Universidade Técnica de Lisboa

Instituto Superior de Economia e Gestão

Mestrado em Ciências Empresariais

Trabalho Final de Mestrado

Dissertação

"Development of a conceptual model of Horizon Scanning for the Lisbon City Council"

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Junho 2013

DEVELOPMENT OF A CONCEPTUAL MODEL OF HORIZON SCANNING FOR THE LISBON CITY COUNCIL

Rui Miguel Filipe Maricato

Para a minha avó Rosa,

por ser a minha primeira professora

Para os meus pais, Felisberto e Isabel,

por terem feito de mim quem sou

Para a minha irmã Joana,

por crescermos juntos

Para a Mónica,

pelo passado e pelo futuro

Acknowledgments

I wish to acknowledge:

Professor José Brandão de Brito for his support and availability to orientate this dissertation.

Doctor of Philosophy Paulo Soeiro de Carvalho and his team (Luis Moniz and Susana Corvelo) from the Lisbon City Council for the availability to work with me.

Gilberto Rodrigues, Nuno Costa and Tiago Fonseca from BIMaven Consulting, and Ana Cardoso and Ricardo Simões from the ZON team for all their support regarding my studies.

Sérgio and Victoria for being such nice flatmates, Raquel for her time, and Joana and Nuno for their companionship through the ISEG journey.

My friends for all the good moments, Mónica for the love I feel inside, my family for always being there, and God for everything.

Abstract

The objective of this dissertation is to draw a conceptual model of Horizon Scanning for the Lisbon City Council. In order to do this, a brief introduction to Foresight and Horizon Scanning is given, as well as a presentation of the rationales and purposes behind the Horizon Scanning system.

The proposed model is divided in four steps: signals' search, classification and organization of the gathered signals, sense-making, and dissemination of the results. Some suggestions regarding the practical implementation of the system are also presented.

Keywords: Foresight, Horizon scanning, Lisbon City Council, Lisbon, Lisboa, Câmara Municipal de Lisboa

Resumo

O objectivo desta dissertação é o desenho de um modelo conceptual de *Horizon Scanning* para a Câmara Municipal de Lisboa. Assim, é feita uma breve introdução à Prospectiva e ao *Horizon Scanning*, assim como uma apresentação dos princípios e objectivos que sustentam o sistema.

O modelo proposto é dividido em quatro passos: procura de sinais, classificação e organização dos sinais recolhidos, *sense-making*, e divulgação dos resultados. Algumas sugestões relativas à implementação prática do sistema são também apresentadas.

Palavras-chave: Prospectiva, Horizon scanning, Câmara Municipal de Lisboa, Lisboa

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1. Introduction

Since the Dawn of Time Humankind has tried to foresee the future. The fascination that the Delphi Oracle exerted to various kings that travelled from far away to receive counsel from it is a good demonstration of that eager attraction**.**

Charles Darwin stated that in Nature the survival of a species does not depend in its strength nor its intelligence, but in its responsiveness to change (Day & Schoemaker, 2005). A transposition of this rationale can be made to the business environment; managers need to be aware of the changes going on in their field, and take decisions in order to cope with them and prepare the organization for the future (Liu, 1998).

Humankind has come a long way since it last resorted to the Delphi Oracle, but the interest in trying to get a glimpse of the future remains. If possible, this knowledge about the future would allow one to get ready for what is coming and get the best possible outcome out of it. Nowadays this quest for future knowledge resorts to a scientific approach, defined by the academic discipline of Foresight.

1.1. Foresight

Foresight is “preparation for the future” (Andersen et al, 2007, page 42) and its purpose is to understand the future effects of change (in an organization or in the whole society), proactively help to prepare for them and explore the related possible opportunities (Andersen et al, 2007). In this dissertation, Foresight is studied resorting to the concept of organization (which is coherent with the literature). The Lisbon City Council (the focus of this work) can be

defined as a public institution, which in turn means it is also an organization (Merriam-Webster Online, 2013); hence, the observations made, although made for a generic organization, apply to the Lisbon City Council as well.

1.1.1 – Definition and objectives

Foresight can be defined as:

"(*…) a systematic, future-oriented, analytical and interactive process contributing to shared visions concerning long-term developments. In foresight exercises dynamics in the innovation system (market and industrial structures, knowledge production structure, forms of interaction and wider framing conditions) are examined in their real-world, economic and societal context. The purpose is to facilitate interaction between the interest groups and to increase the knowledge base of key actors, so that desirable developments can be supported with relevant strategies, decisions and actions"* (Andersen et al, 2007, page 6)

Accordingly to Fahey (1981), the organization can be regarded as an 'open system', a notion which implies a relationship between the organization and the environment; that is, the growth and survival of the organization depends on the environment. Hence, the practice of Foresight aims to identify the drivers (such as trends and discontinuities) that may affect the organization's future.

The objective of Foresight is "to open up an expanded range of perceptions of the strategic options available, so that strategy-making is potentially wiser" (Voros, 2003, page 12). One should note that although

Foresight is focused on the exploration of the effects brought about by changes in the environment, it is not concerned with the implementation of actions to cope with those effects (which is a concern of Strategy). However, the outputs of Foresight should enrich and enhance the practice of Strategy (Voros, 2003).

1.1.2 – Building blocks

In order to do a foresight study, one needs to understand the framing of such study, as well as the drivers of change that impact the subject at focus. These are the building blocks upon which Foresight is build.

1.1.2.1 – Framing

The practice of Foresight needs to be framed accordingly to the scope of the exercise and the aimed results (Andersen et al, 2007); this includes the definition of the considered time horizon (a specific time frame can be defined or, as Brown (2007) suggests, one can use the now, the near future and a more distant future), the subject (topics to be focused and in which context), and the participants and stakeholders (Andersen et al, 2007).

Even though the delimitation of these boundaries may seem implicit, they should be defined in a pre-foresight study (Andersen et al, 2007). Day & Shoemaker (2005) further notes that this framing should be done in order to match the organization need with its own capability.

1.1.2.2 – Drivers of change

The signals and related information gathered in foresight exercises can be classified accordingly to their relevance regarding the outline of the future: weak signals, trends and wildcards.

1.1.2.2.1 - Weak signals

Weak signals are defined as “currently existing small and seemingly insignificant issues that can tell us about the changes in the future. In other words, they are today’s clues and signs providing us with hints of the possible events and trends in the future” (Hiltunen, 2006, page 62).

Hiltunen (2007) states that the information gathered from them may be confusing at first - which tends to lead people to scoff them (Hiltunen, 2006) - since it stands for a brand new idea; as times passes, one may realize that they were the first symptoms of a change taking place. However, this is not always the case and a confusing signal may just be information about something strange happening - a spurious signal (Hiltunen, 2007).

Weak signals are difficult to use, not only because they are numerous and hard to identify among other signals and noise (Hiltunen, 2006), but also because it is challenging by itself to find patterns of change (Hiltunen, 2007) – even more when taken into account that there might be a substantial lag time before the underlying change becomes mainstream. This lag time can however be understood as an opportunity for the signal receiver/interpreter to cope with the change taking course (Hiltunen, 2006).

Despite the obstacles associated with weak signals, scanning for them and using them in Foresight is considered a successful approach for looking to the future (Hiltunen, 2008b).

1.1.2.2.2 - Trends

Trends can be defined as “a constant, sustained and for the most part continuous development– in contrast to cyclical changes, erratic fluctuations” (Glockner & Neef, 2007, page 11).

A noteworthy point is the difference between a trend and a driving force; Brown (2007) explains that a driving force is an environmental change that has an impact. However, it could either be a trend that develops over time (such as climate change), but it could also be a sudden change (such as a change in regulation) that cannot be classified as a trend.

1.1.2.2.3 - Wildcards

A wildcard can be defined as a “surprising event that has significant consequences” (Hiltunen, 2006); that is, wildcards can be characterized by happening suddenly and with a high impact (Amanatidou et al, 2012).

Mendonça et al (2004) states that theoretically weak signals can point to a potential wildcard event, therefore with this approach wildcards could also theoretically be anticipated. However, since this approach is difficult to implement in practice, Hiltunen (2006) suggests that when faced with wildcards that cannot be anticipated (and coping with the resulting crises) one must resort to organizational improvisation.

Hiltunen (2006) concludes that the key issue when considering wildcards is the fast rate of changes that take place and the time taken to consider and face them.

1.1.3 – Horizon Scanning

In today's world changes in the environment start as ideas that gradually mature and obtain public expression – they do not occur spontaneously (Fergunson, 1993 in Hiltunen, 2008a). They are not silent from an information perspective; they create signals and messages that organizations should pay attention to in order to identify and understand the changes that create such signals (Hiltunen, 2008a).

An outcome of this evolutionary idea cycle is that one can anticipate future changes by scanning for signals that may help to identify an underlying future idea in its early stages. That is, when an idea is emerging, it will be reflected through many different signals by simultaneous and overlapping sources which one can scan, cluster and analyze to foresee the future (Kuosa, 2010).

Horizon scanning can be defined as the "acquisition and use of information about events, trends and relationships in an organization's external environment, the knowledge of which would assist management in planning the organization's future course of action" (Choo, 2001, page 1). This is a relevant process, since management and strategy work is based in good information (Auster & Choo, 1994), a relationship that tends to get stronger in the future (Ilmola & Kotsalo-Mustonen, 2003).

Amanatidou et al (2012) argues that horizon scanning has both an alerting function and a creative function. The alerting function helps one to anticipate emerging ideas better and earlier, and the creative function provides the opportunity to reassemble ideas or even create new ones. Together, these

two functions allow the development of new strategies or the testing of already established strategies against unknown but plausible new ideas.

Kuosa (2010) states that horizon scanning can be divided in two approaches: an outside-in approach that scans the entire environment in order to avoid blind spots (but can easily be over flown with information) and an inside-out approach that focus in a limited number of field of interest and uses a limited amount of information (but it is more vulnerable to blind spots since it limits the scanning focus).

The rising interest in horizon scanning can be understood as a consequence of the growing complexity of modern societies, continuously affected by uncertainties (Könnölä et al, 2012). Facing this ever changing environment, organizations that do not implement horizon scanning are unlikely to prosper, since they will miss important information regarding threats and opportunities (Slaughter, 1999); Liu (1998) also notes that horizon scanning can help to maximize limited resources and enhance productivity.

Furthermore, designing, implementing and maintaining a horizon scanning system is a key step to take in order to be able to create an in-house foresight capability (Slaughter, 1999).

1.2 - Research Problem

The purpose of this dissertation was to draw the conceptual model of a Horizon Scanning system for the Lisbon City Council, able to scan the horizon and present results with a regular and continuous schedule.

This dissertation is based in previous work developed by Doctor of Philosophy Paulo Soeiro de Carvalho, Rui Roque, Manuela Madureira, Luis

Moniz, António Alvarenga and Susana Corvelo from the Lisbon City Council. This work consisted in the listing of purposes for the Horizon Scanning system, the listing of proposed partnerships and advantages for the partners, a proposal of a Horizon Scanning model and data structure/format, a listing of the possible outputs of the system and the identification of Economic and Territorial Intelligence platforms examples.

1.2.1 - Rationales

The conceptual model was planned accordingly to the original work developed by the Lisbon City Council team and to the concepts of information management in Horizon Scanning advanced by Choo (1999), relying in the following rationales:

- Needs: a system to scan the environment regularly, structure the gathered knowledge, consider possible conclusions and spread them;
- Acquisition: there are several sources considered to feed the system, further discussed in this work;
- Organization and storage: the information should be organized accordingly to its theme and foresight relevance;
- Products/dissemination*:* there are several planned outputs, namely the writing of foresight insights, disseminated online through a website and newsletters, as well as possible conferences or publications;
- Use: the purpose of this system is to detect and follow the events that may affect the city of Lisbon, foresee the possible impact that they may have in the city and use that knowledge to enhance the decision-making process.

1.2.2 - Purposes

Such a system has several purposes, as originally devised by the Lisbon City Council team:

- Anticipate global trends, prepare the society for the future and create new knowledge, therefore contributing to an increase in wealth and employment;
- Foster entrepreneurship and increase the investment appeal of the city;
- Generate competitive skills and advantages, helping organizations and entrepreneurs to make the best possible decisions and establish goals (Fahey, 1981). Brown (2007) notes that horizon scanning helps organizations react to environment changes in a shorter interval and consequently easily use a window of opportunity;
- Identify drivers of change that affect the city, hence better understanding the risks associated with the definition of policies for the city or justifying a chosen course of action (Andersen et al, 2007). Sutherland et al (2012) also mentions that horizon scanning can lead decision-makers to face uncertainties thus developing more resilient policies.

Other expected results are:

- The creation and dissemination of a shared vocabulary among participants and users of the horizon scanning system (Voros, 2003); through the use of this common language, one has an ‘enzyme’ to think

about the future and communicate between various interest groups (Andersen et al, 2007);

- The establishment of a network around the system (Andersen et al, 2007), that can lead to new partnerships and business opportunities. Conceptually, the users of this system can be divided in circles: departments from the Lisbon City Council, the Lisbon City Council as a whole, citizens, local companies, investors, among others.

In the future this system is expected to be a part of a possible wider platform of the Lisbon City Council, devoted to Economic and Territorial Intelligence (a subject which aims to understand the outside environment that affects a territory (Miedes, 2009; Financial Times Lexicon, 2013) – Lisbon, in this specific case). Platforms such as the ones from Provence-Alpes-Côte d'Azur (Intelligence Económique Provence-Alpes-Côte d'Azur, 2013) and Manchester (Manchester City Council, 2013) are possible examples of the aimed objective.

2. The Conceptual Model of Horizon Scanning

In this section the benchmarking search that was conducted is presented, and the proposed model is also presented and detailed explained. After the explanation of the model, a comparison with the previous work developed by the Lisbon City Council is done.

2.1 – Benchmarking

In order to design the system, research was conducted through academic papers and through the search of real world examples, following Day

& Schoemaker (2005) suggestion that when it comes to detect and act on signals, one should try to learn with the practices of successful organizations.

Medical technology is a domain that applies horizon scanning as a periodic system to gather information, with interesting examples such as Douw et al (2003), Mundy et al (2005), Brown et al (2005) and Joppi et al (2009).

On a government level, the Risk Assessment and Horizon Scanning system coordinated by the government of Singapore (mentioned by Amanatidou et al (2012) and Kuosa (2010)) is a good example of a large "semi-automatic system that provides continuous end-to-end capabilities to collect and classify data, analyse and understand relationships, and anticipate as well as discover emerging issues" (Amanatidou et al, 2012, page 209).

Other relevant Foresight study that was found to incorporate a horizon scanning component (although in a punctual way) was Sutherland et al (2011), focusing in conservation issues.

2.2 – Model proposal

The proposed model is represented in Figure 1 and it will explained in this section.

The outline of the model was based in previous work developed by the Lisbon City Council team (which in turn was based in the CETISME project (2002)). This first model started with a co-definition of objectives between the Lisbon City Council and the partners, followed by the Horizon Scanning process. This process (relying in scanning partners) started with the identification of sources and data, followed by scanning, and then analysis/organization of data – the classification of data would be done

accordingly to its theme, driver of change category and depth of analysis (distinguishing between a short description and a long description). After the Horizon Scanning process, the Lisbon City Council would validate the results, which would then be presented through various outputs and used by decision-makers and entrepreneurs to take actions. These actions would then retroactively affect the co-definition of objectives at the start of another loop.

Further academic research was also conducted, from which the three-phased model proposed by Kuosa (2010) was particularly relevant:

- First phase, where the information is gathered;
- Second phase, diagnosis, which consists in the analysis of the information (with the context and potential changes that may result) and the selection and clustering of the most relevant topics;
- Third phase, where the results of the diagnosis step are presented and a strategy to cope with them is drawn.

The aim was to achieve a Continuous Horizon Scanning System, as defined by Fahey (1981) where information gathering is a structured activity, “the focus shifts from mere problem-solving to opportunity-finding” (Fahey, 1981, page 33) and the system is able to help the organization in a proactive way.

Also kept in mind was Aaker (1983) notion that in order to gather useful information, the system should be focused in specific information needs, try to resort to people exposed to relevant information and take into account the information storage, processing and dissemination.

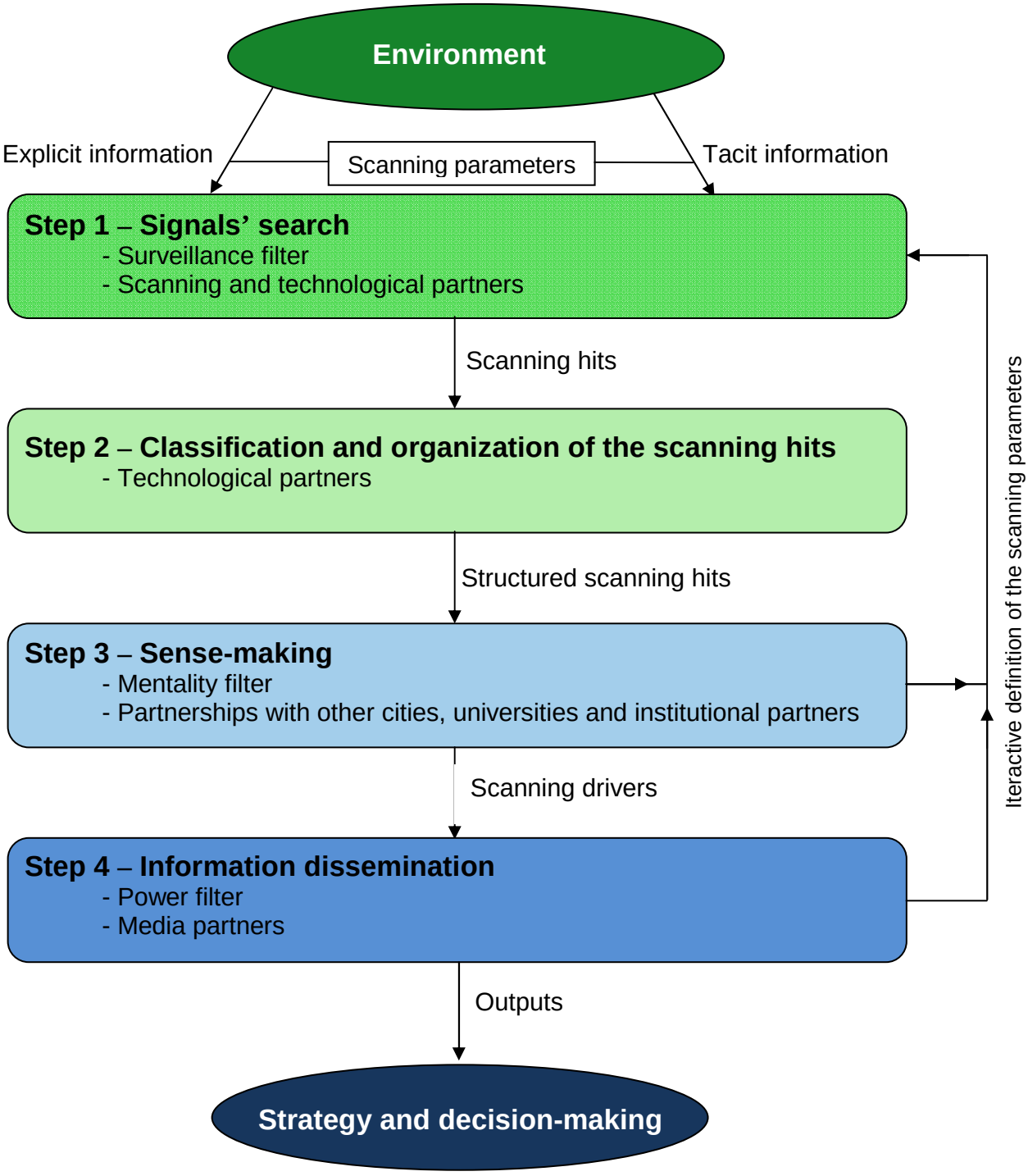

Figure 1- The proposed horizon scanning model.

As one can see, there are several planned partnerships (previously listed by the Lisbon City Council work), namely:

- Scanning partners: entities (such as clipping or horizon scanning companies) that are able to help with the gathering of data and related analysis;
- Technological partners: an outside company or a department from the Lisbon City Council, with the objective of implementing the technological component of the system;
- Partnerships with other cities, in order to share knowledge, results and work in comparative analysis of the drivers of change impact in each city;
- Universities: entities that are able to help with the drivers of change analysis (such as writing outputs or planning events about Economic and Territorial Intelligence);
- Institutional partners: associations and organizations to which the system will be presented, gathering their feedback and possible help (such as financing and divulgation);
- Media partners: media companies that are able to help with the system divulgation (such as the launch of the website or further news coverage).

Some of the advantages (previously identified by the Lisbon City Council work) that could foster the participation of these partners are:

- Active participation in a system of collective learning;
- Presence in the related initiatives (such as conferences or online projects);
- Access to outputs that sustain decision making.

2.2.1 - Step 1: Signals' search

In this step the environment is monitored and scanned for data that may prove relevant for the city future, in a continuous process with high frequency (that is, with short intervals between scanning loops) thus generating scanning hits. It is a step that relies heavily in a process (technological and human-driven) to monitor automatically the environment and the development of a database to store the gathered data; hence, the participation of scanning and technological partners is essential.

Conceptually, this step can be understood as the application of a surveillance filter (Ilmola & Kuusi, 2006) - a filter can be defined as the "operationalization of mental models" used to evaluate signals in an organization (Ilmola & Kuusi, 2006, page 911). Since this surveillance filter is the first filter that the information passes through when it enters the horizon scanning system, it delimits the scope of the scanning. An important aspect to keep in mind is to avoid the simple extrapolation of the past, since discontinuities in their beginnings usually appear from other fields (outside of the traditional focus); that is, one needs to avoid leaving out relevant information regarding discontinuities due to an incorrect filter's focus (Ansoff, 1984 in Ilmola & Kotsalo-Mustonen, 2003).

In order to reflect the priorities of the Lisbon City Council (following the rolling priorities concept suggested by Andersen et al (2007), which notes that the scanning topics may change through time), the scanning done in this step should be defined accordingly to scanning parameters, such as keywords or the number and ranking of sources to take into account while scanning a specific

subject. Hence, the scanning is centered in a list of topics (an inside-out approach), even though it may be take an exploratory approach regarding those topics.

The information gathered in this step can be classified as explicit or tacit information, which implies different sources and different approaches to scanning.

2.2.1.1 – Explicit Information

Explicit information is defined by Brown (2007, page 209) as information that "is written down or otherwise recordable – it tends to be factual information". This information can be gathered through scanning partners, as originally devised by the Lisbon City Council team, and further research can be conducted among other sources (for instance, using automated tools, like news alerts, feeds or automated text-mining, as suggested by Amanatidou et al (2012)), such as:

- Media publications (Amanatidou et al, 2012);
- Conferences (Amanatidou et al, 2012);
- Academic publications (Amanatidou et al, 2012);
- Monitoring of social networks, either by just observing or by promoting discussions. Auster & Choo (1994, Page 1) mentions that scanning could be done through "a casual conversation at the lunch table or a chance observation of an angry customer dumping a product" – nowadays social networks are a prime medium for observing this type of behavior, as well as to gather the current "word of mouth" (an important source, as mentioned by Stevens et al (1999, page 3)). Work regarding a wiki

project and Twitter was done by Amanatidou et al (2012), with conclusions that may be relevant in the practical implementation of this item. The information gathered through this source can be a mix of explicit and tacit information;

- Gray literature, such as internal statistics from public institutions (maternities, registration of new businesses, among others) or regulatory agencies outputs (Agency for Healthcare Research and Quality, 2011);
- Bibliometrics, cybermetrics and patent analysis, where one may notice issues emerging through a pattern (Könnölä et al, 2012);
- Day & Schoemaker (2005) leaves the suggestion of investing in start-up ventures so as to understand the new technologies markets. While this may not be feasible for the Lisbon City Council, other initiatives (such as business incubators) may provide access to the same kind of information.

When selecting and analyzing possible sources, there are several factors to take into account. Liu (1998) explains that information sources form an intertwined chain, where sources rely in each other, with sources building knowledge from other sources. This process can add value, but also distort the information. As a consequence, sources close to the original event provide a detailed perspective, while sources further away summarize the information and may even present a possible interpretation.

Furthermore, Hintunen (2008a) points that it is important to combine information from several sources and Aaker (1983) suggests that the selection

of information sources should be evaluated accordingly to the marginal effort and value.

2.2.1.2 – Tacit Information

Tacit information is information that is "held in people's minds – often associated with experts" (Brown, 2007, page 210). Even though this information is difficult to work with (Brown, 2007), Hiltunen (2008a) concluded that human sources are the most highly regarded in all knowledge areas and also highlights that personal networks provide an important contribution for finding information.

In order to gather this information a crowdsourcing approach was devised (based in Könnölä et al (2012) suggestion that the greater the number of scanners, the more easily one can detect indicators of emerging issues – the wisdom of the crowds), with three different projects (that could be done either online, through a website or a social network, or offline):

- Contributions from the Lisbon City Council members, following Day & Schoemaker (2005) idea that most organizations have people that follow peripheral news but do not try to engage those individuals' knowledge and Aaker (1983) suggestion that a horizon scanning system should also resort to those individuals inside the organization who are exposed to useful information sources (such as business partners or other cities councils);
- Contributions from experts in specific fields (accordingly to the scanning priorities), following Stevens et al (1999) suggestion that one should scan journals and iteratively schedule regular meetings with groups of experts in that subject (called "sentinels" (Stevens et al, 1999,

page 3)). For instance, if a scanning subject would be the film industry in Lisbon, one could schedule regular meetings with experts in that subject. This direct contact with experts, through interviews, surveys and other type of interaction, is also encouraged by Brown (2007); Hiltunen (2008a) sums up by mentioning that one should scan the scanners;

- Contributions from everyone on a wide-open approach, since, as Hiltunen (2008a, page 36) puts it, “the future, as we know, is very much dependent on the actions of ‘ordinary people’”; the involvement of different kinds of people is considered a strength when scanning the horizon (Hiltunen, 2008a). A challenge regarding the practical implementation of this item is the validation of each contribution; Amanatidou et al (2012) wiki project as well as the FuturesWiki (Brown, 2007), together with the work presented by Sutherland et al (2011) and Sutherland et al (2012) offer some conclusions upon one can draw some suggestions, like the aggregation of contributions by subject (later to be reviewed and evaluated by experts) or the forcing of a dual action of contributing and evaluating (for instance, an user submits a contribution, and in the next step a contribution submitted by another user in the same subject is displayed for evaluation). Furthermore, this system could possibly be associated with other initiatives from the Lisbon City Council that engage citizens’ participation.

2.2.1.3 – Scanning hits

The outputs from this step are scanning hits, raw data present in the database. This information is stored and organized in one homogeneous layer of data, which will be organized and classified in the following step.

2.2.2 - Step 2: Classification and organization of the scanning hits

A technological, automatic and continuous process with high frequency (like the previous step), this step takes into account Könnölä et al (2012) view that from the act of collecting signals tends to result pools of signals relatively unstructured, hence proposing a technological and automatic organization of those pools in narrower units that are easier to subsequently analyze.

2.2.2.1 – Theme and relevance

In order to ease the information analysis, in this step the previous scanning hits are classified accordingly to their theme and relevance:

- Theme: this classification focus on the subject of the scanning hit. Brown (2007) proposes the commonly used framework Political, Economic, Social and Technology (P.E.S.T.); this framework can be dynamic and more specific, accordingly to the needs of the Lisbon City Council;

- Relevance: this classification ranks each scanning hit accordingly to several criteria. Auster & Choo (1994) points that the information gathered about the external information is often equivocal, because not only does it concern an evolving environment subject to multiple interpretations, it could also be based in conjectures and incomplete or

incorrect knowledge. Hence, one can try to lower this inherent equivocality by using criteria to rank the relevance of each scanning hit, following the ideas mentioned by Hiltunen (2008b) (that can be further studied and developed):

- Number of occurrences (that is, the number of references to an event that appear in the media; one can distinguish between an event that only appears in one news story and an event that is widely referenced in several news stories);
- Visibility (which presupposes a sources' ranking; Liu (1998) suggests some criteria to evaluate sources, such as their accessibility, their reliability and the richness of their information. Consequently, as an example, one can distinguish between a blog or a daily national newspaper as sources with different visibilities);
- Size of the scanning hit (for instance, one can distinguish between a reference in a newspaper that only takes one paragraph or a full report with several pages);
- Tacit classification (in both works, Sutherland et al (2011) and Sutherland et al (2012), experts were asked to classify the information gathered and selected in a previous phase; a similar approach could also be applied in this system).

In this way one follows a bottom-up process, producing organized scanning hits from regular scanning hits; consequently, the information will be organized in clusters with a meaningful logical structure (Könnölä et al, 2012) –

for instance, the most relevant results regarding technology can easily be consulted.

It should be noted that the practical implementation of criteria to rank signals is highly dependent of the scanning topics. For instance, if scanning the status of Lisbon as an entrepreneurship hotspot, business publications should attain a specific ranking; however, if the scanning topic is the status of Lisbon as a healthcare tourism destination, those same business publications will rank at a different position.

As in the previous step, this step heavily relies in the technology needed to develop and maintain a database able to store and organize the data (as suggested by Amanatidou et al (2012)); hence, the participation of a technological partner is also essential in this step.

2.2.2.2 – Structured scanning hits

The outputs of this step are structured scanning hits, which feature the following structure (heavily based in the original Lisbon City Council work, which in turn was based on Alvarenga (2010)):

- Title: the title of the structured scanning hit;
- Description: a short description of the scanning hit;
- Source(s): the source or sources from where the information was gathered;
- Theme tags: tags that classify the structured scanning hit accordingly to its theme;
- Relevance: calculated from the previously mentioned criteria, it aims to allow the ranking of the structured scanning hit.

2.2.3 - Step 3: Sense-making

This step objective is to fulfill the role of a mentality filter, which is applied to the information in order to understand the opportunities and threats present in the organization's environment – this is achieved through sense-making, a process that creates a common model (shared among the organization) of the external environment and the organization place within it (Ilmola & Kuusi, 2006).

While the previous steps should be performed continuously by resorting to software tools, this step should have larger intervals between each exercise, due to its demanding nature.

2.2.3.1 – The sense-making process

In the sense-making process the information gathered from the environment (the structured scanning hits in this conceptual model) is compared with the current mental model and conclusions are drawn (Ilmola & Kuusi, 2006). Kuosa (2010) classifies each observation either as a promoter (if it is linear with what one expects) or disruptive (if it is not linear); Ilmola & Kotsalo-Mustonen (2003) further classifies the non-linear information in two types: either an event is unexpected (so, the information is novel) or an expected event didn't happen (which points to a discrepancy).

Sense-making can be done at the individual level, based in one's skills to perceive, interpret and build a meaning of the evolving environment, but it is a process that attains better results when done collectively, building upon the participants' skills to achieve conclusions from the analyzed information (for instance, by aggregating observations into meaningful clusters, by crossing them with other notions, or by detecting if a signal is spurious and does not

mean that a change is on its way) (Könnölä et al, 2012). Jackson (2011) suggests that one should try to take different vantages points, such as looking behind an event (its past), beyond (its future) and from above (how it relates to other drivers of change).

However, Ilmola & Kuusi (2006) notes that social interaction as a sense-making process affects the mentality filter role: it will increase the depth of its analysis (as will the implementation of the sense-making process through a multi-step exercise), but will simultaneously reduce its width (that is, diminish its openness - consequently new ideas are not easily accepted). Possible ways to cope with this risk and open the mentality filter is by avoiding being too strict with argumentation requirements and allow the use of symbols, metaphors and multiple interpretations (Ilmola & Kotsalo-Mustonen, 2003).

2.2.3.2 – Sense-making exercises

A practical exercise of sense-making depends on the subject to be studied, the characteristics of the knowledge that supports it, the participants involved and the time available. As so, the planning of each exercise is specific in itself, but some common topics can be identified.

Choo (2011) mentions that the perception of the environment is affected by the perceived complexity (the number of factors to take into account and the opacity of the causal relationships) and by the perceived dynamism (the rate of change), which are factors that one should consider while planning and executing a sense-making exercise. Sutherland et al (2012) also suggests some common criteria to take into account in the sense-making exercise, such

as potential impact, probability of occurrence and degree of knowledge (which can call for further research or consultation of an expert).

Regarding the participants' selection and number, participants from the partners can be invited (other cities, universities, institutional partners), but Day & Schoemaker (2005) also suggests the mobilization of ad hoc issue groups if needed and points outsourcing as an option that provides different perspectives. Könnölä et al (2012) stresses the importance of the participants' selection, noting that it should coverage different fields of expertise, affiliations, cultural backgrounds, organizational functions or personal values. Voros (2001) also notes that one should be aware of the participants' possible blind spots and take them into account – that is, each participant is unique and brings a unique perspective which affects the sense-making process.

Day & Schoemaker (2005) adds the suggestion of creating a high-level lookout able to rise above organizational divisions that may exist, which fits Hiltunen (2008a) mention that the cross-mapping of signals (a possible function of such a lookout) is a valuable sense-making tool.

Könnölä et al (2012) notes that the results of the exercise may seem fragmented. As a solution, it is suggested to create internally consistent theme clusters (by aggregating issues together) that cover the full scope of analysis; this process will bring to attention connections that otherwise might not be noted. In order to implement this, Könnölä et al (2012) suggests that one should start by selecting a small number of issues that are considered significant, and expand that initial set with additional issues related to the originals until a sufficiently broad coverage is achieved.

Furthermore, Könnölä et al (2012) also suggests that continuous idea generation and management can be done through internet-based tools, which can be helpful to collect and analyze observations as well as to work them in order to prepare future face-to-face workshops.

2.2.3.3 - Scanning drivers

As a process that precedes and frames the outputs of decision-making, sense-making plays a significant role (Woodside, 2001 in Ilmola & Kotsalo-Mustonen 2003). Consequently, Könnölä et al (2012) emphasizes that a sense-making process should not result in just a list of issues; instead, it should present its results in meaningful outputs that can be easily linked to the existing decision-making structures.

The tangible output (with the intangible output being the changes in thinking and planning concerning the future, as Voros (2003) observed) from this step are scanning drivers, a concept that takes into account the notion of future sign by Hiltunen (2008a) since it includes a dimension of interpretation, which means “the sense the observer makes out of weak signals and emerging issues in regard to the future” (Hiltunen, 2008a, page 22). As an interpretation done by an observer, it reflects the context in which it is done (Hiltunen, 2008b). Scanning drivers are a way to present the knowledge gathered from the original information about the environment, enriched with perspectives on how it may affect the city of Lisbon, therefore understanding under which driver of change (if any) each event can be classified.

One should also note that the result from the sense-making process can be taken into account to iteratively define the scanning parameters of the Step 1

(signals' search); that is, if one learns that more information is needed regarding a specific area (or that the relevance of another specific area has decreased), the Step 1 scanning parameters can be defined in order to take that into account (for instance, by defining more related searching keywords and scanning more sources)

The proposed structure for the scanning drivers is the following (heavily based in the original Lisbon City Council work, which in turn was based on Alvarenga (2010)):

- Title: the title of the scanning driver;
- Category: classification accordingly to the drivers of change (weak signal, trend, wildcard);
- Theme: classification accordingly to the theme;
- Keywords: words, ideas and concepts that can relate to the scanning driver;
- Description: description of the scanning driver (Jackson (2011) suggests trying to answer who, what, when, where, why and how) and its economic and territorial implications, with a heavy visual component if possible;
- Drivers and inhibitors: identification of the factors that can interfere with the speed or the probability of a scanning driver, either by increasing it (drivers) or decreasing it (inhibitors);
- Players and stakeholders: identification of the players and stakeholders related to the scanning driver (such as companies, public organizations, regions, nations, among others);

- Sources and date: identification of the sources used, with the date and bibliographic reference.

2.2.4 - Step 4: Information dissemination

A challenge stated by Hiltunen (2007) regarding horizon scanning systems is the need to effectively spread their results among the organization, in order to be considered in Strategy and Decision-making processes; that is, a horizon scanning system *per si* is not enough and a planned process to disseminate its results and ensure adherence to them should be present (Stevens et al, 1999). This step can be understood as a way to cope with a power filter: an obstacle between the knowledge gathered from the sense-making process and its consideration by the power structure (Ilmola & Kuusi, 2006).

The importance of this dissemination process (and adherence to its outputs) is emphasized by Day & Schoemaker (2005), stating that generally there is a path of visible antecedents that lead to surprises but people will probably ignore them, since those antecedents may contradict their preconceptions. Ilmola & Kotsalo-Mustonen (2003) mentions that this situation can be particularly noticeable when the power structure of an organization is challenged by a discontinuity; if somebody's position is threatened, the information that causes that threat can be purposively neglected.

As Strategy and Decision-making will build upon the horizon scanning results, a feedback loop is applied in this step in which these two processes will influence and define the scanning parameters present in Step 1; that is, Strategy and Decision-making are aligned with horizon scanning (Choo, 2001).

In the work developed by Voros (2003), its implementation was based in a two-phase staged approach: first a foundation was built by educating the organization about the study of the future, in order to subsequently implement further foresight projects able to enrich the strategic processes of the organization. The education stage was implemented by resorting to frequent e-mails with foresight snippets as well as a horizon scanning newsletter, which were designed to serve the function of conversation starters for the decision-making processes. This approach was taken into account while planning this step, by trying to take the knowledge about the future to the people (so that it can be used in the ongoing routine – (Fahey, 1981)), instead of passively waiting for the people to look for that knowledge.

2.2.4.1 - Outputs

The proposed methods of dissemination of the horizon scanning system results are (heavily influenced by the previous work developed by the Lisbon City Council):

- A website/web portal of Economic and Territorial Intelligence and related presence in social networks;
- A newsletter and foresight snippets distributed by e-mail;
- Inputs for workshops, presentations and work reunions;
- Inputs to support decision-making and speeches;
- Visual presentation of the outputs for offline presentation (following the suggestion of Hiltunen (2007), where relevant graphics and images are presented with screens placed in strategic spots; another idea could be

the development of a computer screensaver to display the aforementioned visual information);

- Resorting to 'future champions' to spread the results (Liu et al (2000) mentions that, in the study, technology champions helped the adoption of a new technology inside of a organization; a similar approach, but regarding the adoption of the horizon scanning results could be applied in this work);
- Joint work with other projects from the Lisbon City Council, where knowledge about the future can be present and be useful.

Work in the outputs could be further developed by working with a media partner. The periodicity and schedule of this step depends on the characteristics of each output.

A further note by Andersen et al (2007) is the recommendation to plan activities to follow complete projects (such as seminars' participation or the presentation of the results to other relevant audiences beyond the original targets); projects often are met with a lot of interest, but at that point no further resources are available to follow up on that interest (since the project has already ended).

2.3 – Comparison with the previous work developed by the Lisbon City Council

Drawing a comparison between the original work developed by the Lisbon City Council and the work presented in this dissertation, one can note that there are some changes. Globally, the level of development and detail of

the whole process was increased, and new concepts and approaches were introduced, as discussed in this section.

The list of purposes for the system was enriched with the identification of the possibility of the development of a shared vocabulary as well as the establishment of a network around the system – by considering this items, its use will be enhanced.

The conceptual model is different from the first model, namely:

- Use of the concept of filters, which helps the users acquire a more inclusive notion of the changes that the information goes through;
- The environment information is classified as explicit and tacit, and different approaches to each kind of information are presented;
- The search for information is more refined, namely with the identification and ranking of sources, as well as with the methods of search;
- While in first model the information was only classified accordingly to its theme and driver of change category, in this model the information is structured accordingly to different criteria in two different phases. In the first phase the information is classified accordingly to its theme and rank of relevance in the environment. In the second phase, the information is analyzed in a sense-making process, where it is then classified accordingly to its theme and driver of change category, which was the only

classification used in the first model. The format of the information (the list of fields used to describe it, such as the description, drivers and inhibitors and so on) is based in the original format devised by the Lisbon City Council;

- Study and further development of the sense-making process, identifying the mechanics of the process as well as the factors that influence its result;

- Modification of the feedback cycle - while in the original model the equivalent of the scanning parameters were only altered with the result of the actions taken, in this model another point of entry to the loop was added, based in the results of the sense-making process – hence, there are now two points of entry to this feedback cycle.

Regarding the list of outputs, it was enriched with the dissemination of results through social networks, use of visual data with screens in strategic spots, resort to 'future champions' as well as with the identification of the possible need of follow-up activities.

3. Conclusions and further steps

The development of this conceptual model for a horizon scanning system was based in previous work already done by the Lisbon City Council team and by academic research. The result is a model sustained by the current academic knowledge and that covers the scanning process from end to end. Different approaches to gather information from the environment (explicit and tacit) are presented, as well as criteria to organize and structure that information. Working

with this structured information, a sense-making exercise is suggested in order to produce insights regarding the future; then, the results of the system are disseminated to its various users.

To implement it as a fully functional system, some topics require more research, namely:

- The crowdsourcing component: This component was studied and researched through academic papers related to horizon scanning (as mentioned in the text); however, the steps needed to implement such a component (how to create and maintain an online social presence, how to foster the participation, among other items) were not fully studied and further research and knowledge should be gathered about this field;
- Sources ranking: Criteria to rank the sources was presented, based in research conducted through academic papers (as mentioned in the text). However, due to the specific nature of each scanning topic as well as the broad range of sources available, further research and discussion regarding this ranking is advised;
- Ranking of the structured scanning hits: The implementation of this ranking is dependent on the implementation of the sources ranking and in the technical implementation of a software tool and database able to calculate this rank in an automated way;
- Sense-making process: The practical implementation of this process depends on the topic to be discussed, the participants and the available time. As so, a generic and conceptual overview of the process was

given, but each particular sense-making session should be researched and designed with its own specificities in mind.

The next step should be the practical implementation of the model, accordingly to the plans and priorities set by the Lisbon City Council and resorting to the establishment of the proposed partnerships (some work on identifying possible candidates was already done by the Lisbon City Council team). Later, the development of an Economic and Territorial Intelligence platform is also possible.

Taking a long-term view, to try to foresee further add-ons to the system, there are some ideas that can also be suggested, such as the crowdsourcing of real-time opinions through smart-phones (which would allow for a more immediate time horizon) or the use of Computational Social Science (the study of digital data to portrait individual and group behavior (Giles, 2012)).

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