical context:

a. SEZ: The SEZ is seen as a trading hub or commerce marketplace. A SEZ can be either situated in a small area, a wide area, be industry specific or performance specific.

b. KIZ: a KIZ is the hub for knowledge and knowledge economy. It can be either located geographically as a knowledge park, in a village, cities, capital. KIZ can also be in a wider area, such as a region, corridor or a country. The main difference between the two concepts would be that a KIZ also can be stretched across borders and exist virtually, using the Internet.

Growth & Development
Since the period of existence differs from the two concepts, growth and development has also been different:

a. SEZ: In the beginning of the SEZ era, about thirty years ago, 80 special economic zones in 30 countries existed. Together, these countries employed about 1 million people and counted for a total export of barely US$6 billion. Year 2006, there are about 3000 SEZ in 120 countries worldwide. SEZ of today

generates US$600 billion of exports and creates 50 million direct job opportunities.

b. KIZ: Since KIZ is a new concept, there is no data available on either development or growth.

Changes over time & future trends
Zones do evolve over time in terms of production, focus and future strategies:

a. SEZ: Over the years, SEZ have shifted industry focus from initial assembly and simple processing to more high tech industries. Initially, textile and clothing were main activities, whereas today the product mix includes many different sectors. Zones have evolved from being low-cost labour intensive to be more science intensive. There is a future trend towards private development of zones, and this often by foreign investors.

b. KIZ: The future trend is that KIZ will shift the focus away from commodities to knowledge based higher value added products and services. This will optimize the use of knowledge as the source of innovation, R&D, business methods, intangible assets, technology and creative thinking.

Economic & Business Objectives
The objectives in terms of business differ between the two zones:

a. SEZ: The economic objective of a SEZ is to foster a steady and sustainable growth. To achieve this, the creation of a profitable business arena is needed, that simplifies business start-up, creates employment, increases economic trade and export, attract foreign investments and incite competitiveness. To attract investors, a minimization of taxes, rules and regulations, policies and other incentives are required.

b. KIZ: The economic objective of a KIZ is to support knowledge-based and creative industries, businesses and economies, where knowledge can lead to balanced and sustainable economic growth and development. Objectives are also to accelerate the creation of knowledge-driven ventures through entrepreneurship and incubation, where knowledge-based products and services can be developed. The idea is to produce knowledge-based wealth and an economy of infinite potential abundance.

Social, Community & Cultural Objectives
The objectives in terms of social life and culture differ between the two zones:

a. SEZ: A special economic zone is less focused on social, cultural or community aspects. In a SEZ, exploitation of low-cost labourers is a fact and workers are trained whenever they are needed. A SEZ does not have any long term interest in nurturing culture or social welfare.

b. KIZ: The knowledge innovation zone, in contrast to a SEZ, supports the enlightened advanced knowledge society and its knowledge citizens. Smart communities are established where social knowledge networks breeds culture and welfare. Good governance foster social responsibility and the elimination of poverty.

Organizational, Technological & Environmental Objectives
The objectives in terms of high tech, organization and environmental attitude differ between the two zones:

a. SEZ: In order to attract foreign capital, efficient communication systems, banking and financial services, logistics, distribution and supply chain processes, as well as modern real estate facilities needs to be established. Also, sufficient transportation infrastructure and access to stable, modern high tech infrastructure is important to sustainable economic growth. A SEZ has low or no concerns about environmental pollution, degradation, and costs.

b. KIZ: The knowledge innovation zone is a flatter, more adaptive and responsive area with networked organizations. Work is done in knowledge networks, communities or project teams, operating both in reality and virtually. High tech infrastructure, with access to technology and internet, and knowledge flow enables innovation and creative thinking. A KIZ focus on a clean, safe and green environment that stimulates knowledge workers and the creative class.

Table 3.2: A comparison between SEZ and KIZ (Knowledge Innovation Zone Research Report, 2006).

	Special Economic Zone (SEZ)	**Knowledge Innovation Zone (KIZ)**
Key words	Economic growth through free trade, tax reduction or exemption, trade friendly policies and export possibilities.	Economic growth via the creation of a knowledge society with a suitable infrastructure that facilitates the flow of information from its origin to the highest point of necessity.
Innovation of what?	Product innovation - Textile and clothing - Electronic equipment - Today; a mix of different industries	Knowledge Innovation - Intangible assets such as brands, business methods, thoughts - R&D, theories & analysis

Objectives	Generate value for the zone and create economic growth through the establishment of new companies & increased production → increase foreign capital investments	Generate value for the zone through the creation of a knowledge flow; knowledge is used where most needed. The flow of knowledge increases creative thinking & innovation → establish new mindsets, visions and leading theories

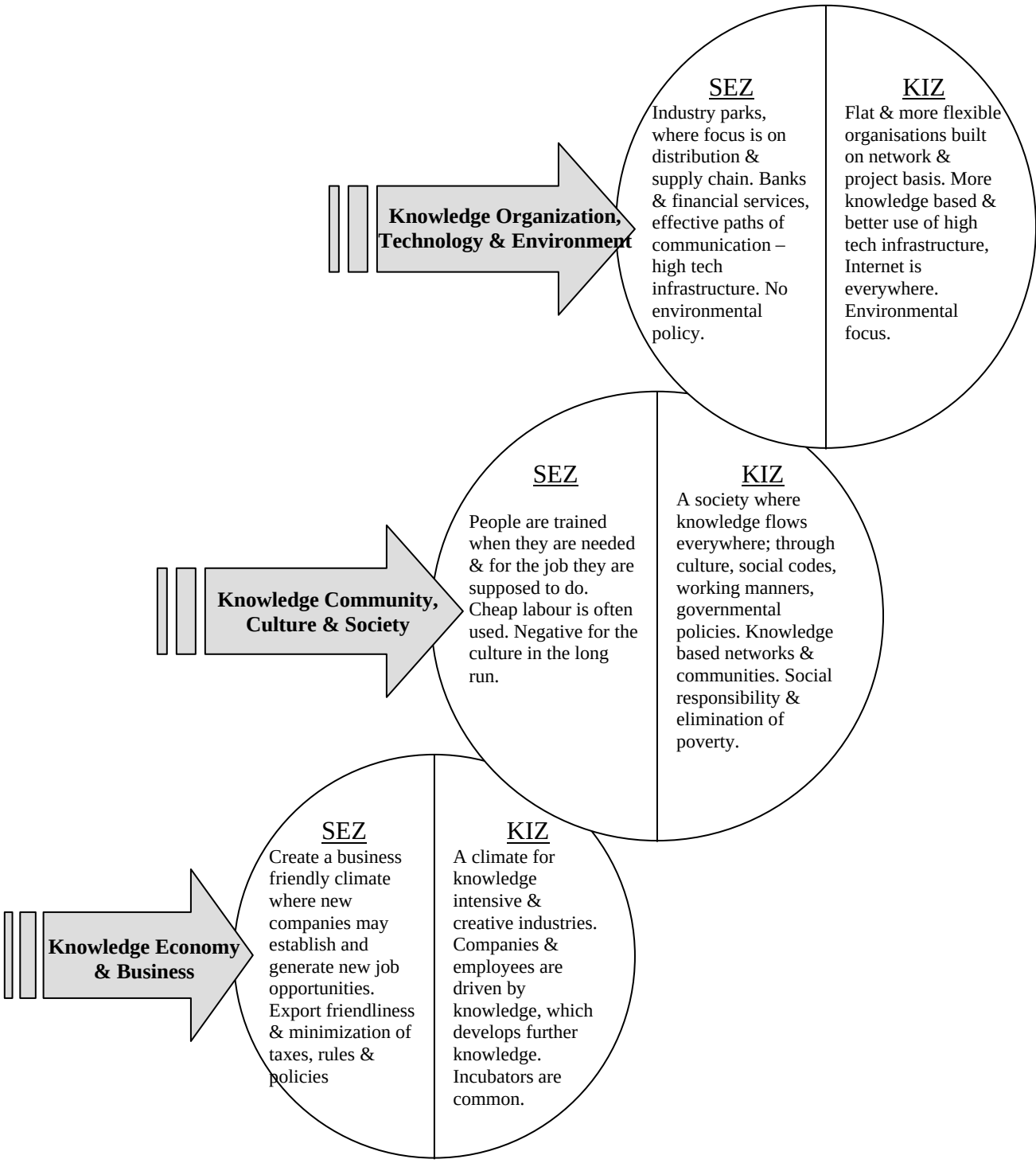

Figure 3.6: Special Economic Zones (SEZ) and Knowledge Innovation Zones (KIZ) seen in the perspective of a Triple Knowledge Lens (Knowledge Innovation Zone Research Report, 2006)

3.8 Triple Knowledge Lens

In the traces of globalisation, multinational companies have understood that they are dependent of innovation that that does not only come from R&D.(Interview Amidon) These companies have understood that they play an important role in the world we live in and has a big impact on its social environment. (Interview Amidon) According to Amidon this also have an effect on their accounting, where they can not only show there financial results but must also show their intangible assets. The financial parameters are not enough when one want to show the health and social environment in a company or a region. This has given the companies and regions the insight that knowledge is of great importance and the availability of it to be spread. According to Amidon, this is a natural step in the reformation of regions dating back to the eighties when governments created zones of industry and technology. In the nineties the big topic was science and technology parks to stimulate entrepreneurship and digital cities with a main thriving force to optimize how information can flow. The topic of the 21st century is that we now leave information and enter the era of knowledge. As seen above, this now means building KIZ. Amidon (Interview) has true her work created a seven steps program that governments, city planers etc can use. She calls this the 7p blueprint. The first p which she calls the "platform" is a starting point called "the triple knowledge lens". This is a way to be able to understand and measure the potential for a region in becoming a KIZ. This lens is based upon three main areas a company/region must acknowledge when becoming a KIZ. According to Amidon (Interview) these are knowledge based economy (business and commerce), the knowledge based society (people, community and culture), the knowledge based infrastructure (organization, technology and environment).

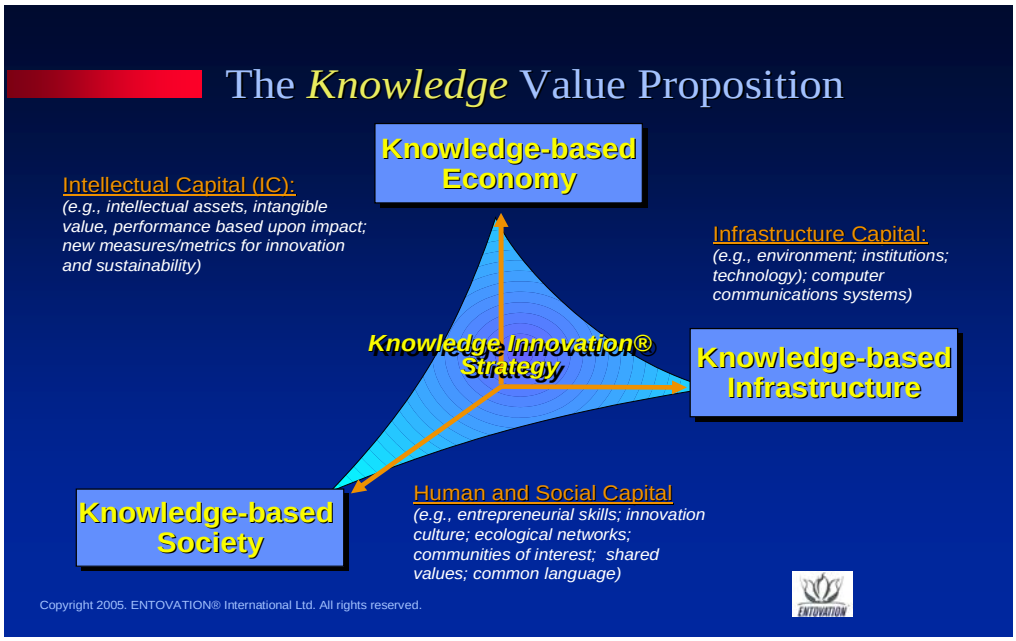

Figure 3.7: The Triple Knowledge Lens (ENTOVATION International Ltd & The KAIETEUR Institute)

3.8.1 The different bricks of a TKL – Knowledge Based Economy

When measuring **knowledge based economy** the common factor is intellectual capital and four different indexes (www.inthekzone.com): *Wealth in human capital index* (WHCI), *Knowledge-based economy strength index* (KBESI), *knowledge markets maturity index* (KMMI) and *knowledge based business innovation index* (KBBII). Amidon raises four different concerns for the knowledge-based economy. These are to be taken into consideration for the planers of a KIZ and be a part of the "platform". She names these concerns:

- Fulfilling the promise

Factors involving businesses are expected to live up to there vision. Will they do that and be realized? Will they only raise revenue for the company, or will they improve the political and social life of the zone?

- The attractiveness Challenge

How will the zone be able to attract investors and people with talent? What will be the important parts in positioning the zone against other similar zones, to raise more funds?

- Models of Knowledge Exchange

How will knowledge be traded? How can the zone be sure of leverage human talent that will be vital in taking a products or service creation to commercialization?

- Foresight – Future Readiness

Since the globalisation is changing the conditions for zones much faster then they did before, zones must create strategic plans that secure them for the future.

3.8.2 The different bricks of a TKL – Knowledge Based Society

The second area in Amidons (Interview) Triple knowledge Lens model is four indexes for measuring the **knowledge based society**. These indexes are (www.inthekzone.com): *Wealth in Relationship Capital Index* (WRCI), *Population Knowledge Motivation Index* (PKMI), *Creative Affinity Index* (CAI) and finally *Knowledge Stakeholder Interactions Innovations Index* (KSIII). As with knowledge-based economy, Amidon (Interview) raises four concerns for the knowledge-based society.

- Change and Adaptation

People and organizations must change and adapt to new technologies. They must also adapt new realities in there world. How will the zone be able to create measurements that can help and stimulate these changes and adaptations?

- Internalizing A continuous Innovation Culture & Mindset

How can a KIZ establish a system that makes them not inventing the wheel again, but rather learn and take advantage of new knowledge. How can the zone, strategize it self, to continuously create knowledge innovation.

- Political Risk

How do you proceed with an aggressive development path, without alienating existing centers of influence and power? And how do you also achieve grassroots support from a wide cross-section of the social spectrum? How do you avoid resistance and backlash that might impede progress?

- Knowledge Leadership challenge

How will a KIZ be able to attract leadership that has the experience to take the zone through its vision and at the same time understand the difference between industrial economic and the new knowledge based economy?

3.8.3 The different bricks of a TKL – Knowledge Based Infrastructure

The third parameter is how to measure **knowledge-based infrastructure**. To be able to measure the infrastructure Amidon suggests following indexes (www.inthekzone.com): *Wealth in Structural Capital Index* (WSCI), *Knowledge Enabling Technology Index* (KETI), *Knowledge Ecologies Index* (KEI) and last the *4p Innovation Index*; Principles, Policies, Practices and Processes. The concerns regarding knowledge-based infrastructure are:

- The Digital Divide
  How will the KIZ create a digital infrastructure, regarding internet, telephones etc that both foster the businesses but also culture and demography. How will it make sure that it affects all parts of the population?

- Intellectual Property Rights
  How will the legal system be incorporated in protecting intellectual property?

- Technology Forecasting and Assessment
  How will the KIZ make sure that there strategic decisions and investments comprehend with new technology?

It is according to Amidon not enough to just measure the infrastructure in a region and not taking its environmental effects in to consideration. At the same time she means that there is no point in measuring the business climate if you do not at the same time consider the importance of cultural entities for the inhabitants. The point is to create a big picture of a region to be able to understand its potential. (Interview, Debra) With the new measurement indexes Debra means that a region can not longer just rely on old measurements (e.g GDP or Patents). She means that there is no point in just measuring how many patents a region create. What they must do instead is to realise that the importance lies within measuring how many that gets realised and commercialised and

by doing so creating value. The idea with the TKL is also to show that in order to progress you need to have a symbiosis between all sectors of the zone. She uses the metaphor with a kaleidoscope. If you just change on bit in one area the entire picture changes. She means that a zone has to work with the three lenses parallel for it to thrive. (Interview, Debra)

As we have seen above Special Economic Zones were and still are created as an effect of globalisation. Scarcities of products, raw materials, labour and economic factors as scale and scope have been the thriving forces for these Zones. In the new knowledge driven era these factors are no longer important. (Amidon)

During the industrial era, companies competed for market shares and considered that to be the way to play the game. Reporting was considered to be a tool for controlling, both companies and people. And what you delivered to the market was a product. John Elkington () use these three parameters as part of eleven trying to explain how companies could show there accounting, connecting financial, social and environmental values. He called this way of accounting during the industrial era the Single Bottom Line. When the information era began, during the nineties, the roles changed. Cooperation became more important than competition and reporting systems became more important as a balance tool. Products were changed to solution and the entire bottom line accounting shifted to what Elkington called the triple bottom line. What Amidon now talks about is taking this one step further. The knowledge era, which consists of KIZ created with the triple knowledge lens have changed the factors of the parameters once again. Collaboration is now the right tool for markets. Reporting systems will be of best help in learning and what the companies/regions will deliver is innovation.

3.9 Our interpretation of Triple Knowledge Lens: TKL Performance Measurements

Using the theories presented above in this chapter, we have developed 24 performance measurements. These are based on Ms. Amidon and Mr. Davis theories of knowledge innovation zones and its belonging triple knowledge lens. Combined with prior research on intellectual capital for regions, they form the foundation of the new language spoken in knowledge innovation zones. Our aim is to apply these 24 performance measurements on our two regions, and it is developed to form a structure for future comparisons amongst regions.

Table 3.3: TKL Performance Measurements (Hansson, Littorin, Svensson, 2007)

Three Lenses/Capital Drivers	**Human capital** → Knowledge Economy & Business	**Relationship capital** → Knowledge Community, Culture & Society	**Structural capital** → Knowledge Organization, Technology & Environment

Leadership Capital & Diversity Capital	Ethnical groups in the zone	% of highly skilled professionals with higher education, originating from abroad	No. of published scientific papers
Knowledge Capital	Exchange students as a % of total amounts of students	Municipal and District libraries Books per inhabitant	No. of available PHD placements
Organizational Capital & Strategic Capital	Employment in high tech sector as a % of total employment	Number of foreign investments made in the zone	No. of companies incubated in science parks
Network Capital	DOI Index	No. of projects between industry and university	No. of hotspots per 1000 inhabitants
Innovation Capital & Technological Capital	% of patent leading to commercialisation	% of zone GDP spent on R&D	% of zone GDP spent on DOI infrastructure
Cultural Capital	Cultural and literary professionals per one million inhabitants	% of urban areas covered in greenery	% of total zone administrative budget spent on cultural entities
Ecology Capital	CO^2discharge per capita	No. of companies with ISO14000EMS accreditation	% of consumed kWh produced from renewable resources
Reputation Capital & Brand Capital	Inhabitants turn-over	No. of international summits	% of total zone administrative budget spent on branding/marketing activities

3.9.1 Further explanations of the TKL Performance Measurements

Leadership Capital & Diversity Capital

- **Ethnical groups in the region:**

  Number of ethnical groups that live in the zone. Most recent data available.
  Implication: This measurement will show the degree of diversity and openness in the zone.

- **% of highly skilled professionals with higher education originating from abroad:**

  Percentage of people employed in highly skilled professions with higher education originating from outside the border of the country/countries where the zone is situated. Higher education should at least be a college or university degree. Most recent data available.
  Implication: This measurement will show the degree of diversity in highly skilled professions.

- **No. of published scientific articles**
  Number of scientific papers that has been published by researcher in the zone in one year. Most recent data available.
  Implication: This measurement will indicate the thought leadership in the zone.

Knowledge Capital

- **Municipal and District library books per inhabitant**

  Number of available library books per inhabitant in the region. Most recent data available.
  Implication: This measurement will show the ability the inhabitants have in the region to increase there knowledge.

- **No. of exchange students as a % of total amount of students:**

  Most recent data available.
  Implication: This measurement will show the degree of interaction between students from the region and students from abroad.

- **No. of available PHD placements:**

  Number of available PHD placements in the zone. Most recent data available.
  Implication: This measurement will show the readiness of the regions infrastructure in handling research and knowledge development.

Organizational Capital & Strategic Capital

- **Employment in high tech sector as % of total workforce:**

  High technological employment as a percentage of the total industrial employment in the zone. Most recent data available.
  Implication: This measurement will show the size of the technology industry in the zone regarding employment.

- **Number of foreign investments made in the zone:**

  Number of foreign investments that has been made in the zone in one year as a percentage of GDP. Most recent data available.
  Implication: This measurement will show how big the will to invest in the zone has been, which is an important indicator of possible future growth.

- **No. of spin-out companies from science parks[1]:**

  Number of spin-out companies that is a result from science parks in one year. Most recent data available.
  Implication: This measurement will show the success of zone science parks in terms of knowledge transfer infrastructure and creating new businesses.

[1] "Science Park: a science park is a property development designed for a concentration of high-tech, science or research related business" (www.wikipedia.org)

Network Capital

- **DOI Index:**

  Measurement of the fulfilment of Digital Opportunity Index (DOI). In an ideal world, the whole population having easy access to ICTs at affordable prices; all homes equipped with ICT devices; all citizens having mobile ICT devices; everyone using broadband. Most recent data available. This index measures from 0-1 where 1 is 100%
  Implication: This measurement will show to what extent zone inhabitants are making use of, and can afford, existing technology and communication channels.

- **No. of projects between industry and university:**

  Number of collaborations between industry and university in the region.
  Most recent data available.
  Implication: This measurement will show the willingness to learn and collaborate in order to increase the welfare in a zone.

- **No. of hotspots per 1 million inhabitants:**

  Number of hotspots[2] per 1 million inhabitants in a zone. Most recent data available.
  Implication: This measurement will show how well the infrastructure is supporting channels of communication and knowledge transfer.

Innovation Capital & Technological Capital

- **% of patent leading to commercialisation:**

  Percentage of all patents that leads to commercialisation within a period of five years. The choice of period is due to the time it will take for a patent to be commercialized.
  Implication: This measurement will show actual knowledge innovation, since a patent can not be capitalized upon if not commercialized.

- **Industry spending on R&D as a % of GDP**

  Percentage of total GDP that industry is spending on research and development within a zone in one year. Most recent data available.
  Implication: This measurement will show how much companies values research and development that can lead to knowledge innovation.

[2] "Hotspots are venues that offer Wi-Fi access. The public can use their laptop, PDA, Dual-mode phones, Nintendo DS or PlayStation Portable to access the Internet" (www.wikipedia.org, http://en.wikipedia.org/wiki/Hotspot_%28Wi-Fi%29).

- **% of zone GDP spent on DOI infrastructure**
  Percentage of total GDP that is spent on DOI[3] infrastructure in one year. Most recent data available.
  Implication: This measurement will show how important a zone sees ICT as a possibility to develop and facilitate the flow of knowledge and innovation.

Cultural Capital

- **Cultural and literary professionals per one million inhabitants:**

  Most recent data available.
  Implication: This measurement will show how strong the human cultural capital is. It will also give an indication on the possibility to survive on culture and literacy.

- **% of total zone administrative budget spent on cultural entities:**

  Percentage of total zone administrative budget spent on cultural entities in one year. Cultural entities are i.e. art galleries, museums, theatres, cinemas, exhibitions, galleries, concerts etc. Most recent data available.
  Implication: This measurement will show how zone administration value cultural development.

- **Available greenery as a % of City area:**

  % of land area in major cities that is covered with greenery (i.e. public parks) Most recent data available
  Implication: This measure will show the recreation availability for the city inhabitants.

Ecology Capital

- **CO^2 emission per capita:**

  Carbon dioxide emission in the zone divided per inhabitant during one year. Most recent data available.
  Implication: This measurement will show the level of pollution in the zone.

- **No of companies with ISO14000EMS accreditation:**

  Number of companies in the zone that has received an ISO14000EMS accreditation. Most recent data available.

[3] "The Digital Opportunity Index (DOI) is at the present the most extensive ICT index providing an internationally-agreed benchmark of the status of ICTs around the world, and can be used to track progress made in infrastructure, opportunity and utilization of ICTs" (www.wikipedia.org)

Implication: This measurement will show the environmental standard among companies in the zone.

- **% of consumed kWh produced from renewable resources**:

  Percentage of total consumption of kWh that is produced from renewable resources. Most recent data available.
  Implication: This measurement will show if action is taken towards a more environmental friendly lifestyle in the zone.

Reputation Capital & Brand Capital

- **Inhabitants turn-over:**

  Inhabitants moving in versus moving out of the zone as a % per year. Most recent data available.
  Example: 1000 moving in, 500 moving out = positive net value of 500→2,0 positive turn-over.
  Implication: This measurement is seen as the indicator of brain-drain in a zone, as well as a measurement of attractiveness of a zone.

- **No. of international summits:**
  Number of international summits that are held in the zone during one year. Most recent data available.
  Implication: This measurement will show the interest of organizing these events from a zone perspective, as well as the attractiveness the zone has as a base for international knowledge transfer.

- **% of total zone administrative budget spent on branding/marketing activities:**

  Percentage of the total zone administrative budget that is spent on branding and marketing activities. Branding and marketing activities are activities which aim to increase the value of the zones brand itself. Most recent data available.
  Implication: This measurement will show how important zone administrative think of branding as a tool to attract foreign investment, talent, collaboration and tourism.

4 Empirical Research

In this chapter, the reader will be introduced to the reality. We will present our qualitative empirical research in an objective perspective, starting with the two regions and how they have developed from what they were, till what they are today. Further on, qualitative data from our empirical research of both regions will be examined.

4.1 The Öresund Region

"With the building of the bridge between Copenhagen, Denmark, and Malmö, Sweden, water ceased to be a barrier. Sjælland and Skåne are linked. New opportunities are opened. Two countries are brought together in one region. Öresund is born."

The Birth of a Region, 1999 (in Berg et al. 2000)

When the bridge over Öresund was finalized and inaugurated in July 2001, a vision was fulfilled. Two countries and their regions had been merged together in one, forming the Öresund Region, with the eastern part constituted by Skåne, Sweden, and western part located on the Danish island of Sjælland. But the vision of uniformity and collaboration had emerged many centuries before, in times of war and conquests. Today, Öresund Region has flourished to a region of a region of peace and prosperity; a region of knowledge wealth and innovation richness; a region of collaboration and neighbourliness. However, this has not always been the case.

4.1.1 A history of love and hate

Öresund, strategically located between the two kingdoms of Sweden and Denmark, was during a long period of time a target of fighting and political disputes. The one who controlled the strait would also control of flow of international traffic in and out of the Baltic Sea. He would also gain important revenues from toll of merchants passing through. Thereby, the geographical position of Öresund made it a location where fierce and furious battles between the two kingdoms were fought during the sixteenth and seventeenth century (Berg et al, 2000:10; Öresundssymposium, 1998:152).

From the Viking Ages, until the middle of seventeenth century, Skåne was an integral part of Denmark. However, during a war between the neighbours (1657-1658), Swedish King Karl IX succeeded to conquer this north-eastern part of Denmark. With the Peace

of Roskilde (1658), Skåne was incorporated with the Kingdom of Sweden, and after the Peace of Copenhagen (1660) the natural border became the water of Öresund strait. Although later hostilities and treaties, due to the Danes rejection of recognizing a Swedish rule, Skåne remained Swedish and the strait kept its position as a natural boundary between the neighbours. The strait constituted a mental barrier between the countries, just as much as a physical one (Berg et al, 2000:10; OECD, 2006; Öresund University, 2006).

The following centuries were calm and the relationship between the countries improved. The two neighbours ended up being two of most prospering and richest countries in the western world. Former hostility was changed to friendliness and brotherhood. According to Berg et al (2000:10), discussions of building a bridge across Öresund first aroused in the late nineteenth century. The strait was then full of steamboats taking passengers on the main routes Malmö – Copenhagen and Helsingborg – Helsingør, and the region could enjoy a substantial upswing in trade with each other.

After World War II, a significant boom in the industry and communications over the strait started to escalate the growth of the region. The ideas of a bridge over Öresund once again came to thought. This time a more concrete project was developed; a plan of building a joint metropolis, with the name Ørestad. The idea was however dismissed due to environmental politics, oil crisis and an economic stagnation during the 70s. The vision once again vanished into the dark (www.oresundsregionen.org).

4.1.2 Bridge over troubled waters

At the end of the 20th century, ideas of a connecting link between the countries started to thrive again. But the interest from important stakeholders was tepid due to the fact that there was a very limited group of people travelling across Öresund. It consisted mostly of day-trippers and tourists, a few commuters, students, and business contacts. The idea of a bridge and a unified region was neither supported by the industry, nor by politicians. “Copenhagen was not more than a shabby city and focus was on the rapidly growing industrial developments in Jutland, whilst Skåne was only fields and some tourists. Malmö was a ragged stop-over for people going to Denmark” says Bengt Streijffert, Director of Öresund University. Both Malmö and Copenhagen were facing great economic difficulties, due to the disappearance of heavy industry, such as ship building, automobile assembly plants, textile factories etc., which used to employ a severe part of the population (Öresund University, 2006).

According to Berg et al (2000), some people started to see the possibility of the bridge as an economic stimulant of southern part of Sweden, heavily affected by this high unemployment and an aging industrial structure. A link would also give Copenhagen, threatened by the growing importance of Jutland, a better position as a national commercial and industrial centre. There were other possibilities of linking the two

regions together; companies had seen the success regions such as Silicon Valley, and started to see regions as a way of building competitive advantages and gain visibility. At the same time, EU noticed the opportunities with regional thinking, and called for action. The timing of establishing a crossing link couldn't have been better.

In 1991, a mutual decision of building a fixed link from Malmö to Copenhagen was taken, and the vision started to become reality. The sea channel would no longer be a barrier to greater interaction between the countries. The 1rst of July 2001, the Öresund opened for public use after an outlay of $ 1.9 billion and nine years of construction (The Economist, 2003). It is today the longest cable stayed bridge for road and rail transport in the world and since the opening. Traffic across the strait increased by 34% immediately after the opening, and today about 75 million persons have crossed the bridge. (www.oresundsregionen.org; OECD, 2006).

4.1.3 Öresund today

What implications did the fixed link have for Öresund as a region? First of all, the Öresund Link is according to Olshov (2000) so much more that just a highway, covering 16 kilometres of motorway. It is in fact the first connection between Denmark and Sweden since the Ice Age 7000, as well as a catalyst for cooperation and convergence.

Osborne (2006) describes the bridge not only as a symbol of growth in cooperation between areas, but that it de facto facilitates geographical mobility, which is vital to deeper interaction. According to him, the overall goal of the Öresund collaboration is to generate a fully functional region that can compete with other regions. Öresund University (2006) agrees, and declares two main visions that were fulfilled when the bridge finally came to place. First, the bridge was a part of a greater thought of trade, where the fixed link as infrastructure played an important role in giving Swedish industries an access to European markets. Second, the bridge was about creating a region that could compete with other large cities such as Helsinki, Berlin, Stockholm, Hamburg and Amsterdam.

Further on, Matthiessein (2004) portrays a south Scandinavian region that has experienced a fundamental change due to the opening of a fixed link. The result is a reduced time distance between the two nations, an elimination of land-sea barrier and bottleneck, as well as a merging of two rich concentrations of population and production.

According to The Economist (2003), cities like Malmö, that during a long period has been a depressed area, is now the fastest-expanding city in the country. In the region, small firms are flourishing, bigger international companies are moving into the area and many new jobs have been created.

Öresund Region today consists of 3,5 million inhabitants, with about two thirds living on the Danish side, and remaining one third on the Swedish side; a total of 27% of Sweden's and Denmark's population. The greater part of the populations tend to live in the urban areas close to the Öresund strait, while more provincial areas are found in the hinterlands. Total area of Öresund Region is 20,859 km^2, and compromises on the Danish side Sjælland, Lolland-Falster, Mon and Bornholm, and Skåne on the Swedish side. Largest city is Copenhagen, with about 1,5 million inhabitants, and thereafter Malmö, housing about 260,000. The region as a whole has an unemployment rate of 6,4% (2005), which is considered relatively low (OECD, 2006; Öresund University, 2006).

Figure 4.1: Öresund Region (Öresund University, 2006)

Gross Regional Product (GRP) of Öresund equalled year 2004 about 104 billion Euro and a GRP per capita of 29 052 Euro. Since 1995, there has been an increase of both GRP and GRP per capita in the whole of the region. In Denmark, the GRP/capita exceeds the national GDP/capita, but in Sweden these scenario is reversed (www.orestat.scb.se):

Table 4.1: GRP/capita (in Euro) in the Öresund Region, Denmark and Sweden (Source: www.orestat.scb.se)

	1995	**1998**	**2002**	**2004**
Total Öresund Region, DK+SE	20 523	23 400	27 358	29 052
Öresund Region DK	22 068	25 200	29 148	30 787
Öresund Region SE	17 267	19 576	23 599	25 403
Denmark	19 941	23 045	27 021	28 862
Sweden	18 886	21 243	25 319	27 745

In terms of gross regional product, Copenhagen is ranked 19th of the European cities. However, combined with Malmö/Lund, they together moves up to an 11th place (Hansen and Hansen, 2006).

Öresund University (2006) describes the mobility in the region as high, both within and to the region. Danes immigrating to Sweden have quadrupled since the opening of the in 2000. But most Danes choose to keep his or her employment in Denmark, and commutes over the bridge on a daily basis. The reason for this is lower costs for housing and cars. Combined with higher wages in Denmark, the quality of life improves increasingly. The number of commuters is now up to 10,000 people per day. According to Bengt Streijffert, Copenhagen is experiences an inflow of manpower, but the Swedish part of Öresund have more difficulties in retaining its talents. Especially graduating students seems to be a group that is hard to keep. Either they move over the strait to Copenhagen, or they move out of the region, abroad or to other regions such as Stockholm. This brain drain is negative for the region as a whole according to Mr. Streijffert. In the economic upswing that the region now undergoes, companies are having trouble in finding talents. Öresund is however not the only region in the world with this problem, but it might affect its possibilities to grow. Without enough educated manpower, foreign investments in the zone will also decrease. It is therefore vital for Öresund to retain its most valuable asset – the human capital.

Interesting enough, the Öresund Region is a cross-border region, including two different countries. This implies that there are in fact great cultural, lingual, political and social differences, irrespective of the close distance. Öresund region does not have any administrative zone government, coordinating activities such as investments, marketing, education or future planning. Instead, Öresund consists of many smaller bodies that are collaborating over the trait and who work with the development of the region in various ways. Political decisions are still taken by each country, either on regional or national level, but the collaborating organisations of Öresund are often influential enough to affect the politics in the region. Regardless of national belonging, the bodies are working in the same direction, driven by the same interests; to be a part of the new knowledge region that is created (Interview with Bengt Streijffert, Director Öresund University). Bengt Streijffert says that the thought of creating regions is a way of surviving in the new game field the knowledge economy has brought upon us.

Bringing the two countries together has been a positive experience so far. In an international perspective, the region illustrates two countries, known for efficiency, competitiveness and transparency, are brought together to combine welfare and economic growth, creating a secure and equal society. But this is not the truth everywhere in the region; “There are two parts of this knowledge region”, says Bengt Streijffert, “on the one hand we development, growth and the positive part of knowledge exchange, which is a project for the elites, including about one third of the population.

On the other hand, there are ghettos with high unemployment and the lowest education level in the countries. And they can hardly be counted as a part of the knowledge region". Urban ares are wealthier than rural areas, and the region includes both some of the most advanced and most depressed areas in Denmark and Sweden. This gap has according to OECD (2006) increased due to the draining of population, industries and services from rural areas to cities. This negative backwash effect of growth tends to outweigh the positive effects in these peripheral areas.

4.1.4 Öresund – The Human Capital of Scandinavia

"It's no wonder that the Øresund Region is doing so well. While others are building walls, the Øresund Region is building bridges"

Øresund – Two countries, One Region (Øresund Network, 2006b)

Heavy investments have been made in the Öresund Region to put the area on the map (OECD, 2006). Öresund wants to be communicated as the human capital of Scandinavia, where everything is measured in human terms and the greatest asset and competitive advantage is the human capital. In communication, slogans as "Two Countires - One Region", "Øresund – Technology with a human touch", "Øresund – Where Human Capital Grows", "Øresund – The Nordic Main Gate" and "Øresund – Quatlity of Life" is used to stress the message of a knowledge region – a region where human capital is at its best and live a joyful life (Øresund Network, 2006a; Wolff, 2003). Further on, two main core values should according to Øresund Network (www.oresundnetwork.com) pervade all communication: (1) Cross-border region and (2) humanity. Cross-border region refers to the fact that two nations are collaborating over the borders, but also to collaboration between high tech, research and development, science, architecture, business etc. Humanity refers to the importance of the human capital that is what makes the region successful and to an attractive area. A high level of education, an international region and a good quality of life are another ways to communicate humanity (www.oresundnetwork.com).

Considerable investments in infrastructure, urban development and restructuring have been made to facilitate for investors and inhabitants, such as the Copenhagen International Airport and Copenhagen Metro. Mr. Streijffert, Öresund University, points out the importance of a having good, accessible airport, saying that "if you just have an airport, everything else will work out fine". Copenhagen airport is the tenth busiest passenger airport and the sixth busiest cargo airport in Europe (OECD, 2006). Investments as the Öresund Link have turned the region into a major logistic hub in Europe and increased the accessibility within the region drastically. Copenhagen is today among the worlds 5 best big cities to live in, and both countries has been ranked as the most tolerant and open societies in the world (Øresund Network, 2006b). Other example of infrastructure investment is Ørestad, a science city, located within the Greater Copenhagen Region, which has been planned to integrate science parks, universities and labs with residential areas, companies, restaurants and hotels to tens of

thousands of people. Similar to Ørestad, in the Swedish part of the region, investments in development have been made. In Malmö, the former dock area has been transformed to a whole new town, including Malmö University, incubators, attractive living and interesting architecture (OECD, 2006).

Key industries in the Öresund are biotechnology; pharmaceuticals and health; information technology and communications; food; tourism, culture and recreation; transport; building construction; and business and financial services (OECD, 2006). Education is another important part of the region. According to OECD (2006), there are 20 higher education institutions in the Öresund area. Twelve of them are connected together in a voluntary consortium called Öresund University, which aim to create the greatest transnational university collaboration in Europe by increasing the co-operation and exchange of knowledge within the consortium, as well as with international universities. In total, Öresund University includes 150 000 students and 14 000 researchers (www.uni.oresund.org). Collaboration takes place mostly at faculty and department levels, and consists of joint courses, creation of research and joint networks etc. By building networks and partnerships, Öresund University wants to develop the human capital of the region, as well as its research. Measured in scientific output, Copenhagen is positioned 21rst in Europe, and Malmö/Lund just within the top 30. Combined together, these two areas are ranked 5th in Europe (Matthiessen, 1999; Matthiessen and Schwarz, 1999; in Hansen and Hansen, 2006).

Even though collaboration seems to be happening on daily basis, there is generally a lack of civil society organisations involved in cross-border activities. Collaboration is happening mostly via businesses and public organisations, and civil society is rarely initiating such cross-Öresund initiatives (OECD, 2003 in OECD, 2006).

4.1.5 A Region of Knowledge

The Öresund Region is today prominent when it comes to science, technology, research and development. An OECD report from 2003 (OECD, 2006) describes four knowledge-intensive activities that the region has developed significant strength in: (1) medical, pharmaceutical and bio-technology industries, (2) certain segments of information and communication technology industries, (3) the food processing industry, and (4) environmental technologies. This knowledge creation and innovation is pointed out by experts and politicians to be sources of future economic growth for Öresund.

There are six fields that officially represent the high tech industry of Öresund (Øresund Network, 2006a):

Table 4.2: The five areas of high tech industry in Öresund (Source: Øresund Network, 2006a)

Target Areas	**Facts**

Medicine/bio-tech	The Öresund Region has the largest pharmaceutical and bio-tech nucleus in Scandinavia, includes i.e. the science cluster "Medicon Valley". In this field, the region is ranked 3rd in Europe, after the triangle of Oxford-Cambridge-London in Great Britain, and the French capital of Paris.
IT/Telecoms	This sector provides employment for around 104,000 people in the region and constitutes the largest concentration of IT competence in Scandinavia.
Food Industry	The food and drink industry in the region is export-oriented and ranges from multinationals to niche developments companies, focusing on functional food.
Environment	The region is working to become a world leading environmental cluster, where research is conducted on aquatic and marine environment as well as energy and policy planning.
Logistics	Geographically, the Öresund Region is a gateway to the Baltic and a hub in Northern Europe, which has made the region to a logistic centre.
Design	The region is a producer of design which is exported worldwide, such as furniture, computer games and porcelain.

In order to create a better understanding between the five different sectors, organisations for one of each of the areas have been established. These together form the strategic alliance of Øresund Science Region, where the aim is to promote growth through collaboration (Øresund Network, 2006a). It also aims to establish state of the art scientific clusters, and thereby make Öresund internationally known as a high tech region (Osborne, 2006). Within Øresund Science Region, there are different networks, or clusters, depending on scientific area. One of these clusters is the biomedical cluster "Medicon Valley", that in a report from 2002, conducted by The Boston Consulting Group, was stated as among the strongest biomedical clusters in the world (Wolff, 2003). Other research networks are Öresund IT Academy, Öresund Food Network and Öresund Environment Academy (Osborne, 2006).

In addition to these research networks, the region has developed Science Parks; an area set aside for business and institutions focused on R&D. They linked with to universities and hosts start-ups as well as bigger companies. Science Parks, as Ideon in Lund and Symbion in Copenhagen, are established to bring together research and companies to generate innovation and business prospects (Osborne, 2006).

As mentioned above, Öresund consists of many hi-tech industries, research parks and science clusters, where scientific cooperation, research and development happen on daily basis. High tech services are located around large town and cities, such as

Malmö/Lund and Copenhagen. Between year 1997-2002, the high tech sector experienced strong growth of 20%, when the growth rates for total employment was not more than 4,6%. The share of the high tech sector in total employment in the Öresund Region year 2002 was 7,2 %, where Sjealand dominates the region in both high tech manufacturing and high tech services. (Hansen & Serin, 2005:114).

According to Hansen & Serin (2005:111), this gives Öresund a seventh position in the EU when it comes to high tech manufacturing and knowledge intensive services, and a ninth position in terms of high tech services. German regions are considered to be in the front, which according to Hansen & Serin (2005:111) is not a coincidence since it is the largest economy in Europe.

4.1.6 Success of the region

The fast development and increasing growth in the Öresund Region is according to Bengt Streijffert due to a few specific factors. First, the lack of territorial thinking or protecting one's reserves has created empty fields where new ideas can flourish and grow. Second, the lack of a strong political rule has made it possible for projects to grow unreservedly. Initiatives are driven by regional public bodies without an overall political or bureaucratic level of administration. Bengt Streijffert: "In the region, projects have been established via bottom-up thinking, and these are projects that never could have aroused via political planning". Third, the bridge is according to Mr. Streijffert another important factor: "The bridge has made us open our minds for the other side of the strait, bringing both possibilities and needs. Cooperation as we see it today could have happened without the fixed link, but it would have taken a serious amount of time. The bridge has acted as a facilitator as well as a catalyst for integration". Fourth, the cross-border relationship has brought new thoughts and ideas to the region, where everyone is working in the same direction, with successful ventures in areas such as medicine/bio-tech as a result. Fifth, Mr. Streijffert says, the close collaboration between universities, authorities and business community in science clusters – the triple helix model – has been appointed as a model for other European regions. Another important part of the success is according to Mr. Streijffert the fact that Öresund Region has developed its society according to the new world order: the knowledge economy and everything it represents.

When it comes to the future, Bengt Streijffert is not sure where Öresund will be: "What is happening now in our region is happening all over Europe, i.e. German regions are growing at a very fast pace". Mr. Streijffert continues: "In 10 years we have either been passed by regions as Stockholm, Uppsala, Berlin or St Petersburg, or we the same position as today". The competition is fierce and it is getting worse. According to Bengt Streijffert the strategy for Öresund Region is to keep having everyone working in the same direction and strengthen the region in order to attract more talents, collaborations and foreign investments. He believes that internal competition will stimulate regional

actors to work harder, as well as it will foster the pioneer spirit in the region and keep Öresund competitive.

4.2 Shenzhen

4.2.1 Shenzhen and the history of a SEZ

In the late 1970s Shenzhen was just a small border town living of agriculture and the 26 small factories situated in the area. The small town located in the Guangdong province, south-east China, was housing about 20 000 inhabitants when it by the government in 1979 was designated as the first SEZ of the country. Less than 30 years afterwards, Shenzhen has developed into a modern city with 8,28 million inhabitants, a GNP per captia of approximately US$ 7 162 in 2004 (Sveriges Generalkonsulat, 2005). Between 1980 and 2001, the annual GDP growth rate was 29,5%; the industrial output increased 45,4% per year; and the foreign trade rose annually with 39,1% (Wang and Meng, 2004).

Figure 4.1: Shenzhen (www.wikipedia.org)

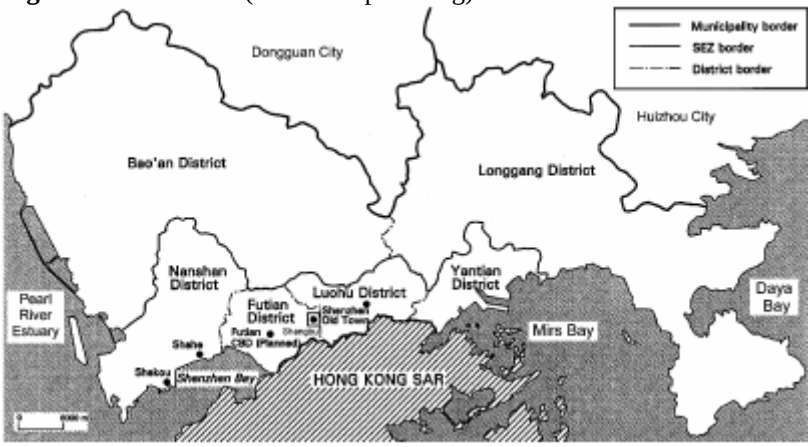

Figure 4.2: Districts in Shenzhen (Ng, 2003)

How did Shenzhen become one of the most rapidly evolving cities in the world, and what were the driving factors behind such an enormous change in such a short period of time?

4.2.2 Political background to the development of Shenzhen SEZ

In 1949 when Mao Zedong took control over China and founded the People's Republic (PRC), he began to close all trade connections with the world. Even though Mao himself wasn't in charge of exchanges between China and foreign countries, he had made recommendations of minimizing such co-operations. According to Mao (1977), each country should do its best to be self-reliant and work independently to the greatest extent possible and thereby making a principle out of not relying on others. "Reliance on other countries…is most dangerous" (Mao, 1977, p.103). Import of goods should only be made after several attempts have been made to produce them locally, and exports should only occur when local need of a product has been satisfied.

Mao's recommendations were clearly followed by his comrades. However, Mao who had inherited an economy torn by years of war and fighting understood that the PRC needed an ally. Because of the anti-communist ambiance created by American policies, he turned to the Soviet Union for economic and military aid. This relationship was short-lived, and in 1960 the Soviet Union withdraw all aid and the People's Republic was standing alone. During the Great Proletarian Cultural Revolution that followed in 1966, self-reliance once again became the keyword. By this time, self-reliance turned out to be more of a self-isolation, as China broke its diplomatic relations with one country after another (Wong and Chu, 1985, p.27).

By 1969, more moderate politicians succeeded to convince Chairman Mao that this total isolation did worse than it did well. Disastrous economic experiments in combination with poor harvest and damaged international relations had left the country and its population in a very bad shape. Now things started happening. China restored its political relations with Japan, United States and many other countries – but not the Soviet Union or East European bloc. Between 1970-1975, transactions with non-Communist countries increased from US$3,5 billion to US$12,2 billion (Wong and Chu, 1985, p.27), which was a dramatic change. These new, more trade friendly policies encountered constant resistance from the ideological Left wing of the communist party. Especially one man became target of this harassment, namely Deng Xiaoping, one of Mao's close comrades who had been General Secretary of the Communist Party and advocated more pragmatic policies. Deng was forced to retire all his political offices – but he would return soon thereafter.

The death of Chairman Mao in 1976 led to a downfall of this left wing fraction, and made way for new, refreshing ideological thought of mind. Deng Xiaoping returned to power and steered China towards a more relaxed and flexible approach to self-reliance and interdependence. His official post was only Chairman of the State and Communist party Central Military Commissions, but he was actually far more influential than other comrades of the party. Deng started to rebuild on the foreign connections and launched a programme for social, political and economic change. With the Four Modernizations, Deng wanted to modernize agriculture, military, science and technology, and industry in

order to create a powerful, modern socialist country before the end of the century. This he called "socialism with Chinese characteristics" and the economic reforms became known as "socialist market economy" (www.wikipedia.org). The new paradigm was as a long term goal that only could be achieved by importation of factors of production, such as technology, capital and management expertise from developed countries (Wong and Chu, 1985, p.28).

By reinterpret Maos self-reliance, Deng made it clear that foreign trade must be achieved to be able to modernize. In 1979 Deng choose four areas in the country and designated them as laboratories for experimentation of the frameworks of market economy and foreign direct investments (FDI)[4]. The Four Special Economic Zones (SEZ) established was Shenzhen SEZ, Zhuhai SEZ, Xiamen SEZ and Shantou SEZ (Wei, 2000; Wong and Chu, 1984; Wong and Chu, 1985, pp.42)

Table 4.4: The original four SEZs established 1979; name, geographic location and area (Wong and Chu, 1985).

Name of SEZ	**Geographic location**	**Area by the time of establishment (sq km)**
Shenzhen SEZ	Next to Hong Kong	327,5 sq km
Zhuhai SEZ	Next to Macau	6,8 sq km
Xiamen SEZ	Opposite Taiwan	2,5 sq km
Shantou SEZ	Opposite Taiwan	1,6 sq km

The reason for establishing these economic zones was to minimizing foreign participation in the national economy, and thereby minimizing the conflict with existing political, economic and social systems. The freedom and autonomy that foreign companies were given was only available inside the designated SEZ. The objective for these SEZs were to foster and stimulate economic development by attracting foreign investment, expanding exports and increasing technology imports (Wei, 2000).

4.2.3 The Shenzhen SEZ

Before the idea of establishing and economic zone emerged in the Guangdong province, Shenzhen was a small town with a population of 20,000 inhabitants working either with agriculture or in one of the 26 factories. These factories counted for a total industrial

[4] Foreign Direct Investment (FDI) is an investment involving a long-term relationship and reflecting a lasting interest of a resident entity in one economy (direct investor) in an entity resident in an economy other than of the investor. The direct investor's purpose is to exert a significant degree of influence on the management of the enterprise resident in the other economy. FDI involves both the initial transaction between the two entities and all subsequent transactions between them and among affiliated enterprises, both incorporated and unincorporated. FDI may be undertaken by individuals, as well as business entities (UNCTAD, United Nations Conference on Trade and Development).

output of less than US$10,000, which would categorize them as very small sized production factories.
According to Wei (2000), the Shenzhen SEZ was in the early days an economic zone lacking in capital and access to international market. Therefore, attracting foreign investments and overseas technology was given top priority. In 1979, an incentive package was put together, including the following tools of persuasion (Wei, 2000):

Table 4.5: Incentive package for the Shenzhen SEZ, 1979 (Wei, 2000).

Incentives
- Streamlined administrative control
- Relative independence for local planning authorities
- Direct access to provincial and central level planning units
- Access to tax breaks
- Free or low duties on imported equipment and production materials
- Free or low-rent business accommodation
- Flexibility in hiring and firing workers
- Deprecation allowances
- Negotiated access to the domestic Chinese market for goods produced within the SEZs
- Residence and work permits and income tax exemptions for foreigners working within SEZs

After presenting this to incentive package to foreign companies, foreign direct investments started to roll in. In 1998, less than 20 years after the launch of the Shenzhen SEZ, more than US$12 billion had been invested into different businesses.

According to Wei (2000), there are three main reasons why Shenzhen succeeded to fund such a large amount of FDI. (1) First, the surplus of cheap labour decreased the foreign companies cost, i.e. the average wage of a Chinese worker was about one-tenth of the average in Hong Kong. (2) Second, the preferential packages made it more profitable to invest in the Shenzhen SEZ than other Asian regions. (3) Thirdly, the close geographical distance to Hong Kong, a truly global city with similar cultural background, language and communication, made it even more convenient to invest in Shenzhen. Social and ethnic ties were very important. By the time of the Shenzhen SEZ establishment, Hong

Kong was already a vibrant trade city, with a GNP per capita of over US$4,000 in 1980 (Wong and Chu, 1985, pp.42). These commercial ties with the rest of the world made a great difference to Shenzhen in comparison with the three other SEZs established at the same time. Hong Kong, who at this time still remained a British colony, had excellent port facilities and many foreign investment groups had branches here due to its strategic location in Asia. Therefore it was natural for Hong Kong agents to suggest investments in the newly built SEZ just across the Shenzhen River.

4.2.4 The evolution of Shenzhen SEZ

In contrast of other economic zones in Asia, the Shenzhen SEZ was set up to embrace tourism, agricultural production, manufacturing, commercial and real estate development. The early SEZ was to include everything from electronic industry, building materials, textiles and clothing, to food processing, petrochemical industry, metal and machinery (Wong and Chu, 1985, pp. 57). Especially high-technology companies were welcome, since the government were keen on adapting new technology in order increase the pace of development. This however became to complex, and the government left their high-technology strategy to focus on labour-intensive industries instead, which transferred a less amount of technology knowledge (Wei, 2000).

According to Wei (2000), it is possible to divide the evolution of Shenzhen SEZ into three phases; formative phase, labour-intensive phase and technology-intensive phase.

4.2.4.1 Stage 1: Formative phase of development

In this early stage of development, 1981, most of the FDI made in Shenzhen SEZ went to tourism activities and real estate. The lack of sufficient infrastructure resulted in that only a small percentage was made into manufacturing activities. Investments in manufacturing also demands greater capital outlay that i.e. real estate. The authorities in Shenzhen soon realized this problem and spent great sums on establishing adequate infrastructure, such as communication links, water, electricity and housing. At the same time, it became clear that the administrative process as well as financial system was very inefficient and restrained many investors. A sufficient infrastructure but inefficient administrative system wouldn’t attract any FDI. Therefore zone authorities started to reform governmental structure, issue legal regulations and cut down on bureaucracy in order to make Shenzhen an interesting choice for foreign investors.

4.2.4.2 Stage 2: Labour-intensive phase of development

Due to improved infrastructure and business-friendly Chinese government, by the end of 1982 foreign investments in manufacturing industry began to increase. Initially, most manufacturing investors came from Hong Kong, and brought with them the technology needed, while China offered the labour force. This was a fruitful relationship, since Shenzhen SEZ lacked technology and marketing capabilities and funds, while Hong Kong lacked the semi-skilled and unskilled low paid labour. In one example, a Hong

Kong based investor was the dominant partner, who provided capital, equipment, management skills and technology. The Shenzhen SEZ partner was responsible of labour and land in exchange for learning opportunities. But China didn't have any intention of becoming a neo-colonial manufacturing centre for foreign enterprises (James, 2000). After two years of partnership, when the Shenzhen partner had gained enough experience and skills, the two would establish an equal relationship, such as a joint venture. With this kind of partnerships, Shenzhen SEZ could channel necessary knowledge for its own development. Other types of foreign capital participation used were i.e. co-operation production and wholly foreign-owned companies.

During the period 1980-1990, the key industries were labour intensive and light processing industries such as toys, shoes, clothing, packaging and bicycles. Output increased for both domestic and overseas markets. In the domestic markets, the competitive advantage was the product novelty and quality of the products and in the overseas market the competitive advantage was the low cost as a result of cheap labour.

4.2.4.3 Stage 3: Technology-intensive phase of development

By the end of 1980s, Shenzhen authorities realized that they needed to change their business model. The surplus of low cost labour did not work as a competitive advantage anymore, due to two main reasons that threatened further development of the SEZ. First, the cost of land had risen extremely during a short period of time, which meant that Shenzhen was no longer a suitable place for labour intensive manufacturing activities that needs large land areas. Second, the competition from inland China had risen increasingly. Other municipalities in China had started to build on the preferential investment incentives, which at first were exclusive for Shenzhen. These regions could offer even better benefits that Shenzhen had and labour intensive production now faced fierce competition. Therefore, Shenzhen SEZ authorities decided to shift back their focus to their initial idea; technological-intensive industries.

A program was put together in order to increase the benefits for technological-intensive firms, and thereby transfer their skills to Chinese partners. This included special allowances and incentives such as tax exemptions and entrance to the domestic Chinese market if a project was qualified as "technologically advanced". Also, Shenzhen SEZ government established services as quality support, productivity enhancements and intellectual property rights for technological zone companies that needed help or information.

All together, this resulted in a transformation of Shenzhen SEZ from a labour-intensive zone to a high-tech centre with a steadily increasing amount of highly educated workers, such as scientists and engineers, both from inland China and abroad.

The different phases all had their characteristics when it comes to comparative advantage, main product, source of technology and role of Chinese government. The differences can be summarized in the following table:

Table 4.6: A summary of the three phases of development (Wei, 2000).

	Formative phase	**Labour-intensive phase**	**Technology-intensive phase**
Comparative advantage	Incentive package for FDI; Location-specific advantages	Low-cost labour surplus; Huge domestic market; Incentive package for FDI; Incentive package for FDI; Location-specific advantages	Low-cost highly educated labour; Accumulated skills and capital; Huge domestic market
Main product	Tourism and real estate development	Toys, clothes, shoes, packaging, bicycles, etc.	Computers, swhiches, etc.
Source of technology		Hong Kong	Developed countries
Role of government	Infrastructure building; Institutional reforms	Help firms find employees nationwide in order to keep the competitive position, threatened by other low-cost competitors	Technology infrastructure building; protection of intellectual property, etc.

4.2.5 Success factors of Shenzhen SEZ

In less than three decades, Shenzhen managed to become the most rapidly evolving city in the world. It is an implication that SEZ do tend to have positive effects in large continental economies.

Research made by Wei (2000) shows that there are a three important factors why this massive development have taken place.

(i) *Infrastructure enhancement*: By developing and enhancing the infrastructure and institutional framework, an industrial base can be formed and foreign investors are attracted.

(ii) *Building on resources*: Fast development should be built on the comparative advantages given by the very nature of the zone. In the case of Shenzhen SEZ, surplus of cheap labour, land and geographical advantages had a particular important role in the evolving phase.

(iii) *Shift toward higher value-adding activities*: When realizing the problem with labour-intensive industries, SEZ authorities of Shenzhen choose to restructure their business model. When the cost of production factories, such

> as land and labour, and the competition increased, Shenzhen SEZ chooses to focus on the high-tech industry, which meant more value-adding activities that increased foreign investments. In order to create a lasting well-performing special economic zone, the transition of technological knowledge from investors to host country is immense. Governmental policies and outside competition drives this process. Competition reduces profit, which creates financial pressure that forces policy changes to a shift toward higher value adding activities.

Haywood (2000) states another important factor to the success of Shenzhen SEZ: independence. The Chinese government have given their zones a greater independence than many other Asian countries. This implies that Chinese SEZs many times can act as autonomous states within the country, with their own legislation, execution rights and judicial functions. Because of the autonomy, Shenzhen authorities have been able to react on changing markets, fierce competition, customer demands, and develop the zone into what it is today.

4.2.6 Shenzhen SEZ today

The establishment of special economic zones have created deregulations and an entry of domestic producers, which have given China the chance to gradually make itself comfortable with market economy (Wei 2000). Today, high-technology is the main industry in Shenzhen SEZ. In 1998, high-tech accounted for nearly 40 percent of the total industrial output, and in 2004 it had increased to almost 60 percent (Wei 2000; Shenzhen Government Online).

Shenzhen is today the city which has the highest export of all cities in the Chinese mainland. The city has the 4th largest GDP in the country and with a population of 8, 28 million. The SEZ advantages that Shenzhen has of tax reforms and preferred policies for investors are still intact for the zone and will keep attracting investors in the future. (Enright & Edith, 2005)

Table 4.7: Shenzhen GDP 2005 (Enright & Edith, 2005)

Year 2005	**US$ Billion**	**Percentage**
Total GDP	60,16	100%
GDP primary sector	0,12	0,2%
GDP secondary sector	31,51	52%
GDP tertiary sector	28,53	47,8%

Primary sector includes farming, forestry, animal husbandry, fisheries, natural resource extraction, and other similar industries. *Secondary sector* includes manufacturing, construction, mining, water supply, electricity supply, gas supply, steam supply, and hot water supply. *Teritary sector* is compromises all other sectors which includes logistics;

data transmission; wholesale and retail trade; tourism; financial services; real estate; business services; scientific research and technical services; geological prospecting; environmental and public facility management; education; health care, social security and social welfare; culture, sports and recreation; public administration and social organisations; and international organizations'. As seen in table 4.7, the biggest industrial sector in Shenzhen is the secondary one, closely followed by the tertiary.

According to Shenzhen Government Online, the city has since the mid-1990s focused its economy on seven major industries, including computer software; IT; microelectronics and components; video and audio products; electro mechanical integration; and key projects of light industry and energy. Other industries such as pharmaceuticals, medical equipment, biotechnology and new materials have rapidly grown. Telecommunications equipment, computers and other electronics counted in 2004 for the larger part of the manufacturing gross industrial output, $US 47 billion, followed by electric equipment and machinery, only counting for about $US 4,5 billion (table 4.8).

Table 4.8: Shenzhen top manufacturing industries by gross industrial output, US$ billion, 2004 (Enright & Edith, 2005)

Manufacturing Industry	**US$ Billion**
1. Telecommunications equipment, computers, and other electronics	47
2. Electric equipment and machinery	4,49
:	
10. Special purpose equipment	0,81

Regarding the service industry, transportation, storage, post and telecommunications are the biggest industries in terms of gross industrial output, US$ 3,15 billion, closely followed by the Finance and insurance sector, US$ 3,10 billion (Table 4.9).

Table 4.9: Shenzhen top service industries by gross industrial output, US$ billion, 2004 (Enright & Edith, 2005)

Service Industry	**US$ Billion**
1. Transportation, storage, post and telecommunications	3,15
2. Finance and insurance	3,10
:	
4. Real estate trade	2,87

4.2.7 The Four Pillar Industries of Shenzhen

According to Shenzhen Government Online, Shenzhen industry consists of four key sectors: High tech, logistics, finance and culture.

4.2.7.1 High technology

According to Shenzhen Government Online, high tech industry is the base in Shenzhen economy, and its output volume has grown with a rate of 46,5% per year since 1992. Shenzhen is the leading city regarding technology production in China. Shenzhen develops 50% of all software which is exported from China and 25% of its integrated circuit design business. (Enright & Edith, 2005)

The city's strategy for research and development is up to 90% done by private owned enterprises, meanwhile domestic colleges, universities and institutes are backing up behind. About 18,8% of registered private high technology enterprises are involved in high technology product research and development. In Shenzhen there are 87 foreign invested research centers with a total of US$ 1,77 billion invested. The result of the R&D is that Shenzhen in 2004 had 14, 914 patent applications, 20,7% more than previous year. (Shenzhen Government Online)

To push the technological development, Shenzhen has adopted a "park driven strategy". This implies that industries with the same high technology base are situated in same area. There are today 11 high technology industrial parks which all have a different focus, from telecom to oceanic tourism. (Shenzhen Government Online)

According to Shenzhen Government Online, the high tech industry was by 2004 providing 610 000 professional technology experts with work, where around 10% came from overseas. The government is promoting its high technology sector through China Hi-Tech fair, established in 1999. The 6th high tech fair was held 2004 in the then newly built Shenzhen Exhibition Center. At the fair there were a total of 115 delegations from 42 regions and nations, 62 multinational companies were represented, with 4041 exhibitors, 9674 projects and 1882 investors attended the fair. (Shenzhen Government Online)

4.2.7.2 Finance

According to the government of Shenzhen (Shenzhen Government Online), the city has together with other financial institutions set up a complete and sound financial system with banking, securities and insurance as the main business. Shenzhen has been in the forefront of developing the finance market of mainland China. The were the first city to have a foreign invested bank, first securities company, first foreign exchange regulation center and first electronic financial settlement center. All domestic banks are presented in Shenzhen and over 50 foreign invested financial institutions have settled up branches in Shenzhen. Shenzhen is home of one of two stock exchanges on mainland China. (Shenzhen Government Online)

4.2.7.3 Logistics

Shenzhen's geographical location makes it the only city in China with air, land and sea ports. It has the worlds 4th largest port in terms of containers shipped, and therefore leading Chinese logistic industry is emerging (Enright & Edith, 2005). Shenzhen Bao An international airport has 95 domestic routes and 14 international, which makes it is the 4th largest airport in China. Shenzhen has an extensive road and train network which links Shenzhen with other cities in the region and to Hong Kong and Macao in the south. The airports of Shenzhen, Zhuan Hai, Macao, Guangzhou and Hong Kong can all be reached within a 90 minutes drive. (Shenzhen Government Online)

4.2.7.4 Culture

The forth pillar in Shenzhen industry is culture, which includes industries such as printing; broadcasting; news and publishing; advertising; travel; cultural and recreation; and cultural products manufacturing industry. The cultural industry of Shenzhen can be divided into three parts:

(i) Media
(ii) Design
(iii) Tourism and public event related activities

In the media industry, there are Press Publications; Printing; and Broadcasting Television and Film. The Design part consists of Animation; Artists and Painters. The third group is based on cultural events in the city. Shenzhen hosts many Culture Festivals which have both domestic and international focus. The city has an International Culture Industry Fair, and through out the city there are 5000 Cultural Venues for singing and dancing. (Shenzhen Government Online)

According to Shenzhen Government Online, Shenzhen has started to implement a strategy of "building a culture based city", where they wish to create a city of "high-quality culture". The initiative has according to the government boosted the culture industry with 20.76% from 2003 to 2004 and was by 2004 accounting for 4.77% of the city's total GDP. Government officials says that the development of the cultural industry in Shenzhen will be based on innovative cultural brand as the core, and eight advantageous industries will be especially developed, including media industry; publishing industry; creative design industry; printing industry; audio and visual industry; recreation industry and travel industry (Shenzhen Government Online).

4.2.8 Society, Community and Environment

The average population age in Shenzhen is less than 30 years old and the population is polarized among two extremes; (a) densely populated professionals with high level of education and (b) migrant workers with poor education. The less educated have a minimum salary of $US 86 a month inside the special economic zone and $US 57 in the areas outside. A social welfare system is being built with Social Insurance, Social Welfare and Legal Aid. To be granted legal aid you have to be a permanent citizen in

Shenzhen, have to live in the city for over a year, and to be able to state that you cannot fund the aid the by yourself. (Shenzhen Government Online)

Shenzhen has had big environmental problems where there have been no or very few restrictions on toxic waste from its thousands of manufacturing plants. The government has realized the problem, and in 2004 the officials pledged that 3% of Shenzhen's total GDP shall be put into environmental protection, a huge investment of $US 421 million (News Guangdong).

4.2.8.1 Education

The citizens of Shenzhen are the most educated in the whole of China (Enright & Edith, 2005). The government invested $US 1,35 billion in 2004 in the education system. Between the ages of 3 to 6 years old, 98% went to school. Nine years of school is compulsory. For the higher education, Shenzhen has 11 colleges and universities with a total enrolment of 41 300 students. (Shenzhen Government Online)
The park driven strategy, mention above, is used also for tertiary education. Shenzhen has a university town which in the first phase covers an area of 3, 8 sqkm, in which famous domestic Chinese universities such as Qinghua University, Peking University, Harbin Institute of Technology are situated. The town has six national level key labs which are established to generate a multi functional, comprehensive and modern University Park, integrating manufacturing, study and research. (Shenzhen Government Online)

Shenzhen has five international schools, and three additional for Hong Kong children and one for Taiwanese children. Shenzhen has 8 public libraries and 385 community libraries with a goal of achieving one community library for every 15 000 people. (Shenzhen Government Online)

The talent structure of the city consists of more than 600 000 professionals, where there are about 32 000 citizens with master degrees and 2300 with doctorate degrees. The communist party and municipal organs of Shenzhen has about 20 000 employed, where 35% has a bachelor degree and 7.5% a master degree. (Shenzhen Government Online)

4.2.9 Future Goals

In 2005 the government of Shenzhen announced their new strategy for the next 5 coming years. The city shall adopt the "scientific development perspective" where the goal is to build an effective and harmonious Shenzhen. The GDP shall double, it wants to boost social causes and improve the living standard for its citizens during the coming five year period. Another goal is to enhance the city's competitiveness to lay a solid foundation to become "a modern city metropolis"

The rapid development shall be maintained but a new industry structure shall emerge, with focus on high technology manufacturing and high territory industries; a structure

which shall be developed through increasing investments in high technology research. Shenzhen shall create a recycle economy for a green economy and increase the investment in talent to provide the city with a more profound knowledge. The traditional industry technology shall be upgraded, support the industries of new material and new energy. The rapid evolving service industries like tourism, trade, exhibition, conventions and sport industry shall be more promoted, and financial services and logistics shall be strengthen. The city will try to attract more big multinational companies to use the city as a logistic hub or procurement headquarters.

According to Enright & Edith (2005) the city center of Shenzhen are now developing a central business district which will provide a base point for the commerce of finance, trade, information and cultural services. The Shenzhen Science & Industry Park is fully occupied with world renowned companies like IBM, Compaq and TCL. The area will now expand to create a so called "high tech industry corridor".

According to Shenzhen Government Online, future city planning is focused on developing different industries in special areas. High technology shall be based in the southern part of the city whereas heavy industry in the northern part. New metropolitan high tech value added industrial areas shall be built with focus on development of finance, logistics and high tech research, software and trade. Tourism and Port shall be focused on the western and eastern parts of the city.

4.3 Collection of statistical data

4.3.1 Empirical framework

We will start this chapter with a presentation of a generalization index and thereafter work our way through the data our empirical studies has given. For this first part, we have chosen three parameters to show the possibility of using data for a country and use it on a region with statistical reliability. The parameters used are:

(i) *Gini index*: "The Gini coefficient is a measure of inequality of a distribution of income". (Wikipedia, 2007). This index shows if a country have a high or low difference in income among its citizens. The Gini index spreads from 0- perfect income equality to 1- perfect inequality. (Wikipedia, 2007)

(ii) *Public spending on education as % of GDP*: This parameter has the implication of showing the equality among citizens in attending school, and by that having the same opportunity to educate them selves. Number shown in %

(iii) *Political stability*: This parameter shows the political stability in a country. This has the implication that the higher the stability is the smaller the

differences within the country. This number is shown as "normalized on a scale of zero to ten relative to other countries in the comparison group[5]". (World Bank, 2007)

Table 4.10: Gini index, public spending, political stability by nations (World Bank, UN Gini Index; Wikipedia, 2007)

	Gini Index		Public spending on education as % of GDP	Political stability
Sweden	,247	(2000)	8,76	9,39
Denmark	,25	(1997)	9,82	8,56
China	,447	(2001)	0,44	4,55

4.3.2 Data for the two regions, Öresund and Shenzhen

Leadership Capital & Diversity Capital

- **Ethnical groups in the region:**

Öresund Region

There are 171 different ethnical groups represented in the region.

Shenzhen

There are 54 different ethnical groups represented in the region.

Sources: Malmö Stad, Shenzhen government

- **% of highly skilled professionals with higher education originating from abroad:**

Öresund Region

There are 10295 persons living in the Öresund Region with a tertiary[6] education with a non Swedish/Danish origin. This part of the population represent 1,57 % of the total with the same degree of education. There are 654 023 people with a tertiary education. Below is a matrix showing the education level in the region:

Table 4.11:

	Whole population	Population with tertiary education	Population with a tertiary education originating from abroad

[5] All countries
[6] Tertiary meaning university or college degree.

	3 614 448	657 023	10 295
% of total population	-	18,18%	0,28%
% of tertiary education	-	-	1,57%

Shenzhen

NA

Sources: Öresund statistics

- **No. of published scientific articles**

Öresund Region

NA

Shenzhen

NA

Sources:

Knowledge Capital

- **No. of exchange students as a % of total amount of students:**

Öresund Region

The region has about 10 000 exchange students in 14 universities. This is 6% of the total population of 154 364 students.

Shenzhen

NA

Source: Öresund statistics – 2004, Öresund University – 2004 and Shenzhen government – 2004

- **Municipal and District library books per inhabitant**

Öresund Region

There are 22 310 756 municipal and district library books in the region. This means that there are 6,19 book per inhabitant.

Shenzhen

There are 7 590 000 municipal and district library books in the region. This means that there are 0,91 books per inhabitant.

Sources: http://sbs.bs.dk, Statens Kulturråd - 2005, Shenzhen Government - 2004

- **No. of available PHD placements:**

Öresund Region

There is a total amount of 9255 PH.D. placements in the Öresund region. There are 154 364 students at a tertiary level in the region. Compared to the total amount of university/college students in the Öresund region, PH.D. placements stand for 5,5 %.

Shenzhen

NA

Sources: OECD – 2005, Öresund University – 2007, SLU/Alnarp – 2007, Öresunds statistics (Appendix 4)

Organizational Capital & Strategic Capital

- **Employment in high tech sector as % of total workforce:**

Öresund Region

The share of the high tech sector in total employment in the Öresund Region was year 2002 about 7,2 %, where Sjealand dominates the region in both high tech manufacturing and high tech services (Hansen & Serin, 2005):

Table 4.12: Employment in the high tech sector in the Öresund Region as a percentage of total employment 2002 (Source: Hansen & Serin, 2005:78)

	Sjælland	**Skåne**	**Total**
High tech manufacturing	2,4%	1,8%	2,2%
High tech services	5,2%	4.4%	5.0%
Total high tech	7,6%	6,2%	7,2%

Shenzhen

In Shenzhen 663 400 worked in the high tech sector. Of the total work force of

Sources: Hansen & Serin, 2005:78, Shenzhen Government - 2004

- **Number of foreign investments made in the zone:**

  Öresund Region

  During the year 2006, 85 foreign direct investments were made in the Öresund Region

  Shenzhen

  NA

  Sources: Inward Invest Sweden, Invest in Denmark and Copenhagen Capacity

- **No. of companies incubated in science parks[7]:**

  Öresund Region

  There are six functioning science parks in the Öresund Region. In Danmark: CAT Science Park, Scio-DTU, Symbion Science Park; in Sweden: Ideon Science Park, Krinova Science Park, Medeon Science Park. There is also a seventh, COBIS, that will open in 2008 (Innovation Guide, 2007) Together they incubate 590 different companies.

Table 4.13:

Name of Science Park	No. of companies in incubator
Ideon	200
Medeon	30
Krinova	35
CAT	65
Scion-DTU	170
Symbion Science Park	90
Total	***590***

Shenzhen

[7] "Science Park: a science park is a property development designed for a concentration of high-tech, science or research related business" (www.wikipedia.org)

There is only one science park in Shenzhen, incubating 300 companies

Table 4.14:

Name of Science Park	No. of companies in incubator
Shenzhen High-Tec industrial park	300

Sources: The above mentioned Science parks

Network Capital

- **DOI Index:**

Öresund Region

The DOI index has not been measured for the region. Below are the figures for the two countries.

Denmark ,76
Sweden 0,71

Shenzhen

The DOI index has not been measured for Shenzhen. It has though been measured for two major cities near by. Below are the figures for these cities and for the entire China.

Hong Kong 0,7
Macao 0,69
China 0,45

***Source*:** World information society report 2006 (www.itu.int)

- **No. of projects between industry and university:**

This parameter has not been measured for the regions. It is according to Bengt Streijffert Director Öresund University hard due to that is it difficult to define what a project is. A project can also be divided between many parts of the university and industry. Kristian Lindel at Region Skåne also talks about the difficulties regarding the validity of the data if measured. According to him many researchers and companies do not always want to share there research.

Öresund Region

The World Bank has made measurements on countries. For Sweden the number is 9,66 and for Denmark 8,71. These figures are “normalized on a

scale of zero to ten relative to other countries in the comparison group[8]". (World Bank, 2007)

Shenzhen

In China this "normalized" number is according to the World Bank 7,59

Source: World Bank - 2006

- **No. of hotspots per 1 million inhabitants:**

Öresund Region

There are 842 hotspots in the Öresund Region.

Shenzhen

Shenzhen has six hot spots.

Sources: Spray Statistics – 2007, Shenzhen Government
http://wifi.spray.se/statistics/statistics

Innovation Capital & Technological Capital

- **% of patent leading to commercialisation:**

Öresund Region

NA. The number of patents that actually leads to commercialization has not been measured in the Öresund Region, neither on the Danish nor the Swedish side.

Shenzhen

NA

Sources: Swedish Patent and registration office - 2007

- **Industry spending on R&D as a % of GDP**

Öresund Region

The total expenditures on R&D from the industry accounts for 2,6% of the total GDP in the Öresund Region.

[8] All countries

Shenzhen

NA

Source: Öresundsinstitutet

- **% of zone GDP spent on DOI infrastructure**

Öresund Region

NA

Shenzhen

NA

***Sources*:**

Cultural Capital

- **Cultural and literary professionals per one million inhabitants:**

Öresund Region

NA

Shenzhen

There are about 3000 cultural and literary professionals in the region. This means 362 per one million inhabitants.

Sources: Shenzhen Government

- **% of total zone administrative budget spent on cultural entities:**

Öresund Region

Government subsidy to cultural entities in the Öresund Region were last year 2 126 987 417 SEK. This number represents the subsidies to the 194 larges cultural institutions.

Shenzhen

NA

Source: Maria Videll (Musik i syd, 2007)

- **Available greenery as a % of City area:**

Öresund Region

In the Swedish part of Öresund Region is 13% of the urban area greenery.

Shenzhen

Shenzhen has 45% of its urban area covered with greenery.

Sources: Länstyrelsen Skåne – 2005, Shenzhen Government
http://www.m.lst.se/documents/Plattform%20f%C3%B6r%20statlig%20samverkan.pdf

Ecology Capital

- **CO^2 emission per capita:**

Öresund Region

On the Swedish side of Öresund Region the CO^2 Emission per capita is 4505 kg. On the Danish side the same number is 8850 kg[9]. The average in the region is 5904 kg CO^2 emission per capita.

Shenzhen

NA

Sources: SCB - 2004, Globalis – 2002

- **No. of companies with ISO14000EMI accreditation:**

Öresund Region

NA

Shenzhen

NA

Source*s*:

- **% of consumed kWh produced from renewable resources**:

[9] 8850kg is per capita for the entire country. No measurements have been done on the Danish side of the region alone.

Öresund Region

There are no measurements over the Öresund Region alone. There are thought numbers over the two countries. In Sweden 26% of the electricity used originate from renewable recourses. In Denmark this number is 15%. Because of how the distribution of electricity is build up in the countries one could draw the conclusion that these figures represent the two sides of the region.

Shenzhen

NA

Sources: Swedish Energy Agency, Danish Energy Authority, Skane Energy Agency

Reputation Capital & Brand Capital

- **Inhabitants turn-over:**

Öresund Region

The region has a inhabitant turnover of 1,3669. 52117 persons moved in and 38127 moved out of the region.

Shenzhen

NA

Sources: SCB - 2007, Danish Statistics – 2007

- **No. of international summits**

Öresund Region

NA

Shenzhen

NA

Sources:

- **% of total zone administrative budget spent on branding/marketing activities:**

Öresund Region

The total amount spent on branding and marketing activities in the Öresund Region last year was. The sum is the total sum of the five organizations in the region.

Table 4.15:

Organization	**Sum milj SEK**
Wonderful Copenhagen	152
Copenhagen Capacity	
Position Skåne	
Öresund Network	5
Inward Invest Skåne	
Total	

Shenzhen

NA

Sources: Wonderful Copenhagen, Copenhagen capacity, Position Skåne, Öresund Network and Inward Invest Skåne.

5 Analysis

In this chapter we will via our theoretical framework analyze our empirical research. A brief introduction will give the reader an idea of how we will approach our empirical findings, which then will follow by an analysis of the data for each region.

5.1 Introduction

The purpose of this thesis is to try to design a Triple Knowledge Lens of Öresund and Shenzhen. We have in chapter four explained how this new mindset has been created. In chapter five we have presented the empirical results. We will in this chapter analyze our findings for both our quantitative and qualitative empirical data of the both regions. We will analyze our result through our TKL model combined with the theories of IC and KIZ.

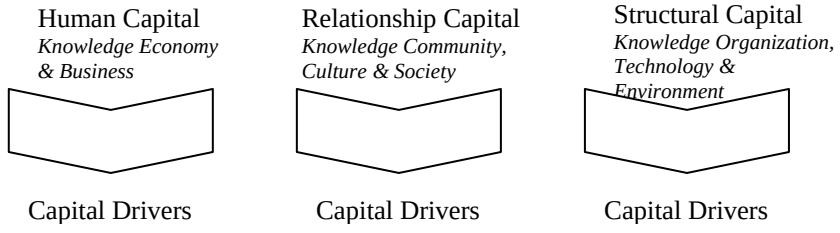

Figure 5.1: Our interpretation of the Triple Knowledge Lens

Each chapter will be divided by each of the lenses, starting with Human Capital, followed by Relationship Capital, and finally Structural Capital. In each part, the eleven drivers and the belonging performance measurements for the particular lens will be presented and analyzed.

5.2 Analysis

5.2.1 Human Capital – Knowledge Economy & Business

1. Ethnical Groups in the Region

Öresund: 171 **Shenzhen: 54**

The first of the three groups presented in our own TKL framework is the human capital. We can thru our empirical findings state several indicators on the human capital of the Öresund Region and Shenzhen. We started out by examining the *Leadership & Diversity Capital*. Thru our empirical research we found that there are 171 different ethnical groups in the Öresund region. This shows that diversity of human capital is large. Thru all these different groups new knowledge can be spread and thereby increase the total knowledge in the region. In Shenzhen we found 54 different ethnical groups. That is more than half as many as in the Öresund region but one must take into consideration that Shenzhen has not been as open as Öresund in the last decade. Shenzhen were not far ago a rather small city and has therefore not been the obvious chose for personal establishment. The Swedish part of the Öresund region has long been known for taking many refugees. The country has in many ways taken the responsibility for the actions the western world have done in the last centuries. One could therefore argue that many of the ethnical groups are not here due to there knowledge contribution but we believe one need to see it in a broader picture. It is not only knowledge that these groups stand for, but also new cultures. The more diversified the country is the more open-minded the inhabitants become and thru that increase the overall knowledge.

2. No. of exchange student as a measure % of total amount of students

Öresund: 6% **Shenzhen: NA**

We have also in this study found data on the combination *Knowledge Capital* and Human Capital. Our research has found that there are little over 10 000 foreign exchange students in the Öresund region. They stand for 6 % of the total population of students. There is nothing in the theory that say that 6% is high or low but this will rather be used in a comparison with other regions. The exchange students bring new knowledge and the more there are the more it shows of collaborations between universities outside the region. We also believe that this collaboration is good for the region in the longer perspective. Students in the region increase there network with

other parts of the world. This will increase the knowledge interactions in the region. The number of exchange students also shows the level of university ranking in the world. The region has many highly acknowledge universities and the higher the rank the more students will attend. One argument that needs to be addressed is that exchange students could be a sort of brain drain from the region. To fully measure this we could have compared it to how many of the students from the region that is exchange students outside the region. They will then com back with knowledge that can be shared.

3. Employment in high tech sector as % of total workforce

Öresund: 7,2 % **Shenzhen: NA**

Next in line on the Human Capital was to study the *Organizational Capital & Strategic Capital*. We chose to do that by examining the percentage of the total workforce that work in the high-tech sector. The higher number the higher degree of innovation in the region. The high-tech sector attracts and need highly educated people that thru knowledge sharing increase innovation activities. As with the former measurement we can not say what is good and what is bad. Different zones can also have different ways of defining high-tech sector. In the Öresund region 7,2 % of the employed population work in the high-tech sector.

4. DOI Index:

Denmark 0.76, Sweden 0.71 Hong Kong 0,7 Macao 0,69 China 0,45

We are according to Amidon living in a knowledge economy. For knowledge to thrive it has to according to her be shared. We therefore tried to measure the *Network Capital* by examining the ability for the people to communicate with each other. The DOI index shows in a good way this possibility. There have not been any measurements done on the two regions alone. What have been measured so far are countries. Both Sweden and Denmark take high positions in the index, only beaten by a few. Thru our generalization index we are fairly confident in transforming these data on to the Öresund Region even thou it is not statistically secured. The Gini index shows that there are not that big differences among the inhabitants in the country and the two other, education spending and political stability reinforce this view. The region is also fairly urban and it is there telecommunication, broadband and available distributors are most developed. We can show that the inhabitants are in the top of the world in the ability to communicate with each other and thru that share knowledge. Shenzhen on the other hand is harder. We have found three different DOI indexes. One is for the entire China. This number is low and we and we con not thru our generalisation index say that this also stand for Shenzhen. The differences are too large in China to statistically generalize. We have thou found measurements that could give an indication on Shenzhen. It is figures for Hong Kong and Macao which are two large cities close to Shenzhen. Both show figures close to Sweden and Denmark and could be an indicator showing that there are small differences between the two regions.

5. % of patent leading to commercialisation

Öresund: NA **Shenzhen: NA**

The next measurement in our TKL framework is to se what the communication, academy and industry do with knowledge and knowledge sharing. This is done by studying the Capital Driver, *Innovation Capital & Technological Capital*. We chose to do that by measuring how many patents that actually leads to commercialisation. According to Amidon, patents it self say nothing of how innovative a region is. This has unfortunately not been measured in the regions. We wanted to find out how much of the innovative progress in companies that actually lead to knowledge for the society. Showing the human capital of the inhabitants to create useful innovations.

6. Cultural and literary professionals per one million inhabitants

Öresund: NA **Shenzhen: 362**

Leaving the industry and academia we also want to capture the broader perspective of the regions. We start this by examining the Human Capital aspect on *Cultural Capital*. We have found that there are about 3000 cultural and literary professionals in Shenzhen which divided by 8.28 million inhabitants make a number of 362 professionals per million. This could sound as very few compared to how many inhabitants there are in Shenzhen. One thing must be taken into consideration. Shenzhen as it is today is fairly young and have in the last decades put all its focus on activities related to SEZ. When comparing one region to another the number of cultural and literary professionals will show which region that the most human capital working in these professions. It will also give an indication on where it is easier to make a living on your profession. One must acknowledge the definition on this data. Is it just full time professionals that are being measured or will a part time worker in a post office that spend the rest if his/her time is a writer fall out of the system.

7. Co2 Discharge Per Capita

Öresund: 5904 KG **Shenzhen: NA**

The next Capital Driver being measured is *Ecology Capital*. On a human capital level we wanted to show how much CO2 emissions per capita the region have. This gives an indication of what kind of industries, amount of traffic etc the region has. We found that the average emission in the Öresund region is 5904 kg. The figure on the Danish side is for the entire country so entirely statistically secure is not the figure. The lower the figure is the more it shows that the region is thinking of the environment from the nature point of view but also on the effects it has of the inhabitants. If it is a nice place to live in but also future public spending on health problems this might effect.

8. Inhabitants turn over

Öresund: 0.4% **Shenzhen: 3,2%**

Last but not least we want to measure the overall picture of the zone on a Human Capital level. This is done thru the Capital Driver, *Reputation Capital and Brand Capital.* We believe that inhabitant turn over is a good way of showing if the above mentioned Capital Drivers are successful or not. It is of course hard to say if the people moving in contribute with knowledge and people moving out are not "brain drain". This is hard to measure and we have to see it in a broader picture. We believe that in the long run a positive turn over is positive and regions have to work to continue attracting people to the region. A positive turnover also increases the regions total knowledge, especially as knowledge multiplies when shared. We can thru our study show that the Öresund region has a positive turnover, indicating that the region is successful in attracting knowledge.

5.2.2 Relationship Capital- Knowledge Community, Culture & Society

In the TKL theory and in the theory for knowledge economy there are many examples on how knowledge is multiplied when shared, and how a development for an economy, according to the KIZ, is dependent on its collaboration between the society's different knowledge holders.

1. % of highly skilled professionals with higher education originating from abroad

Öresund 1.57% **Shenzhen: minimum of 1%**

A measurement of how well the zone is able to attract talent from abroad which can share their knowledge which will be multiplied when shared.

We have not found a correct measurement for Shenzhen but our quantative study shows an indicator of 6500 foreigners which have been employed in the High technology sector where we assume that all of those have a minimum of Bachelor degree. The quantitive study also shows how the city has 600 000 professionals and the foreigners employed in the high tech sector would thus make a number around 1% of total professionals in the city.

The high tech industry makes about half of the total Shenzhen GDP and as we do not have any indicators of how many people is deployed in other industries it is very hard to speculate. It could be as many as for the High tech industry which thus would lead to a number of 2% of highly skilled professionals originating from abroad, a number higher than the Oresund region, but as we do not have any indicators we can only state there is a minimum of 1%. The gap between the Shenzhen 1% compared to Oresund region of 1.57% is nothing which we see as a very critical difference.

The salary levels in Shenzhen show that an low level worker has about 600 yuan in a salary and a engineer around 5000 Yuan. There are few expatriate workers which are willing to move to a country, even if the cost of living is much lower, earning 20% of their home country salary or maybe even 10%. The 1% of foreign work force in the high-tech business are thus either working at a very low salary comparing to their home country or at same salary base as home and should thus be at very high positions in the companies. The economy in China is rapidly evolving and the country will if the development keeps steady increasing the salary curve for the whole workforce. The salaries at lower management level and low engineer level will be more competitive with western standard and it should attract much more workforce from the city's international companies which probably will increase the number of foreigners' professionals even more.

2. Municipal and District library books per inhabitant

Öresund 6.9 Books **Shenzhen 0.91**

This measurement will show the ability the inhabitants have in the region to increase there knowledge. There is here in this measurement a great difference between the regions. It is of course hard for Shenzhen to compare with cities which have had universities for over 300 years to catch up in 30 years. There is of course a big amount of accumulated books from all these years that the Öresund region has collected. These accumulated ancient books are not contributing to the knowledge innovation today but is having a value as a cultural heritage and for historical research. The measurement of amount of books is to show the availability of books for the citizens and for enhancing its link to economy and innovation it is books which are recent. Thus the books in the Shenzhen libraries should be of more recent years and the Oresund should have a certain amount of ancient books which makes the gap between the regions not as big as numbers shown. To refine the measurement it should be in the future directed towards how many recent science & technology literature books available per citizen.

3. Number of foreign investments made in the zone

Öresund 85 **Shenzhen 41 000**

The measurement is made to show how global the economy is in the region as if there are many foreign investments there is also an inflow of knowledge into the economy which comes from the investors in forms of the foreign companies R&D, management knowledge and practices and other spill over effects. Here the Öresund region is extremely at low rate compared to Shenzhen. The international practices Öresund region has as the many companies are selling to a international market the picture is not as bad as it shows here as there are many other ways to grasp the international knowledge flows. This indicates though that Shenzhen in the future will have a higher knowledge from different management cultures R&D practices and be able to easier grasp those up.

4. Number of projects between industry and university:

Sweden 9,66 Denmark 8,71 China 7,59

Collaboration is one of the key words for the TKL and as knowledge is multiplied when shared, the measurements gives an indicator on how good the universities and the business sector are at collaborating to share their knowledge among them. In a ranking of 10 possible and 0 the lowest Sweden and Denmark are showing top scores. China is lacking behind but the difference is not that thrilling.

You might also argument as the education is free in Sweden and Denmark and thus all the Universities in the countries should have the same amount of subsidization and thus the same opportunities and level of knowledge sharing. The education system in China seems more unstable and Shenzhen might have a higher score than the country as a whole which would make the gap between the regions shorter.

5. Private enterprise spending on R&D as a % of GDP (Innovation & Technologichal)

Öresund 2,6% Shenzhen NA

This measurement is made to show how the private enterprises are focusing on creating innovation. There are no measurements of China but we have seen from the quantitive study is that the innovation is

6. Available greenery as a % of City area

Öresund 13% Shenzhen 45%

7. Numbers of production companies which are accredited ISO14000EMS

Öresund NA Shenzhen 80

Numbers of ISO14000EMS companies are a measurement to show how serious the government and companies are stressing the development of ecological economy development. There are only 80 companies in Shenzhen which shows a step towards eecology thinking but far from the standards of a KIZ. The theory of a KIZ is highly stressing the ecology and a KIZ standard should be 100% or very close.

8. No. of international summits

Öresund NA Shenzhen NA

One of Debra's concerns in the TKL is how a region shall work to attract investors and talent. The measurement is also linked to one of Bontis's explanations of the marketing capital, to show how well a nation/region can create partnerships with companies and nations outside the region. The measurements is thus made to show how the zone is able

promote it self and its ability to establish relations. There was no available data for these measurments.

5.2.3 Structural Capital – Knowledge Organization, Technology & Environment

The last group in our TKL framework is the Structural Capital. The measure organisations and the base of a region. The structural capital works as a meeting place and foundation for enabling knowledge and innovation. The structural part can also be measured and compared using the IC multiplicator. Regions have to have a steady base of structural capital to be able to handle the human capital. We choose number of published scientific articles as a measurement on how well organized the university system is. This measurement shows the level of thought Leadership Capital.

1. No. of Published Scientific Papers

Öresund NA **Shenzhen NA**

The more articles being published the better the coordination and collaboration works, and knowledge is being spread, not kept behind the walls in an office. We can not say that a KIZ need to have an exact number of published articles but we can use it when comparing with other regions. The more articles being published the better.

2. No. of Available Ph. D placements

Öresund 9255 **Shenzhen NA**

If published articles show the level of actual knowledge spreading, number of available PHD placements show the readiness for research and how well established research is in a region. For articles to be published there need to be researchers. There is no point in having a highly educated human capital if there is not enough structural capital for them to work in. The knowledge will not be increased and the human capital will seek other regions where there competences are acknowledged. This measurement shows the degree of *Knowledge Capital*.

3. Number of companies stationed in Science Parks

Öresund 590 **Shenzhen 300**

Organizational Capital & Strategic Capital show the future vision and organizational planning for a region. The future for a region is its knowledge and innovations that will enhance not only the financial sector but also the cultural and social life of its inhabitants. To show this structural capital we have studied science parks in the regions. Number of companies stationed in science parks show new ideas in a region and how they can be commercialized thru the networking, collaboration and infrastructure

science parks offer. There are 590 companies incubated in science parks in the Öresund region. The same number in Shenzhen is 300 companies. We can not say anything about the size of the companies and how many innovations each of then put on the open market. One large company could produce more innovations that ten smaller ones. This would have been interesting to measure but was not doable in this study. We do thou believe that the amount of companies give a good indication on the innovation climate in a region.

As mentioned above, knowledge multiplies when shared. The ability to share knowledge is thereby important. People have to be able to communicate with each other. Internet and telecommunication has developed a lot in the last decade. The ability of this new technology for the inhabitants was previously shown in the DOI index. When applying it on the structural capital of the region, we chose to use number of hotspots available.

4. No. of Hot Spots

Öresund 842 **Shenzhen 6**

One could argue that there are different sizes of hot spots meaning that one could be larger than ten smaller combined. This may be thru but we believe that by studying how many give a better picture of the accessibility of different inhabitants and therefore reduce the usage to the "elite" of the society. There are 842 different hotspots in the Öresund region. Shenzhen have six. We argue that this means that the accessibility for different inhabitants to interact with each other and the rest of the world is larger in Öresund region.

Since the technological development of DOI infrastructure increases each year a region have to make investments to keep up. New technology enables people to communicate and share knowledge in new ways.

5. GDP Spent on DOI Infrastructure

Öresund	**Shenzhen**
NA	**NA**

Percentage of GDP spent on DOI infrastructure is therefore according to us a good way of studying the *Innovation Capital & Technological Capital*. The more percent spent the more it shows how important the region think DOI infrastructure is. We were unfortunately unable to find this information for the two regions.

% of total zone administrative spent on cultural entities

Öresund 2 Billion SEK **Shenzhen NA**

(Will be presented As a % of GDP**)**

Amidon stress the issue of the importance of improving all parts of a region and not leaving something behind. Culture is one of the things that have not been given much space in former region constellations' such as SEZ. For a region to become a KIZ culture is as important as anything ells (Amidon). In our study of the structural capital in a region we chose % of total zone administrative spent on cultural entities as measurement of *Cultural Capital*. This measure gives an indication on available cultural activities for inhabitants in a region. It also show how important the administrative think culture is. Since The Öresund region is a hybrid project one could argue that a lot has been done on the culture front before, and therefore need to spend less money. We do think thou that redevelopment is necessary and is needed to attract new talents. Shenzhen on the other hand is considered a green field. Since we do not know what has been done before we think that this measurement fits in well in the study of the cultural capital. By using this measurement we take the future into consideration. We have not been able to find data of this measurement in the regions.

7. % of consumed kWh produced from renewable recourses

Denmark	Sweden	Shenzhen
15%	26%	NA

As with culture mentioned above, ecology is of great importance for a region. The *Ecology Capital* show everything from if it is nice to live in a region due to pollutions to the degree of research in environment friendly fuels. To measure the structural capital in a region we chose to study the electrical market and how large part of it that comes from renewable recourses (i.e. wind, water etc). We were not able to find figures for the Öresund region, but we found figures from Denmark and Sweden. We are quite confident to use these data on the Öresund region due to our generalization index and the way the electrical market is built up in the countries. We found that 26% of used KWh in Sweden originates from renewable recourses. In Denmark this number is 15%. If this is high or low KIZ wise is hard to tell and will be valued first when comparing with other zones. We chose this measurement when studying the structural capital due to the fact that inhabitants them self can not in a great extent decide from where there electricity should originate. When measuring over time it will show the regions work in improving the environment they act and live in. If not done the region risk loosing key inhabitants moving to "better" regions. We were unfortunately not able to find these figures for Shenzhen.

8. Percentage of Administrative Zone Budget spent on

Öresund	Shenzhen
NA	NA

If inhabitant turnover show the human capital level of Reputation Capital & Brand Capital and number of international summits show the relationship capital, percentage of zone administrative budget spent on branding and marketing activities show

structural capital. This measurement show how much work that is put down by the region in attracting persons and investments. The capital drivers mentioned above are all parts of what the region can use when branding or doing marketing. They all therefore have to be thought of and improved for the branding to succeed. The Öresund region does not have an overall administration like Shenzhen. It is therefore hard to define what is and what not is administrative budget. We have in our study used the information given by Mr Streijffert. We studied each of the organizations connected to the region. We have not been able to find sufficient data on neither of the regions.

Out of our 24 measurements we have yet only found available data for 10 maeasuremnts which are including data for the both regions. The measurements are:

5.2.4 Summary of results

Here the reader will follow a summary on the results where we have found data for *both* regions. The summary is divided into each of the three lenses, and it will present what region that has received the highest result in our empirical study.

5.2.4.1 Human Capital – Knowledge Economy & Business

1. Ethnical Groups in the Region

Öresund: 171 **Shenzhen: 54**

4. DOI Index:

Denmark 0.76, Sweden 0.71 **Hong Kong 0,7 Macao 0,69 China 0,45**

8. Inhabitants turn over

Öresund: 0.4% **Shenzhen: 3,2%**

5.2.4.2 Relationship Capital- Knowledge Community, Culture & Society

1. % of highly skilled professionals with higher education originating from abroad

Öresund 1.57% **Shenzhen: minimum of 1%**

2. Municipal and District library books per inhabitant

Öresund 6.9 Books **Shenzhen 0.91**

3. Number of foreign investments made in the zone

Öresund 85 **Shenzhen 41 000**

4. Number of projects between industry and university:

Sweden 9,66 Denmark 8,71 **China 7,59**

6. Available greenery as a % of City area

Öresund 13% **Shenzhen 45%**

5.2.4.3 Structural Capital – Knowledge Organization, Technology & Environment

3. Number of companies stationed in Science Parks

Öresund 590 **Shenzhen 300**

4. No. of Hot Spots

Öresund 842 **Shenzhen 6**

5.2.4.4 Discussion of results where data for both regions have been found

Of the 10 measurements we can see that Öresund has the most positive results where the region has the best results for 7 out of 10 the measurements. Looked in a more detailed perspective we see how the results show a highly divided picture.

There are 4 measurements where Öresund shows extraordinary numbers ahead of Shenzhen: Ethnical Groups in the Region, Municipal and District library books per inhabitant, Number of companies stationed in Science Parks and No. of Hot Spots.

There are 3 measurements where the Öresund and Shenzhen are at very close stages: DOI Index, % of highly skilled professionals with higher education originating from abroad, Number of projects between industry and university. Of the 3 measurements, Öresund is showing a just slightly more positive result.

There are 3 measurements where Shenzhen are having a much greater result than the region of Öresund: Inhabitants turn over, Number of foreign investments made in the zone, Available greenery as a % of City area

We can see that Öresund region shows high results compared to Shenzhen on the major part of the questions but there are a few which are very low. How and why has these figures has emerged, and what they actually alert is hard to analyze. The same goes for Shenzhen which has surprisingly the similar results to Öresund on some measurements and on some a much higher results than Öresund on others. Shenzhen seems at some points be a KIZ but at other measurements far below standard.

What causes these differences and to explain why and how these differences appear would be very hard to state without having a broader empirical study. **Both Bontis and Dr. Debra have** stated that with only measurements it is very hard to give a full picture of the current situation for a Zone or a Region. To answer our purpose question: if and

how the regions have adopted the mind set of a KIZ we therefore have to analyze our quantitative empirical data.

5.3 Shenzhen – a KIZ or a SEZ?

Shenzhen shows in our empirical study a divided city which is in many ways inherits most of the characters of a KIZ meanwhile it still has its basic foundation of a SEZ.

Our empirical study shows how the economy of Shenzhen today has its base in manufacturing, where the main base is in manufacturing of high technology. The city is though promoting itself as having a economy base in high technology development and the service industry. The four pillars industries metaphor which the Shenzhen government gives on its homepage shows quite a clear view on where and how the city wants to promote itself and how it wants to develop for the future. The industries of finance, logistics are very small compared to the total GDP of Shenzhen but its clear that it is with these kinds of value adding services the city wants its economy prosper. The most interesting industry the government chooses to promote of the four pillars is the culture industry. The government definition of the industry is including a wide range of sub industries like media, tourism, and design which all together only makes about 5% of the total GDP for Shenzhen.

We see how the Shenzhen government is stressing the culture industry importance in the same way the theory of KIZ is stressing to employ creativity, knowledge and innovation as resources and inputs for growth and prosperity, where the main purpose is to create liveable and thriving cultural communities, as well as smart organizations infrastructures and platforms.

In our empirical research the cultural industry is divided into three parts. The first is the Media which includes Press Publications, Printing and Broadcasting Television and Film. The Second group is Design and Animation, Artists and Painters. The third is based on cultural events in the city: Culture Festivals, Culture Industry Fair, Cultural Venues, Relic and Historical Protected sites and Museums.

We see the governmental promoting of the culture industries not only for economical growth but also as a KIZ purpose. The Media sub industries of Press Publications, Printing and Broadcasting is to promote information flows and knowledge sharing in the society. The Design group is to build up a base of creative human capital and employ their creativity for innovation. The third and most important group is the stress of cultural events in the city which we link with the KIZ theory of creating a livable and thriving cultural community. Shenzhen wants to have a society and community which prosper not only economically but as important culturally and socially.

In our empirical part for future goals of Shenzhen we see how the city has adopted many of the KIZ theory's most important parts. The city mentions how it shall adopt a "scientific development perspective" with more investment in high technology research; the city shall have a high level of international technology application, adopt a green economy and create an international metropolis society. These are not empty words stated from the government. Our empirical data shows how patent applications are increasing rapidly and how the local government is investing heavily in environmental protection.

The same time as Shenzhen shows great development in the direction of a KIZ it still has many roots of an SEZ. Half of the economy is still based in manufacturing. The lowest monthly salary in the zone is 600 Yuan about 85 USD far from western levels. The zone is developing a welfare system, with social insurance and legal aid. The government mentions how the population is polarized among two extremes one wealthy educated part of the population which lives in densely populated areas and on the other side there is poor migrant workers with no education. The gap is also shown in the city's planning where the heavy industry shall be located on the northern part of the peninsula towards the mainland meanwhile the planned and existing high tech and metropolitan area of finance, logistic and research shall be in the south facing the waterfront and Hong Kong.

Our view is that Shenzhen has adopted most of the mindset and thinking of a KIZ, where a lot of the society economically, culturally and environmentally is a KIZ where the grassroots of the economy is still in the SEZ stadium. If this development continues Shenzhen will create a great gap between the affluent Shenzhen citizens with high education working for companies which can develop the same value adding products as the richest countries in the world, which are sharing the same city as millions of people living on the poverty line. We think Shenzhen government is aware of the path which is developing and the government addresses when it states how they want to create a harmonious future development for Shenzhen.

This development can be a threat to the zone development which our KIZ theory states under the TKL lens of knowledge based society. By Political risk Amidon says"*How do you proceed with an aggressive development path, without alienating existing centers of influence and power? And how do you also achieve grassroots support from a wide cross-section of the social spectrum? How do you avoid resistance and backlash that might impede progress?" (Amidon,)*

The Chinese society is under communist rule and freedom of speech is still regulated of the ruling party. How this is influencing the flow of information and knowledge is hindered we still have not concluded a comment about.

5.4 Öresund – a region of future knowledge?

The picture Öresund Region gives in our empirical data is a region which has a very high developed mind set in terms of collaborations, economic development in terms of innovative businesses and a high ecological thinking. There is though one great concern we want to raise to the region. The quantitative study shows how companies in the region do not want to do investments as there is a shortage in skills workforce. Our TKL model shows how it is only 0.4% positive inflow of people and how the region only has 85 foreign investments. On the questions on what the Öresund Region shall do in the future Mr. Streijffert says; nothing we shall just go an as we done before. How will the region be able in the future to attract talent from the international and the domestic work market of Denmark and Sweden?

Our theory of a KIZ states how important it is for a KIZ to cope with the "attractiveness challenge" "how a zone will be able to attract investors and people with talent?" and to have "Foresight-Future Readiness, Since the globalisation is changing the conditions for zones much faster then they did before, zones must create strategic plans that secure them for the future." Our empirical study shows no signs on how the Öresund region is trying through a special strategy to attract either talent or investment.

Shenzhen is promoting an ecological society and have invested and are strongly promoting a lively multicultural culture an international life in the city. We think that this is one part of the city's strategy to attract talent which they understand are highly important for the development of the region. But where are those initiatives for Öresund? The region mentions how they usually end up in the top of quality of life rankings, but is that enough to attract young, creative and innovative people which are screening the world for a great and exciting location to start of, or advance their professional career life?

6 Conclusion

We will in this chapter clarify and discuss our results that has evolved throughout our analysis. We will start with bringing up some subjective thoughts about interesting issues that we believe are important to stress. Thereafter we will end this chapter with ideas for future research.

6.1 Discussion around Analysis and Conclusion

Our purpose for the thesis was to see the theoretical differences between a KIZ and a SEZ. To do a TKL model which we applied on the Regions of Öresund and Shenzhen and see if the regions had adopted the mind set of a TKL.

The theoretical study of differences of a SEZ and a KIZ we stated in chapter 3. Our TKL model gave us very interesting data showing a much divided picture for the regions of Öresund and Shenzhen. To give a more deep and thorough analysis we had to analyze our quantitative study for the both regions. The TKL measurement is therefore a good tool to give indications, but it is hard to create a understanding on why and how the circumstances appear and thus to see if the regions have adopted the mind set of the TKL.

The empirical quantitative studies gave us a picture of Shenzhen as a city which were half standing in the mind set of a KIZ with a high technology industry based on research and development innovations, focus on ecology, and a high quality culture life and at the same time a zone with its base in a SEZ. We have augmented for how this development could be hurting the zone in the future and how it should be a concern for the zone in the future.

The empirical analysis for Öresund showed a region which probably during a long time has had a lot of the mind set for a KIZ. With highly developed education system which reaches hundreds of years back in time, science parks developed centuries ago and excellent collaboration rankings between businesses and universities. The region seem though to have been to caught up in its own success and is not aware of what is needed for attracting investment and talent in the global world of the 21st century, where the competition for talent is fierce and you have to position and market yourself to gain attraction.

6.2 Further Research Proposals

KIZ is built on an elitistic foundation; such a zone is only open to educated people and will have difficulties to cope with the general society. In a knowledge economy and a Knowledge Innovation Zone, what is happening with the part of our society that is not involved in knowledge innovation, such as low skilled or non educated people? Can you in the future survive outside a knowledge zone? How do you minimize the gaps in a knowledge society? These are questions and concerns we have found during our work, which we believe is an important and interesting topic.

We have not yet included in our theory about how important a human health is to create innovation. We think it should be a very important part for a successful KIZ to have a healthy human capital which regularly is exercising and having a good quality of life to be able to grasp knowledge and innovation. We will develop this argument in our final version where we will suggest Human Capital and stress its importance as an additional capital driver for a future TKL.

7 Bibliography

7.1 Persons

Debra Amidon, 8 May, 2007, 16 may, 2007

Brian Davis, 18 may, 2007

Bengt Streijffert, Director Öresund University, 25 may, 2007

Anders Axelsson, 30 may, 2007

Kristian Lindell, 31 may, 2007

Maria Videll, Musik i Syd, 28 may and 1 june, 2007

7.2 Literature

7.2.1 Books

Bounfour, A.; Edvinsson, L., (2005) *Intellectual Capital for Communities, Nations, Regions, and Cities,* Elsevier Butterworth-Heinemann, 2005

Gustavsson, B., (2002) *Vad är kunskap? En diskussion om praktisk och teoretisk kunskap,* Skolverket, Best.nr. 02:768, Kalmar 2002

Bounfour, A.; Edvindsson, L., (2005) *Intellectual Capital for Communities Nations, Regions and Cities,* Elsevier Butterworth-Heinemann, USA, 2005

Machlup, F. (1962), *The Production and Distribution of Knowledge in the United States*, Princeton University Press, Princeton, NJ

Wong, K.; Chu, D. K.Y., (1985) *Modernization in China, The Case of the Shenzhen Special Economic Zone*, Oxford University Press

Berg, P. O.; Linde-Laursen, A.; Löfgren, A., (2000) *Invoking a Transnational Metropolis, The Making of the Öresund Region*, Studentlitteratur, Lund

Hansen, P. A.; Serin, G., (2005) *High tech in the Öresund region – a European perspective*, Geography Roskilde University Research Report 126, Roskilde University

Öresundssymposium, (1998) *Hur en region nybildas, Öresundsuniversitetet*, SLU Repro Alnarp

Edvinsson, L.; Grafström (1998) *Accounting for Minds- an inspirational guide to intellectual capital*

7.2.2 Scientific Articles

Cowey, M., (2000) Knowledge – fact or fad?, *New Zealand Management*, May 2000; 47, 4; ABI/INFORM Global, pp. 54-55

Frederick, H. H; McIlroy, D., (1999) New Zealand and its competitors in the knowledge economy, *Telematics and Informatics*, 16 (1999), pp. 177-217

Malhotra, Y., (2003) Measuring Knowledge Assets of a Nation: Knowledge Systems for Development, *Knowledge Management Measurements: State of Research 2003-2004*, version: Aug 18, 2002

Malhotra, Y. (2001), Knowledge assets in the global economy: assessment of national intellectual capital, in Malhotra, Y. (Ed.), *Knowledge Management and Business Model Innovation*, Idea Publishing Group, London.

Romer, P. M., (1986) Increasing returns and long-run growth, *Journal of Political Economy*, 94 (5), pp.1002-1037

Romer, P. M., (1990) Endogenous technological change, *Journal of Political Economy*, 98 (5), pp. 71-102

Seizer, J., (2001) Research and the Knowledge Age, *Tertiary Education and Management*, ABI/INFORM Global, 2001; 7, 3; pp. 227-242

Hansen, T.; Hansen, R. F., (2006) Integration of scientific commuity as exemplified by the biotech sector: An analysis based on bibliometric indicators in the Danish-Swedish border region, *GeoJournal*, 67: 241-252.

Matthiessen, C. W., (2004) The Öresund Area: Pre- and post-bridge cross-border functional integration: the bi-national regional question, *GeoJournal*, 61: 31-39, 2004

Olshov, A., (2000) Sweden-Denmark bridge sets Öresund buzzing, *Unitas*, 2000; 72, 3; ABI/INFORM Global, pp. 31-35

Osborne, R. D., (2006) Cross-border Higher Education Collaboration in Europe: lessons for the 'two Irelands'?, *European Journal of Education*, Vol. 41, No. 1, 2006

The Economist, (2003) Survey: Borderless, *The Economist Newspaper Ltd.*, London, Vol. 367, Iss. 8328; pg. 6

Wolff, M. F., (2003) Biomedical clusters blossoms in Scandinavia, *Research Technology Management*, Jul/Aug 2003; 46, 4; ABI/INFORM Global, pp. 2-4

Cannon, T., (1998) The third industrial revolution, *Director*, Feb. 1998; 51, 7; ABI/INFORM Global, pg. 16

James, G., (2000) The China Puzzle, *Upside*, Feb 2000, 12, 2; ABI/INFORM Global, pp. 193-196

Johansson, H.; Nilsson, L., (1997) Export Processing Zones as Catalysts, *World Development*, Vol. 25, No. 12. pp. 2115-2128, 1997

Ki, K.; Whitwell, J.; Yao, S., (2005) A Growth Model for China's Special Economic Zone, *Pacific Economic Review*, 10:4 pp. 439-449

Reardon, L. C., (1996) The Rise and Decline of China's Export Processing Zones, *Journal of Contemporary China*, November 1996

Romer, P. M., (1993) Idea Gaps and Object Gaps in Economic Development, *Journal of Monetary Economics*, 32, pp. 543-573

Rondinelli, D. A., (1987) Export Processing Zones and Economic Development in Asia: a Review and Reassessment of Means of Promoting Growth and Jobs, *American Journal of Economics and Sociology*, Vol. 46, No. 1 (January 1987)

Schweinberger, A. G., (2003) Special Economic Zones in Developing and/or Transition Economies: a Policy Proposal, *Review of International Economics*, 11(4), pp. 619-629

Wang, M. Y.; Meng, X., (2004) Global-local initiatives in FDI: The experience of Shenzhen, China, *Asia Pacific Viewpoint*, Vol. 45, No. 2, August 2004, pp. 181-196

Wei, X., (2000) Acquisition of Technological Capability Through Special Economic Zones (SEZs): The Case of Shenzhen SEZ, *Industry and Innovation*, Dec 2000; 7, 2; ABI/INFORM Global, pg. 199

Wong, K.; Chu, D. K. Y., (1984) Export Processing Zones and Special Economic Zones as Generators of Economic Development: The Asian Experience, *Geografiska Annaler. Series B, Human Geography*, Vol. 66, No. 1. (1984), pp. 1-6

Ng, M. K., (2003) City Profile, Shenzhen, *Cities*, Vol. 20, No. 6, pp. 429-441

Edvinsson L.; Malone, M., (1997) Intellectual Capital: Realizing your company's true value by finding its hidden brain power, *Harper Business*

7.2.3 Booklets

Øresund Network, (2006a) *The Little Blue Øresund Book*, Øresund Network

Øresund Network, (2006b) *Øresund – Two countries, One Region*, Øresund Network

Haywood, R. C., (2004) *Economic Realities and Free Trade Zones*, World Economic Processing Zones Association, Evergreen, Colorado, USA, No.4 Ver. 1

Haywood, R. C., (2000) *Free Zones in the Modern World*, World Economic Processing Zones Association, Evergreen, Colorado, USA, No.5 Ver. 1

Amidon, D. M.; Davis, B. E., (2006) *A preview: The State of Knowledge Innovation Zones (KIZ),* ENTOVATION International Ltd & The KAIETEUR Institute, USA, 2006

Amidon, D. M.; Davis, B. E., (2006) *Follow the leader, Carving out a knowledge-conscious culture* , ENTOVATION International Ltd & The KAIETEUR Institute, USA, 2004

Sveriges Generalkonsulat, (2005) *Guangdongs ekonomi 2005 och provinsens ledande städer: Kanton (Guangzhou) och Shenzhen*, Sveriges Generalkonsulat, Kanton, Ulf Sörmark

7.2.4 Reports

Öresund University, (2006) *The Contribution of Higher Education Institutions to Regional Development in the Öresund Region*, Self Evaluation Report, February 2006

OECD, (2006) *The Öresund Science Region: A cross-border partnership between Denmark and Sweden*, Peer Review Report, OECD/ Report, June 2006

Knowledge Innovation Zone Research Report (2006), *Special Economic Zones (SEZ) versus Knowledge Innovation Zones (KIZ) – a Comparison*, ENTOVATION International Ltd & The KAIETEUR Institute

World Bank, (1999) *World Development Report 1998/99: Knowledge for Development.* Washington: World Bank. (1999, 9 August)

Enright, M. J.; Edith, E., (2005) *The Greater Pearl River Delta*, 4th Edition, October 2005, Scott, Published by Invest Hong Kong of the HKSAR

Berglund, R.; Grönvall, T.; Johansson, M., (2002) *Internationals Capital's Leverage on Market Value*, Master Thesis School of Economics and Management, Lund University

7.2.5 Electronical Sources

Öresundsportalen
http://www.oresundsregionen.org/historia [2007-05-28]

Öresund University
http://www.uni.oresund.org/sw333.asp [2007-05-30]

Ørestat
http://www.orestat.scb.se/website/index.aspx [2007-05-30]

http://80.80.6.50/pxweb/Database/oresund/Economic%20accounts%20-%20%D8resund/Economic%20accounts%20-%20%D8resund.asp [2007-05-30]

UNCTAD, United Nations Conference on Trade and Development
http://www.unctad.org/Templates/Page.asp?intItemID=3164&lang=1 [2007-04-27]

Wikipedia The Free Encyclopedia
http://en.wikipedia.org/wiki/Special_economic_zone [2007-05-07]

http://en.wikipedia.org/wiki/Deng_Xiaoping [2007-04-25]

In the K zone
http://www.inthekzone.com/kIZ-triplelens.htm 17/4-12,00 [2007-04-25]

Länstyrelsen Skåne
http://www.m.lst.se/documents/Plattform%20f%C3%B6r%20statlig%20samverkan.pdf [2007-06-01]

Danska Bibliotekstyrelsen
http://sbs.bs.dk [2007-05-30]

Spray Statistics
http://wifi.spray.se/statistics/statistics [2007-05-30]

Statistiska Centralbyrån
www.scb.se

Shenzhen Government Online

http://english.sz.gov.cn [2007-05-07]

http://english.sz.gov.cn/economy/200509/t20050930_506.htm [2005-05-31]

http://english.sz.gov.cn/iis/200509/t20050930_517.htm [2005-05-30]

http://english.sz.gov.cn/economy/200509/t20050929_482.htm [2005-05-30]

http://english.sz.gov.cn/iis/200509/t20050930_517.htm [2005-05-30]

http://english.sz.gov.cn/iis/200509/t20050930_517.htm [2005-05-30]

http://english.sz.gov.cn/iis/200509/t20050930_517.htm [2005-05-30]

http://english.sz.gov.cn/lis/lis1/200611/t20061118_160643.htm [2005-05-30]

http://english.sz.gov.cn/iis/200509/t20050930_517.htm [2005-05-30]

http://english.sz.gov.cn/lis/lis1/200611/t20061118_160642.htm [2005-05-31]

http://english.sz.gov.cn/lis/lis1/200611/t20061118_160644.htm [2005-05-31]

http://english.sz.gov.cn/economy/200509/t20050929_482.htm [2005-05-31]

http://english.sz.gov.cn/lis/200611/t20061118_160648.htm [2005-05-31]

http://english.sz.gov.cn/lis/200611/t20061118_160647.htm [2005-05-31]

http://english.sz.gov.cn/lis/lis1/200611/t20061118_160644.htm [2005-05-31]

http://english.sz.gov.cn/ltg/ [2005-05-31]

News Guangdong

http://www.southcn.com/english/exploregd/citiestowns/200303130894.htm [2005-05-31]

8 Appendix

APPENDIX 1: Value added intellectual coefficient index (VAIC)

VA=OUT-IN

When counting value added for a company one can also use the following formula where OP= operating profit, EC= employee costs, D= depreciation and A= amortization

VA=OP+EC+D+A

By using this index measurement a company or a region can show the ability they have in creating value from there investments including salaries, dividends, future development etc. In this way both IC and financial capital will be showed when calculating the actual health of a company/region. This index can then be used as a marketing tool for the region when drawing skilled workers and investors to the region.

According to Pulic (in Bounfour & Edvinsson, 2005), IC contains of two components: human capital and structural capital. Within the component human capital all expenditures for employees are included. This means that salaries are no longer considered a cost but rather as investments. Pulic (in Bounfour & Edvinsson, 2005) means that knowledge workers invest their time, and by doing so create value to a company or a region. As we have established that human capital is a resource we need a way to calculate it. Pulic (in Bounfour & Edvinsson, 2005) defines this coefficient as "human capital efficiency" (HCE) where HC stands for the total salaries and wages for a company.

HCE=VA/HC

Structural capital (SC) as we have seen above is the second part of the IC. It stands for the parts of the IC that stays in the company when the workers have left for the day. This part can be owned by the company. Structural capital is according to Pulic (in Bounfour & Edvinsson, 2005) calculated as:

SC=VA-HC

We have now showed the way to calculate SC, but as with human capital we want a way to measure the efficiency of the structural capital. Pulic (in Bounfour & Edvinsson, 2005) suggest the following where SCE stands for; "structural capital efficiency".

SCE=SC/VA

We can now sum these efficiencies in to total intellectual capital efficiency. The coefficient to be measures is intellectual capital efficiency (ICE).

ICE=HCE+SCE

Even though intangible assets have become the main focus in the modern companies of today, the financial focus can not be overseen. The knowledge workers of the 21 first century companies have the same function for efficiency as productivity had for the manual workers in the past. "IC cannot create value on its own". (Pulic, in Bounfour & Edvinsson, 2005) We therefore need a way to measure the efficiency of the capital employed. Public suggest that this efficiency should be calculated as an "capital employed efficiency coefficient" (CEE) where the denominator is "book value of the net assets for a company" (CE) (Pulic, 2005)

CEE=VA/CE

We now have all the necessary coefficients to be able to calculate what we in the beginning of this chapter called the VAIC. We simply do this by adding the IC part with the numbers taking tangible assets such as physical and financial capital in to consideration. This indicator now shows an understanding of the total efficiency of a company or region.

VAIC=ICE+CEE

With this new measurement instrument we can now according to Pulic (in Bounfour & Edvinsson, 2005) show "how much new value that has been created per invested monetary unit in resources" (Pulic, in Bounfour & Edvinsson, 2005). In this way a company/region does not only show there financial ability but also there intangible resources, here named IC.

As we said earlier the VAIC has the benefit that companies or regions now in a better way can be compared and benchmarked. The VAIC provides according to Pulic (in Bounfour & Edvinsson, 2005) a standardized way to perform comparisons nationwide or internationally no matter company size or in what industrial sector they are present in. (Pulic, in Bounfour & Edvinsson, 2005) Another benefit when using VAIC when calculating the efficiency of a company is that all the numbers figures used can be found in the information given by the accountant. Therefore the results can be easily verifiable

and according to Pulic (in Bounfour & Edvinsson, 2005) objective. The third benefit that Pulic (in Bounfour & Edvinsson, 2005) raise concerning the VAIC is that it is easy to calculate. This has the effect that all stakeholders and not only specialists can use the formula when looking after there interests.

APPENDIX 2: Cities´ Intellectual Capital Benchmarking System (CICBS)

Divisions	Period	Value	Measuring unit
Financial Capital			
GDP (market prices)			
Household's disposal income			
GDP per capita			
Human Capital			
University/college + sec school			
Habitual internet users			
Percentage of qualified workers			
Activity rate			
Gini index			
Process Capital			
Service sector development			
Salaried workers in the high knowledge sector %			
Percentage of firms with Internet connection			
Market Capital			
Self-containment			
Self sufficient			
Exports/Import ratio			
Renovation Capital			
Youth rate			
New firms registered for taxation			

APPENDIX 3: Growth rates of countries with/without economic zones, 1993-1996 by GNP/Capita (Haywood, 2000).

GNP	**Countries With/Without Zones, GNP per Capita**	**Growth Rate of Total Exports to EU and US 1993-1996**
High GNP	Over US$9385	
	With Zones	28%
	Without Zones	45%
Upper Mid GNP	US$3035-9384	
	With Zones	62%
	Without Zones	33%
Lower Mid GNP	US$765-3034	
	With Zones	72%

	Without Zones	1%
Low GNP	Below US$765	
	With Zones	59%
	Without Zones	57%

APPENDIX 4: Number of PH.D.s in Öresund Region 2007

University	**Number of PH.D.**
KU	3405
LU	3047
DTU	600
KA	26
KVL	450
DFU	140
HKr	0
CBS	178
DB	13
RUC	232
Mah	206
ITU	35
DPU	93
SLU/Alnarp	60
Total	**8495**

KVL and DFU are not members of the Öresund University