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EDITOR'S NOTE **VOL 8, NO 1 (2018)**

Stevan Dedijer
1911-2004

The disciplines of management and IT have indeed merged: new empirical data

Advancement in the intelligence field can only be achieved through new observations and the presentation of new empirical data. This is a continuous process and includes how we as employees engage with software and technical solutions. Just as it is impossible to teach or learn anything in marketing today without a deep understanding of digital marketing, in the same way is it impossible to make advancements in intelligence studies without first-hand experience with business intelligence software and new IT-equipment. Management and IT have indeed merged.

This understanding has been an integrated part of JISIB since the journal started some eight years ago. And as always, we are less interested in how new technologies are developed (for that there are excellent technical journals) than about the management practice of these developments. This issue follows very much on this track.

The article by Fatma Fourati-Jamoussi, Claude-Narcisse Niamba and Julien Duquennoy entitled "An evaluation of competitive and technological intelligence tools: A cluster analysis of users' perceptions" is an evaluation of competitive and technological intelligence (CTI) tools by students to help designers get the best efficiency out of a monitoring process. The paper finds that user perception is greater than expected and that designers of CTI tools must take this in account when developing new products. The authors argue that this is a major reason why new software implementation fails in organizations.

The article by Ahmad Abbaspour, Amir Hussein Amirkhani, Ali Asghar Pour Ezzat, and Mohammad Javad Hozori is entitled "Identifying and describing sub-processes in strategic intelligence process by qualitative content analysis in inductive way". The authors set out to identify and describe the sub-processes of the strategic intelligence process in organizational analysis. Fourteen main sub-processes are identified to describe the strategic intelligence process. The results give new insight into the strategic intelligence process implementations in organizations.

The article by Mourad Oubrich, Abdelati Hakmaoui, Robert Bierwolf and Mouna Haddani entitled "Development of a competitive intelligence maturity model-Insights from Moroccan companies" identifies six CI dimensions (CI culture of an organization, CI deliverables, CI sourcing, CI cycle, CI investment in terms of resources, CI users and CI application) in CI implantation at three different CI levels (early, mid, world class).

The article by Avner Barnea entitled "Israeli start-ups – especially in cyber: can a new model enhance their survival rate?" concludes that the high percentage of failures of Israeli start-ups is due to the difficulties in comprehending the competitive landscape. Barnea draws this conclusion from having worked and interviewed a number of companies for years. He introduces what he calls the competitive review model to help small companies better prepare themselves for intense competition, especially relevant for the cyber security industry.

This issue also features a book review of Tetlock and Gardner's Superforecasting: The art and science of prediction (2015, Crown Publishers, New York, NY).

As always, we would above all like to thank the authors for their contributions to this issue of JISIB. Thanks to Dr. Allison Perrigo for reviewing English grammar and helping with layout design for all articles and to the Swedish Research Council for continuous financial support.

On behalf of the Editorial Board,

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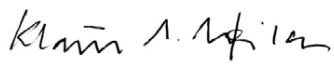

Prof. Dr. Klaus Solberg Søilen
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An evaluation of competitive and technological intelligence tools: A cluster analysis of users' perceptions

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ABSTRACT The purpose of this article is to discuss and evaluate the use of competitive and technological intelligence (CTI) tools by students to help designers of these tools get the best efficiency out of a monitoring process. This article introduces an application of the cluster analysis method and the competitive and technological intelligence literature. In order to evaluate the use of CTI tools, we deal with two evaluation models: Task-Technology Fit (TTF) and the Technology Acceptance Model (TAM). A survey was sent to users of CTI tools addressed to engineering students and the most pertinent replies were examined. The responses were analyzed by using the statistical software SPAD. Results showed a typology from the various profiles of users of this technology by using the method of classification. We note different perceptions between student users. Although this study remains focused on the individual perspective, it requires more examination about the organizational impact of the use of CTI tools. The identification of the different user profiles was done by using a cluster analysis. For the designers of CTI tools these results highlight the importance of user perception, suggesting designers take into account the perception of all user types. As these tools develop, more and more companies will be looking for skills of future engineers for monitoring and management of strategic information. That's why practical courses in CTI are taught to the students in order to take into account the companies' needs.

KEYWORDS Competitive and technological intelligence, cluster analysis, TTF model, TAM model, user perception

1. INTRODUCTION

Generation Y students need to understand why we use information gathering tools and how these tools have evolved since their emergence. What sense can be given to the quality of information found on the web? Are they able to judge the quality of the monitoring tools used and the information found? What do they need today in an engineering school?

These questions prompted us to think about teaching a module entitled Economic and Strategic Intelligence at UniLaSalle where we present the tools of competitive intelligence, technological intelligence, marketing intelligence and e-reputation (Fourati-Jamoussi, 2015). We have applied these types of surveillance (French *veille*) to a problem related to the fields of study of our students. We have three specialties in engineering training: agriculture, food and health and geology.

Our approach seeks to answer two key research questions:

1. How can engineering students make a choice between different monitoring tools to collect, process and disseminate information?

2. What are the different perceptions between students using monitoring tools?

To answer these questions, we propose in the second section the conceptual background about some cluster analysis applications, cluster analysis methodology, cluster analysis with SPAD and we define the two processes of "competitive intelligence" and "technological intelligence". In a third section, we propose the approach of our study and the research method. In the fourth section, we present our results on the monitoring tools developed within UniLaSalle and cluster users' perceptions of these tools. Conclusions are drawn in the fifth section.

2. CONCEPTUAL BACKGROUND

2.1 Cluster analysis applications

Anderberg (1973, 2014) presented all various applications of cluster analysis, the topics covered from variables and scales to measures of association among variables and data units. He discussed the conceptual problems in cluster analysis and presented many major areas of application. These are:

> "- The life sciences: the object of the analysis method is to develop complete taxonomies to delimit the subspecies of a distinct but varied species (for example, plants or animals);
>
> - The medical sciences: the cluster may be a disease, patient (or their disease profiles) and laboratory tests;
>
> - The behavioral and social sciences: the objects of analysis covered training method, factors of human performance, organizations, students, courses in school, teaching methodologies or techniques. Factor analysis is a competitor to cluster analysis in these applications.
>
> - The earth sciences: the object of these applications is to soils, countries, or regions of the world;
>
> - The engineering sciences: the application has been relatively unused in this field.
> - The information, policy and decision sciences: the applications to documents, the political units, products, markets, sales, programs, research and development projects." (p. 5-6)

A cluster analysis is considered to be a tool of classification, most frequently used in marketing research (Punj and Stewart, 1983).

2.2 Cluster analysis methodology

"Cluster analysis is the art of findings groups in data" (p. 1), the classification of similar objects or perceptions into groups is an important human activity (Kaufman and Rousseeuw, 2009). Berkhin (2006) defined clustering as a division of data into groups of similar objects, it is related to many disciplines and plays an important role in a broad range of applications that deal with large database with many attributes.

Clustering must not be confused with classification. In clustering, we must first develop a quantitative scale on which to measure the similarity between objects and secondly an algorithm for sorting objects into groups (Johnson and Wichern, 1998). In classification, we first separate a known number of groups and then assign new observations to one of these group according to the measurements.

To carry out a cluster analysis, a wide variety of clustering algorithms is available: hierarchical techniques and nonhierarchical techniques.

> "Hierarchical clustering techniques proceed by either a series of successive mergers (agglomerative hierarchical methods) or a series of successive divisions (divisive hierarchical methods).
>
> Agglomerative hierarchical methods start with the individual objects. Thus, there are initially as many clusters as objects. The most similar objects are first grouped, and these initial groups are merged according to their similarities.
>
> Divisive hierarchical methods work in the opposite direction. An initial single group of objects is divided into subgroups such that the objects in one subgroup are 'far from' the objects in the other. These subgroups are then further divided into similar subgroups; the process continues until there are many subgroups as objects – that is, until each object forms a group" (Johnson and Wichern, 1998).

> "The results of both agglomerative and divisive methods may be displayed in the form of a two-dimensional diagram known as a dendrogram. The dendrogram illustrates the mergers or divisions that have been made at successive level and looks like a tree" (Johnson and Wichern, 1998). This is why it's sometimes called the "hierarchical tree".
>
> "Nonhierarchical clustering techniques are design to group items into a collection of k clusters. The number of clusters, k, is specified before starting the clustering procedure.
>
> However, hierarchical clustering techniques are the most popular. In the following sections, we will deal with one particular agglomerative hierarchical procedure, say the Ward's hierarchical clustering method. In this method, a variance criterion is used to decide on which individuals or which clusters should be fused at each stage in the procedure. To implement this method, it's necessary to find, at each step, the pair of individuals or clusters that leads to a minimum decrease in total between-cluster variance after merging. In other words, two items whose merging results in the smallest decrease in between-cluster variance are joined. The results of Ward's method can be displayed as a dendrogram which is often used to identify the best groups of clusters: those in which the between-cluster variance is high whereas the within-cluster variance is low. The vertical axis of the dendrogram gives the values of the between-cluster variance decrease at which the mergers occur" (Johnson and Wichern, 1998).

Beyond the identification of the best groups of clusters, it is important to know how the clusters could be described, in other words which variables are concerned by the observed similarities (Johnson and Wichern, 1998).

2.3 Cluster analysis with SPAD v.8

SPAD is a useful statistical software used to deal with multivariate data analysis techniques such as hierarchical clustering. An exploratory factor analysis (principal component analysis or multiple correspondence analysis) is always conducted prior to a cluster analysis. The aim is to extract the meaningful dimensions in the dataset and then describe the objects that will be classified into groups by using the dimensions, which are also called factors. In fact, there are two types of attributes involved in the data to be clustered: metric and nonmetric. If the data are metric then a principal component analysis is used, if not, a multiple correspondence analysis is used. SPAD offers the opportunity to reduce the dimensions in the data and then use the scores from the suitable exploratory factor analysis to perform the Ward's hierarchical clustering method. After performing the clustering, the analyst is involved in two main steps:

> Step 1: Choosing the best groupings of individuals by using a visual cutting of the dendrogram. The "branches" of the dendrogram are cut with horizontal lines where the consecutive nodes are distant. In other words, the dendrogram is cut where its branches are very long. It's good to have an idea of the best groupings even if those groupings are not necessarily stable. In practice, there are two or three possible cuttings. It is up to the user to choose one of them.
>
> Step 2: Description of the clusters from a chosen grouping. The significant variables are used to characterize the individuals from each cluster. That description is done when the groupings are "consolidated". For instance, each individual is assigned to the cluster whose centroid is nearest (Johnson and Wichern, 1998).

SPAD also offers the opportunity to work with a hybrid clustering technique when the size of the dataset, especially the number of individuals, is very important (more than several thousand individuals). A nonhierarchical clustering technique, such as the "K-means" technique (Everitt, 1998), is applied to the dataset prior to the hierarchical clustering technique.

2.4 The process of Competitive and Technological Intelligence

"Competitive intelligence" (Jakobiak, 1998; Herring, 1998; Kahaner, 1998; Ruach and Santi, 2001) is regarded as a specialized branch

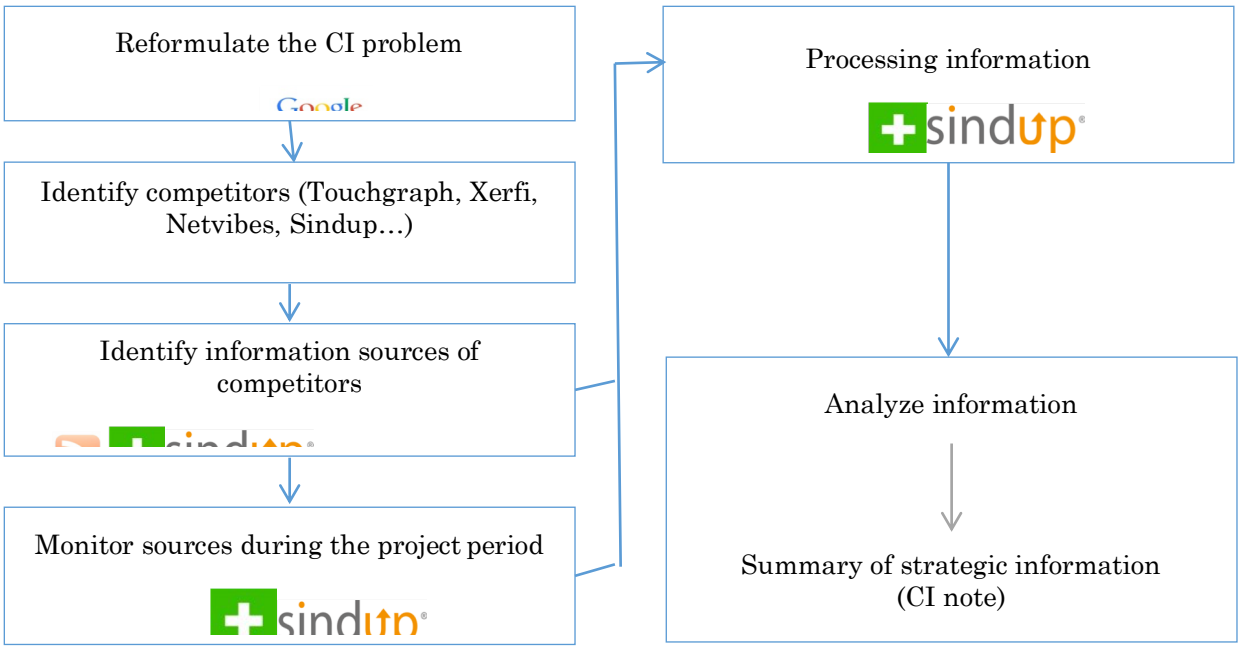


Figure 1 Teaching the Competitive Intelligence (CI) Methodology

of "business intelligence" (Giald and Giald, 1988; Sakys and Butleris, 2011). Solberg Soilen (2015) proposed the classification of intelligence studies to help place different forms of intelligence and show how they related to each other. The first concept aims to collect and analyze data on specific and generic competitive environments, it is also defined by Bel Hadj et al. (2016) as "a voluntary process whereby a company can begin to scan and absorb information from its socioeconomic environment in order to minimize the risks associated with the uncertainty and locate available opportunities" (Pateyron, 1998). While the second focuses on the current competitors and can analyze areas such as potential acquisitions-mergers and evaluate specific country risks (Lesca and Caron Fasan, 2006). Bel Hadj et al. (2016) highlighted the literature that examines competitive intelligence in relation to its integration with company strategy (Porter, 1999), knowledge management (Jacob and Patriat, 2002), collective learning and cooperation (Salles, 2006), business opportunities (Marmuse, 1996) and entrepreneurial orientation (Bel Hadj et al., 2014).

Du Toit (2015) listed the terms and the number of articles selected for the period between 1995 and 2014 to show the evolution of terms using the database ABI/Inform: competitive intelligence (75%), business intelligence (13%), marketing intelligence (8%), strategic intelligence (1%), technological intelligence (1%) and competitor intelligence (1%). He showed also the main journals that published a high percentage of competitive intelligence articles and only two journals: *Journal of Intelligence Studies in Business* and *Marketing Intelligence & Planning* that focused exclusively on the publication of intelligence types.

Competitive intelligence serves to identify, monitor competitors and decrypt their strategy. Technological intelligence is to follow a technical and scientific domain in time and to monitor developments (www.ie.bercy.gouv.fr). Salvador et al. (2014) presented a patent analysis on additive manufacturing and showed the work of Calof and Smith (2010) that "consider that competitive technical intelligence (CTI) and strategic technological foresight (STF) are fields with similar objectives and techniques. While the authors define CTI as a practice that provides business sensitive information on external scientific or technological traits, opportunities or developments that have the potential to affect a company's competitive position. STF according to them is a collaborative tool that draws upon the talents of many individuals (not only from the technology domain) and is an important source for technical and business intelligence."

The articles published in the *Journal of Intelligence Studies in Business* since 2011 were focused on developing and testing models to evaluate business intelligence systems and software. Following these studies, new problems have emerged: to study the differentiation of business intelligence vendors (Solberg Soilen and Hasslinger, 2012), to

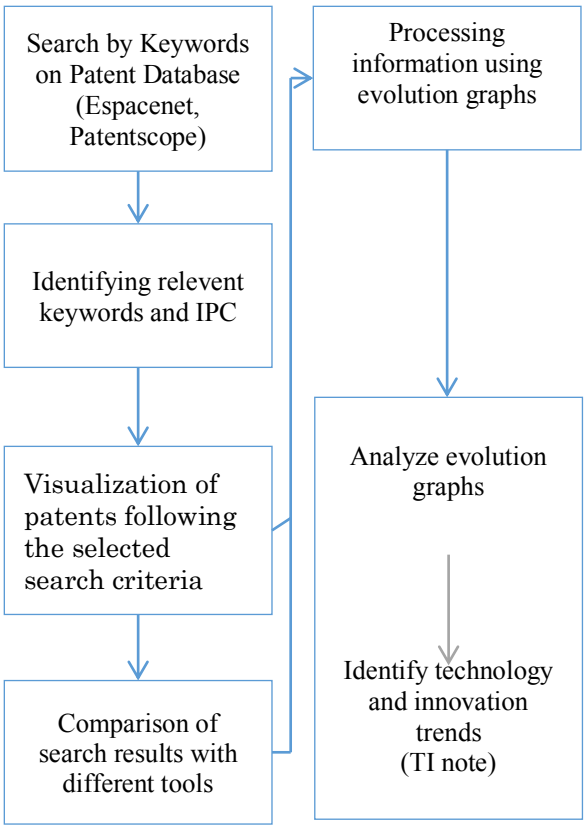


Figure 2 Teaching the technology intelligence (TI) methodology

classify business intelligence software based on their functionalities and performance (Amara et al. 2012; Nyblom et al. 2012; Abzaltynova and Williams, 2013), and to show the perception of business intelligence tools by professionals and students using two models of information systems literature (Fourati-Jamoussi and Niamba, 2016).

This literature review has enabled the definition of a competitive and technological intelligence plan (Figure 1 and 2). These two methodologies of CTI were applied by all students when they reformulated and responded to their watch problems (for example: extraction of pea protein; create new food products such as ice cream and energy cake; future of renewable energies and rare metals)

To apply this CI methodology, the students collected information from the competitive environment of the firm selected, they used general and monitoring tools to identify information sources of competitors, then monitor them over time (period of the watch project). Finally, they organized and analyzed all information treated to understand the strategic development of all competitors.

The TI methodology consists of establishing the goal of the project, then organizing a collection of patent information by using databases: Espacenet and Patentscope designed by the INPI (Institut National de la Propriété Intellectuelle) and the WIPO (World Intellectual Property Organization). The students need to identify the main countries, International Patent Classifications (IPCs), applicants, and inventors. To exploit and analyze all pertinent patents, they used the keyword-based patent analysis (Salvador el al. 2014) that represents an important method used to determine technology trends, discover technological opportunities and predict new technological advances. This method is based on patent keyword frequencies between them (Choi et al. 2012).

3. THE METHODOLOGY AND THE RESEARCH MODEL

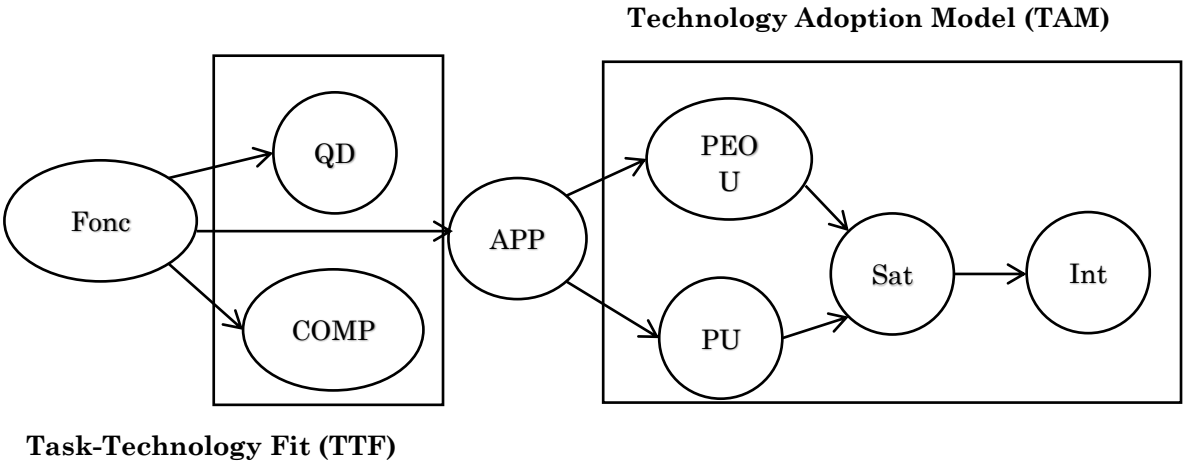
3.1 Data collection

The study concentrated on a certain number of variables stemming from the literature in information systems, which join the problem of the evaluation of the CTI tools used within the framework of the process of strategic intelligence. A survey was built in the field of the conception of the CTI tools (Fourati-Jamoussi, 2014). Through this study, we tried to show the use of the watch tools and their applications. The survey was built with the aim to operationalize the variables of the theoretical model as well as to profile the users who answered this survey. It was designed and diffused to UniLaSalle students after applying CTI methodologies presented above. Our database is composed of 265 responses for clustering the users' monitoring tools. These respondents were from three specialties: i) agriculture; ii) food and health; iii) geology.

3.2 Logic of the study

To evaluate and compare the user profiles, the selected criteria were taken from the theoretical fusion of these two models: technology / task fit (Goodhue and Thompson, 1995) and technology acceptance (Davis, 1989; Venkatesh et al., 2003) as part of the literature on the evaluation of information systems (Figure 3).

Model I: "Task/Technology Fit" aims to evaluate the user perception towards the used system. It is defined by the degree of correspondence between the functional needs relative to the task and the technical features offered by the information technology. It was explained by four criteria (b, c, d, e):



Legend:
Fonc: Functionalities of monitoring tools
QD: Quality of Data
COMP: Compatibility of Sources
APP: Capacity of learning
PEOU: Perceived Ease of Use
PU: Perceived Utility
Sat: User satisfaction
Int: Intention of use

Figure 3 Research Model of CTI tools used

a. CTI tools used: is not shown in the model but in the survey. These tools are classified into three categories (presented in Table 2).

b. Functionalities of CTI tools: were the capacities of the system to help individuals or a group, determined by the type of system used (Benbasat and Nault, 1990; Wierenga and Van Bruggen, 2000). The tasks presented in the questionnaire were: search information, store, process and extract a large quantity of information, resolve the semantic and syntactic problems.

c. Data Quality: measured the correspondence between needs and the available data, it also measured the exactness of these available data by using CTI tools and the quality of data at a level of detail suitable for the tasks.

d. Data Compatibility: between the various sources of data.

e. Capacity of learning: the ability of students to use these watch tools.

f. The intensity or frequency of use: it was a subjective appreciation of the increase or the decrease in the degree of use. The intensity depended on the integration of the business intelligence system (Grublješič and Jaklič, 2014) and on the strategy adopted by the company (presented in the survey).

Model II: The acceptance of CTI tools is inspired from the "Technology Acceptance Model" of Davis'86, this model was explained by:

a. Ease of use of the CTI tools (Davis, 1989): measured the degree of faith of a user in the effort to supply in order to use the system. To measure the ease of use, we referred to the measuring instrument of Davis (1989) which consists of six items, proven valid and reliable by Doll and Torkzadeh (1998).

b. Perceived Utility of the CTI tools: this element was not directly measurable. This notion came from microeconomic analysis: it was the measure of the use value of hardware or software for a user. It measured at the same time the impact of CTI tools on productivity and quality. The perceived utility was defined by the degree of improvement of the performances expected from the use of the system (Davis, 1989).

c. Satisfaction of the CTI tools user: it was the degree of continuity of use by the individual. It was a positive faith of the individual perception which showed the value of CTI tools. This variable was considered as a dimension of success of CTI tools (Seddon, 1997). It could influence the intention, but it was also a consequence of the use (Delone and McLean, 2003) of the utility and the ease of use perceived.

d. Intention of CTI tools use: the manager can accept a system but decides when he uses it or plans to use it in the process of decision-making. The intention of a user to use a system adopted by the organization as well as its satisfaction by this use depended on the utility and on the ease of use perceived from the system.

4. RESULTS ANALYSIS

Descriptive statistics have been used in order to show population characteristics. We have used the statistical software SPAD v.8 to treat the data. 35.8% of respondents were male and 64.2% were female. 98.5% of respondents were between the ages of 20-25 years, 1.5% were between the ages 26-30 years. Finally, our sample of users comes from three fields of studies: 50.2% from agriculture and 23% from food and health and 26.8% from geology (Table 1).

Table 1 Demographic profile of respondents (n=265)

Characteristic	Descriptor	Distribution (%)
Gender	Male	35.8
	Female	64.2
Age	20-25 years	98.5
	26-30 years	1.5
Field of studies	Agriculture	50.2
	Food and Health	23.0
	Geology	26.8

According to Table 2, about 42.6% of respondents used general tools such as search engines and other free tools (Google search, Google alert, websites), while 35.8% used monitoring tools like databases of patents or sector studies (search engines, Touchgaph, Xerfi, Espacenet, Patentscope), and finally 21.5% used platforms to monitor the competitive environment, the E-reputation brands and social networks (Geological Databases, Netvibes, Sindup, Alerti, Mention, Talkwalker).

Around 50.5% of respondents didn't frequently use monitoring tools, 48.3% used them sometimes or often, and 1.1% always used them.

Using the Task-Technology Fit (TTF) model leads to 14 variables with scale values. The Ward's hierarchical clustering technique shows that the sample of students could be split in two opposite groups before the research of the stable groupings (Figure 4): the first one with 67% of students and the second one with 33% of them.

Table 2 Respondents' tools usage and characteristics

Characteristic	Descriptor	Distribution (%)
Tools	Search Engines and Websites	42.6
	Search Engines and Patent Databases	35.8
	Specialized monitoring tools	21.5
Usage Frequency	Never	6.0
	Rarely	44.5
	Sometimes	35.5
	Often	12.8
	Always	1.1

The search for *stability* of groupings leads to two clusters whose frequencies are respectively 60% and 40%, instead of 67% and 33%. Each individual is represented in a scatter plot of principal component scores by a point which is the number of the cluster it belongs to (Figure 5). Each cluster mean (centroid) is also

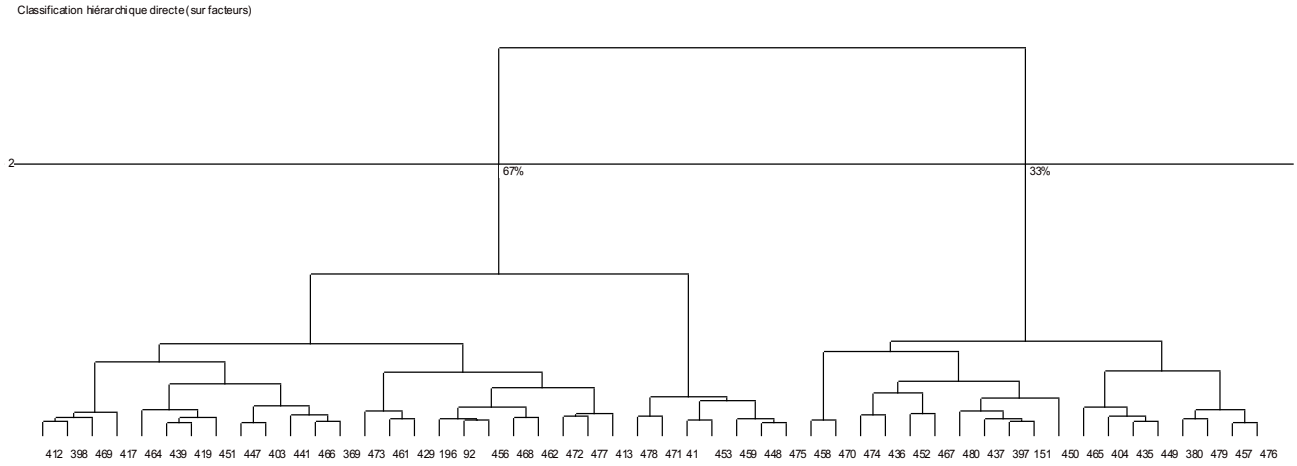


Figure 4 Dendrogram of similarities between 265 students according to the TTF model

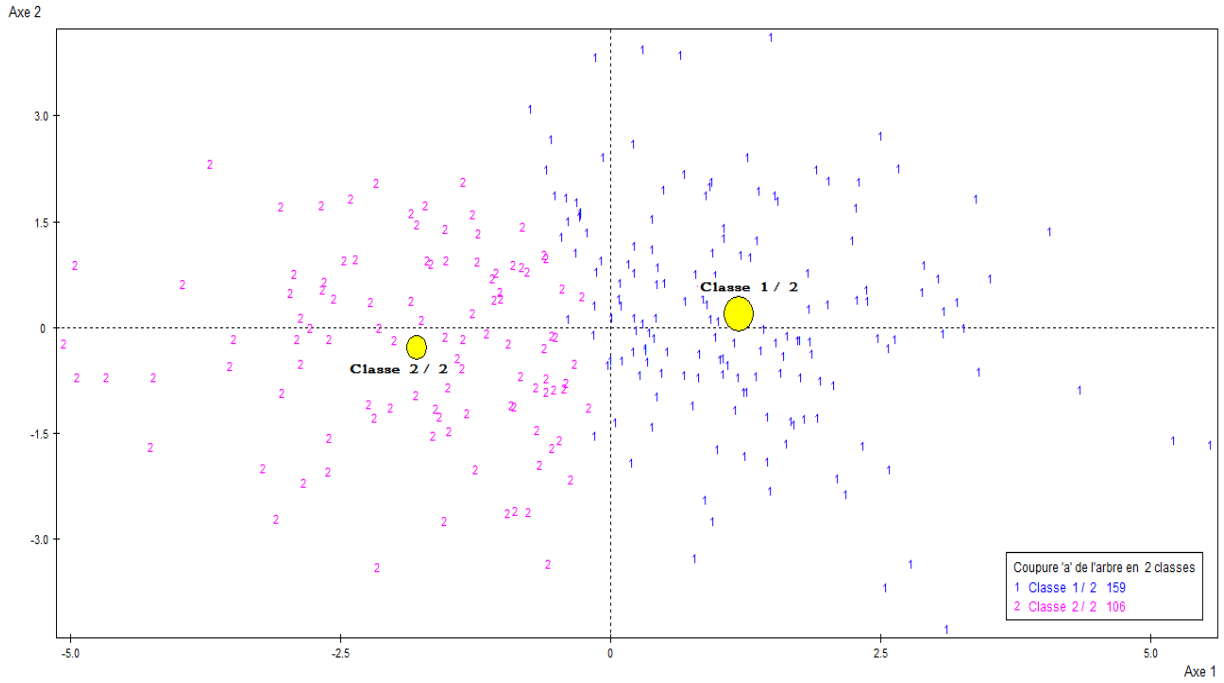


Figure 5 Positioning of the two clusters in a scatter plot of principal component scores.

represented by a point whose size indicates the proportion of individuals in the cluster.

The categorical data (gender, field of studies, tools, usage frequency) used in the description of the groups show otherwise that the first group of 60% of respondents is mainly composed of students from the specialty "geology" who often used CTI specialized tools. The characteristics of these students from group 1, according to CTI tools' perception, are shown below:

- The available data are either suitable for their needs or helpful for their tasks;

- They claim to have greater capacities of learning by using CTI tools;

- They mostly agree with the functionalities of monitoring tools;

On the other hand, it is not easy for them to find useful tools for their daily work.

The characteristics of the students from group 2, according to the CTI tools' perception are certainly antagonistic, but it can be noted that the individuals who belong this second group are students from the specialty "agriculture" who never used search engines and websites.

The Technology Adoption Model (TAM) leads to 25 variables with scale values. Two groups of students or three groups are highlight by the cuttings of the displayed dendrogram (Figure 6). In the following paragraph, the cluster description in three groups is made in order to take into account the presence of a small group of 33 students with particular characteristics. The reallocation

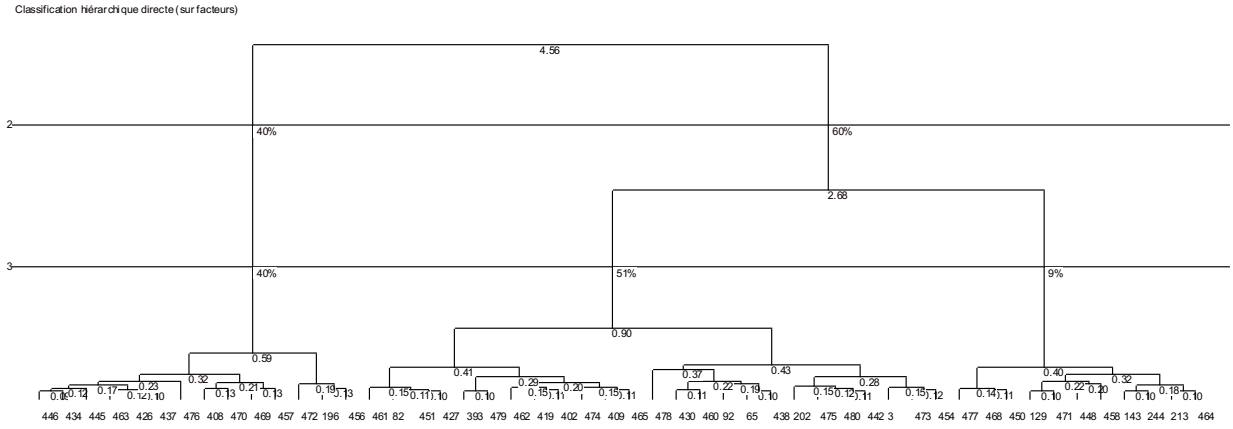


Figure 6 Dendrogram of similarities between 265 students according to the TAM model.

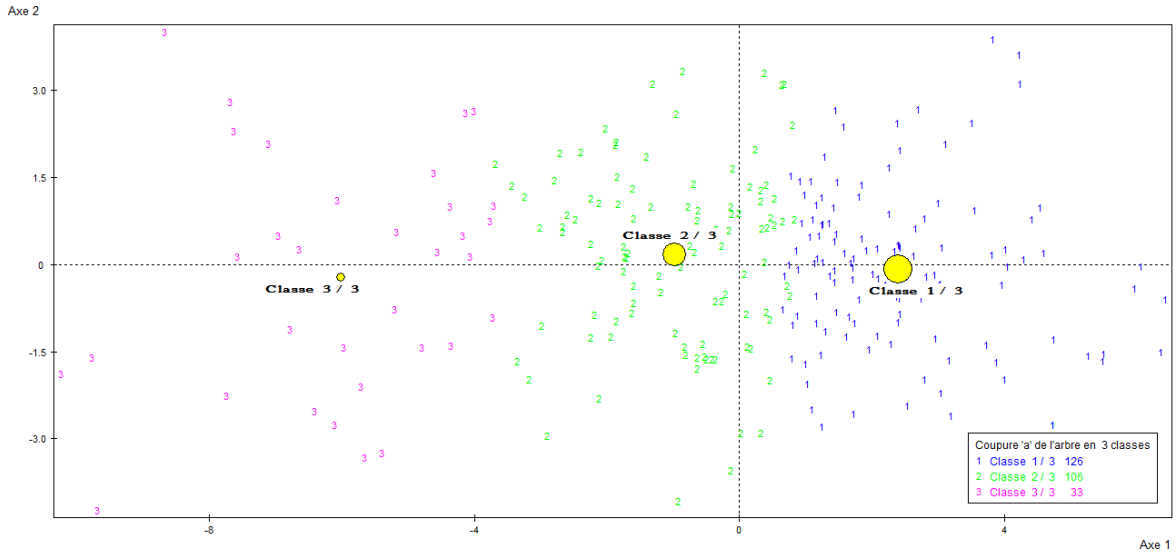


Figure 7 Positioning of the three clusters in a scatter plot of principal component scores.

step for the grouping stability search indicates three clusters whose observed frequencies are 126, 106 and 33. Categorical data are also used in the description of these clusters. General statements and characteristics of respondents in each group are:

Group 1: often use CTI specialized tools, interest shown for CTI tools (utility, ease of use, ease of learning, satisfaction and intention to use in the future).

Group 2: rarely use general tools, little interest.

Group 3: Never use general CTI tools, rare interest in monitoring tools.

The dispersion of classes described above can be visualized on the scatter plot of principal component scores (Figure 7). It shows how differentiated the clusters are. The individuals are represented on the plane by identifying them by their group number. The centroids are also represented by points whose size is proportional to the size of the clusters.

5. CONCLUSIONS

Regarding the managerial implication, the first technology-task fit model showed two groups from those who used CTI tools, ranging from source identification to the dissemination of information. We can see that the profile of the first group of users can be part of an advance monitoring unit. The second group of users were latecomers in adopting this technology. Finding the monitoring tools not flexible, this implies the dissatisfaction with the quality of service offered by this technology may be due to limited use.

Three groups were identified in the second technology adoption model, the first group is aware of the perceived usefulness of these monitoring tools and the second is considered as intermediate because they used general tools that showed their limits to achieve a watch type. The third is not satisfied completely as first users of a watch platform as part of a monitoring project. The difficulty lies in the appropriation of these tools by students and their adaptation to the selected CTI projects.

We deduced that a CTI tool implementation in a company is accompanied by organizational change, sometimes cultural, which task-technology fit and tools adoption impact were not negligible. This would explain, in part, why these tools can have both success and failure in the watch projects.

The implementation of this monitoring system has shown the pervasive role of students/agents/analysts in the organization and coordination of steps in this process, from receipt of the request to the dissemination of results using different monitoring tools according to their needs of information and watch types (competitive, technological, marketing).

Our article provides evidence that competitive and technological intelligence (*e-veille*: See the definition of "*e-veille*" in Lexique de Gestion et de Management sous la direction de J.P. Denis, A.C. Martinet et A. Silem, 9ème édition, Dunod, 2016.) was most taught to be applied to business cases for purely pedagogic education using the free and commercial watch

tools (Netvibes, Touchgraph, Google, Xerfi, Espacenet, Patentscope, Sindup) to achieve these methodologies. Finally, the monitoring of open and closed data can be a full search. This study showed us how to use a cluster analysis method to identify the groups of students who differ in attitude, perception and utility of the monitoring tools by putting them in situations of watching problematic. All these indicators are important to measure in subsequent works the adequacy between the functionalities of these tools and the quality of the data and the compatibility of the sources, as well as the acceptance of the monitoring tools by engineering students.

This study ensures the furthering of existing models to classify business intelligence software based on their functionalities and performance (Amara et al. 2012; Nyblom et al. 2012; Abzaltynova and Williams, 2013) and to show the perception of business intelligence tools by professionals and students using two models of information systems literature (Fourati-Jamoussi and Niamba, 2016). We have focused our attention on the perception of future engineering students coming from different specialties to meet several objectives: i) observe the learning and discovery process of CTI tools by students; ii) adapt our teaching to the needs of student profiles, and iii) help these students to understand and develop individual and collective skills (able to implement a competitive and technological intelligence system).

We will increase the number of respondents for future studies to prove the significance of all variables.

6. REFERENCES

Abzaltynova, Z. and Williams, J. (2013). Developments in Business Intelligence Software. *Journal of Intelligence Studies in Business*, (II): 40-54.

Amara, Y., Solberg Soilen, K. and Vriens, D. (2012). Using the SSAV model to evaluate Business Intelligence Software. *Journal of Intelligence Studies in Business*, (III): 29-40.

Anderberg, M. R. (1973). Cluster Analysis for Applications. New York: Academic Press, 372pp.

Anderberg, M. R. (2014).Cluster Analysis for Applications: Probability and Mathematical Statistics. A series of monographs and textbooks. New York: Academic Press, books.google.com.

Bel Hadj, T. and and Aouadi, S. (2014). Effects of corporate economic intelligence on international competitiveness of Tunisian firms. *Knowledge Horizons-Economics*. 6 (1): 113-121.

Bel Hadj, T., Ghodbane, A. and Aouadi, S. (2016). The relationship between 'competitive intelligence' and the internationalization of North African SMEs. *Competition & Change*. 20 (V) : 326-336.

Benbasat, I. and Nault, B. R. (1990). An evaluation of empirical research in managerial support systems. *Decision Support Systems*, 6 (III): 203-226.

Berkhin, P. (2006). A survey of clustering data mining techniques, grouping multidimensional data, Springer, 25-71.

Calof, J., and Smith, J. (2010). The integrative domain of foresight and competitive intelligence and its impact on R&D management. *R&D Management*. 40 (1): 31-39. doi:10.1111/j.1467-9310.2009.00579.x

Choi, S., Park, H., Kang, D., Lee, J. and Kim, K. (2012). A SAO-based text mining approach to building a technology tree for technology planning. *Expert Systems with Applications*. 39: 11443–11455.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technologies. *MIS Quarterly*, 13 (III): 319-340.

Delone, W. H. and McLean, E. R. (2003). The Delone and McLean model of information success: A ten-year update. *Journal of Management Information Systems*, 19 (IV): 9-30.

Doll, W. J. and Torkzadeh, G. (1998). Developing a multidimensional measure of system-use in an organizational context. *Information and Management*, 33 (IV): 171-185.

Du Toit, A. S. A. (2015). Competitive intelligence research: an investigation of trends in the literature. *Journal of Intelligence Studies in Business*, 5 (II): 14-21.

Everitt B. S. (1998). Dictionary of statistics. Cambridge University Press, London.

Fourati-Jamoussi, F. (2014). Veille stratégique: l'évaluation de l'utilisation des agents intelligents. *Presses Académiques*

Francophones, ISBN 978-3-8381-4777-2, 448p.

Fourati-Jamoussi, F. (2015). E-reputation: a case study of organic cosmetics in social media. In: 2015 6th international conference on Information Systems and Economic Intelligence, IEEE, pp 125–132.

Fourati-Jamoussi, F. and Niamba, C. N. (2016). An evaluation of business intelligence tools: a cluster analysis of users' perceptions. *Journal of Intelligence Studies in Business*. 6 (1): 37-47.

Giald, B. and Giald, T. (1988). The business intelligence system, a new tool for competitive advantage, New York: AMACOM.

Goodhue, D. L. and Thompson R. L. (1995). Task-Technology Fit and Individual Performance. *MIS Quarterly*, 19 (II): 213-236.

Grublješič, T. and Jaklič, J. (2014). Customer oriented Management practices leading to BIS embeddedness. *Online Journal of applied Knowledge Management*, 2 (I):11-27.

Herring, J. P. (1998). What is intelligence analysis?. *Competitive Intelligence Magazine*, 1(II).(current September 1, 2003).

Jacob, R. and Pariat, L. (2002). Gestion des connaissances et compétitivité des entreprises. *Réseaux*. 3 (II): 4.

Jakobiak, F. (1998). L'intelligence économique en pratique. Paris: Editions d'Organisation, 307 p.

Johnson, R. A. and Wichern, D. W. (1998). Applied multivariate statistical analysis. Prentice Hall, New Jersey.

Kahaner, L. (1998). Competitive Intelligence: How to gather, analyze and use information to move your business to the top, Touchstone.

Kaufman L. and Rousseeuw P. J. (2009). Finding groups in Data: an introduction to cluster analysis. A John Wiley and Sons, INC, ISBN 978-0-470-31748-8, 368 p.

Lesca, N. and Caron-Fasan, M. L. (2006). Veille anticipative, une autre approche de l'intelligence économique. Lavoisier, Paris.

McKercher B. (2008). Segment transformation in urban tourism, Tourism Management, 29 (VI): 1215-1225.

Mooi, E. and Sarstedt, M. (2011). Cluster analysis, in a concise guide to market research, Springer Berlin Heidelberg, ISBN 978-3-642-12540-9, 237-284.

Nyblom, M., Behrami, J., Nikkilä, T. and Solberg Soilen, K. (2012). An evaluation of Business Intelligence Software systems in SMEs-a case study, *Journal of Intelligence Studies in Business*, (II): 51-57.

Pateyron, E. (1998). La veille stratégique. Paris: Economica, 1998, 212 p.

Porter, M. E. (1999). La concurrence selon Porter. Paris: Editions Village Mondial.

Punj, G. and Stewart, D. W. (1983). Cluster Analysis in Marketing Research: Review and Suggestions for Application, *Journal of Marketing Research*. 20 (II): 134-148.

Ruach, D. and Santi, P. (2001). Competitive Intelligence Adds Value: Five Intelligence Attitudes, *European Management Journal*, 19 (V): 552-559.

Sakys, V. and Butleris, R. (2011). Business Intelligence tools and technology for the analysis of university studies management. *Transformations in Business and Economics*, 10 (II): 125-136.

Salles, M. (2006). Stratégies des PME et intelligence économique: une méthode d'analyse du besoin 2 éme edition. Paris: Economica.

Salvador, M. R., Zamudio, P. C., Carrasco, A. S. A., Benítez, E. O., Bautista, B. A. (2014). Strategic Foresight: Determining Patent Trends in Additive Manufacturing. *Journal of Intelligence Studies in Business*, 4 (III): 42-62.

Seddon, P. B. (1997). A respecification and extension of the Delone and McLean model of IS success. *Information Systems Research*, 8 (III): 240-253.

Solberg Soilen, K. (2015). A place for intelligence studies as a scientific discipline, *Journal of Intelligence Studies in Business*, 5 (III): 34-46.

Solberg Soilen, K. and Hasslinger, A. (2012). Factors shaping vendor differentiation in the Business Intelligence Software industry. *Journal of Intelligence Studies in Business*, (III): 48 - 54.

Venkatesh, V., Morris, M. G., Davis, G. B. and Davis, F. D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27 (III): 425-478.

Wierenga, B. and Van Bruggen, G.H. (2000). Marketing Management Support Systems: Principles, Tools and Implementation. *International Series in Quantitative Marketing*. Kluwer Academic Publishers.

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Identifying and describing sub-processes in the strategic intelligence process by qualitative content analysis in an inductive way

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ABSTRACT The purpose of this study was to identify and describe the sub-processes of the strategic intelligence process in organizational level analysis. Data were collected by searching the major academic and practitioner books, theses and journals in the Ebsco, Google Scholar and IranDoc databases in Persian and English. Nine thousand pages of text data were examined using content analysis. Fourteen main sub-processes were identified to describe the strategic intelligence process: (1) Identification of strategic environments and prioritizing them, (2) determination of organizational information needs and prioritizing them, (3) determination of monitoring period for each section of strategic environment and organization key information needs (KIN), (4) determination of information sources and assessment of information capturing, (5) external information scanning, (6) internal information extracting, (7) setting criteria for gathered information assessment, (8) information filtering, categorizing and abstracting, (9) information analysis, (10) interpretation and sense making (intelligence generation), (11) determination of intelligence users and intelligence distribution media, (12) intelligence distribution, (13) feedback from recipients, revision and adjustment, intelligence storage, and (14) intelligence use. The results provided useful insight for strategic intelligence process implementation in organizations and its effectiveness evaluation. The innovative aspect of this study is its response to a lack studies about strategic intelligence process modelling.

KEYWORDS Competitive intelligence, strategic intelligence, process, content analysis, inductive way

1. INTRODUCTION

The notion of strategy is multi-dimensional and multifaceted and includes many meaning (Leonard and Mintzberg 1996). In this way, strategic intelligence (SI) has many definitions too. Cohen (2009, 31) states she can account "*for at least 25 different expressions in English publications*" for the notion of SI, by studying books and articles published since 1967. This difference of views has led to some instability of terminology and lack of consensus in the SI body of knowledge. McDowell (2009) reported some difficulty for analysts and practitioners who want do research in SI. Many authors have written in this regard, acknowledging the disagreement about SI process and procedures in many organizations (Kruger 2010, Marchand and Hykes 2007, Brouard 2007, Xu and Kaye 2007, Liebowitz, 2006). Here, we want to analysis relevant texts about SI processes to: 1) find a

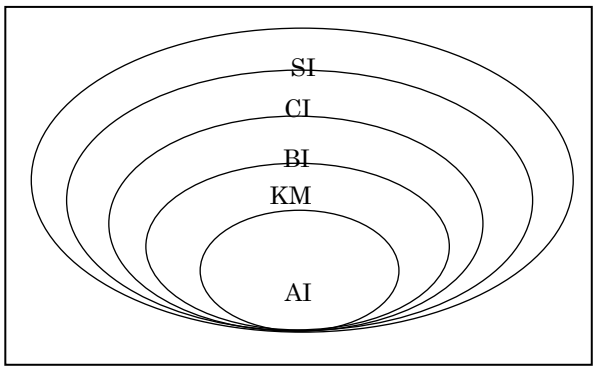

Figure 1 Framework of Intelligentsia (Liebowitz 2006,14).

basic consensus among authors about essential activities that are causing strategic intelligence. 2) identify executive requirements that impose strategic intelligence on organizations and 3) identify the sub-processes of strategic intelligence.

2. THEORETICAL FRAMEWORK

Intelligence is a comprehensive word, and many types of intelligence known in organizations are under the umbrella of this term. According to Liebowitz (2006): artificial intelligence (AI), business intelligence (BI), and competitive intelligence (CI), are different forms of intelligence at the organizational level of analysis. Liebowitz (2006, 14) has suggested a framework of intelligence to integrate many kinds of intelligence in organizations. Figure 1 indicates Liebowitz's (2006, 14) comprehensive model and shows the inclusion of different types of organizational levels of intelligence.

According to Liebowitz (2006, 13):

> "*The inner layer refers to AI. This is the field of developing intelligent systems to support or, in some cases, replace the decision maker*".

Although the benefits of AI techniques can be gained, in Liebowitz's (2006) opinion, this does not necessarily mean that other intelligence layers must use AI techniques. He admits that because of the model's comprehensiveness, he introduced artificial intelligence into the model.

The next layer in the intelligence framework refers to knowledge management (KM). According to Bali *et al.* (2009, 7) KM is defined as:

> *"Comprised a set of tools, techniques, tactics and technologies aimed at maximizing an organization's intangible assets through the extraction of relevant data, pertinent information and germane knowledge, to facilitate superior decision-making so that an organization attains and maintains sustainable competitive advantage".*

Jennex (2009, 4) define KM as:

> *"the practice of selectively applying knowledge from previous experiences of decision-making to current and future decision-making activities with the express purpose of improving the organization's effectiveness".*

KM refers to how the organization's knowledge can be used for innovation, essential knowledge retention, loyalty creation, and employees' productivity improvement. For gaining, organizing and sharing knowledge, AI techniques can be used.

Business intelligence (BI) has been placed in the next layer of Figure 1. The Knowledge Management and Business Intelligence (KMBI 2005) Workshop defined BI as an:

> *"active model-based, and prospective approach to discover and explain hidden, decision relevant aspects in large amounts of business data to better inform business decision processes"*. Turban *et al.* (2007, 24) define BI as *"an umbrella term that combines architecture, tools, databases, analytical tools, applications, and methodologies"* that *"give business managers and analysts the ability to conduct appropriate analysis"* on historical and current business data.

How to effectively manage the organization's internal information, to improve organizational performance and to align implementation and strategy, are the key issues of BI.

Liebowitz (2006, 14), has introduced competitive intelligence (CI) in the fourth layer of Figure 1. BI focuses on the internal and often quantitative data of the organization; however, CI focuses on data outside the organization, often qualitative in nature. These data refer to the competitive aspect of the external environment of an organization (Liebowitz 2006, Britt 2006, McGonagle and Vella 2002). The Society of

Competitive Intelligence Professionals (SCIP 2007) has defined CI as:

> *"A systematic and ethical program for gathering, analyzing, and managing external information that can affect a company's plans, decisions, and operations".*

CI is information, which is gathered from the market, then analyzed to provide recommendations and solutions to decision-makers; all of these are done in a legal and ethical way (Miller 2000). CI means creating a systematic plan capturing organizational external information and knowledge, as well as analyzing and managing this information and knowledge, to improve the organizational decision-making capacity (Jones 2009, Calof and Wright, 2008, Liebowitz 2006).

The last layer in Liebowitz's (2006, 14) framework of intelligence is strategic intelligence (SI), which includes all types of intelligences in organization. SI helps the organization make the best strategic decisions. The top managers of an organization have to anticipate the future of the organization to gain competitive advantage. To do this, they must have intelligence about the trend and direction of the changes that occur in the following areas: resources, customer expectations, emerging technologies that affect business and customers' behavior, political and social change, incentive and restrictive laws (Marchand and Hykes 2007).

According to Cohen (2009) there is no common, consensual definition of SI. Each author, according to her/his research background, has defined SI. For this reason, in Table 1, different definitions and perspectives of SI are presented.

Considering the definitions given in Table 1, there is no general consensus among scholars involved in the SI phenomenon; and the body of knowledge about this phenomenon is fragmented. So, using the methodological suggestion of Elo and Kyngäs (2008), a qualitative content analysis method was used to address the aims of this paper.

3. METHODOLOGY

In terms of qualitative versus quantitative methodologies, we use a qualitative methodology to identify and describe SI sub-processes. From the ontological point of view, the qualitative methodology is placed in a Holistic-Inductive Paradigm (Sarantakos 2004). A qualitative methodology is used when there is some concern about understanding a phenomenon, and the goal is not to measure the relationship between variables. Content analysis as a research method is a systematic and objective means of describing and quantifying phenomena (Krippendorff 1980, Downe-Wamboldt 1992, Sandelowski 1995). It is also known as a method of analyzing documents (Elo and Kyngäs 2008).

Table 1 Different definitions of SI at the organizational level of analysis.

author	definition
Tham and Kim (2002, 2)	*Strategic Intelligence can be identified as what a company needs to know of its business environment to enable it to gain insight into its present processes, anticipate and manage change for the future, design appropriate strategies that will create business value for customers, and improve profitability in current and new markets*
Global Intelligence Alliance (2004, 5)	*A systematic and continuous process of producing needed intelligence of strategic value in an actionable form to facilitate long-term decision making.*
Liebowitz (2006, 22)	*SI is the aggregation of the other types of intelligentsia to provide value-added information and knowledge toward making organizational strategic decisions.*
Marchand and Hykes (2007,1)	*Strategic intelligence is about having the right information in the hands of the right people at the right time so that those people are able to make informed business decisions about the future of the business.*
Brouard (2007, 122)	*Strategic intelligence could be defined as the output of the informational process by which an organization stays attuned to its environment in order to make decisions and then act in pursuit of its objectives.*
McDowell (2009, 24)	*The specific objective for strategic intelligence is to provide accurate, long-range intelligence to enable effective high-level planning and management of law enforcement resources to meet the overall perceived threat.*
Cohen (2009, 49)	*SI is a formalized process of research, collection, information processing and distribution of knowledge useful to strategic management.*

Content analysis is (Elo and Kyngäs 2008, 109):

> *"A method that be used in an inductive or deductive way. Which of these is used is determined by the purpose of the study. If there is not enough former knowledge about the phenomenon or if this knowledge is fragmented, the inductive approach is recommended".*

In an inductive way, concepts and classifications are extracted from the data. The qualitative content analysis in the inductive method has three main steps: preparation, organizing and reporting (Elo and Kyngäs 2008). These steps are shown in Figure 2.

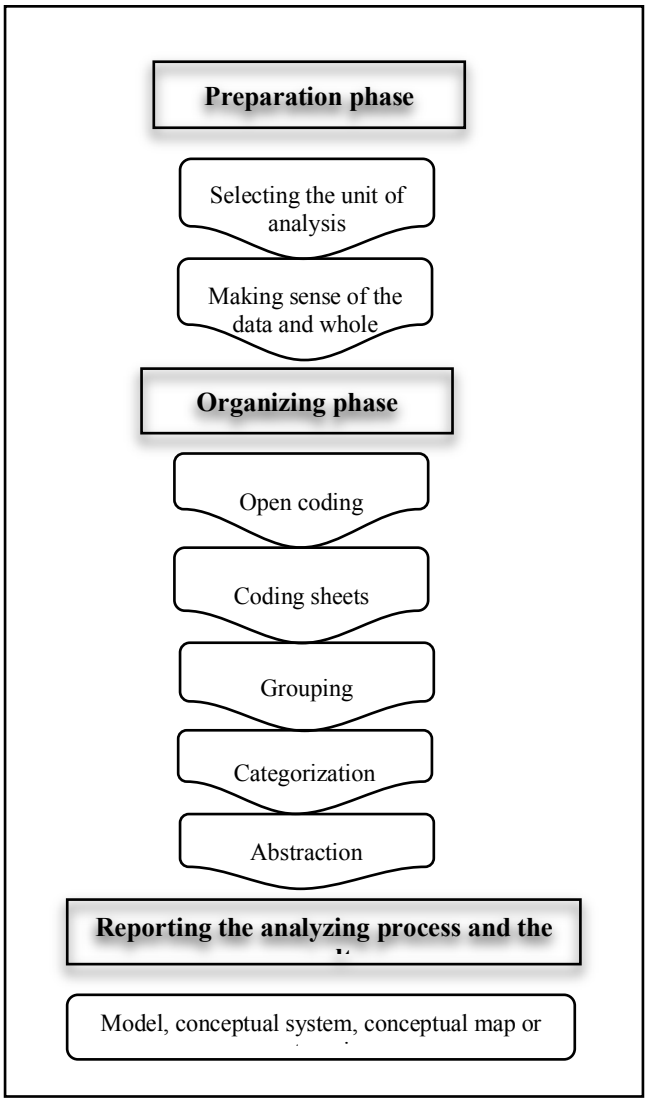

Figure 2 Figure 2 - Preparation, organizing and resulting phases in the content analysis process by the inductive approach. (Elo and Kyngäs 2008, 110).

3.1 Trustworthiness

There is a lot of struggle between authors about the appropriate terms for evaluating the validity of qualitative research. Many terms such as rigor, validity, reliability and trustworthiness were developed for this purpose (Koch and Harrington 1998). The most widely used criteria for evaluating qualitative content analysis are those developed by Lincoln and Guba (1985). They used the term "*trustworthiness*". The aim of trustworthiness in a qualitative inquiry is to support the argument that the research's findings are "worth paying attention to" (Elo et al. 2014, 2). Lincoln and Guba (1985) have suggest five options for assessing the trustworthiness of qualitative research. These are credibility, dependability, conformability, transferability, and authenticity. Elo et al. (2014, 3) proposed a checklist for researchers attempting to improve the trustworthiness of a content analysis study. In this paper, we use their proposed checklist and the points to be reported according to their checklist (Elo et al. 2014), according to the following headings.

3.2 Data collection method

Material for this study included all published texts and literature in Persian and English about strategic intelligence. We used a two-stage strategy for selecting material. First, we searched the major academic and practitioner journals and books in the Ebsco, Google Scholar and IranDoc databases using the keywords "strategic intelligence" in Persian and English for the period from 1967 to the present (March 2017). This time frame was selected because it corresponds to the period during which SI appeared in the management field (Cohen 2009). Second, we checked the reference lists of the articles and books obtained through the initial search to uncover additional studies. In total, a little more than nine thousand text data sheets were collected for review.

3.3 Sampling strategy

In qualitative research, the sampling strategy is selected based on the methodology and subject and there is no requirement for generalizability of the results (Higginbottom 2004). The most commonly used method in content analysis studies is purposive sampling (Kyngäs et al. 2011). In this research, purposive sampling was also used. Two criteria were used to select appropriate samples: (1) texts should be in the business or organization context; and (2) examine SI at

the organizational level of analysis. It has been suggested that the saturation of data may indicate the optimal sample size (Guthrie et al. 2004, Sandelowski 1995a). By definition, saturated data ensure replication in categories, which in turn verifies and ensures comprehension and completeness (Morse et al. 2002). The saturation law in this study was "three new texts do not add new code to the study" and "all extracted code can be included in previous categories".

3.4 Selecting the unit of analysis

In this research, we selected the sentence as unit of analysis. Because the meanings we want to extract are infinitive phrases; so the sentence size seems to be appropriate.

3.5 Categorization and abstraction

After each text was coded, codes were shifted to the codebook. Then the codes were re-examined and grouped. Groups that had overlapping meanings built the abstract categories of the research. This process continued until saturation of categories was reached. Co-researchers checked the categories to ensure no overlap between categories and concepts, and then overlapping categories and concepts were integrated. In the next step, several experts in SI were asked to examine the conceptual similarity between categories and concepts. In this way, fourteen abstract categories were identified as SI sub-processes.

3.6 Interpretation

For avoidance of excessive interpretation, only clear and unambiguous sentences were selected for open coding, and hidden concepts in the texts were ignored. According to Elo et al. (2014) co-researchers checked out all analyzing process steps.

3.7 Representativeness

Face validities were used to improve the trustworthiness of the research findings. Some experts were asked to evaluate research findings, and their assessment was that the results are realistic.

4. FINDINGS

Fourteen main categories (sub-processes) were established to describe the SI process: identification of strategic environments and prioritizing them, determination of organizational information needs and prioritizing them, determination of a monitoring period for each section of strategic environment and organization key information needs (KIN), determine information sources and assess information capturing ways, external information scanning, internal information extracting, setting criteria for gathered information assessment, information filtering, categorizing and abstracting, information analysis, interpretation and sense making (intelligence generation), determination of intelligence users and intelligence distribution media, intelligence distribution, feedback from recipients, revision and adjustment, intelligence storage, and intelligence use.

4.1 Identification of Strategic Environment and Prioritizing Them

In the opinion of most of the contributors, the identification of important areas of the environment is one of the main activities in the SI process.

> *"Dividing the environment into sectors to monitor is the first solution proposed"* (Cohen 2009, 144).

> *"In a limited resource context or in a desire for efficiency and optimization, prioritization of sections and axes of surveillance seems vital to ensure the effectiveness of surveillance practiced"* (Cohen 2009, 148).

Therefore, in order to achieve the expected outcomes of a SI system, the strategic areas of the organization's environment should be identified and prioritized.

4.2 Determination of Organizational Information Needs and Prioritizing Them

Some contributors identify the beginning of the SI process by ascertaining the organization's needs and problems. According to McDowell (2009), SI is an organizational level of analysis issue and deals with issues and problems which are identified in the structure, goals or nature of organizations so one of the important steps in the SI process is to recognize the organization's problems.

> *"As the first stage of the intelligence cycle, the Strategic Intelligence System is concerned with the establishing of parameters for what information is*

required, what priorities should be established, and what indicators should be monitored" (Kruger 2010,110).

4.3 Determination of Monitoring Period for Each Section of Strategic Environment and Organization Key Information Needs (KIN)

Nowadays, constant changes are one of the main characters of the organizational environment. For this reason, some authors, considering the perceived uncertainty of different parts of the environment, embedded the determination of monitoring period for each section of strategic environment and organization key information needs as essential activities in the SI process (Kruger 2010, Cohen 2009, Montgomery and Weinberg 1998).

4.4 Determination of Information Sources and Assess Information Capturing Ways

Information overflow convinced some authors that planning for identifying relevant, reliable, valid, and up to date resources makes the process of SI more effective and prevents overflow of information and its related costs. According to Cohen (2009, 157):

"To ensure the effectiveness of information collection and to avoid wasting corporate resources, which are by definition limited, it is necessary to select information sources and the most valuable information".

4.5 External Information Scanning and Internal Information Extracting

Almost in all of the texts which were analyzed, information gathering activity was identified as the most important phase of the SI process. According to Marchand and Hykes (2007, 5) the collecting phase, which *"Focuses on ways of gathering information that are relevant and potentially meaningful"* one of the steps that makes the SI process effective.

But the origin of the gathered information led to some disagreement among authors. On the one hand, some authors (for example, Kruger 2010, Cohen 2009, Marchand and Hykes 2007) believed that the internal environment of an organization's information gathering system and external environment of the organization's information gathering are the same; on the other hand, there are authors (Xu and Kaye 2007, Montgomery and Weinberg 1998) who believed that these two areas have different information gathering approaches.

4.6 Setting Criteria for Gathered Information Assessment

Most authors agree on the evaluation of the information gathered. However, some have recommended setting criteria for the evaluation of information:

"In other words, volume, diversity and quality of information sources, and the existence of control to verify value seem vital for the effectiveness of surveillance" (Cohen 2009, 159).

While others only assess the validity and reliability of information:

"[Analysis of gathered information] simply cannot occur until and unless the collected information has been brought together in appropriate sets and then considered for its reliability, relevance, and believability value" (McDowell 2009, 195).

4.7 Information Filtering, Categorizing and Abstracting

In recent years, most authors have emphasized categorizing and abstracting refined information. They believe in the benefits that these activities bring. These activities save time and money for the organization and provide a more effective analysis of the data. Some even believe that this activity should be done according to user preferences and feedback (Ong et al. 2007).

4.8 Information Analysis

Compared to the research and collection phase, there is not much said in the literature about the other phases of the SI process, in particular the information processing phase, which is central to the activity of SI (Cohen 2009).

The difference between the authors in this phase is their attitude to the method of analysis. Cohen (2009) has focused more on the introduction of analytical techniques and their application for information processing, however McDowell (2009) has suggested instructions for preparing data, for methods of selecting an analysis tool, and auxiliary resources for information processing.

Nonetheless, the goal of the authors was to turn data into information. That is, the output of this stage should be a meaningful and believable piece of information. *"Analysis creates information by linking data together and identifying patterns and trends"* (Brouard 2007, 124).

4.9 Interpretation and Sense Making (Intelligence Generation)

Some authors who have written in the field of SI believe that information analysis is not enough to generate intelligence. In the opinion of this group of experts, the interpretation of the analyzed information creates intelligence and advice for action. But there is no consensus on how to interpret information and generate intelligence. In Daft and Weick's (1984) point of view:

> *"Interpretation pertains to process by which managers translate data into knowledge and understanding about the environment. This process will vary according to the means for equivocality reduction and the assembly rules that govern information processing behavior among managers"* (291).

4.10 Determination of Intelligence Users and Intelligence Distribution Media

Almost all contributors have confirmed that the SI user's identification and determination of SI finding distribution media are activities in the SI process context.

> *"The first problem is to distribute the information to the right recipients, i.e. those interested by it and liable to use it." (Cohen 2009, 179). "The distribution of the products of surveillance activity be by written, oral, electronic channels, etc. numerous and varied. Some studies list the most widely used methods of information distribution" (Ibid 180-81).*

4.11 Intelligence Distribution

In many references about the process of SI, considering the distribution of intelligence is a key part of the process (Kruger 2010; McDowell 2009; Brouard 2007; Ong et al. 2007; Xu and Kaye 2007; Montgomery and Weinberg 1998). According to Cohen (2009, 179):

> *"The role of distribution in [SI] surveillance effectiveness is therefore obvious: information which is collected, processed, stored but not distributed is not used, which reduces [SI] surveillance effectiveness to zero."*

4.12 Feedback from Recipients, Revision and Adjustment, Intelligence Storage

The recipient's feedback on transmitted information is recommended by many authors. It is the best way to improve the quality of information. They recommend the implementation of a feedback contract encouraging users to issue feedback on each item of information transmitted (Cohen 2009; Brockhoff 1992; Prescott and Smith 1989).

4.13 Intelligence Use

Most authors agree on identifying a separate phase in the SI process as the intelligence use stage. McDowell (2009) has called this phase *"recommendations"*. Daft and Weick (1984) named this stage *"strategy formulation and decision making"*.

5. DISCUSSION AND CONCLUSION

Strategic intelligence in the organizational level of analysis is an abstract phenomenon that exists only in the minds of organization members where it appears as cognitive maps of a socially constructed reality. It enacts inter-subjectively in nature. Those who coined this term's intention was to respond to the information needs of decision makers at the strategic level of the organization (Seitovirta 2011, Liebowitz 2006, miller 1996).

To make an inter-subjective meaning, share an opinion and understand this phenomenon, SI components and steps describing it seem essential. A process that develops an organizational strategic intelligence consists of fourteen sub-processes. The way each of these sub-processes is implemented depends on the organization's age and size, and perceived complexity of the organization's environment by top managers (Daft and Weick 1984).

One of the weaknesses of the qualitative content analysis method is that it does not provide tools for modeling or prioritizing classes and concepts created (Elo and Kyngäs 2008). For this reason, the sub-processes identified in this research do not have the order or priority. The process modeling of these sub-processes needs further research.

SI in the organizational level of analysis is a term which is used to describe some intelligence activities. These activities are meaningful in the context of strategic planning and strategic management (Marin 2015). SI is about creating a shared common understanding of the internal and external environment in an organization member's minds. Whenever these shared understandings are created in the organization it can be assured that appropriate strategies are selected; which are appropriate to the circumstances and the nature of the organization (Pirttimäki 2007).

For an organization to have an SI attribute, it must do the following activities in some ways: (1) identification of strategic environments, (2) determination of organizational information needs, (3) determination of monitoring periods, (4) determination of information capturing ways, (5) external information scanning, (6) internal information extracting, (7) setting criteria for gathered information assessment, (8) information filtering, categorizing and abstracting, (9) information analysis, (10) interpretation and sense making (intelligence generation), (11) determination of intelligence users and intelligence distribution media, (12) intelligence distribution, (13) feedback from recipients, revision and adjustment, intelligence storage, (14) intelligence use.

6. REFERENCES

Bali, R.K. and Wickramasinghe, N. and Lehaney, B. (2009*). Knowledge Management Primer*. New York: Routledge.

Britt, P. (2006). The New Competitive Intelligence: Raising the Confidence Quotient. *KMWorld*, 15(10), 10-24.

Brouard, F. (2007). Awareness and Assessment of Strategic Intelligence: A Diagnostic Tool, In Xu, M. (Ed). *Managing strategic intelligence*. (pp. 122-140). Hershey, PA: Information Science Reference.

Calof, J.L & Wright, S. (2008). Competitive Intelligence: A Practitioner, Academic and Inter-disciplinary Perspective. *European Journal of Marketing*. 42(7/8). 717 - 730.

Cohen, C. (2009). *Business intelligence: Evaluation and impact on performance*. London: ISTE.

Cole, F.L. (1988). Content analysis: process and application. *Clinical Nurse Specialist*, 2(1), 53–57.

Daft, R., & Weick, K. (1984). Toward a Model of Organizations as Interpretation Systems. *The Academy Of Management Review*, 9(2), 284-95.

Downe-Wamboldt, B. (1992). Content analysis: Method, applications, and issues. *Health Care for Women International*, 13(3), 313-321.

Elo, S. & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107-115.

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K. and Kyngäs, H. (2014). Qualitative Content Analysis. *SAGE Open*, 4(1), p.215824401452263.

Fernández-Villacañas Marín, M. (2015). The Global Strategic Intelligence Management. In: *Learning and thinking skills*. [Online] University of Alcalá (UAH). Available at: http://europehome-project.eu/resources/learning-materials [Accessed 14 Jul. 2016].

Guthrie, J., Yongvanich, K., & Ricceri, F. (2004). Using Content Analysis as a Research Method to Inquire Into Intellectual Capital Reporting. *Journal of Intellectual Capital*, 5, 282-293.

Jennex, M.E. (2009). *Knowledge Management, Organizational Memory, and Transfer Behavior: Global Approaches and Advancements*. Hershey, PA: Information Science Reference.

Jones, R.B. (2009). It's Eleven O'clock... Do you know what your Competition is doing? *Adhesives & Sealants Industry*. Issue 4. 14 - 19.

Knowledge Management and Business Intelligence (KMBI) Workshop, Available from http://wm2005.iese.fraunhofer.de, Germany, 2005.

Koch, T., & Harrington, A. (1998). Re-conceptualizing rigour: The case for reflexivity. *Journal of Advanced Nursing*, 28, 882-890.

Krippendorff, K. (1980). *Content Analysis: An Introduction to its Methodology*. Sage Publications, Newbury Park.

Kruger, J. (2010). *A Study of Strategic Intelligence as a Strategic Management Tool in the Long-Term Insurance Industry in*

South Africa (Master of Commerce). University Of South Africa.

Leonard, E. and Mintzberg, H. (1996). The Rise and fall of Strategic Planning. *Journal of Marketing*, 60(4), p.129.

Liebowitz, J. (2006). *Strategic Intelligence: Business Intelligence, Competitive Intelligence, and Knowledge Management*. Boca Raton, FL.: Auerbach Publications. Taylor & Francis Group.

Marchand, D. and Hykes, A. (2007). Leveraging What Your Company Really Knows: A Process View of Strategic Intelligence, In Xu, M. (Ed). *Managing strategic intelligence*. pp. 1-13. Hershey, PA: Information Science Reference.

McDowell, D. (2009). *Strategic intelligence*. Lanham, Md.: Scarecrow Press.

McGonagle, J. and Vella, C.M. (2002). A Case for Competitive Intelligence: 90% of the information a company needs to understand its market and competitors and to make key decisions is already public. *Information Management Journal*. 36(4). 35-40.

Miller, J. (2000). *Millennium Intelligence: Understanding and Conducting Competitive Intelligence in the Digital Age*. Medford, N.J.: CyberAge Books.

Miller, J.P. (1996) Information Science and Competitive Intelligence: Possible Collaborators? *Bulletin of the American Society for Information Science and Technology*. 23 (1). 11-13.

Montgomery, D.B. and Weinberg, C.B. (1998). Toward Strategic Intelligence Systems. *Marketing Management*. 6(4). 44-52.

Pirttimäki, V. (2007) *Business Intelligence as a Managerial Tool in Large Finnish Companies*, Doctoral Dissertation. Tampere, Tampere University of Technology.

Sandelowski, M. (1995). Qualitative analysis: What it is and how to begin. *Research in Nursing & Health*, 18(4), 371-375.

Sarantakos, S. (2004). *Social research*. Basingstoke: Palgrave Macmillan.

Seitovirta, L.C. (2011). *The Role of Strategic Intelligence in Corporate Decision Making*, Department of Management and International Business, Aalto University School of Economics.

Tham, K.D. and Kim, H.M. (2002). *Towards Strategic Intelligence with Ontology Based Enterprise Modelling and ABC*. Proceedings of the IBER Conference, Las Vegas, NV.

Turban, E. and Aronson, J.E. and Liang, T. and Sharda, R. (2007). *Decision Support and Business Intelligence Systems*. 8th Edition. Upper Saddle River, N.J.: Pearson Prentice Hall.

Xu, M. & Kaye, R. (2007). The Nature of Strategic Intelligence, Current Practice and Solutions, In Xu, M. (Ed). *Managing strategic intelligence*. pp. 36-53. Hershey, PA: Information Science Reference.

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Development of a competitive intelligence maturity model: Insights from Moroccan companies

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ABSTRACT This paper aims to assess the maturity level of competitive intelligence (CI) in Moroccan companies, so as to improve theirs practices, and to justify their investment in competitive intelligence. To do so, we have identified the maturity model based on a comprehensive review of recent literature. The objectives of this paper are threefold: (1) to determine the major purposes of a CI maturity model (CIMM), (2) to identify the types of CI dimensions and levels of maturity, (3) to evaluate Moroccan companies in terms of CI practice. Our approach is to develop a conceptual framework of the CI maturity model that articulates (1) dimensions of CI, and (2) maturity levels of CI. We note that little attention has been given in previous research to how CI is actually conducted in Moroccan companies. For this purpose, an empirical study was conducted. The results discuss various perspectives and insights from a competitive intelligence maturity model point of view in the Moroccan context. The results show that the majority of the Moroccan companies are in an early stage of the CI levels, where the CI practice is only to employ environment scanning and the competition in the business environment is not intense. We also note the absence of CI structure at this level. Most of these Moroccan companies are not able to cope with changes in the business environment. The CI systems and processes are released on an irregular basis. This study is the first to investigate the Competitive Intelligence Maturity Model (CIMM) in the Moroccan context. The findings of this research show that there are six CI dimensions (CI culture of an organization; CI deliverables; CI sourcing; CI cycle; CI investment in terms of resources; CI users and CI application) that should be taken into account in CI implementation with regard to the CI level (early, mid, world class).

KEYWORDS Competitive intelligence, maturity model, information, competitive advantage, moroccan companies

1. INTRODUCTION

According to Du Toit (2003), enterprises today operate in a global market in an increasingly turbulent and volatile environment and must withstand competitive pressures both from other producers or suppliers and from new technologies and products/services, otherwise they will be disrupted. Corporate management therefore needs input from competitive information and has to manage and utilize this information. Competitive intelligence (CI) pulls together data and information from a very large and strategic view, allowing a company to predict or to forecast what is going to happen in its competitive environment (Bose, 2007).

Despite the increasing interest in CI, two critical gaps emerge in the literature. First, there are few empirical works assessing the maturity of a firm's competitive intelligence activities. Most literature addressing this issue has been focused on the measurement of competitive intelligence in the context of the developed markets of the USA, Canada and Europe (Wright & Calof, 2006; Gainor & Bouthillier, 2014; Bose, 2007).

The objectives of this paper are twofold. First, a description of the current knowledge regarding the maturity model of CI is derived from the literature. Second, the paper makes a contribution to the currently empirical knowledge on the topic, particularly in the Moroccan context.

The central question that will be addressed is: What are the dimensions of CI involved in the assessment of a CI maturity model?

This paper is organized as follows: in the first section, we present the state of the art regarding competitive intelligence and maturity models. Then, in the second section, we describe the research methodology. In the third section, we discuss the main results and the important lessons learned from the empirical study.

2. BACKGROUND

The literature reviewed for this study includes recent literature on competitive intelligence and CI maturity models.

2.1 Competitive intelligence

The term competitive intelligence (CI) has been around for about 50 years (Luh, 1958; Wilensky, 1967). Over time, the definition for CI has broadened to include not only organizational and business processes, but also technological processes.

For the purpose of this research, and according to Gainor & Bouthillier (2014), CI is described as the collection, analysis and dissemination of publicly available, ethically and legally obtained relevant information as a means of producing actionable knowledge. Actionable knowledge is then a basis for the improvement of corporate decision-making and action. The overall goal of CI is to identify and act upon signals, events and discernible patterns, which can inform and enhance the organization's decision-making activities (Wright et al. 2009).

Bose (2008) said that the most common benefit of CI is its ability to build information profiles that helps a company to identify its competitor's strengths, weaknesses, strategies, objectives, market positioning and likely reaction patterns. These information profiles include data needed to effectively identify, classify and track competitors and their behavior.

In fact, the assessment of CI is considered an important issue. Several scholars have called for research into how CI might be assessed. According to the literature (Gainor & Bouthillier, 2014; Heppes & Du Toit, 2009), the maturity model can be used to assess the relevance of CI within an organization.

The conceptual challenges assessing CI are: understanding what is being assessed, the reliability and validity of the maturity model selected, and how to critically evaluate the maturity of CI.

2.2 Maturity models

In this section, we will discuss the basic building blocks of maturity models. Interestingly, Albliwi et al. (2014) mentioned that there is a lack of consensus on the definition of a maturity model, and most of the definitions have only described the capability levels, behaviors and the objectives of the model.

Accordingly, due to the lack of an accepted general definition, it is necessary to have a closer look at maturity models from three perspectives (Wendler, 2012):

- an understanding of basic terms like maturity and capability
- purpose, application, and benefits
- structure and components

For Becker et al. (2009), a maturity model consists of a sequence of maturity levels for a class of objects. It represents an anticipated, desired, or typical evolution path of these objects shaped as discrete stages. The basic idea behind the maturity model is that higher levels of maturity indicate increased capabilities in managing the specific domain or process with better competitiveness and thus increasing your chance of sustained success. However, if all players are equally benchmarked of course there is no edge or advantage anymore, but then the process becomes imperative just to hold your position among your peers (Rapaccin et al, 2013),

The concept of maturity models is increasingly being applied within the field of information systems (IS), both as an approach for organizational development and as a means

of organizational assessment (Mettler & Rohner, 2009).

In fact, we can find many maturity models in the relevant literature. One of the most influential maturity models is the Capability-Maturity Model (CMM), proposed in November 1986 by the Software Engineering Institute at Carnegie Mellon and subsequently evolved into the Capability Maturity Model Integration (CMMI). The CMMI is based on knowledge acquired from software-process assessments and extensive feedback from both industry and government (Paulk et al, 1993). Since then, the maturity model has been expanded into other contexts. Moreover, maturity models have been applied to several domains such as business process management (Röglinger, Pöppelbuß, & Becker, 2012), business intelligence (Raber, Winter and Wortmann, 2012), knowledge management (Serna M, 2012), supply chain management (Lockamy & McCormack, 2004) and social media (Geyer & Krumay, 2015).

Table 1 Maturity model methodologies.

Maturity model methodology steps	**Source**
1. Initial decisions 2. Sources analysis 3. Strategy for development 4. Model design 5. Draft model development 6. Draft model validation 7. Model consolidation	Salviano et al. (2009)
1. Identify problem and motivate 2. Define objectives of a solution 3. Design and development 4. Demonstration 5. Evaluation 6. Communication	Peffers et al.(2007)
1. Scope 2. Design 3. Populate 4. Test 5. Deploy and Maintain	Bruin et al. (2005)
1. Comparison with existing maturity models 2. Iterative Procedure 3. Evaluation 4. Multi-methodological Procedure 5. Identification of Problem Relevance 6. Problem Definition 7. Targeted publication of results	Hevner et al. (2004)

Whilst maturity models are high in number and broad in application, there is little documentation on how to develop a maturity model that is theoretically sound, rigorously tested and widely accepted (Bruin et al., 2005). In this vein, Bruin et al., (2005) proposed, in order to overcome this problem, six phases to develop a maturity model: scope, design, populate, test, deploy and maintain. Becker et al. (2009) adopted Hevner et al. (2004) design guidelines to formulate the maturity model framework that consists of seven phases: comparison with existing maturity models, iterative procedure, evaluation, multi-methodological procedure, identification of problem relevance, problem definition, targeted publication of results. Peffers et al. (2007) proposed a design science process model, which essentially creates a methodology for following the seven guidelines. This process methodology involves six key steps: identify the problem and motivate, define objectives of a solution, design and development, demonstration, evaluation, communication.

Other authors have attempted to define sequential steps to guide the development of a maturity model. Table 1 summarizes the main activities described in each methodology.

De Bruin et al. (2005) point out that the development of a maturity model depends on the purpose for which a model may be applied including whether the resulting maturity assessment is descriptive, prescriptive or comparative in nature. If a model is purely descriptive, the application of the model would be seen as a single point encounter with no provision for improving maturity or providing relationships to performance. A prescriptive model, on the other hand, provides emphasis on the domain relationships to business performance. Finally, a comparative model enables benchmarking across industries or regions. A model of this nature would be able to compare similar practices across organizations in order to benchmark maturity within disparate industries.

2.3 Maturity models for CI

Despite the vast number of applications in different management domains, to the best of our knowledge, no maturity models to assess the capabilities of CI has been developed yet. This paper aims to fill this gap. For these reasons, the maturity model for CI respects the design principles proposed by Hevner et al. (2004) in their framework. In the same vein, Tej Adidam et al. (2012) distinguished three levels of CI maturity: primitive level, intermediate level and advanced level.

The first step of the Hevner et al. (2004) approach is to review, compare and contrast the existing maturity models in CI. From the

literature, we note that Heppes & Du Toit (2009) developed the only CI maturity model.

Gainor & Bouthillier (2014) mentioned that the assessment of CI would need to capture CI usage, the outputs in relation to decision-making and decision outcomes. To this end, we propose, according to our literature review, to assess CI practices from eight dimensions that are presented in Table 3.

Table 2 CI maturity model.

Authors	Dimensions	Levels	Industry
Heppes & Du Toit (2009)	• Deliverables and capabilities • Analytical products • Relationship with management • Sources of information • Personnel • Skills & Training	• Early stage CI • Mid-level CI capability • World-class CI capability	Retail bank

Table 3 CI dimensions.

CI dimensions	Source
CIdim1. CI Strategy and Culture	Comai et al (2005), Bose (2007), Heppes & Du Toit (2009), Oubrich (2011)
CIdim2. CI Relationship with management	Heppes & Du Toit (2009)
CIdim3. CI Structure	Calof (2002), Comai et al (2005), Bose (2007), Heppes & Du Toit (2009)
CIdim4. CI Resources	Comai et al (2005), Bose (2007), Heppes & Du Toit (2009)
CIdim5. CI System	Calof (2002), Comai et al (2005), Bose (2007), Heppes & Du Toit (2009), Oubrich (2011)
CIdim6. CI Deliverables and capabilities	Heppes & Du Toit (2009)
CIdim7. CI Analytical products and CI Use	Bose (2007), Heppes & Du Toit (2009)
CIdim8. CI Impact	Bose (2007), Heppes & Du Toit (2009), Seng Yap & Abdul Rashid (2011), Oubrich (2011)

3. EMPIRICAL STUDY

3.1 Research Methodology

We think that CI is still in an embryonic stage in Morocco but is widely thought by those in the business to be growing rapidly. However, there are practically no empirical research papers at hand. This paper aims to offer an insight into the assessment of CI and by doing so, to remedy the lack, we noted, of research in the CI field. An empirical research study was developed in order to assess CI in Moroccan companies, in terms of the eight dimensions and three levels of maturity (listed on tables 2 and 3).

3.2 Data collection

CIEMS Research launched between September 2015 and December 2016, the first barometer on CI in Morocco, and e-mail, followed by direct contact were used to invite the firms to join our CI research program. The questionnaire was sent to the sample with the objective of evaluating CI in Moroccan companies, in terms of the eight dimensions and three levels of maturity.

150 questionnaires were sent, resulting in 57 usable responses (38%). The industry split was information technologies and telecommunications (12.5%), agriculture and fishing industry (8.9%), finance, banking and insurance (8.9%), media and communication (3.6%), construction industry (3.6%), transport and logistic (1.8%), manufacturing industry (1.8%), oil and gas industry (1.8%), with sales reported in excess of 3 million MAD by 75%. More than 40% of respondents have a position

as senior/middle management, and 10.7% are at director level.

Moreover, 69.40% of the respondents have experience in CI between 1 and 5 years, and the rest of the respondents, which represent 30.60% have experience in CI for more than 6 years. This shows that CI in Morocco is a young field as mentioned earlier.

4. DATA ANALYSIS AND INTERPRETATION

On looking back on the research question posed at the start of this study, it is possible to find the following results and analysis, which show the most common responses from the Morocco companies in terms of CI practice assessment in the eight dimensions.

4.1 CI Strategy and Culture

The perceived need for a CI strategy is determined by the intensity of competition in the market serviced by the company. If there are no competitors in the domestic market, there may be no point in wasting resources on CI. The companies that embrace CI are those which experience the most intense competition or where the competitive environment is changing rapidly. The overall goal of CI therefore is to identify and act upon signals, events and discernable patterns, which can inform and enhance the organization's decision-making activities (Wright el al, 2009).

In this same vein, CI strategy assessment will depend on the level at which companies respond to change in their business environment and CI practices. According to Oubrich (2009), we can distinguish between two types of CI strategy: defensive and offensive. CI defensive strategy includes mainly scanning environment and protection assets; meanwhile CI offensive strategy includes an influence approach.

As for the future, there is no doubt that competitive pressure will continue to intensify in all markets. This means that the companies will have to shift their CI strategy from defensive to offensive.

The findings of our study revealed that Moroccan firms practiced CI at many different levels with regard to the nature and extent of the competition (very intense, intense, not intense). However, when the competition is not intense, the practice of CI is limited to scanning the environment rather than assets protection or influence. As the competition becomes fierce and more aggressive, companies should empower themselves with an offensive CI strategy.

4.2 CI Relationship with management

The purpose of this dimension is to gain an understanding of the CI activities that take place within organizations and how they are supported by management. According to Pellissier and Kruger (2011), there is a growing proportion of managers using CI in their strategic planning and decision-making.

Based on the results obtained, we found that the top management linked CI to protect their intangible assets (24.76%), detection of opportunities and threats (25.52%), coordination of activities (23%) and coordination of strategies (23.08%). Moreover, CI helped them to stay informed about the internal and external environment (24.66%), production of new knowledge (23.70%), making better decisions (24.6%) and sale goals (23.81%). Finally, the use of CI can lead to innovation (24.48%) and competitive advantages (25.17%).

There is also an agreement that CI is clearly widespread across all management levels, as Table 4 shows.

Table 4 Management level of respondents.

Management level	**% of respondents**
Top management	26.66
Strategy department	16.45
Marketing department	15.79
R&D department	11.18
Commercial department	9.21
Finance and administrative department	8.55
Sale department	6.58
Logistic and distribution department	5.26
Export department	1.32

4.3 CI Structure

The CI system is often influenced by the degree of its formalization. It can be described as a formalized structure when it is governed by rules and procedures (Cohen, 2004). The results of this study show that more than half of Moroccan companies surveyed admit to having a formalized structure. The structure of their CI system differs depending on the degree of progress of scanning. So, the more the CI structure is developed, the more the CI approach becomes offensive.

Indeed, the empirical study revealed that Moroccan companies with 1 to 5 years of

experience in CI, are satisfied with their CI structure. Beyond 10 years of experience in CI, the company adopts a proactive CI approach for purposes of influence and lobbying.

According to the empirical data, it should be noted that whatever approach is adopted, most companies only hire people with a higher education degree in order to develop their CI structure (80% have a masters' degree).

4.4 CI Resources

Watchers (Martinet and Marti, 1996), trackers (Lesca, 1997), observers (Jakobiak, 1998), and analysts (Knauf, 2005), are people in charge of the collection, analysis and dissemination of information to turn it into intelligence in order to have better decisions and actions (Bulinge, Agostinelli, 2005).

Therefore, CI professional should have different types of additional skills (Salvetat, 2001) such as mastering techniques of acquisition and validation of information sources and analysis, complementary skills related to the management of IT tools, and openness and interpersonal skills (Gilad, 1986).

This survey reveals that the majority of the CI professionals surveyed hold a higher education diploma, most frequently a masters' or PhD. In addition, more than half occupy a managerial function, which reflects that Moroccan companies increasingly recognize the level of skills of CI professional.

4.5 CI System

Hassid et al. (1997) indicate that information collection involves gathering information, identifying available formal and informal sources and analyzing the practical conditions of access and the technical arrangements for better collection. Effective environmental scanning must be integrated into several formal and informal sources, both internal and external.

Formal sources or open sources are those where there is hard support that include the following categories: press, media, books, databases, and patents.

Informal sources or closed sources mainly reside in contacts with people such as customers, suppliers, competitors, laboratories, and trade fairs. This type of source often requires the mobilization of a multidisciplinary network of human resources inside and outside the company to communicate competitive information (Gilad, 1995).

The survey reveals that the majority of CI professionals interviewed integrate the web into their scanning panel. The scanning from the ground includes trade show, seminars, and meetings with suppliers. The trend confirmed by this survey is the diversity and complementarity of information channels (web and ground information).

4.6 CI Deliverables and capabilities

Levet (2001), shows that diffusion and dissemination of information to the people involved is an essential step in the CI cycle of Martinet and Marti, (2001). Dumas (2008) proposes a typology of three products of environmental scanning that intended to stimulate reflection and to help decision-making. It distinguishes between alert signals (warning alerts), one-off deliverables (briefing notes, scanning reports) and regular deliverables (newsletter, actors mapping).

The CI professional should choose the most appropriate support and diffusion of information, and the frequency between a real-time diffusion of information. They should also analyze delayed information dissemination.

Our study shows that Moroccan companies are willing to disseminate information. Indeed, email alerts are the best-used channel, followed by newsletters. The companies also rank the presentation and scanning report highly.

The findings in this study indicate that the information is not significantly processed by the Moroccan structures, and it is still related to punctual consumption. This explains the early stage of the CI practice in the Moroccan context.

4.7 CI Analytical products and CI Use

One the most challenging tasks of CI use and CI analytical product methods for the professional is to analyze the information in the dynamic and competitive context as information changes and updates frequently.

Some research observed that analysis is critical to CI use and CI analytical product methods as it generates some kind of intelligence for the firm (Calof and Dishman, 2008). Tej Adidam et al., (2009) make sure that the critical part of the CI process (mainly CI use and CI analytical product methods) is the basis of this analysis and dissemination of intelligence to the relevant firms' users. Therefore, the relevance and quality of this analysis is very important to make effective

decisions. It is understood that this relevance and quality are different among CI early level, CI mid-level and CI world-class level (Heppes & Du Toit 2009, Tej Adidam et al., 2012).

We can state that the highest level is the sophisticated analytical techniques, which in turn generate better intelligence output (Dishman and Calof, 2008) and lead to better CI performance. In line with this, our empirical study shows that where information is transformed into knowledge more efficiently and effectively, companies move ahead to the world class CI practice, and the more they tend to use CI methods such as crosscheck analysis, competition, value chain analysis. However, for the early stage of CI, the companies still use the general methods (such as Mckinsy Matrix, patent analysis, PESTEL Analysis) to generate intelligence. The mid-level is better developed than the early stage in terms of CI maturity, because they use both general and specific methods (such as value chain analysis and competition analysis).

Table 5 : CI Analytical product methods (in terms of number of occurrences).

Early Level		**Mid-level**		**World class**	
Mckinsy Matrix	100	Value Chaine Analysis	98	Cross-Check Analysis	37
Patente Analysis	97	Competition Analysis	95	Competition Analysis	33
PESTEL Analysis,	96	SWOT	93	Financial Analysis	30
BCG Matrix	90	Partner analysis	91	Value Chaine Analysis	27
Scenario Analysis	88	Resources and competence Analysis	91	Scenario Analysis	23
Resources and competence Analysis	74	Cross-Check Analysis	88	Partner analysis	21
Cross-Check Analysis	70	PESTEL Analysis,	75	SWOT	19
Financial Analysis	67	Scenario Analysis	72	PESTEL Analysis,	19
SWOT	65	BCG Matrix	70	Resources and competence Analysis	19
Partner analysis	58	Financial Analysis	67	BCG Matrix	16
Value Chaine Analysis	58	Patente Analysis	57	Mckinsy Matrix	14
Competition Analysis	56	Mckinsy Matrix	42	Patente Analysis	13

4.8 CI Impact

CI attitudes impact managerial CI and goal setting. Different levels and modes (inactive or passive, reactive or proactive; El Sawy, 1985; Jain, 1984) of CI attitudes have important implications for organizations. This is demonstrated in the fact that while some managers obtain CI passively (what we called the early stage CI level), others (mid-CI level and world class CI level) engage in an active search for CI. Opportunities or threats can arise from many different market sectors.

Managers with a CI high level tend, in a strategic vision, to be engaged in a proactive CI scanning. They rigorously try to scrutinize situational variables and seek opportunities from the market. More specifically, they are engaged to be successful, to control the environment, and to be innovative and create knowledge, have a strong motivation to conduct frequent and regular scanning for CI.

Between these two kinds of CI attitudes, we identified some managers who are tending to be in the world-class level but still acting only in a tactical way.

Our findings show clearly that managers in the early CI level are more oriented towards protecting their assets (24.79%), coordinating activities and detecting opportunities and threats in the market.

Table 6 Early CI level data (in terms of number of occurrences).

	Early CI level		
	Protect intangible assets	Detection of opportunities and threats	Coordination of activities
Top management	24.79	25.52	23.00
Strategy department	15.70	16.55	16.00
Marketing department	15.70	15.17	13.00
RD department	11.57	11.03	10.00
Commercial department	9.09	9.66	10.00
Finance and administrative department	9.92	8.97	11.00
Sale department	6.61	6.90	8.00
Logistic and distribution department	5.79	5.52	8.00
Export department	0.83	0.69	1.00
	100.00	100.00	100.00

Table 7 : Mid CI level data (in terms of number of occurrences).

	Mid CI level	
	Coordination of strategies	Stay informed about internal and external environments
Top management	23.08	24.66
Strategy department	16.92	16.44
Marketing department	14.62	15.75
RD department	11.54	11.64
Commercial department	10.00	9.59
Finance and administrative department	9.23	8.90
Sale department	7.69	6.85
Logistic and distribution department	6.15	5.48
Export department	0.77	0.68

In the mid CI level, managers have more behaviors that are active in regards to the market and try to move from a passive CI level to a proactive CI level.

The world-class CI level shows the importance of a proactive strategy. Indeed, the top management, and the strategy and the marketing departments emphasize that CI models help to make better decisions (33%), more innovation (35%) and influence (29%) on the products, services and the activities to generate more sales (25%). In this world class CI level, managers agreed that the ultimate goal is also to create a competitive advantage (37%).

5. CONCLUSION

Presently, we are unaware of any significant literature about how to define and develop a CI maturity model. The initial research published in Aslib Proceedings, Vol. 61 Iss: 1 (Du Toit & Heppes, 2009), discussed the possible conceptual frameworks.

Based on Du Toit & Heppes, (2009) and the findings of our research, we should look at a variety of different characteristics of a company in order to determine the CI maturity model of an organization. The main dimensions of CI evaluated in this research, are presented as follows:

1- CI culture of an organization
2- CI deliverables
3- CI sourcing
4- CI cycle
5- CI investment in terms of resources
6- CI users and CI application

Table 9 shows what this CI maturity model looks like, and the increasing levels of maturity. A company progresses from the early stage (basic level) towards the world-class (high level), by increasing its competitive maturity in the eight areas defined above. As a company does so, it also finds that it enjoys an increasing competitiveness and thus increasing influence in a given market.

Table 9 gives a summary of what one might expect to find for each of the eight evaluation areas (CI dimensions) at each of the different CI levels of maturity. By examining a company's CI maturity level, dimensions of improvement can be identified that will help companies to move to the next step and increase competitiveness. It becomes a straightforward exercise to evaluate the organization and to identify areas for improvement.

Table 8 World class CI level data (in terms of number of occurrences)

World class CI level						
	Making better decision	Innovation	Influence	Generate sale	Competitive advantage	Production of new knowledge
Top management	33	35	29	25	37	32
Strategy department	22	23	17	16	24	22
Marketing department	21	22	16	15	23	21
RD department	16	17	12	12	17	16
Commercial department	13	14	11	10	14	12
Finance and administrative department	13	13	13	12	13	13
Sale department	9	10	9	7	10	10
Logistic and distribution department	8	8	7	8	8	8
Export department	1	1	1	0	1	1

Table 9 CI maturity model.

CI dimension	Early stage CI	Mid-level CI capability	World-class CI capability
CI Strategy and Culture	- The competition in the business environment is not intense - CI practice is only about environment scanning - Absence of CI structure - Not able to cope with changes in the business environment	- The competition in the business environment is intense - CI practices are about environment scanning and asset protection - Absence of CI structure - Able to cope with changes in the business environment	The competition in the business environment is very intense - CI practices are about environment scanning, asset protection, and influence - Existence of CI structure - Able to drive the change in the business environment
CI Relationship with Management	CI output is used by marketing or sale and commercial departments	CI output is used by export department	CI output is used by top management or strategy department
CI Structure	- The age of a CI unit within organization is between 0-5 years - Scanning environment activity exists - CI team has less education (most with less than bachelor degree) and less years of experience	- The age of CI unit within organization is between 6-10 years - Scanning environment and protection asset activities exist - CI team is composed of people who have bachelor's degrees and fewer years of experience	- Environment scanning, assets protection, and influence activities in existence for more than 10 years - CI team has advanced degrees (mainly masters or PhD) and several years of experience
CI Resources	CI human resources have less education (most with less than bachelor degree), often lower-level managers	CI human resources are composed of people who have bachelor's degrees, often senior/middle managers	CI human resources are composed of people who have masters or PhD degrees, often top managers
CI System	Few information gathering sources utilized annually	Several information gathering sources utilized monthly	Several information gathering sources utilized daily
CI Deliverables and Capabilities	The CI process output released annually	The CI process output released monthly	The CI process output released daily
CI Analytical Products and CI Use	Few analytical product methods and CI deliverables utilized annually	Several analytical product methods and CI deliverables utilized monthly	Several analytical product methods and CI deliverables utilized daily
CI Impact	CI impacts operational side of an organization, mainly protection of their assets, coordination of their activities, information about the change in the environment.	CI impacts tactical side of an organization, mainly access to new markets, coordination of their strategies.	CI impacts strategic side of an organization, mainly allowing companies to make better decisions, create new knowledge on their products, services and processes.

We successively analyze the limits of this research in the theory, methodology and the results obtained. From a theoretical point of view, this research raises some key questions related to the use of maturity models as a framework for understanding our research problem. However, the maturity models did not describe the processes themselves; they describe the characteristics of good processes, thus providing guidelines for companies developing their own sets of processes.

According to our empirical study, CI in Morocco is still a relatively young practice, therefore, it is very hard to assess the companies concerning levels of the maturity models described in this paper, and that is why our sample was very small. The size of this sample was insufficient for the research purpose, and did not allow us to draw generalized conclusions, but it can be considered representative of all Moroccan companies. In the same vein, as most companies did not respond to our questionnaire for confidentiality reasons, there was no real strategy for the choice of companies.

The findings of this paper indicate that further research related to competitive intelligence maturity models can be conducted. For instance, future research should be undertaken through in-depth case studies. Then, it will be worthwhile to generalize the results of the study to other companies to finally develop a holistic maturity model that takes into account the characteristics of each company.

This study is the first to investigate CI in Morocco. It was quantitative in nature, and further research is needed to better understand

the current state of CI in Morocco and explore possible relationships between CI maturity levels and firm performance in the Moroccan context.

6. REFERENCES

Albliwi, S.A. et al, (2014), Critical literature review on maturity models for business process excellence, *Proceedings of the 2014 IEEE IEEM*.

Bateman, T.S, Crant, J.M. (1993), "The proactive component of organizational behavior: a measure and correlates", *Journal of Organizational Behavior*, Vol. 14, pp. 103-18.

Beal, R.M. (2000), "Competing effectively: environmental scanning, competitive strategy, and organizational performance in small manufacturing firms", *Journal of Small Business Management*, Vol. 38, pp. 27-47.

Becker, J., Knackstedt, R., and Pöppelbuß, J. (2009), "Developing Maturity Models for IT Management – A Procedure Model and its Application", *Business & Information Systems Engineering*, 1(3), pp. 213- 222.

Bose R. (2007), "Competitive intelligence process and tools for intelligence analysis", *Industrial Management & Data Systems*, Vol. 108 No. 4, 2008 pp. 510-528

Bose, R. (2008), "Competitive intelligence process and tools for intelligence analysis", *Industrial Management & Data Systems*, Vol. 108 No. 4.

Bulinge, F. and Agostinelli, S. (2005), L'analyse d'information : d'un modèle individuel à une culture collective,, *R3I*, p. 1-18.

Bulinge, F. (2013), "Analyse d'information et construction de connaissance : une théorie de l'intelligence informationnelle appliquée au renseignement et à l'intelligence économique", HDR, Université de Poitiers.

Calof, J., Dishman, L, (2008), "Competitive intelligence: a multiphasic precedent to marketing strategy", *European Journal of Marketing*, Vol. 42 Iss: 7/8, pp.766 – 785

Calof , J.L. and Wright, S. (2008), "Competitive Intelligence A Practitioner, Academic and Inter-disciplinary Perspective", *European Journal of Marketing*, 42(7/8), 717-730

Carr, J.C, Lopez, T.B. (2007), "Examining market orientation as both culture and conduct: modeling the relationships between market orientation and employee responses", *Journal of Marketing Theory & Practice*, Vol. 15 No. 2, pp. 113-25.

Cervera, A., Molla, A. and Sanchez, M. (2001), "Antecedents and consequences of market orientation in public organizations", *European Journal of Marketing*, Vol. 35 Nos 11/12, pp. 1259-86.

Cohen, C. (2004), Veille et intelligence stratégiques, Hermes science publication, Lavoisier, Collection Management, finance et gestion, 2004

Covin, J.G, Covin, T.J. (1990), "Competitive aggressiveness, environmental context, and small firm performance", *Entrepreneurship Theory and Practice*, Summer, pp. 35-50.

De Bruin, T., Freeze, R., Kulkarni, U., and Rosemann, M. (2005), "Understanding the Main Phases of Developing a Maturity Assessment Model", in *ACIS 2005 Proceedings*.

De Bruin T., Rosemann M., Freeze R., Kulkarni U. (2005), "Understanding the main phases of developing a maturity assessment model". *Proceedings of the Australasian Conference on Information Systems* (ACIS), Sydney.

Du Toit, A.S.A. (2003), "Competitive intelligence in the knowledge economy : what is in it for South African manufacturing enterprises? " *International Journal of Information Management* 23 (2003) 111–120

El Sawy, O.A. (1985), "Personal information systems for strategic scanning in turbulent environments: can the CEO go on-line? ", *MIS Quarterly*, March, pp. 53-60.

Entrialgo, M., Fernandez, E. and Vazquez, C.J. (2000), "Characteristics of managers as determinants of entrepreneurial orientation: some Spanish evidence", *Enterprise & Innovation Management Studies*, Vol. 1 No. 2, pp. 187-205

Gainor, R; Bouthillier, F. (2014), "An evaluation framework for outcome and impact measures", *77th ASIS&T Annual Meeting*, October 31-November 5, 2014, Seattle, WA, USA.

Geyer, S & Krumay, B. (2015), "Development of a Social Media Maturity Model – A grounded theory approach", *48th Hawaii International Conference on System Sciences*.

Gilad, B. (1995), "Do we matter? ", *Competitive Intelligence Review*, June.

Gilad, T. (1986), "Business intelligence : the quiet revolution", MIT, *Sloan Management Review*, pp. 53-61, 1986

Heppes, D. & Du Toit, A. (2009), "Level of maturity of the competitive intelligence function: Case study of a retail bank in South Africa", *Aslib Proceedings: New Information Perspectives* 61(1), 48–66

Hevner, A et al., (2004), "Design Science in Information Systems Research", *MIS Quarterly* (28:1), pp. 75-105.

Hevner, A.R., March, S. T., Park, J., and Ram, S.,(2004), "Design science in information systems research", *MIS Quarterly*. 28(1), pp. 75–105.

Jain, S.C. (1984), "Environmental scanning in US corporations", *Long Range Planning*, Vol. 17, pp. 117-28.

Jakobiak, F. (1998), *L'intelligence économique en pratique*, Éd. d'organisation, 1998

Knauf, A., (2005), "L'interaction acteur – système d'information au cœur de la dynamique d'un dispositif d'intelligence territoriale", *Revue ISDM* (*Journal of Information Science for Decision Making*), n°22.

Knauf, A, (2005), "L'interaction acteur – système d'information au cœur de la dynamique d'un dispositif
d'intelligence territoriale". *In Revue ISDM* (*Journal of Information Science for Decision Making*), n°22.

Levet, J.L. (2001), "L'intelligence économique : mode de pensée, mode d'action", Economica African small business owners", *European Journal of Work & Organizational Psychology*, Vol. 14 No. 3, pp. 315-44.

Lesca, H. (1997), *Veille stratégique : concepts et démarche de mise en place dans l'entreprise*, DISTNB, Paris.

Lockamy, A & McCormack, K (2004), "The development of a supply chain management process maturity model using the concepts of business process orientation", *Supply Chain Management: An International Journal*, Volume 9, Number 4, pp. 272-278.

Locke, E.A, Latham, G.P. (1990), *A Theory of goal setting and task performance*, Prentice-Hall, Englewood Cliffs, NJ.

Martinet B., Marti, Y.M.(2001), *L'intelligence économique, Comment donner de la valeur concurrentielle à l'information*, Paris, Editions d'Organisation, ISBN 978-2-708-12511-7

McClelland, D.C. (1987a), "Characteristics of successful entrepreneurs", *Journal of Creative Behavior*, Vol. 21 No. 3, pp. 219-33.

McClelland, D.C. (1987b), *Human Motivation*, Cambridge University Press, Cambridge.

McDonald, R.E, Madhavaram, S. (2007), "What firms learn depends on what firms know : the implications of prior knowledge for market orientation", *Marketing Management Journal*, Vol. 17 No. 1, pp. 171-83.

Mettler, T. and P. Rohner (2009), "Situational Maturity Models as Instrumental Artifacts for Organizational Design", *DESRIST'09*, May 7-8, Malvern, PA, USA. 24). Pittsburgh, PA: Software Engineering Institute.

Paulk, M.C., Curtis, B., Chrissis, M.B., & Weber, C.V. (1993), *The capability maturity model for software*, Version 1.1 (No. CMU/SEI-93-TR

Peffers, K., Tuunanen, T., Rothenberger, M., & Chatterjee, S. (2007), "A design science research methodology for information systems research". *Journal of Management Information Systems*, 24(3), 45–77.

Pellissier, R., Kruger, J.-P (2011), "A study of strategic intelligence as a strategic management tool in the long-term insurance industry in South Africa", *European Business Review*, Vol. 23 No. 6.

Raber, D., Winter, R., Wortmann, F., (2012), "Using Quantitative Analyses to Construct a Capability Maturity Model for Business Intelligence", *45th Hawaii International Conference on System Sciences*.

Rapaccini, M., Saccani, N., Pezzotta, G., Burger,T., and Ganz,W., (2013), "Service development in product-service systems: a maturity model", *The Service Industries Journal*, Vol. 33, Nos. 3–4, 300–319

Ro¨glinger, M., Po¨ppelbuß, J., and Becker , J., (2012), "Maturity models in business process management", *Business Process Management Journal*, Vol. 18 No. 2, pp. 328-346

Sagie, A, Elizur, D., (1999), "Achievement motive and entrepreneurial orientation : a structrual analysis", *Journal of Organizational Behavior*, Vol. 20 No. 3, pp. 375-87.

Salvetat, D., (2001), "Les pratiques d'intelligence économique et leurs déterminants : le cas des entreprises de hautes technologies en Europe", PhD dissertation, Université de Montpellier 1.

Salvetat D. (2008), "Pratiques d'intelligence économiques : entre structuration et dé-structuration. Le cas des entreprises européennes de hautes technologies", *Systèmes d'information et management*, 13, 3, p43.

Serna M, E., (2012), "Maturity model of Knowledge Management in the interpretativist perspective", *International Journal of Information Management*.

Swierczek, F.W, Thanh Ha, T. (2003), "Motivation, entrepreneurship and the performance of SMEs in Vietnam, *Journal of Enterprising Culture*", Vol. 11 No. 1, pp. 47-68.

Tej Adidam et al., (2009), "Cross-cultural competitive intelligence strategies", *Marketing Intelligence & Planning* 27(5):666-680

Tej Adidam, P, et al., (2012), "Competitive intelligence and firm's performance in emerging markets: An exploratory study in India", *Journal of Business & Industrial Marketing* 27(3):242-254 ·

Thomas, J.B., Clark, S.M. and Giola, D.A. (1993), "Strategic sensemaking and organizational performance: linkages among scanning, interpretation, action, and outcomes", *Academy of Management Journal*, Vol. 36 No. 2, pp. 239-70.

Wendler, R (2012), "The maturity of maturity model research: A systematic mapping study", *Information and Software Technology*, 54, 1317–1339

Wilensky, H., (1967), *Organizational Intelligence: Knowledge and Policy in Government and Industry*, New York: Basic Books.

Wright, S., Eid, E.R., & Fleisher, C.S. (2009). "Competitive Intelligence in Practice: Empirical Evidence From the UK Retail Banking Sector", *Journal of Marketing Management*, 25(9/10), 941-964

Wright, R. Eid, Fleisher (2009), "Competitive intelligence in practice: empirical evidence from the UK retail banking sector", *Journal of marketing management*, Vol. 25, No. 9-10, pp. 941-964.

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Israeli start-ups – especially in cyber security: Can a new model enhance their survival rate?

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ABSTRACT Start-up companies are the fastest growing business in Israel. However, half of them do not last through their fourth year. This paper looks into the issue of the power of Israeli start-ups to survive and to become successful companies. The challenge is to seek new directions, which will help this sector to change this disappointing course. The start-up sector has a significant contribution to the strength of the Israeli economy which leans on its intellectual resources. Based on my continuing consulting in implementing competitive intelligence to local Israeli start-ups and further research that I have done by following closely the added value of developing capabilities, which enable better understanding of the external environment, I have found that one of the main causes of the high percentage of failures of Israeli start-ups is the difficulties in comprehending the competitive landscape, which has a significant contribution to making them less competitive. By using a new model, the competitive review model, which considers the special attributes of start-ups, especially in cyber security, this kind of small company can be better prepared for intense competition. This is in addition to the Lean start-up model, which is not executed in this segment in Israel and faces serious resistance based mainly on opposition to unfamiliar input. Based on combining the new competitive review model with existing analytical models, a few local start-ups' executives have already matured by awareness about the value of sensing the external environment, which have the potential to change the course of at least some of the Israeli start-ups and increase the success rate for this sector.

KEYWORDS Adaptability, competition, competitive review model, competitive intelligence, four corners model, Israel, lean start-up, strategic planning, start-ups

1. INTRODUCTION

The growth of the Israeli economy is dependent much on its export, mainly high-technology industries and the ability to develop new technologies and applications that would be attractive in the global markets (Central Bureau of Statistics, 2014). Many firms are aware that one of the keys to success is intimate knowledge of the global markets (Bulley, Baku and Allan, 2014) by ongoing monitoring of the changes and it is not enough to offer advanced technological solutions (Prescott, 1999) and to prevent business failures as a result of intelligence downfalls in business (Tsitoura & Stephens, 2012).

Many corporations already understand that competitive intelligence (Blenkhorn, & Fleisher, 2005) can be of great help in reaching a competitive advantage and sustaining it (Global Intelligence Alliance, 2009, 2011). It is evident that companies with poor information about competitive landscapes were stuck being reactive (Le Bon, 2014). The use of competitive intelligence can be referred to also as

integrated intelligence capabilities, which occur in many larger corporations (Bulger, 2016) and more professionals in corporations are using intelligence for their daily missions (McGonagle and Misner-Elias, 2016). It looks as though corporations that have CI practices do not use half of the information they collect for various reasons (Gilad and Fuld, 2016). The challenge is to adjust between the needs of executives and how their corporations collect and process intelligence. There are also those who believe (Hoppe, 2015) that in most organizations, intelligence is constructed informally. I do not share this view.

Large and medium-size Israeli companies are moving forward slowly and recent studies conducted indicate this direction (Barnea, 2006, Barnea, 2009). It seems that competitive intelligence as a discipline in Israel that is underdeveloped (Barnea, 2016) and it is focused more on fulfilling the immediate needs of the corporate decision-makers rather than on working closely with marketing and strategic planning. In a study titled "Why start-up companies failed to adopt competitive intelligence" (Barnea, 2006) the key conclusion was that the absence of competitive intelligence awareness was one of the main reasons why Israeli start-up companies failed in the global markets during the 1990s. The author has offered different ways to change the situation; one of the primary suggestions was to appoint a senior executive to take care of this issue, as monitoring the international markets was a critical factor for such companies. The author has recommended also to the investment ventures to encourage these ideas and to act to implement them. Most of these lessons have never been fulfilled.

Another study that has looked at CI in Israel, mainly from the aspects of using expert tools (Barnea, 2009), has revealed that "local firms were not prepared to invest in new CI tools that would enable CI professionals to perform better. As a result, most CI professionals have to continue using generic tools such as Office (Microsoft), which offers unsatisfactory solutions to their CI program needs". And also that "the high level CI solutions have not reached its potential target market due to a lack of support by senior executives."

In 2015, research on the use of open source intelligence (OSINT) by Israeli firms (Markovich, 2015) showed that there is intense use of these sources, but the added value to the corporate decision-making process was little. It overlooked the entire picture of CI in the Israeli business scene.

2. METHODOLOGY

Throughout my consulting in CI among Israeli start-ups, I have noticed that their sense of the competitive landscape is very low. The next step was to hold discussions with executives in these start-ups regarding the reasons behind this phenomenon and also watch the start-ups' business performance, mainly in their rate of success to their efforts to penetrate into the markets after their products were completed. As a result, I have proposed the competitive review model with support from other tools as will be described later.

After the implementation of the new model in these start-ups, I interviewed the relevant executives in these start-ups to receive feedback. So far, based on a small number of start-ups, it looks as if the decision-making process has been improved and makes these new business entities more competitive. I plan to expand this model to more Israeli start-ups and hope that in two years there will be more information regarding the added value of this model.

In building the methodology for this model, I used the grounded theory (Glazer & Strauss, 1967), which guides the scholar on matters of data collection and details rigorous procedures for data analysis. It is based on a systematic watch of certain activities and based upon these views, to build a theory which will improve the quality of these acts.

2.1 Limits of the research

This research is based on a few start-ups that have agreed to implement the model which will be presented later. It is obviously a limitation, but it looks that in the coming year, more start-ups will participate and this will enable further analysis to reach a better understanding of how much this new model is really helping start-ups to become more competitive.

2.2 The start- up industry in Israel

Over the last 15 years, Israel has built a strong reputation as one of the leading countries in the segment of start- ups. Dan Senor and Saul Singer's book "Start-up Nation: The Story of Israel's Economic Miracle" (Senor and Singer, 2009), has been translated into more than 30 languages, has strengthened the success story of Israel- a state that produces more start-up companies than large, peaceful, and stable

nations such as Japan, China, India, Korea, Canada, and the United Kingdom.

The success of Israel's high-tech sector has attracted attention from larger corporations and each year around 10- 15 Israeli start- ups are acquired by global corporations for billions of dollars in total. A substantial number of foreign investors are investing directly in Israel's technology market through foreign venture capital funds (VCs), corporate VCs or as individuals ("angels"), as a result of the tremendous success of the growing Israeli technology market.

Contrary to the public perception, the Israeli Start-up Success Report 1999-2014 (IVC, 2016) uncovers that about 47% of Israeli start-ups stop operating (3985 start-ups out of 8489) within 3.5 years on average since their foundation. We do not see an intense theoretical effort dedicated to change that direction from the business studies point of view.

In the last three years, Israel has seen a very significant growth in the segment of new start-ups in cyber security. It looks as if these start-ups are facing the same illness as regular start-ups – lack of profound understanding of the competitive landscape, both competitors and customers. Perhaps adaptive start-up companies that are capable of change fast have better chances to last.

In 2016, the Israeli start-ups industry raised an all-time high of $4.8 billion, up to 11% from the $4.4 billion raised in 2015 (Solomon, 2017). The year 2015 was the most successful for Israeli high-tech capital raising activity – 708 deals accounted for an exceptional investment of $4.43 billion. The amount reflected a 30 percent increase from the previous record in 2014, when 690 deals attracted $3.42 billion. The average deal peaked with $6.3 million in 2015, compared with the previous year's $5 million average and a $4 million average deal in the past 10 years (IVC and KMPG, 2016).

However, a closer look at the start-up industry in Israel shows that the picture is not so pink. Although the Israeli start-up industry is very attractive for investors, the Israeli Startup Success Report 1999-2014 (IVC, 2016) shows that about 46% of the Israeli start-ups stop operating within 3.5 years on average since their foundation and 41% of venture-backed start-ups are shut down or are sold at a loss. Another study published in Israel shows similar rates of failure: the number of start-up companies which were terminated is high and in recent years (2005-2014), there are about 300 (on average) a year when about 700 new start-up companies have been initiated (Orpaz, 2017). Following the length of life of start-ups operating in Israel in 2005-2014 clarifies that there was no change from 10 years ago and 46% of companies lasted between 1 - 3 years, while 76% of these companies did not last more than six years (Orpaz, 2017). Similar findings have been reported already regarding the dot com era in Israel (Barnea, 2006). The amount of money lost in these failures in Israel is huge, reaching approximately $ 1 billion a year. It is relevant to mention that the tendency in Israel is often to hold companies alive as long as possible, relative to the U.S. or Europe and thus to give them more time to bleed. It is a component of the Israeli business culture - not to give up, and to try again, but it succeeds only in some cases.

Shutting off failed start-ups is usually hidden and is not reported through the business media, while great success stories like selling Waze, the world's largest community-based traffic and navigation application, to Google for $ 1 billion, was in the Israeli headlines for a long period. Another recent great success is selling the Israeli Mobileye, operating in development of vision technology for Advanced Driver Assistance Systems (ADAS) and autonomous driving, to Intel for $15 billion.

The difficulties of start-ups survival are known also in other countries: Shekhar Ghosh, a senior lecturer at Harvard Business School wrote, "Three out of four start-ups - Venture capital-backed start-ups do not return capital to investors" (Blank, 2013). The figures in the US are quite similar- about 60% of start-ups survived until the third year, and less than 35% matured and survived the sixth year (Barnea, 2014). Other sources of information indicate that 90% of start-ups fail (Patel, 2015).

2.3 Lessons from start-up companies

According to CB Insights research (Griffith, 2014), which follows worldwide tech markets, including start-ups, the main reason for failures of start-ups was a low demand for their products: almost 50% of start-ups did not survive for that reason. The second reason for failures was ending of the funds, and the third reason for closing the doors was losing the battle against competitors. However, it would be more refined to put together reasons 1 and 3, as they are interconnected, enable one to see that almost 60% of start-ups have lost the

battle to survive for poor understanding of the essence of markets and competitors.

Looking at many start-up companies worldwide for a long-time shows the following (Blank, 2013):

1. Usually successful start-ups grow differently than ordinary companies, and they are quickly adjusting themselves to changes and to inputs from customers until they reach to their targets (if they get there!).

2. Only seldom, business plans survived as is after the first feedback from customers.

3. Most business plans of start-ups are not practical and preparing them in the conventional way can be a waste of time.

4. Too often, start-ups lack the knowledge and the experience acquired from monitoring competitors and the marketplace, so they are incline to repeat similar mistakes or ignore important lessons.

Contrary to existing companies, which are busy implementing business plans, successful start-ups tend to look for the right business plans. This great difference has an incredible impact on their chances to succeed (Blank, 2013).

Blank proposed (Blank, 2013), that start-ups will fulfill the approach of "Lean Start-up" that is taught in more than 30 business schools in universities in the US. The "Lean Start-up" methodology is based upon three principles:

1. Entrepreneurs have to drop a conventional business plan and offer a set of assumptions or wild guesses that can clarify how start-ups can bring value to customers.

2. To test their assumptions, start-ups have to go out to the field and to ask customers and potential partners about the new product, including characteristics, pricing, distribution and strategies how to reach to customers and based on this information to update their assumptions regarding the new product.

3. Further, "Lean Start- up" has to cut the length of the product development cycle by adjusting fast to the information gathered. Through this process it will enable creating a product that stands in the most advanced requirements.

This new model by Blank assumes that contrary to start-ups that launched in the dot com era, working in "silent motion" to avoid potential competitors learning about their plans and to find they are not relevant to the customers eventually led to their collapse.

As Blank proposes, it is desirable to act differently to increase success rates by exposing beta products at an early stage. Feedback gathered from customers and sometimes from competitors, is more significant than secrecy and therefore, delivers better results. Lowering failure rates of start-ups have major economic implications. As a result of the fierce competition in many industries, countless jobs are lost and successful start-ups have a great potential to increase the employment rates and so to compensate for the jobs that are lost in existing industries. So far, Israeli start-ups are not aware of the "Lean Start-up" approach.

One of the weaknesses of the "Lean Start-up" model is that it does not include the fundamental need to systematically monitor the external environment, especially competitors, and to learn continuously about potential threats and opportunities. Large-scale enterprises and leading business schools in North America, Europe and parts of Asia recognize that competitive intelligence has increasingly come of age as it steadily expands “into mainstream business practices" (Hawley & Marden, 2006). It happens also in Israeli business schools. There is a need within the start-up industry to adopt the competitive intelligence discipline and to implement it suitably with its specific needs.

2.4 The challenge of cyber security start-ups in Israel

In the last three years, Israel has seen a very significant growth in the segment of new start-ups in cyber security in Israel. Two years ago there were around 200 Israeli cyber start-ups, and we are seeing now around 450. This is very fast growth, especially as the support by the governmental funds is quite minimal. We already see first indicators that in 2017, launching new Israeli start-ups in cyber seem

to be slowing. Most of the funds for these ventures as well as most start-ups in Israel are coming from outside Israel. In the last year, we are facing also a huge increase in Chinese interest funding and acquiring new Israeli technologies.

The Israeli cyber security start-ups' solutions are covering almost every relevant business segment including automotive, health, infrastructure, information systems, mobile applications, and enterprises. Cyber security expenses will keep on growing across all industries. Stricter regulation is brought in, while the threats and the concerns are increasing. According to the Grant Thornton report, (Grant Thornton, 2015) the leading accountancy and advisory organization, cyber-attacks cost global business about $315 billion over the past 12 months.

A doubt has been raised regarding the future of these start-ups in cyber (Orpaz, 2017). Is it possible to forecast who will survive and who will disappear? It is already known that the rate of Israeli start-ups that do not survive is quite high – around 50% after their fourth year. It is not known yet how the figures will look within the cyber segment of start-ups, as most of them are quite new.

Looking into the start-up industry in Israel uncovered that about 90% of these start-ups do not monitor systematically the external business landscape. It appears that start-ups in cyber in Israel are focused more on the quality and the innovation of the products they offer to their clients. Considerably less effort is put into the analytical issues such as what exactly their competitors are offering or intend to offer, what the clients are looking for and analyzing the gaps between "our" solutions vs. the competitors, possibly by applying the methodology of gap analysis (BusinessDictionary, 2017).

Israeli outsourcing information suppliers are providing their start-up clients with intelligence on their competitors. They are pretending to give insights; however, these information specialists are unable to give added value and quality intelligence as this needs intimate knowledge of each segment in such a level that only those who are doing this internally on a daily basis, can really deliver. The conclusion is that especially in the start-up industry, outsourcing inputs are incapable of providing proper intelligence and are caught in information rather than in intelligence.

The second point is that while considering the small size of most of the start-ups, they need to build up their own capability of intelligence and understand the competitive arena with adaption to their special characteristics. Unfortunately, an effort to build a small dedicated intelligence internal capability too often comes across with internal opposition claiming that the resources for such a move are limited.

3. COMPETITIVE REVIEW MODEL: THE THEORY

A new model, the Competitive Review Model, has been introduced lately in Israel, in order to challenge and support start-ups to become more competitive, that probably increase their survival success rate. So far, this model which I have developed and tested in the last year was implemented in a few start-ups in Israel. It is still in its first stage of implementation. It was also presented a few months ago in the quarterly meeting of the Israeli CI Forum (FIMAT) and received a warm welcome.

3.1 Basic assumptions

1. Start-ups are in critical need for dynamic monitoring of the competitive environment. Doing this must be an internal business procedure supported by the senior management.

2. Each start-up needs to designate a "CI care taker" (a partial job). The goal of this function is to make sure that the firm will be aware of external changes and new directions in its specific segment and to evaluate their possible impact on the firm.

3. Intelligence reports have to be prepared internally (OSINT, supported by outsourcing gathering) implementing the rule of sharing of information internally to avoid unnecessary silos. The outcome is completive review reports.

3.2 Competitive Review Model: the process

3.2.1 Aim

To present the senior management of the start-up with periodic assessments of the competitive environment to help decision-makers to better understand threats and opportunities and to consider formulating these insights into business strategy.

3.2.2 When

Assessments will be presented each quarter. An annual intelligence report will be presented towards at the end of the year. The annual

report will outline the current year and will present also trends and potential moves for the next year. Only occurring of highly significant events will need an immediate special report.

3.2.3 The outline of the competitive review intelligence report

The outline of the concise competitive review report is as following:

A. *Executive summary* – what are the major changes in the last period that may effect "our" performance and business plan?

B. *Analysis of the competitive environment* – description of important changes that occurred during the period reviewed: notable successes and failures of competitors, new players, new technologies, important changes in regulation, significant mergers and acquisitions in your segment, vital innovation moves and major market trends and clients' expectations.

C. *Analysis of key players*: related to key competitors and strategic suppliers separately: key movements, current status of products / capabilities and plans for the future. This stage can be supported by competitive analysis template which divides the analysis into four categories: company highlights, market information, product information and SWOT information.

D. *Summary and conclusions* - how "our" start-up stands relative to the competitors / strategic customers and against the trends in the competition environment. It will include also defining what the opportunities are for "us".

3.2.4 Competitive Review Model: further recommendations

Based on the experience acquired already in Israel, there are further recommendations.

A. With regard to the examination of each key competitor and its future strategic moves, it is highly recommended to strengthen the analytical capability by using Porter's Four Corners Model (Porter, 1980; Gilead, 2009) as a complementary tool, which will provide with remarkable insights the future moves and the strategy of key competitors.

B. It is also suggested that competitive review intelligence reports are shared with the senior executives of the start-up and with key investors and further used as an agenda for strategic discussions.

C. Start-ups have also to implement rules for gathering information at exhibitions and professional conferences attended by their employees (Calof and Fox, 2003). Unfortunately, when this is not done systematically it causes losses of meaningful insights.

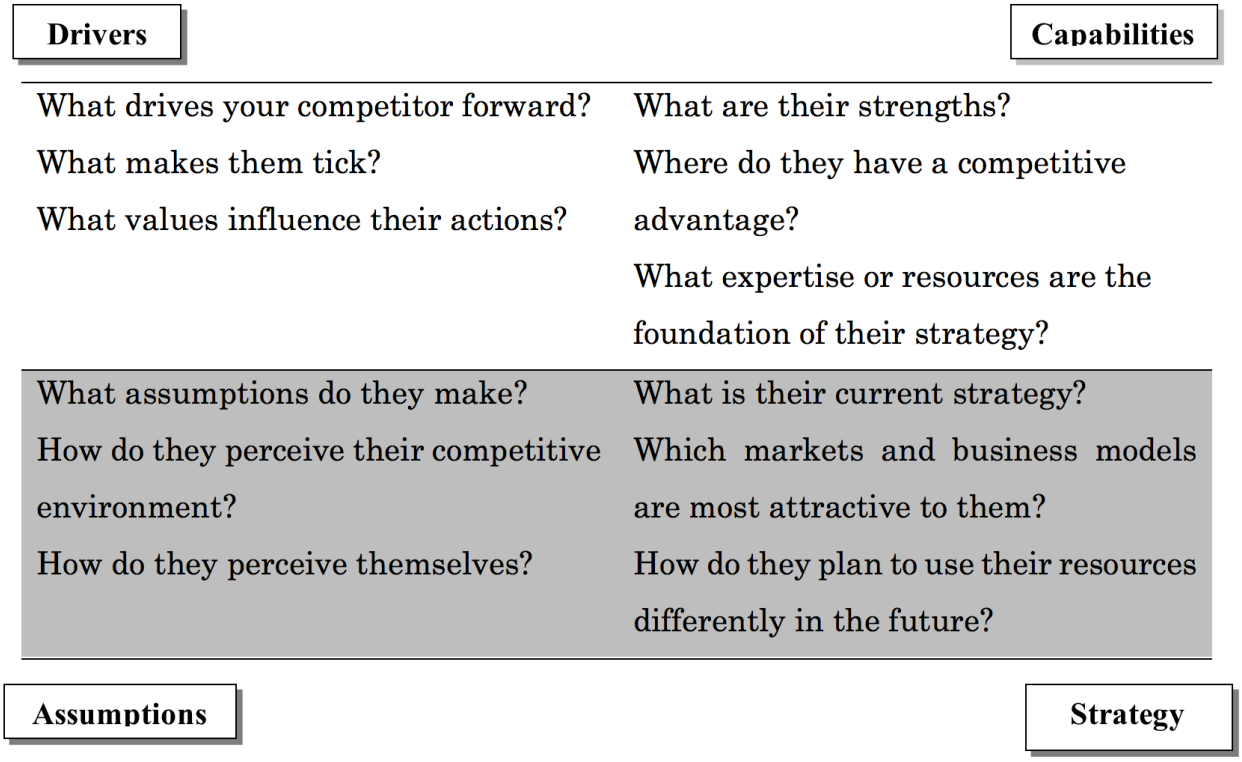

Figure 1 Four corners model.

The competitive review model, actually forced start-ups which use it to review systematically the competitive landscape. Its outcome is important not only to executives but also to the investors to be able to understand better the capabilities of start-ups to compete successfully and to be more knowledgeable in their discussions with the senior executive of "their" start-ups.

3.3 Adaptability and start-ups: adjusting organizational culture

Throughout the process of developing and executing the competitive review model I have noticed that the success of this model depends not only on its own merits but also on the ability of these companies to change. A major challenge of implementing this model in start-ups is also to learn how best to adopt new plans and to establish decisions that may improve their potential to succeed. The meaning is that they need to act on signals of change from the external environment and to be able to move forward rapidly. To do so, start-ups have to behave as "adaptive companies" (Reeves and Deimler, 2011) in order to gain competitive advantage. Adaptability as a new competitive capability in response to uncertainty (Garcia-Salmones and Yin, 2014) can be also a result of experimenting with customers in the early stage as already mentioned by Blank (Blank, 2013).

Adaptability is the organization´s capacity to change internally in response to external conditions (Denison and Mishra, 1995) which can change the classical strategic thinking, and force start-ups to operate as "adaptive companies" while they create more fluid structures, which can make the decision-making process faster and better.

4. CONCLUSIONS

Unfortunately, a high number of Israeli start-ups will not survive, and many of them will disappear within the first three to four years after their establishment as happens also in the start-up industry in other nations. Regarding the cyber start-ups, it is fairly reasonable to foresee a process of fast consolidation, which has already begun.

Contrary to what most founders and VC officials think and expect, I believe that those who will survive will be those who have the best understanding of the markets and the competition i.e. identify early indicators of opportunities and threats, and not those who just have better products. So, start-ups have to be superior "adaptive companies" and move fast to improve their dynamic monitoring and especially their intelligence of the markets and the competitive arena to support building a winning strategy. Thinking more about the future and the next move by competitors supported by systematic use of the competitive review model is essential.

In two years, it will be possible to look at the success rates of start-ups that have implemented the new competitive review model and to compare it with those who continue with their "traditional" direction.

5. A SHORT CASE STUDY

The managing director of the Israeli start-up (Hola, http://hola.org/), Ofer Vilenski, has admitted recently (Vilenski, 2017) that:

> "for four years, since 2013, we have developed a technology that will connect users to accelerate the Internet. However, when we went out with the product on the market, we discovered that it did not interest anyone. As a result, the start-up has created an organizational culture of quick attempts that focus on a particular direction only if two conditions were met: the basic assumptions of the product can be examined within two weeks and there is business potential in a direction that justifies the experiment. Otherwise, you have to kill the idea or change the focus. The start-up raised about $30 million, but most of the money was spent without any real progress."

Following this experience, the company started teaching its employees that it is okay to fail and to move on. Vilenski emphasized that:

> "most people are not used to changing direction at 90 degrees. It took a long time to convince them that an approach of rapid change is the way to achieve success, that they have to move quickly to change direction, to adapt to what is happening on the ground, and not to treat the ego."

Today Hola's employees prefer to find out why a certain product will not work, instead of getting stuck after three years of working on a

product that is not required. Vilenski is confident that:

> "you cannot tell if something is good or bad, and you have to know how to accept it (even outside the world of work). Therefore, a management culture must be developed to ensure that product development is a rapid evolutionary process."

The Hola start-up reported (2017) a significant milestone: 117 million installations have so far been recorded for the company's product. The company's main product is a VPN service that allows you to bypass geographic or government restrictions for surfing the Internet.

The success story of the Hola start-up can be summarized by the following key success factors: ability to become an adoptive company, receiving early feedback from the customers about the new product, and to develop greater awareness of the activity by the competitors to observe how it is possible to create a competitive advantage.

6. REFERENCES

Barnea, A. (2006). "Why Start-up Companies Fail to Adopt CI", *Competitive Intelligence Magazine*, Vol. 9, No. 1, January/February.

Barnea, A. (2009). "Intelligence Solutions through the Use of Expert Tools". *Competitive Intelligence Magazine,* Vol. 12, No. 3, May – June, 2009.

Barnea, A. (2014). "Looking Outward: the Start-up Industry: A View from Israel"*, Competitive Intelligence Magazin*e, Vol. 17, No. 2 April /June.

Barnea, A. (2016). "Study on Competitive intelligence in Israel: 2016 update", *Journal of Intelligence Studies in Business*, 6, (2) 5-16.

Blank, S. (2013). "Why lean start- up Changes Everything, *Harvard Business Review*, May.

Blenkhorn, D. L., & Fleisher, C. S. (2005). *Competitive intelligence and global business*. Westport, CT: Praeger.

Business dictionary, 2017, definition of gap analysis, http://www.businessdictionary.com/definition/gap-analysis.html

Bulger, N. (2016). "The Evolving Role of Intelligence: Migrating from Traditional Competitive Intelligence to Integrated Intelligence", *the International Journal of Intelligence, Security and Public Affairs*, 18:1, 57-84.

Bulley, C., Baku, K. and Allan, M. (2014). "Competitive Intelligence Information: A Key Business Success Factor", *Journal of Management and Sustainability*; Vol. 4, No. 2.

Calof, J., & Fox, B. (2003). "Trade Show Intelligence", *Competitive Intelligence M*agazine, Vol 6, No. 6, November - December.

Central Bureau of Statistics, State of Israel (2014). http://www.cbs.gov.il/www/hodaot2014n/16_14_170e.pdf

Denison, D. R., & Mishra, A. K. (1995). "Toward a theory of organizational culture and effectiveness". *Organization Science,* 6 (2).

Gilad, B. and Fuld, L. (2016). "Only Half of Companies Actually Use the Competitive Intelligence they Collect", *Harvard Business Review*, Jan. 26, https://hbr.org/2016/01/only-half-of-companies-actually-use-the-competitive-intelligence-they-collect

Gilad, Benjamin (2009). *Business War Games*. NJ, Career Press.

Global Intelligence Alliance (2009). "Competitive intelligence: A Global Study on Large Companies", http://www.globalintelligence.com/insights-analysis/white-papers/best-practices/

Global Intelligence Alliance (2011). "Market Intelligence in Global Organizations: Survey Findings in 2011", https://www.m-brain.com/wp-content/uploads/2015/04/10852.pdf

Grant Thornton, (2015). "Cyber attacks cost global business $300bn+", at https://www.grantthornton.global/en/insights/articles/cyber-attacks-cost-global-business-over-$300bn-a-year/

Garcia-Salmones, L., & Yin, J. (2014). "Developing Adaptability for New Competitive Advantage", *Asian Journal of Management and Innovation*, June-December.

Griffith, E. (2014) "Why startups fail, according to their founders", *Fortun*e, Sep 25, at http://fortune.com/2014/09/25/why-startups-fail-according-to-their-founders/

Hawley, M., & Marden, B. (2006). "FIM: A Business Information System for Intelligence", *International Journal of Intelligence and CounterIntelligence*, Vol. 19, No. 3.

Hoppe, M. (2015). "Intelligence as a discipline not just a practice", *Journal of Intelligence Studies in Business*, Vol. 5, No. 3, pp. 47-56.

IVC Research Center. (2016)."Israel Startup Success Report 1999-2014", at http://www.ivc-online.com/Research-Center/IVC-Publications/IVC-Surveys/Startup-Report

IVC Research Center & KPMG. (2013). "Summary of Israeli High-Tech Company Capital Raising 2012, IVC and KPMG Report", at http://www.ivc-online.com/Portals/0/RC/Survey/IVC_Q4-12_Survey_PR-Eng-Final.pdf

Le Bon, J. (2014). "Use your Sales Force's Competitive Intelligence Wisely", *From Data to Action*, Harvard Business Publishing, HBR. Org. Insight Center.

Markovich, A. (2015). "The Impact of Perceived Quality of Web Information Sources on the Use of Competitive Information by Decision-Makers and on Firm's Performance", *MA Dissertation,* The University of Haifa, School of Management, the Department of Information and Knowledge Management.

McGonagle, J. and Misner-Elias, M. (2016). "The Changing Landscape of Competitive Intelligence: The Critical Issues Investigated", *Salus Journal*, Issue 4 No. 1.

Orpaz, E. (2013), "The Brutal Survival Laws of the Start – Up Industry*", The Marker* (Hebrew), July 1st, at http://www.themarker.com/technation/1.2059828

Orpaz, E. (2017), "Come on – this is a start-up*", The Marker* (Hebrew), May 30, at https://www.themarker.com/technation/startup/1.4137625

Patel, N. (2015). "90% Of Startups Fail: Here's What You Need to Know About The 10%", *Forbes*, Jan. 16, https://www.forbes.com/sites/neilpatel/2015/01/16/90-of-startups-will-fail-heres-what-you-need-to-know-about-the-10/#21d37bd66792

Porter, M. E. (1980). *Competitive Strategy*. New York: Free Press.

Prescott, J. (1999). "The Evolution of Competitive Intelligence, Designing a Process for Action", *APMP*, Spring.

Reeves, M., & Deimler, M. (2011). "Adaptability: The New Competitive Advantage", *Harvard Business Review*, July-August.

Senor, D., & Singer, S. (2009). *Start-up Nation: The Story of Israel's Economic Miracle*, Twelve, Hachette Book Group, NY.

Solomon, S. (2017). "Israel tech raised record $4.8b in 2016, up 11% from last year – report", *Times of Israel,* January 10, at http://www.timesofisrael.com/israel-tech-raised-record-4-8b-in-2016-up-11-from-last-year-report/

Tsitoura, N. & Stephens, D. (2012). "Development and evaluation of a framework to explain causes of competitive intelligence failures" *Information Research*, 17 (2), paper 521.

Vilenski, O. (2017). "We invested four years in a product that did not interest anyone", *Themarker* (in Hebrew), May 30, at http://www.themarker.com/technation/startup/1.4137788

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Book review: Superforecasting: The art and science of prediction. *Crown Publishers, New York, NY. Tetlock. E. Philip, Gardner, Dan (2015)*

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Throughout this review I write "the authors" referring to everything that is written in the book, even though I suspect that Tetlock is the leading theorist. Gardner is a journalist, it says on the dust jacket. I do not exactly know what that means when it comes to whose ideas are in the book – who has contributed with what – and I do not want to speculate.

Philip E Tetlock is a scholar of psychology with an impressive number of publications and citation, so expectations are high right from the start. And, this is a good book, but not for any of the reasons that it pretends to be one; in fact, it is the opposite. I will get back to this at the end of this review but concentrate on the critique.

Forecasting is another word for intelligence work or guessing about the future. When we talk about forecasting we normally think about scientific methods that imply using more quantitative methods, on problems where such methods are thought to be of real use, as in weather forecasting. As we shall see throughout the book, the methods used for actually predicting events in this book are not quantitative but qualitative. That by itself is a problem when the term 'forecasting' is chosen, as it is confusing to intelligence professionals.

The 'super' in 'Superforecasting' sounds like something that is made up to sell extra copies of a book. For two authors who place so much value on modesty (as they describe in chapter 12) it's an odd contradiction to throw the word "super" around in so many forms through a book about the activities one is doing oneself (for example, superforecasters, superteams, superquestions, supersmart, superquants and supernewsjunkies). I guess all professional like to be "super", but super is something that others say about our work, not something we use to describe our own work and it is difficult to find any irony most of the time when the prefix is being used about how well the authors/project/project members did. It's quite possible that the authors thought that the ambiguity and playing with irony would go over well with the reader, but it does not. The subtitle is the 'art and science'. It's a popular subtitle in English but does not say much as it suggests everything (both a science and an art), thus nothing. What is normally more interesting to know is if the authors see something as a science or an art and why. Again, the impression is one of selling more copies of the book.

Chapter one throws arounds names and parallels like Bill Gates and his anthropological work and Tom Friedman and his thesis about the flat world. The project the authors work with is "The Good Judgement Project," which sounds like something pulled out of a commentary to the bible. More interesting, the authors explain how their wok is supported by the American Intelligence Community (IC) and that its participants have outperformed other analysts. This is a claim throughout the book which is never explained in any detail. We are not told much about how the actual competition was arranged, for example how the answers were graded. We are only given some example of questions asked and presented with names of some participants

that used the authors methods (the superforecasters) and how well they did compared to others. The book promises that the key to becoming a good forecaster using the method is not math skills, or an abundance of reading or excellent knowledge of history or geography, but comes down to some simple methods of psychology. In other words, good predictions all come down to how you think (not what you know), the authors claim. It is about thinking in a way that is "open-minded, careful, curious and – above all – self-critical. It also demands focus" (p. 20). Now, If I had been a few decades younger I would have been very excited at this point in the book with the promise of a quick solution, a method available to everyone (who reads the book), but these personal qualities, as much as they are required, are just the beginning of good forecasting. At this point in the book I get the feeling that I just saw an infamous gambler ride into town.

Chapter two cannot wait to provoke with its title: "Illusions of Knowledge". We are told some quick, smart stories from the history of medicine where the moral is that we should be critical, as in scientific rigor. Then we should think about how we think, a favorite idea among psychologists. The chapter goes on to talk about Kahnemann and Tversky (colleague) and abruptly ends without every really explaining what illusions are found in knowledge or having ever come close to treating the topic of knowledge more than superficially. By this time it is unclear whether or not it is worth reading the rest of the book. The suspicions from having read the title and the few introductory pages are confirmed.

In chapter three, entitle "Keeping Score," we are introduced to an old legend, the historian Sherman Kent, who was one of the first people in modern times to introduce science into intelligence work. To ensure his analysts were using the same language, Kent defined 100% certainty as "certain", 95% as "almost certain", 75% as "probable", 50% as "chances about even", 30% as "probably not", 7% as "almost certainly not" and 0% as "impossible". The idea that this would help analysts use the same measure, thus increasing accuracy in predictions. The idea was also good, but never became widespread. One could object that if you use a Likert scale of seven it would make more sense to set the percentages with 14.3 percentage point intervals (for example, 100-85.7%). To allow for the 50% mark, it would make more sense with a five-grade Likert scale. The authors do not comment on this but conclude that the system was never adopted. What they do note is that what is here presented as objective statements is subjective. That in itself is a strange comment as it excludes the possibility that some observations are facts (100% and "certain"), and that all statements are subjective. The authors go on to say that at the end all these estimates can only be presented as opinions, which depends entirely upon what kind of questions the scale goes on to measure (for example, natural facts or predicting human behavior at time t). What did remain in IC after Kent was the use of probabilities, such as when IC told Obama that there was a 70% or 90% probability that the man in the Pakistani compound was Osama bin Laden (p. 59). What that implies is more disturbing, that Obama decided to lead a military operation into a foreign country (a military ally) without even consulting their government when there was a 10-30% probability that they were wrong. The same logic goes to explain why so many civilians are killed with drones and other air strikes; the US has a policy of bombing targets when they are not quite sure who the targets are.

The authors go on to argue for the value of the Brier score that measures the accuracy of probabilistic predictions. But they fail to note that the Brier score becomes inadequate for very rare (or very frequent) events, because it does not sufficiently discriminate between small changes in forecasts. The authors fail to see the fundamental difference between predicting the weather with fewer and easier variables to measure and predicting human behavior which consists of many more variables that are more difficult to measure and that frequently vary under the same conditions, such as when a customer suddenly decides not to buy an ice-cream on a hot day even though he did so a week ago under similar conditions. Not to mention the unreliability of the rationality assumptions, which are largely avoided in the book.

Too many analysts think ideologically, and try to fit their observations with their beliefs. What does not fit is treated as an irrelevant distraction. They are also likely to declare things "impossible" or "certain", the authors remind us. This brings us to a key element in the method that is presented, that the "superforecasters" are taught to express themselves more carefully. This is illustrated

in the allegory of the fox and the hedgehog by Isaiah Berlin. The foxes win by "playing it safe with 60% and 70% forecasts where hedgehogs boldly went with 90% and 100%" (p. 69). This is the same in Obama's dilemma presented above. What actually happens is that the risk of mistake is transferred from the intelligence analyst to the decision maker. The decision maker is tempted to give the go-ahead if he is presented with something that has a 60% or higher probability. If things go wrong then the intelligence analyst can always say it was not his fault as there was a 40 or 30% chance of failure or mistake. Does this mean we have a better method for intelligence analysis? No, of course not. It is only transferring the risk of fault from the person who is doing to analysis to the person who is requesting it or making the decision. To the extent to which it is not possible to be more certain of course then 60 or 70% likelihood will have to do. The question then becomes if the decision maker should make a decision to engage at all, given the risks. Are the risks sufficiently explained to the decision maker? In the case of Osama in the bunker the answer is not clear.

So, is this better intelligence work and is it a better method for intelligence analysis? I think the book offers some good advice in terms of rules of thumb, which we shall come back to, but so far the suggestions made imply that the analysts have just become smarter fencing off potential criticism for potential mistakes. If this is how the authors won the competition against their colleagues in the IC – by giving vaguer answers - then that is no real victory, but a statistical trick. This would also explain why they do not focus on knowledge, as they are not so concerned with ideas, but more with careful expressions. So far into the book this seems to be the essence, and a better title may have been "the art of careful expressions". The question remains what kind of people you would like to fill your intelligence department with, well-read experts or people who have learned that careful expressions will put you in the right more often? Note again that in the Obama case the analysts are not really helping Obama by saying that there is a 70% or 90% possibility bin Laden is in that house in Pakistan. It's also odd to say "70% or 90%", 70 to 90% would at least make some sense, but 70 or 90 is like giving two different answers. As if we are free to choose. Obama is faced with two choices: to bomb/attack or not to bomb/attack, it is either or, but the answers given him are in terms of a percentage likelihood of bin Laden being in that house, which is not what he needs. In other words he is not being given the intelligence he requested. If it was difficult to be sure, why not wait until they were more certain? The analysts figure Obama will bomb/attack because there is only a 30% chance that bin Laden is not in that house, but Obama could also have reasoned that it is not worth bombing/attacking as there is a 30% chance someone else (innocent people) will be killed.

Another technique used by foxes is to analyze the problems using many methods/analyses and synthesize it into one answer at the end, something the authors call aggregation, but others call redundancy in method. It is a well-used method in the social sciences, so there is nothing new about it.

Chapter four starts with the horrifying story of how the intelligence community made up of 20,000 intelligence analysts supported a claim from the White House that Iraqis had a nuclear weapons program that produced weapons that was a threat to the US and NATO countries (National Intelligence Estimate 2002-16HC). One explanation was that the IC had been bullied by the White House to come up with documents that suggested a war. With the authors method, the IC should have said that there was a 70% likelihood or similar, but then the results would probably have been the same anyway. This just proves how dangerous the method of transferring the risk to the decision maker is. The authors struggle to find the right answer to the question. They do not start by saying that maybe the IC should have listened to Dr. Hans Blix, the IAEA Director General from 1981 to 1997, who was experience with these issues and guided the Agency through the Chernobyl disaster. Dr. Blix was against the invasion from the start, as there was no evidence to suggest that the claim was true. Thus, it is disheartening to see how the authors stay with their initial method in this example, they should have said 60-70%. Then they would not have been completely wrong and that, the authors think, would have been better. For whom? For the estimated 1 million Iraqis who died as a result of the conflict?

Another example that is used in the book is the use of math to make predictions on Wall Street. The authors suggest that the answer to intelligence is statistics and math, just like for the study of economics (probability). But how well did the quantitative analysts really do for their investors? What about the consequences

of the failed banks and all the pensioners who lost their retirement funds? The authors never go down that road. In general, has the study of finance succeeded with math? If one had asked that question 20 years ago most colleagues would have said yes, but today large part of quantitative finance is left behind as irrelevant, including option pricing models. Some of those who received the Nobel Prize for their "inventions" in finance have since been discredited.

Chapter five is about IQ and intelligence. Much of the chapter and chapters in general are case allegories, small cases with no clear conclusion, as in the example of the cause of death of Yasser Arafat (pp. 114-117). The case is picked up in later chapters as a to-be-continued ploy for the reader to find the content interesting, it seems.

Chapter six is entitled "Superquants". We are told that Superforcasters are not like the quants (quantitative analysists) of Wall Street, they don't use that much math. It's more careful thought-out and nuanced answers (p. 129). The authors return to the Obama – bin Laden example, citing Mark Bowden, who confirms what Obama thought about the intelligence estimates he received. Obama got "probabilities that disguised uncertainty as opposed to actually providing you with useful information" (p. 135). Obama acknowledged that he was left with a gamble, as we commented on earlier in the review. Obama himself is quoted as having said it was a "fifty-fifty". Then a whole analysis follows about what this comment means; if it was to be interpreted literally or not. Was he being sarcastic, critical or just stating a fact? It's easier to say for those who were in the room. He may have thought that the figures presented insufficient information. One interpretation says that Obama would have attacked the facility no matter how small the odds were for finding bin Laden. If that is true it borders to an almost bizarre example of decision making that resembles gambling, which may or may not be what he meant. The authors and those consulted in the book cannot agree what Obama was thinking when he said "fifty-fifty" or what I meant, which is not much more comforting.

Chapter seven in entitled "Supernewsjunkies". Just the idea that extensive reading makes someone a "junkie" is offensive but fits well with the authors' idea that it is not what you know but how you think. The chapter starts by unfolding more of the "superforecasting" method, leaving the reader puzzled as to why the method is spread around the book in small pieces. It makes the book seem scientifically unfriendly, again, as it is all about selling books and consultant services. The suggestion is to "unpack the question into components" distinguish between unknown and known and leave no assumption unscrutinized (p. 153). Fair enough, but this is much more difficult than it seems and poorly explained on the following pages. "Adopt the outside view and put the problem into a comparative perspective that downplays its uniqueness and treats it as a special case of a wider class of phenomenon". "Also explore the similarities and differences of your own views and those of others…" (p. 153). The author's method consists of synthesizing these two views and the views of the crowd. This is questionable. First of all, if I am not well-read on a topic why include my opinion at all? And surely the opinion of the crowd is a function of the information spread in mass media, whatever that may be. Thus to find some sort of average (another statistical ploy) on these three positions is ludicrous. Why should this method bring you any closer to anything truthful? What it will give us is what the social truth is, but the social truth is very often different from the truth per se as will be obvious, for example, to anyone asking people about which religion is right.

The authors go on to say that this process of gathering the three views takes time and is only the beginning of the method (but by now the reader is a bit tired of the sales talk). The reader is annoyed by the probability figures the authors keep throwing around in the chapters, like the 60% probability that polonium would be found in Arafat's body (p. 153). The authors should for once tell the reader how the analyst got to that figure, as that calculation is the cornerstone of the whole method suggested in this book. It's not explained anywhere.

The time frame of a decision is very important of course. The authors talk about "scope", an effect that may give an answer of no today, but yes in a month or two, so the answer depends on the point in time. The "superforcasters" know this so they update their information much more frequently, on average, than regular forecasters, we are told. It makes you wonder who the regulars are, analysts at IC? I am sure they must be thrilled

to read how badly they do their work, all 20 000 of them. By now the reader is also annoyingly interested in learning about all the facts of the "tournament" where the "superforecasters did so well and so much better than the rest. What were the questions? Who set them up? How much time was given to each question? And more fundamentally, how were they graded? I do not want to speculate but I suspect that the best answer was not in terms of right or wrong answers, but the answer that comes closest to the truth as that would favor those answer with vague answers. It should have all been explained clearly at the start, not as loose sentences spread around the book like bait to turn another page. On the other hand I guess that is how bestseller books are written, they are exiting partly because the reader hopes to know what it's all about and keeps flipping those pages. The point about updates also makes you wonder if the "superforcasters" won because they updated their information more frequently.

The article continues on the Arafat question, and Bill Flac (one of the superforcasters) updates his estimate from 60% to 65% yes as he thinks that the delay in time the Swiss laboratory has with publishing the results has to do with the operation they may be testing to rule out lead as the source of death. Another issue that is interesting here is the calculation that increases with 5% likelihood. That calculation is never shown. Why not? Surely if focus is on psychology it would be interesting to learn about the cognitive processes that makes the difference of 5%, not least the biases if there is no clear calculation but more of a feeling. In a book dedicated to this essential topic how come the calculations are not shown? I am not saying it is easy, but others have tried and it is the central theme of the book. Instead the authors talk about the Briar score again, which is used as a measure of success for predictions, not for the calculation of estimates. In fact, about the only thing the method presented in the book has in common with forecasting is the Briar score.

The randomness of the method is clear in another example about Republican voters in Colorado: … "So you think that the maximum you should raise your forecast is 10%. It's now between 1% and 10%" (p. 168) "Finally you settle on 4%". This shows clearly that this is what we call a rule of thumb, which by itself is fine, but then it should say so clearly, and there is nothing new with this approach. Maybe that is the most critical part about this book: that it pretends to be about forecasting but is instead a good collection of rules of thumb. It's a method by which new information leads to small adjustments in the estimates. Another methodological problem is that if you go with a certain hypothesis and gather a large amount of information in that direction, then you are likely to get a high likelihood of true or false because each new piece of information could lead to a small adjustment. It will also depend on the information you happen to find in the language(s) you can read. There will be plenty of information that you do not see or find, there will be some stories you tend to go with so in reality this incremental approach by which likelihoods are increasing or decreasing with percentage points is not that straight forward to use.

Chapter nine is entitled "Superteams". It starts by telling the disastrous story of the Bay of Pigs Invasion (1,400 terrorists were surrounded by 20,000 soldiers when they tried to invade a foreign country) and how that lead to the Cuban Missile Crisis. Much of this is true but the authors forget to mention that the Russian placement of missiles was also a reaction to the American placement of missiles in Turkey. That in itself is an argument for the importance of knowing history. And if you did not know that it does not help to put you into a team of other superforecasters in a superteam asking superquestions. The result is just going to look even more wrong.

Chapter ten raises a relevant topic for anyone who has read this far, how it is possible to be a good leader and make accurate decisions if all you are getting are vague estimates. The answer suggested by the authors seems to be based on Moltke, the Prussian general. The reason Moltke is largely implied is because he said that everything in war is uncertain. So, don't trust your plan. An officer should be calm and assuring, and knows that he needs to make a decision in a fog of uncertainty. As often is in these kinds of books, there is the introduction of a German magic word that is supposed to explain it all (other examples in other books: "gestalt" or "verstehen"). The word this time is 'Auftragstaktik', or mission command in English. As valuable as the idea may be, I am not sure it is going to be a consolation for Obama when he is asked to take the risk of attacking a house just outside of a Pakistani

army base. It is not going to give me more confidence in intelligence analysts.

Chapter eleven is the second to last and is called "Are they really so super"? So, through the whole book they have been telling me how super they are and now they are about to say that they are not super? As could be expected, the authors do not give a clear answer. This is not unusual in these kinds of bestseller books either. Instead, there is an insinuation, a hint to the reader to draw his own conclusion that they are in fact super because their predictions are best, which is a claim that can never be tested.

The chapter goes on to talk about conversations with General Mikael Flynn who was the National Security Advisor for Donald Trump for 24 days, the shortest in the office's history. (He pleaded guilty to lying to the FBI over his contact with the Russian government during the Trump presidential transition). Flynn tells the author that he thinks "societal conflicts" are at unprecedented levels. The reader thinks that he must have forgotten about the race riots of the 1960s and the American Civil War. Maybe he meant during the past generation, in the US, but it does not say so. The authors criticize Flynn for falling for the "oldest trick in the psychology book", assuming that what is presented to you is all there is. Flynn's inbox is full of reports that confirm this view. The authors argue that facts show that interstates conflicts have been declining since the 1950s: it's enough to google the question and you will see. What the authors fail to mention is that googling a question is often a poor source of information, but otherwise they may be right. Much of the information found on webpages is false and most good information is not freely available. That is one reason why books continue to be so important. Not to mention a good general education. Then there is a lot of Kahnemnan and Tverksy again, but few other references to psychologists' research. There is also a comparison between the authors and Kahnemann and Taleb's ideas about predictions, where the authors claim to be right.

An interesting replica of a strategic memo written by Linton Wells II (not Linto Wells, who was his father and a well-known American foreign correspondent) is presented. It was from 2001. In it, Wells II shows examples from the past hundred years of how fast foreign relations have changes, thus drawing the conclusion that the US should plan for something unexpected, that that is the best overall strategy. Another good citation here is from Eisenhower, "plans are useless, but planning is indispensable" (P. 244). The memo from Rumsfeld citing Wells II says nothing about what England, and later the US, actually knew or how good their guesses were about the future at that time. It just assumes that they were surprised, which is probably close to the truth for most of the examples listed. At the same time, it's a bit like saying that the US was not very good at predictions at the time (not that any other powers are recorded has having gotten it right more often, to my knowledge). Wells II's response was to plan for adaptability and resilience as a way to meet the unexpected. This is also close to what the US has done with its continuous massive military buildup. One problem has been that there has not been any money for this buildup, so the government has turned to massive borrowing during the past administrations. (It is often forgotten, but Obama borrowed more money and engaged in more wars than any of his predecessors since the Vietnam War). The US has also not been able to make money on its wars, which is the other major problem. Today they are in a squeeze needing to borrow more money to keep the military strong so as not to have to repay their foreign debt, which cannot be paid. In Wells II's defense, we can say that he did not imagine the financing part of his strategy. Unfortunately for the US and its allies the US military is failing both with adaptability and resilience.

The authors then go on to speculate about why China may not become the world's leading economic power by comparing it to Japan. Many thought Japan would become the leader, but it did not happen, they reason. The authors do not discuss the fact that China's population is growing to ten times the size of Japan's, the fact that China has been a world economic power for most of the past 2-3 millennia, except since the mid-1600s (the Enlightment). They do not discuss cultural similarities or differences either, I assume again because they do not look at knowledge but how you think. Sure, China may face great difficulties and may even decline as a result, but the authors are too light on this question. The simplicity with which this parallel is treated is symptomatic of the whole book when it comes to questions of history, geography and culture. Their approach is a combination of psychology

studies and basic statistics, good enough, but not enough by itself.

Chapter twelve is the last chapter. It highlights the credo, "keep scores". It also says to analyze results, but how to do this is not shown with any clarity anywhere in the book (p. 259). Keeping scores, or evaluations of past performances, is a key part of any intelligence cycle (that is why it is drawn as a cycle), which is the most basic model any intelligence analyst is shown for how to work. That evaluations are not done in the American IC (or in many other countries, I am sure) is not surprising, but that is more a question of professionalism within the working corps. It's a fact, the "sharpest knives in the box" don't become intelligence analysts, not yesterday and not today. The IC is not McKinsey or KPMG, not yet at least.

A useful rule of thumb mentioned in the book is to try to solve the larger questions by breaking them into many small questions. A parallel is made to the technique of pointillism (p. 263), where a painter makes a painting by adding a greater number of dots on the canvas. A few dots do not look like anything, but as more dots are added we see an image emerge, the larger picture or question. Of course a painter knows what he is setting out to make so no dots are wasted. An intelligence analyst may collect the wrong dots, or dots belonging to another painting and it is far from certain that enough dots or the right dots are collected to get the larger picture so the parallel is merely suggestive.

Towards the end the author reminds us that his friend Tom Friedman (who is mentioned on every other page or so it feels) was for the invasion of Iraq because he thought that Iraq was the way it was because of Saddam Hussein. Another possibility is that Saddam Hussein was the way he was because of Iraq. Friedman decided upon the first alternative. The authors point to the fact that the conclusion and his reasoning was not correct. To present the conflict in such simplistic terms is shocking, to say the least. Anyone with a minor grip on history will analyze this conflict from a Shia-Sunni perspective, which could also explain why the Sunnis felt desperate enough to form the Islamic State after their defeat. It was the American-led invasion that created ISIS. Actually US foreign policy is to blame for most of the disruption of the Arab world and the Middle East, which started with the First Gulf War but whose history goes back to the beginning of the American-Saudi relationship at the end of WW2, a relationship they inherited from the British.

At the end the authors explain that superforcasters are more humble than other forecasters, analysts or experts; they do not show off and know their limitations (they do not need to go to Davos, but leave that to others). They can do this because they have the support of a proven record of predictions. With the Briar score they ride into the sunset. Somehow I was never impressed but I know some of my colleagues are.

Conclusion

There are many things that are good about this book. Philip E Tetlock is a scholar with an impressive number of publications and citation. The book is well-written and easy to read, but that is also the best that can be said.

The book falls into a long line of bestselling books that have an extravagantly attractive title that has little to do with the content, and a first chapter that is all about promises of what is to be delivered in the following pages. As such, this is all too common in the management literature in general as we have known it since the early 1980s, maybe even earlier. It throws around the names of famous people and stories people can relate to. But what is the problem with that, the reader may ask. Well the problem is that these types of management books continue to have a significant influence on practice, much more so than scientific articles or more instrumental books on intelligence analysis. This is not a new phenomenon either but has been going on since "In search of Excellence" or maybe even longer. For the most part though these books are being discredited in the long run, but then it is too late, as their content has already been put into practice.

For one thing there is nothing that has been presented in the book that helps explain why the project was better at predicting events than anybody else, if we are to believe that that is true. More worryingly, the book does not say how the authors and the project beat the other analysts, if it was by simply using a more vague language in its estimates or by the way correct answers were calculated. The rules of these competitions are never explained, at least not in the book.

The main idea in the book is that if you give precise questions and ask for answers expressed in numbers for specific time frames, then you can also sit back and wait to measure the results. You will then know how good you

are. That by itself is not a bad idea. Instead we are led on a series of loose threads and assumptions, by the authors who are expert analysts because they did so – "it took years" - and won. It seems like a proven way to sell consultancy, but does not convince a reader who is even half awake.

Clearly psychology is important for decision making and forecasting, especially when confronted with social situations where an outcome is the result of the interaction and the expectations of several individuals with different interests and values. Some of these problems can be modelled using game theory, but the authors fail to see that this is only one half of the equation. The other half is what you actually know. The intelligence reality of Mr Tetlock is much like that of a psychologist in a poker game. He does not know what the other person knows but tries to guess it based on his behavior. That is a much riskier way of solving a problem than using resources to actually find out. Good intelligence is about finding out what hand was actually dealt. This will give us certainty to know how we could win the game, or at least avoid losing more money than what was in the pot. Psychology is important in knowing how the player will behave. It is this other part of the equation—that the psychological insights are valuable—that Tetlock introduces in this book.

It's a good suggestion to test or check guesses to learn from them, but it's hardly a new or novel idea. It's true that it is "astonishing" how many organizations do not check the intelligence they produce or buy, but it's hardly a new problem or even surprising.

The book is one in a long tradition of "hype" books which are so popular and not only in the Anglo-Saxon world, similar to Nassim Taleb's book "Black Swan", which the authors also refer to. You take something that is merely common sense and present it in an appealing way, such as that complete unknowns are like black swans. The reader will not have learned anything new, but old wisdom is frightfully well packaged, thus appealing. It does not help that the authors disagree with Taleb in that they think that many swans that people say are black are in fact grey (another metaphor of the same type).

I said at the beginning that this is a good book. The reason for this is that it contains many good rules of thumb. Unfortunately, they are not listed in any single place in the book. We should break large questions into many small questions. We should make scorekeeping an integral part of intelligence analysis (p. 259). That is a simple but important lesson. Thus the book is worth reading.