

## Business Intelligence & Knowledge Management – Technological Support for Strategic Management in the Knowledge Based Economy

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*The viability and success of modern enterprises are subject to the increasing dynamic of the economic environment, so they need to adjust rapidly their policies and strategies in order to respond to sophistication of competitors, customers and suppliers, globalization of business, international competition. Perhaps the most critical component for success of the modern enterprise is its ability to take advantage of all available information - both internal and external. Making sense of all this information, gaining value and competitive advantage through represents real challenges for the enterprise. The IT solutions designed to address these challenges have been developed in two different approaches: structured data management (Business Intelligence) and unstructured content management (Knowledge Management). Integrating Business Intelligence and Knowledge Management in new software applications designated not only to store highly structured data and exploit it in real time but also to interpret the results and communicate them to decision factors provides real technological support for Strategic Management. Integrating Business Intelligence and Knowledge Management in order to respond to the challenges the modern enterprise has to deal with represents not only a „new trend” in IT, but a necessity in the emerging knowledge based economy. These hybrid technologies are already widely known in both scientific and practice communities as Competitive Intelligence. In the end of paper, a competitive datawarehouse design is proposed, in an attempt to apply business intelligence technologies to economic environment analysis making use of Romanian public data sources.*

**Keywords:** *business intelligence, knowledge management, competitive intelligence, public data-sources, strategic management*

### **I**ntrouction

Nowdays, economic organizations are subject to external forces that they must live with and react to: increasing sophistication of competitors, customers and suppliers, globalization of business, international competition. Perhaps the most critical component for success of the modern enterprise is its ability to take advantage of all available information - both internal and external. It's a real challenge, due to the tremendous flow of information it's facing every day. Also, the nature of information itself has changed, in terms of volume, availability and importance. The data to be considered becomes more and more complex in both structure and semantics. With the Internet, Intranets, Groupware systems the volume of available data increases each day – customer communications, internal research reports or competitors web sites are just some sources of electronic data. Intellectual property and assets, knowledge are

contained within the huge volumes of information and leveraging this value is increasingly important in the competitive market. Making sense of all this information, gaining value and competitive advantage through represents real challenges for the enterprise. The IT solutions designed to address these challenges have been developed in two different approaches: structured data management and unstructured content management. We can even think at these approaches in a more general perspective as being information management technologies and knowledge management technologies – being aware in the same time that information management it's a part of knowledge management, as information can be considered a type of knowledge (explicit knowledge). Knowledge management technologies, while less mature than information management technologies, are more and more capable of combining content management systems and

the Web with vastly improved searching and text mining capabilities to derive more value from the explosion of textual information. Integrating Business Intelligence and Knowledge Management in order to respond to the challenges the modern enterprise has to deal with represents not only a „new trend” in IT, but a necessity. Over time, techniques from both technologies blended, Competitive Intelligence Systems are a direct result of such integration.

### Business Competitive Intelligence

Competitive intelligence has undergone a raising interest in recent years as a result of the information explosion and the sharpness of information technologies. Trying to define the scope of competitive intelligence, a lot of definitions proposed by business intelligence professionals and strategic analysts were summed up in the Competitive Intelligence Handbook [4]. The general opinion of all these business information professionals is

that Competitive Intelligence deals with the collection, selection and interpretation of publicly-held information that emphasize competitors position, performance, capabilities and intentions.

Competitive intelligence is the analytical process that transforms scattered information about competitors and customers into relevant, accurate and usable strategic knowledge on market evolution, business opportunities and threats. It is focused on environment and uses public sources to locate and develop information on competition and competitors, information later used as references, benchmarks or any other basis for strategic analysis. Competitive Intelligence is the natural exploit of the increasing availability of commercial databases world-wide, the on-line mass-media and the development of cutting edge information technologies: business intelligence and knowledge management.

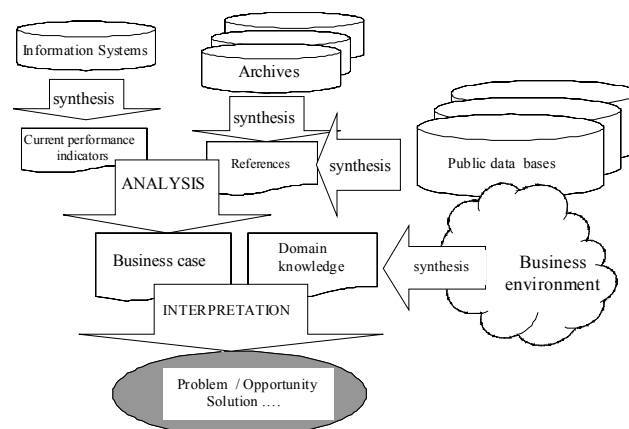
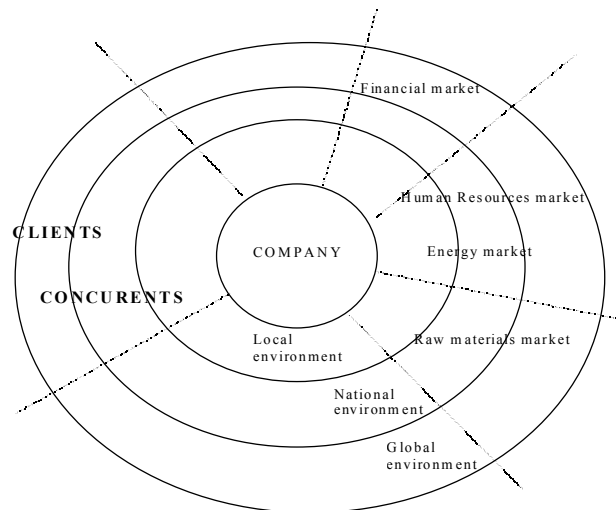


Fig.1. Competitive Intelligence framework

By its very nature, no business is isolated. In doing its activity, the business will need to deal with customers, suppliers, employees, and others. In almost all cases there will also be other organizations offering similar products to similar customers and seeking similar objectives: growth, profit and fame. These other organizations are known as competitors.

Competitiveness is a natural relationship between businesses. Business competitors are other organizations offering the same product or service in the present time but also in the

future and also organizations that could remove the need for a product or service by offering substitutes or changing habits. Monitoring competitors worth a lot because it provides necessary knowledge to be able to predict their next moves, exploit their weaknesses and undermine their strengths. According to Arthur Weiss, founder managing partner of AWARE company which has an international reputation within the Society of Competitive Intelligence Professionals (SCIP), there are four stages in monitoring competitors - the four "C"s:

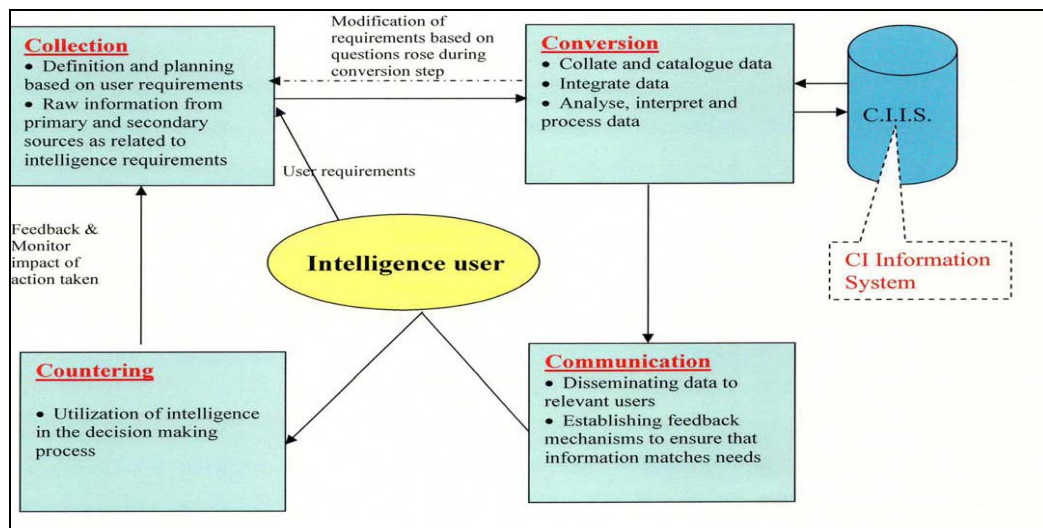


**Fig.2.** Business environment

1. Collecting the information
2. Converting information into intelligence
3. Communicating the intelligence
4. Countering any adverse competitor actions (making use of gathered intelligence)

This approach is war-like, with terminology taken from the military field (intelligence, counterintelligence and techniques as well). All businesses are fighting to gain the same resource and occupy the same territory: the

market. And like in war, it is necessary to understand the enemy: his vision, his strengths, where he is vulnerable; where he can be attacked; where the risk of attack is too great and so on. The war-like approach of the business relationship with the competitors led to a new branch of IT applications designated to support competitive intelligence - CI information systems.



**Fig.3.** The 4C approach of competitive intelligence

A.Weiss Business Information Review 19(2) – 2002 [5]

*1. Collecting competitor information*

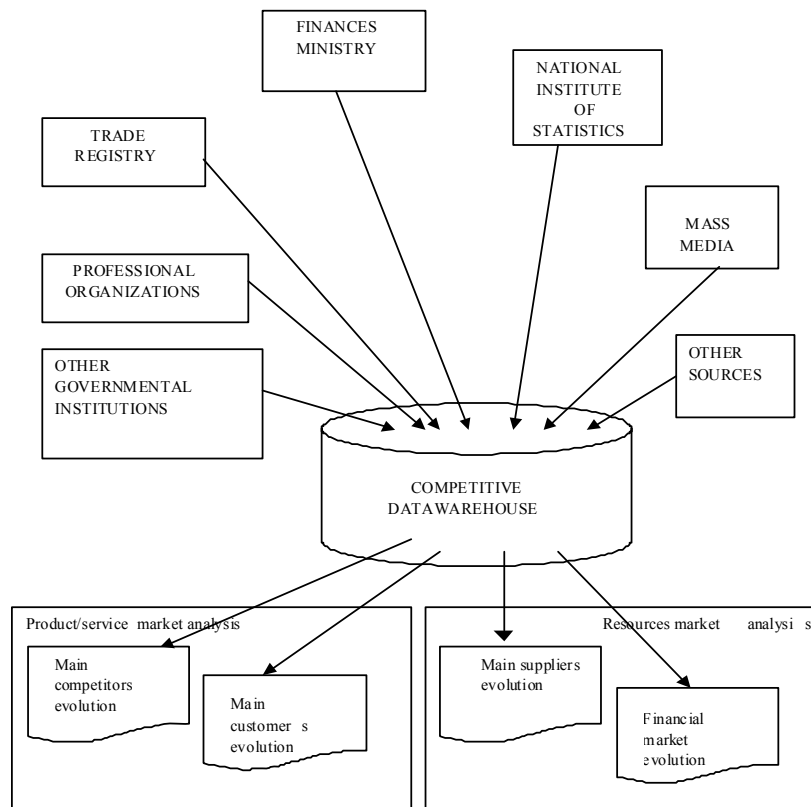
Preliminary decision on what business environmental information must focus on is made roughly on business strategic plans ranging from planning a new product, developing a new business line to follow the industry trend

or making use of an entirely new technology up to looking at a potential merger, acquisition or business partnership. The information requirements for different business decisions will be completely different and so the information that should be seek will also be

different. There is no value in information that cannot be used to inform the business's strategic or tactical decisions and the time, money, and effort spent collecting it is wasted.

At this stage the objective is to identify the key areas of concern for the business deci-

sion makers and the requested information. Thus, rather than collecting information at random, the search needs to be focused and planned, and aimed at answering the various intelligence requirements of the business – often termed key intelligence topics.



**Fig.4.** Competitive Datawarehouse – Inputs&Outputs

In the Internet era there are a lot of public electronic primary information sources most companies are advertising their services, there are numerous other web-sources - discussion forums, web-logs, customer and governmental sites and so on. One can also find information at trade shows and conferences, and by interviewing industry experts, your competitors' customers and suppliers, ex-competitor employees - or even the competitor although there are ethical issues involved when obtaining information from some of these sources.

## 2. Converting information into intelligence

Unfortunately much of collected data will be redundant, out of date, inaccurate or incomplete, even wrong. Like a puzzle, each piece can help build up the compete picture even if

some pieces are missing or damaged, one can often get a good idea of what the real picture actually is.

We can regard it as being a process of knowledge creation. As we know, most of the knowledge creation activities are products of people interacting with people, people interacting with data and information, people interacting with systems and people interacting with the environment in which they operate. In fact, there are two basic approaches in knowledge creation:

- **DATA** → **INFORMATION** → **KNOWLEDGE** - the structured linear view, based on information processing which extracts knowledge from information and information from data. It's a process of both creating and adding value to data, process

strongly sustained by information technologies. Business intelligence technology plays the central role in that context. Basically, it has applied the functionality, scalability and reliability of modern database management systems to built data warehouses (information bases) and to utilize data mining techniques to extract business advantage from the vast amount of available data. Data warehousing and knowledge discovery has been widely accepted as a key technology for organizations to improve their abilities in data analysis, decision support and the automatic extraction of knowledge from data. However, there is a long way from information to intelligence. Converting information into intelligence (in a particular context) is a process consisting of three steps: collate and catalogue information, integrate it with other pieces of information, analyze and interpret it.

- **INTEGRATION** - interaction and communication of tacit (expertise, insight in human mind) and explicit knowledge (documents, databases, data warehouses, etc). Knowledge integration, in relation to use of IT systems is the end product of a lot of work involving a range of different sense-making processes and information technologies. The concept of knowing itself underscores that knowledge is inherently constituted in prac-

tices and furthermore that knowledge should be understood as inseparable from its broader context. Knowledge application – or knowing- is an effect of a heterogeneous network having both material and social components. Knowledge integration is perceived as being a synthesis of best available evidence with expertise of individuals and customer values.

3. *Communicating the intelligence*

Competitor intelligence needs to be evaluated and selectively communicated to all who need to make decisions based on what customers, suppliers, or other companies in the market are doing or are likely to do.

Even if this stage seems well understood and well supported by communication technologies, Knowledge Management technologies are widely used in order to fully achieve this goal.

4. *Countering* (making use of gathered intelligence in decision process)

Business intelligence is scanning internal environment for summary information that is relevant for the decision-making. Current information about the environment is needed in the analysis process to make reference to as industry benchmarks or just as direct competitors performance levels to compare against. This reference information is provided by competitive intelligence which monitors the company environment.

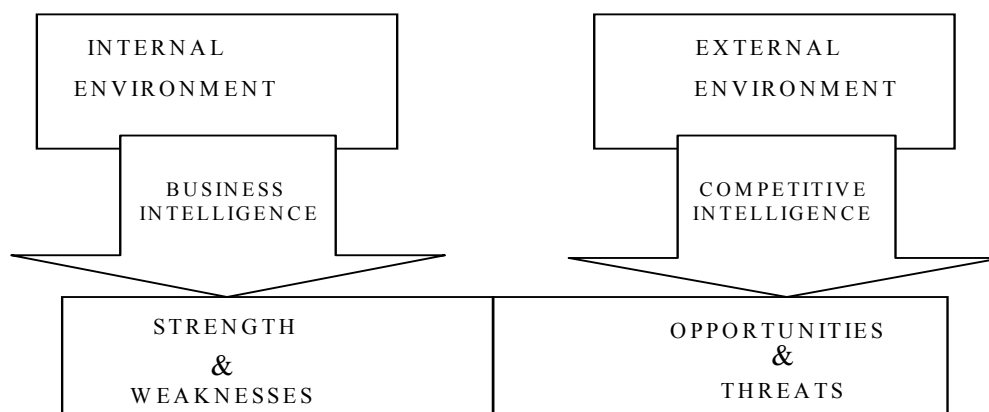


Fig.5. Business and competitive intelligence outputs

The cross-analysis of information provided by both technologies may be syntetised in a SWOT matrix, BCG matrix or any other basis for strategic analysis. Michel Porter’s ap-

proach in analysing industry and competitors largely known as Five’s Forces Model is entirely based on such cross information with great added value. The strategic business

managers seeking to develop an edge over rival firms often use this model to better understand the industry context in which the firm operates.

### Strategic analysis of gathered information

The core of competitive intelligence is analysis. Professionals must be experts in the use of various analytical models, such as SWOT Analysis, Porter's Five Forces, PEST, Market Segmentation and special analytical models such as Psychological Profiling, Shadowing, Reverse Engineering. When applied correctly, these analytical models can convert disparate pieces of information into actionable intelligence.

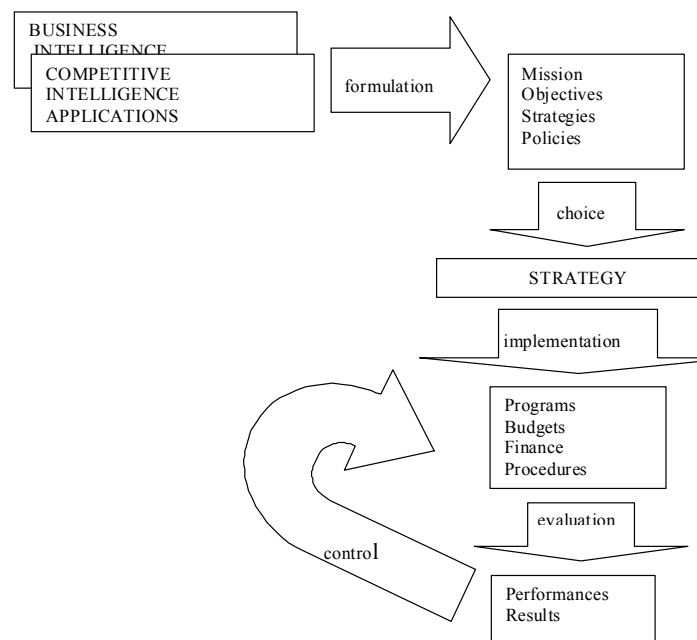
CI uses different methods and types of analysis to transform the obtained information into acting intelligence. A research study made by SCIP (Society of Competitive Intelligence Professionals) in 2006 shows the most frequently used analysis methods: Competitor Analysis (known as Competitive Analysis), SWOT analysis and Industry Analysis based on Porter's Five Forces Model.

For this type of analysis can be successfully

used knowledge repositories and artificial reasoning. The artificial intelligence (AI) technologies can play an important role in analyzing and interpreting all the gathered information, providing solutions, interpretations, in other words, actionable intelligence. Integrating Business Competitive Intelligence in Strategic Management process

The last phase of Competitive Intelligence process refers to the use of intelligence in the decision making process and is focused on evaluation of decisions' impact over the competitive position and performances in the own company. The CI process can restart to collect new information as a consequence of new demand of intelligence. In the CI process, there is a continuous interaction between producers and end-users of intelligence, both in the beginning phase to clarify the demands as well as in the feedback phase to establish the quality and utility for the resulted products.

This last phase will assure the informational and decisional superiority with results in obtaining competitive advantages.



**Fig.6.** Business&Competitive Intelligence Integration in Management Process

As presented in the picture above, the integrated technologies of Business and Competitive Intelligence are useful in formulating mission and long term objectives for the

company; in designing strategies from which the company will make a choice. These are obviously features of strategic management level, the technological support is known as

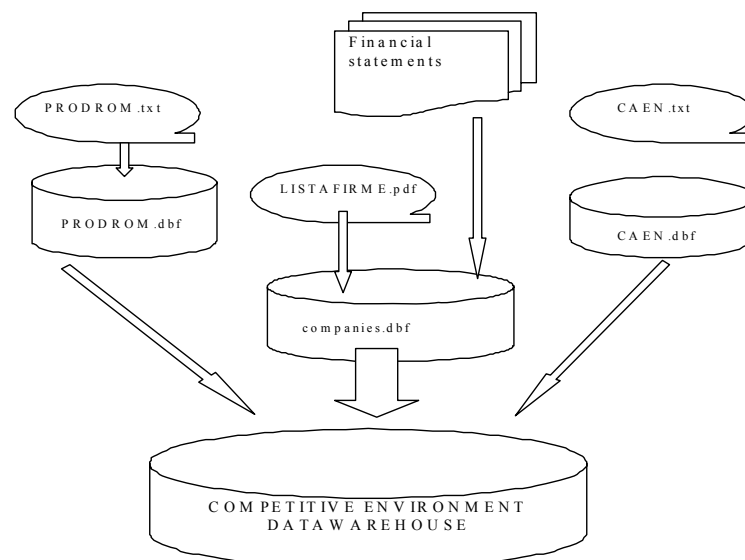
**Strategic Management Support System.**

The implementation of the strategy could also be assisted by Business Intelligence, mostly on operational side – in the planning phase when programs, budgets, procedures, financing plans are to be established and optimized. At this stage, one can rely on **Operational Management software** support. Once the implementation plan approved and the project start up, **Performance Management Systems** must enter the scene, in order to evaluate the evolution of the project and keep it under control.

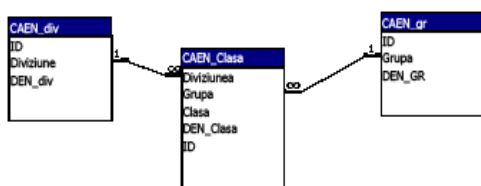
**Competitive Intelligence application for**

**Romanian environment**

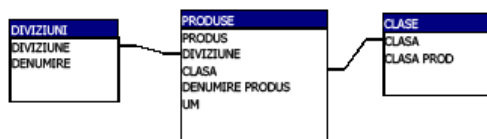
The proposed Competitive Intelligence application is based on a central datawarehouse build mainly on Financial statements of enterprises published by the Finances ministry. The financial data are collected for companies along 5 years and completed with CAEN code of the main activity and Product code associated with CAEN classification taken from the PRODROM master file. There are also added data on company location and other data provided by a specialized company Listafirme that exploit data from Trade Register and some data from financial statements



**Fig.7.** Competitive environment datawarehouse



**Fig.8.** CAEN database



**Fig 9.** Prodrom database

Even if classification information on many companies regarding activity object and delivered products are not always accurate, many cross analysis could give some insights on

Romanian economy. Future developments aims to insert statistical references provided by National Institute of Statistics and could be expanded to accommodate data from other countries economies. The utmost use of such competitive intelligence application could be done if implemented inside a governmental organization like Finances Ministry. The exploiting possibilities vary from market segmentation and benchmarking to estimated value chains and trophic chains. The application is an attempt to apply business intelligence technologies to economic environment analysis making use of Romanian public data sources.

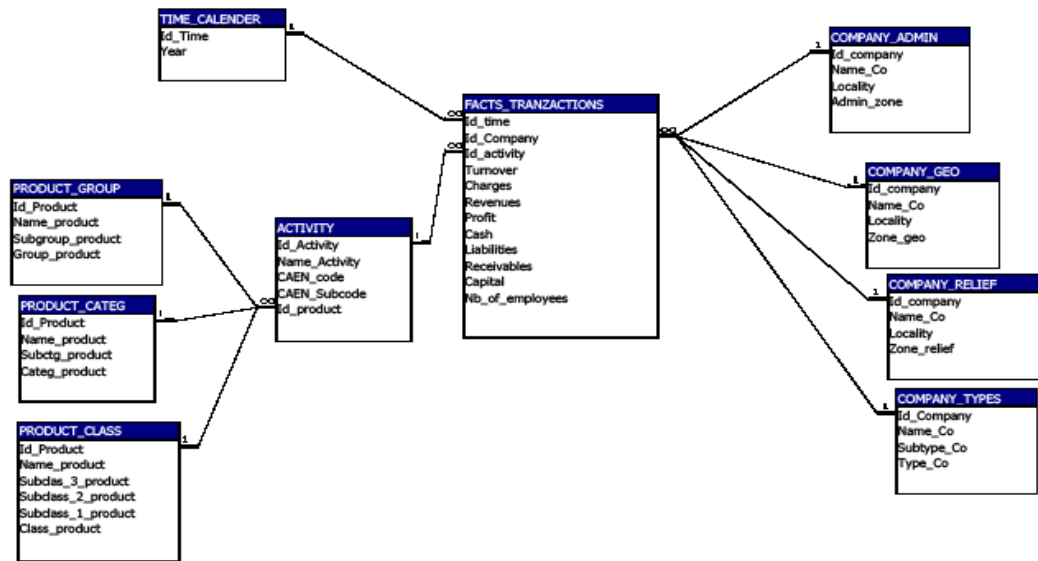


Fig. 10. Competitive intelligence application datawarehouse

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