

Cities Auditing Model

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Abstract. In the last decade, the world economy has undergone numerous transformations and knowledge management, based on the management of intangible assets, became a factor of differentiation and competitiveness. Lisbon Strategy [1] and “Leipzig Charter [2] on Sustainable European Cities” both recognize that cities are “centers of knowledge and sources of growth and innovation”. Developing intelligent and innovative solutions, using responsible and sustainable resources, many cities are implementing strategies for transforming themselves into a “knowledge city”, but the results still have little significance, particularly because it is necessary to identify and manage the intangible assets, recognized as intellectual capital. This paper proposes an approach to audit this knowledge using the same concept of intellectual capital that is applied to companies. According to our research, auditing the intellectual capital of companies, countries or cities can be done with the same model, just changing the metrics.

Keywords: Cities · Management · Intellectual capital

1 Introduction

According the UN’s “State of the World’s Cities Report 2012” [3] by the middle of this century, it is expected that out of every 10 people on the planet, seven will be living in urban areas. Therefore, we need to modify the concept of city and this Report advocates for a new type of city – the city of the 21st century – that is a ‘good’, people centered city, one that is capable of integrating the tangible and intangible aspects of prosperity in the process of eliminating the inefficient, unsustainable forms and functionalities of the city of the previous century.

The rise of the knowledge society, where the principal asset is the intangible knowledge, has originated significant changes in cities. Some cities have been working on strategies of city branding. For example, by reducing greenhouse gas emissions by 50 % within 2030, Oslo wants to be recognized as the “green city”; by increasing its potential of knowledge, Barcelona wants to be recognized as the “city of knowledge”; by improving the design, development and perception of the capital, Vienna wants to be recognized as “the leading smart city”; by considering the gastronomy of excellence, the entertainment and the places to discover, Lisbon wants to be recognized as the “most cool city”.

There are also several studies that attempt to measure the development of the cities, relating it to the investment and management in intellectual capital, but few of them

have sufficient objectivity and credibility to serve as strategic guidance of the construction of an ideal city or even a city branding.

Based on the literature review and preliminary studies that compare the metrics for evaluating the intellectual capital of companies with the intellectual capital of the countries, this paper presents a theoretical model supporting the audit of the management of intellectual capital of cities.

2 Representative Models and Principles Underlying the Theory

In the current context there is a large consensus on the importance of intangible assets as a source of economic competitiveness of firms, cities, regions and countries.

Although the term “intellectual capital” has its origins in a publication of Galbraith [4], we find the beginning of the movement of intellectual capital management in three distinct origins: the first, in the works of Itami [5], who studied the effects of invisible assets in the management of Japanese companies; the second, in the work of several economists (e.g. Penrose, Rumelt, and others) and finally, the third, in the work of Karl-Erik Sveiby, in Sweden, whose works gave prominence to intellectual capital.

The author gave a new vision of intellectual capital considering the intangible assets as the main strategic issue that should be used by the organizations.

Sveiby [6] developed a measurement methodology, “The Intangible Asset Monitor”, by dividing the intangible assets into three groups: individual competence, internal structure and external structure. To assess the intellectual capital, this methodology is based on quantitative and qualitative indicators. “The Intangible Asset Monitor” is used by several companies around the world and offers an overview of intellectual capital. After Sveiby [6], several authors proposed models and methodologies for assessing the intellectual capital of organizations.

The further development of these models was found with authors such as Edvinsson and Malone [7]. Edvinsson and Malone [7] proposed a model, “Skandia Navigator”, which divides intellectual capital into two categories: human capital and structural capital. Thus, according to this vision, intellectual capital is the sum of structural capital and human capital, being this the basic capacity for the creation of high quality value.

The macroeconomic researches on intellectual capital are more recent. These researches have emerged in the early 2000s. Researchers and some governments (particularly the Danish and the Dutch) realized that it was important to know and measure the intellectual capital of countries, regions or cities.

Academic studies, comparative analyses and macroeconomic rankings have been conducted, almost always based on the model presented by Edvinsson and Malone [7] for companies.

If we analyze the intellectual capital models applied to cities or smaller urban units (e.g. villages), we found that the literature is very similar to the literature of companies and countries, almost always considering the same concepts.

Usually, we consider two approaches: the first one, based on the measurement of intellectual capital of companies as proposed by Edvinsson and Malone [7]; the second one, based on the macro-level of countries.

There are some approaches to the subject of intellectual capital applied to cities, in particular: Carrillo [8] studied the knowledge cities, identifying three types of capital (human capital, meta-capital and instrumental capital).

Viedma [9] proposed a methodology (CICBS - Cities' Intellectual Capital Benchmarking System) to measure the intellectual capital of cities, consisting of two models: a model formed by the vision, resources, skills and indicators, based on "Skandia Navigator", and another that identifies the micro-clusters of the city.

Bossi et al. [10] adapted to the cities the methodology of intellectual capital in the public sector.

To Schiuma et al. [11], city's competitiveness depends on its innovation capacity. Authors divided city's knowledge capital into the four categories: human, relational, structural and social.

To Cabrita and Cabrita [12], the most important factors influencing cities intellectual capital are the operations of creative industries. They divided the creative industries resources into four categories: human, institutional, organizational, physical and social.

Ergazakis and Metaxiotis [13] presented the "KnowCis 2.0 methodology", a methodology proposed for the formulation of a Knowledge Cities strategy.

Alfaro, López and Nevado [14] presented the MEICC, a theoretical model to measure and evaluate the cities intellectual capital.

There are other studies that have ranked the cities, for example, the study by PricewaterhouseCoopers [15] and the studies and Mercer's Location Evaluation and Quality of Living Reports [16]. These studies have rankings of cities based on some recognized indicators of intellectual capital.

The majority of this methodologies are theoretical and so, they had little impact in the strategy of cities.

3 Cities Auditing ICM Methodology

3.1 Formulation of Hypothesis

Considering the exploration of the theory we have just held and other studies we have conducted using *Biplots* (vide Matos et al. 2014 [17]) where we try to compare the common aspects between the measurement of intellectual capital of countries and companies, we put the hypothesis:

H1 - Intellectual Capital, regardless of the object for which it is defined (countries, regions, cities or firms) is always measured based on the same components.

Aiming to verify this theoretical hypothesis, we analyzed the different methodological proposals for measuring intellectual capital of cities and concluded that it does not exist a framework accepted by the scientific community to evaluate the intellectual capital of the cities, but there is consensus about the main components.

Therefore, we can say that the main authors are unanimous in considering as components of intellectual capital: human capital, structural capital and market capital with the integration of other forms of capital (e.g. social capital).

3.2 Development of the Model

Matos and Lopes [18] proposed a dynamic model – ICM - to audit intellectual capital in the business context.

Considering that the context of cities could be similar to the context of companies, we did the adaptation of ICM to the cities and we created the Cities Auditing ICM.

According to our methodology, this model considers that the intellectual capital is a combination of Human capital, Organizational capital, Processes capital and Market capital, articulated by Networking capital and Technological capital (Fig. 1).

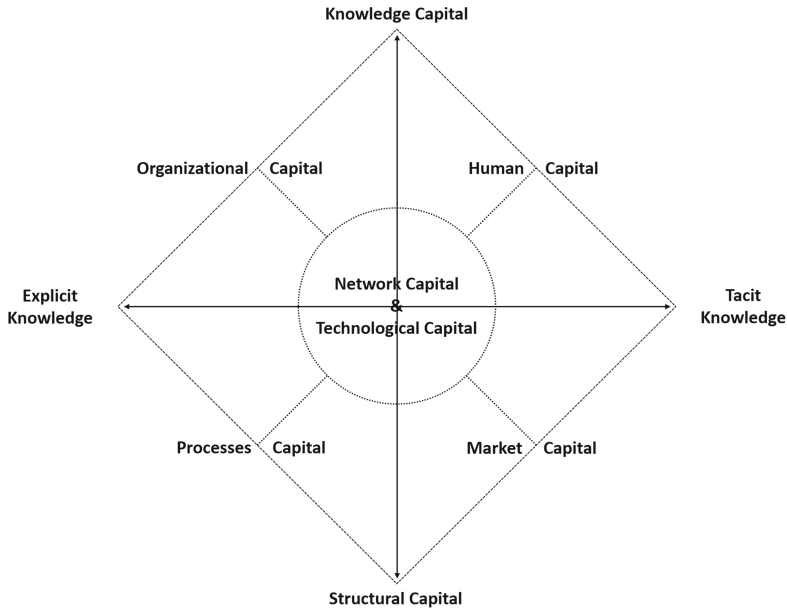


Fig. 1. Cities auditing ICM.

3.2.1 Human Capital

Human capital represents one of the most important sources of value because it is the support of the creativity and the innovation of the city, as well as the basis of renewal of the city.

Cities with aging populations have much difficulty in renewing and developing competitive performances.

Human capital can be increased and enhanced through the investment in education and training or, for example, when we take actions that promote entrepreneurship and innovation or improve the culture of citizens.

One of the main responsibilities of city governments is the investment in human capital so that it is valued and can meet the needs of the business world, so it is important that governors know how to map the knowledge of the city.

For example, if a city wants to attract investors for the development of creative industries, it has to know first if it has people with the skills needed for these industries or if it has the ability to attract people with those skills.

Cities need to attract creative talent to live and work in the city but, as in companies, this talent has to be retained and managed. Therefore, governors of cities have to create conditions so that the city is desirable, attracting and retaining the best talents.

3.2.2 Organizational Capital

Organizational capital allows the sharing of tacit knowledge from individuals and converts it into explicit knowledge or formalized in the form of specifications, process descriptions, rules, regulations, among others. When this tacit knowledge of individuals is shared with the collective, it earns a higher value and is able to become structural capital.

The effect of leadership is visible and becomes more evident in this indicator. Cities require leaders capable of managing and coordinate the different leaderships.

The organizational capital includes the political, social and economic systems and how they are articulated (e.g. the extent to which investment policies are articulated with the qualification of the population, the extent to which programs of research and development respond to the needs of businesses in the city, the extent to which public funds are properly targeted to the needs of the city).

Organizational capital can also include what some authors call “cultural capital” and “democratic capital”. Cultural capital includes the values of society and the forms of cultural expression. The democratic capital includes how citizens are encouraged to participate in society and how the leaders rule the cities, promoting transparency and dialogue with citizens.

3.2.3 Processes Capital

Processes capital refers to the organizational memory that is the essence of the competitive process.

This type of knowledge covers, among other dimensions, the organizational routines or the organizational memory of the city. Organizational memory of the city represents the register of a city, represented by a set of documents and artefacts. Represents too, the detailed history of the city.

Cities have their own history, which is documented through computerized files or paper files resulting from routines that are being assimilated and standardized in procedures manuals.

Access to this information is facilitated through information management, held with the support of technologies.

This processes capital is very important because it allows the creation of more structural capital, necessary to develop the city’s reputation and to attract more investors or more residents.

Processes capital helps the city to develop, improve and maximize its organizational capital.

The quality of the infrastructures of the city and the respective quality of life (e.g. cleaning, environment, social support) depends, therefore, on how the structural capital is developed and incorporated in the city's organizational processes.

In processes capital we can also find the stocks of knowledge stored in databases and how this knowledge is available to serve as a support to decision making in the management processes of the city.

The processes capital is essential for the construction of standards that command the operating rules of the city and help to generate trust, based on the predictability of processes.

The existence of electronic governance systems and the citizens' access to internet are examples of this type of capital.

In processes capital we can find too the financial reserves of the city and how the financial capital is transformed into tangible assets such as buildings, transports, roads, schools, utilities, hardware, etc.

The processes capital is essential for the differentiation of cities and the creation of city branding.

3.2.4 Market Capital

Market capital refers to how the city renews and adapts its human and organizational capital to the demands of the market, producing goods and services that can sustain its competitiveness and meet the challenges of the economy, society and environment.

For example, when the city of Oslo wants to reduce carbon emissions, what kind of innovations have to be incorporated in the city management and how it can become a brand for the city?

The correct use of knowledge management is crucial in interacting with the market and to build a stable market. There is a continued investment in innovation and development in order to meet needs previously scheduled.

Thus, this capital includes all the knowledge that the city has in the market, including indicators to know the size of the target market and potential market, clients' preferences, the purchasing decision factors and reputation or image of the city.

The analysis of the movements of this should enable indicators to predict the direction in which the city should follow their strategies for economic growth and investment attraction.

Innovation, research and development in the city is essential to keep the renewal of the capital, which is essential to competitiveness.

In this topic, we consider too the social innovation and the relation of not-profit organizations working in this area.

3.2.5 Networking and Technological Capital

Networking capital comprises both formal and informal social networks, including the interaction among citizens, city, regional, national and global environment.

Using networks, to share personal and local knowledge, the cities transform tacit knowledge into explicit knowledge, essential to the creation of wealth.

In the networking capital, we include social capital, which is essential to understand the development of a city.

The technological capital is essential to support the services and infrastructures. This capital is responsible for the interaction between the other types of capital.

3.3 Operationalization of the Model

This theoretical model will be supported by a set of intangible indicators of the intellectual capital of the cities. The list of these indicators is not definitive and static. The system should permit the installation of new data sources and the integration of these new sources in the current system configuration - without having to reprogram the entire system.

The model will allow the creation of intellectual capital indicators indices of the cities.

These indices will be based on statistical indicators of each city. These indicators should follow the research base of official data bases (e.g. national statistics and Eurostat) and will allow to create maps of positioning of each component of intellectual capital (e.g. human capital potential of a city or market capital potential of the same city).

It will be possible to build comparative maps of cities (by region, by country or even by a global region, such as the European Union) or even ratings. These maps can guide the investment and strategic planning in public policies. From these maps, we can also create more sustainable strategies for city branding

In Fig. 2, we can verify a proposal of the cities auditing ICM, considering the ideal city (thick line) and the experimental city - the city of Santarém (one of the district capitals of Portugal with 61505 inhabitants and 560.2 km²).

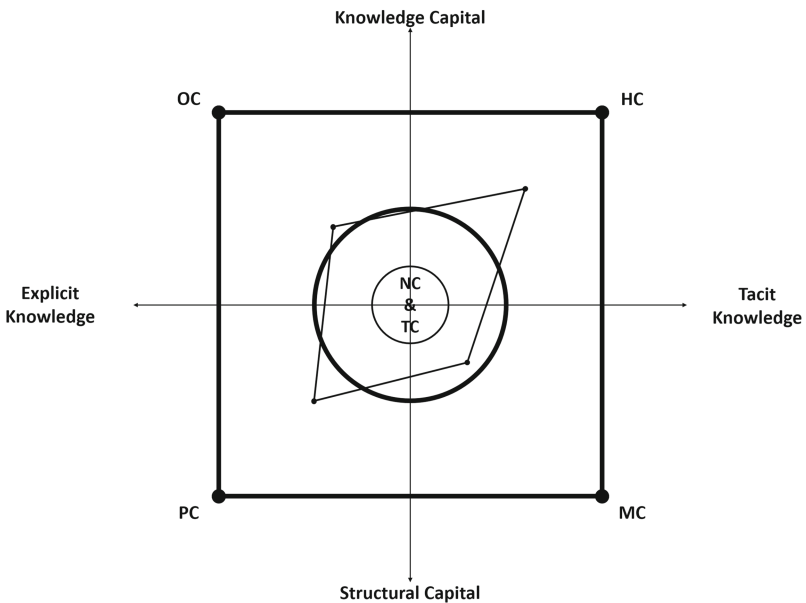


Fig. 2. Cities Auditing ICM applied to Santarém, Portugal.

An analysis of the configuration of the management of intellectual capital in this city shows that there is a good potential of human capital (about 60 %), some balance between organizational capital and processes capital (approximately 40 %–50 %), but quite imbalance in capital market (about 30 %), demonstrating a great difficulty of the city to attract investments and talents to generate innovation and renew their intellectual capital.

The network capital and technological capital also have low parameters (approximately 40 %).

The specification and a detailed description of the indicators underlying the model would allow us to draw strategic guidelines for the management of the city.

4 Conclusion

The hypothesis is confirmed: Intellectual Capital, regardless of the object for which it is defined (countries, regions, cities or firms) is always measured based on the same components.

It is possible to create a model of intellectual capital to the cities based on numerous studies that already exist at the micro-level and macro-level.

Underlying these components, we always find the enhancement of human resources, the organization of the different resources, systematization and processes control, business relations, research and development, renewal of knowledge, etc.

If cities know how to recognize and value the management of these resources, they can become more prosperous and sustainable.

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