Ontology – Based Strategic Process:

The development of a new Business Model

This thesis is submitted for the partial cover of requirements aiming at the acquisition of diploma

Msc in Economic and Business Strategy

By

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Talantzis K. Apostolos

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Contents

Table Content

Figure Content

Statement of Originality

As far as the author is aware of this thesis is original and it was worked out exclusively for the acquisition of postgraduate title in Economic and Business Strategy of the University of Piraeus department of Economic Science.

Abstract

This research started putting as a target the exploration and the analysis of the sensitivity of the firm to internal and external environment compared to that of the industry and to that of its competitors. That kind of analysis can show to the firm its vulnerability to environmental changes compared to the industry.

To do so we used ontology. In philosophy, ontology is the most fundamental branch of metaphysics. It studies being or existence and their basic categories and relationships, to determine what entities and what types of entities exist. Ontology thus has strong implications for conception of reality.

Ontology as a concept exists since ancient Greece but it is only recently that it has being applied in economics. A typical case of designing ontology is a business. To create an understanding of enterprises and the ways they do business, a starting point could be to identify the main actors and the values transferred between them.

The results that the ontological analysis gave are quite deferent from the classical analysis (Porter, P.E.S.T.E.L. etc.). The analysis shows through relationships that all the factors influence each other either in a direct way or in an indirect way.

The thesis is being formed in seven parts. **Part 1:** in the first part there are being cited the basic concepts; ontology and business environment. **Part 2:** in this part we have the classical environmental analysis; P.E.S.T.E.L., Porter's analysis, market types and value chain analysis. **Part 3:** in the third part we analyze the ontology of business environment and all the factors that affect it. **Part 4:** in this part we draw the map of ontological business environment and categorize the environmental factors in internal, external and middle

environment. **Part 5:** in the fifth part we draw and describe an ontology based environment matrix and we try to conclude to the appropriate strategy that any company must follow according to its position in the matrix. **Part 6:** in the sixth part there are the conclusions. There are being cited the ontological analysis outcomes and the usefulness of the O.B.B.E. matrix. **Part 7:** in the last part there are the future researches that can be done.

Acknowledgment

First of all I would like to thank my supervisor Associate Professor Pollalis Yannis for his unique guidance and support throughout my years in the University of Piraeus. I feel that the present work is only a small sample of the academic inspiration he manages to spread to the people around him. Without him none of this would have been possible.

Next, I would like to express my gratitude to all my professors throughout my student years in the University of Piraeus and Panteion University.

Most important though I would to thank my parents Constantinos and Eftichia and my brother Fotios for giving me the opportunity to study and make a better man of myself. Their support cannot really be acknowledged in a few words.

Next to them I would like to thank my colleague Yannis Sykamias for the hours spending arguing and drinking with me trying to find solutions of the problems occurred in this thesis.

Last but not least I would like to thank all my friends and colleagues for bearing me and making my student life a memorable experience.

1. Basic concepts

The two basic concepts that are being used in this thesis are ontology and business environment. These two concepts are being analyzed next.

1.1 Ontology

In philosophy, ontology is the most fundamental branch of metaphysics. It studies being or existence and their basic categories and relationships, to determine what entities and what types of entities exist. Ontology thus has strong implications for conception of reality.

The concept of ontology is generally thought to have originated in early Greece and occupied Plato and Aristotle.

Students of Aristotle first used the word "metaphysical" (literally "after the physical") to refer to the work their teacher described as "the science of being *qua* being". The word *'qua'* means 'in the capacity of'. According to this theory, then, ontology is the science of being or the study of beings insofar as they exist.

Aristotle is the first who saw that all causes of things are beginnings; that we have scientific knowledge when we know the cause; that to know a thing's existence is to know the reason for its existence.[1]

[1] Wikipedia.org - The multilingual free internet encyclopedia – www.wikipedia.org

Ontologies are collections of concepts, instances of concepts and relations among them. The two basic relations are: the 'super/sub-concept' relation and the 'instance-of' relation. But a more comprehensive list of relations is required in order to link concepts and instances thematically. Attributes are assigned to concepts, instances and relations in order to specify the content of the knowledge network. In addition, ontology constructs (e.g. concepts, relations and instances) could be enriched with terms, definitions, axioms and constraints that are expressed at the desired level of formality and that are deemed to be important in characterizing the knowledge domain under consideration at the desired level of detail (Sowa, 2000; Gruber, 1993). These are used in asking and answering questions, making assertions, offering insights, describing practices and discussing investigations.

The development of an ontology is usually a top-down process which starts at the highest level of resolution considered and finishes at the lowest level of resolution which is considered appropriate for the purpose of the ontology building process (Colomb and Dampney, 2005; Masuwa-Morgan and Burrell, 2004).

A typical case of designing ontology is a business. To create an understanding of enterprises and the ways they do business, a starting point could be to identify the main actors and the values transferred between them. Business models are created in order to make clear who the business actors are in a business case and to make their relations explicit. The relations are formulated in terms of values exchanged between the actors.

In designing ontology, the main objective is to capture and represent the knowledge which is implicit in the application domain so that it can be made reusable. To represent the ontology and its contents we use knowledge networks. Knowledge networks provide a particular way of structuring and visualizing ontologies that can be based on any of the nine

narrative structures proposed by Ryan: (i) the complete graph, (ii) the network, (iii) the tree, (iv) the vector with side branches, (v) the maze, (vi) the directed network or flowchart, (vii) the hidden story, (viii) the braided plot and (ix) Action pace, Epic Wandering, and story world (Ryan, 2001). Figure 1 shows a schematic representation of the three repositories used in the proposed approach.[2]

[2] A. Macris and Y. Pollalis (2004). Ontology – Based Knowledge Networks for User Training in Business Process Management. Forthcoming

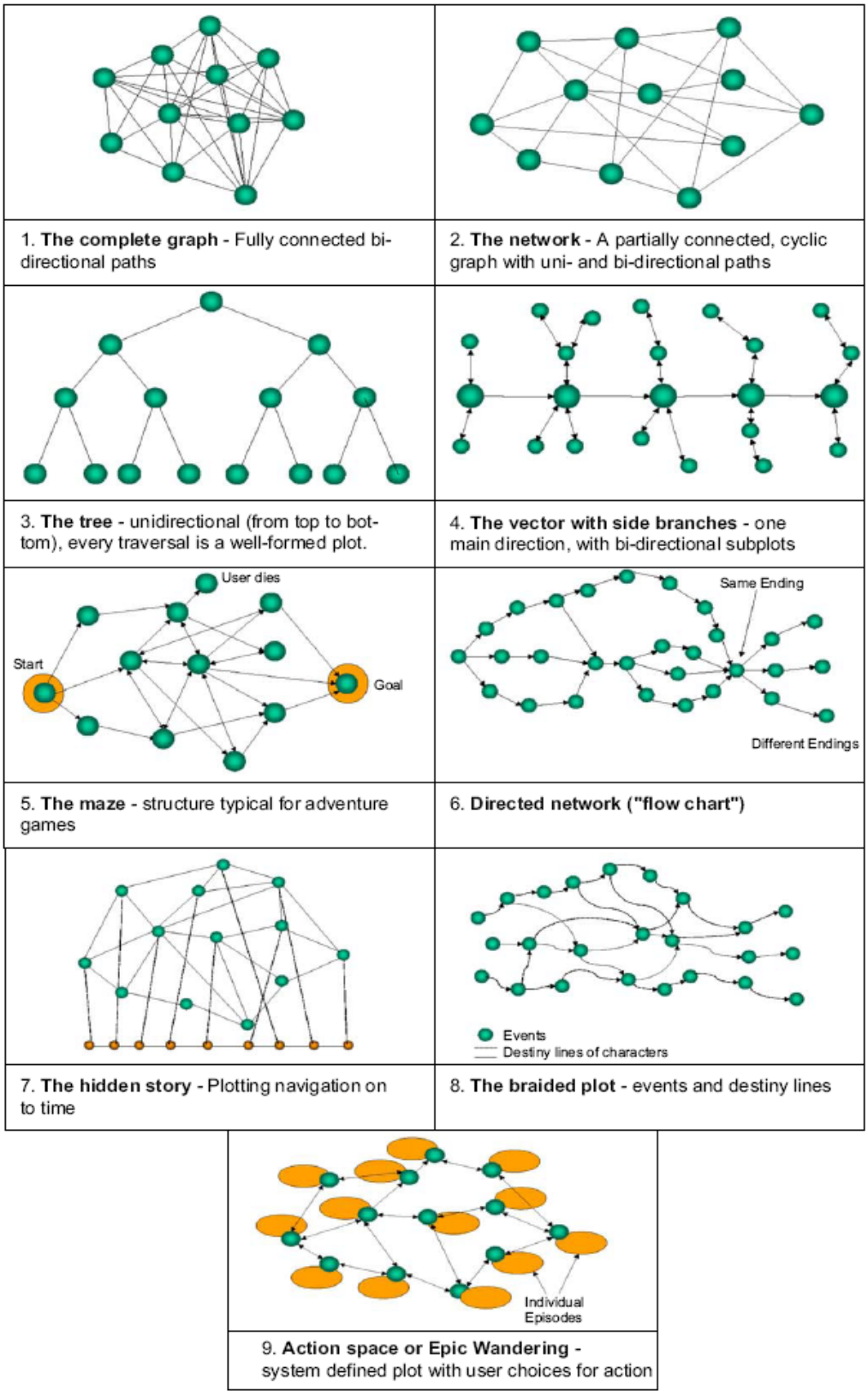

1. The complete graph - Fully connected bi-directional paths
2. The network - A partially connected, cyclic graph with uni- and bi-directional paths
3. The tree - unidirectional (from top to bottom), every traversal is a well-formed plot.
4. The vector with side branches - one main direction, with bi-directional subplots
User dies
Start
Goal
5. The maze - structure typical for adventure games
Same Ending
Different Endings
6. Directed network ("flow chart")
7. The hidden story - Plotting navigation on to time
Events
Destiny lines of characters
8. The braided plot - events and destiny lines
Individual Episodes
9. Action space or Epic Wandering - system defined plot with user choices for action

Figure 1

1.2 Business Environment[3]

Besides relating to the elements in the triangle a company's business model is continuously subject to external pressures that oblige a company to constantly adapt their business model to a changing environment. In this section we list some of these pressures that directly or indirectly influence a business model. Namely, these are technological change, competitive forces, change in customer demand and change in the social or legal environment.

Technological change: Technology and its application in business is rapidly changing. And since technology is increasingly applied to every aspect of business, technological change pressures managers to reflect on how technology can be adopted to improve the business logic of the firm. With the rise of the Internet companies started adopting new web-based channels. Some even tried to figure out how their products could be entirely digitized or at least "digitally enhanced". Also, falling communication and coordination costs due to cheaper technology have forced companies to become more efficient. They started to outsource all non-essential business and progressively rely on partnerships. In some cases technological change may even challenge the mere existence of a particular business model.

Competitive forces: A second-major pressure on a company's business model comes from its competitors. For traditional industry players adapting to changes in the competitive

[3] Osterwalser Alexander (2004). The business model ontology: a proposition in a design science approach. Phd Thesis, University of Lausanne

environment is especially crucial when new dynamic competitors rapidly dispute their market position as an incumbent (cf. Christensen 1997; Christensen 2003).

Customer demand: Pressure to adapt a company's business model may also come from the customer demand side. Changes in consumption patterns, revenue increases and "fashion changes" are just some of the possibilities.

Social environment: Sometimes the social environment and social mood can influence the business model of a firm. This kind of pressure is particularly studied in stakeholder theory (Friedman and Miles 2002). Besides ethics, changes in the social environment will also have an indirect influence on customer demand. This is the case for technology adoption, where the use and social acceptance of a specific technology by a broad majority opens up completely new markets and customer demands (Moore 1999).

Legal environment: Often changes in the legal environment also make it necessary to adapt business models. The introduction of new privacy laws can make the use of some business models illegal, if a company has extensively relied on customer information without the customer's explicit accordance. Anti-spamming laws may (hopefully) wipe-out business models based on sending out large trunks of unsolicited mails. Regulating advertisement over mobile phones may limit the range of possible business models in m-commerce. New taxes may make a company's value proposition too costly and thus uninteresting for the customer. In general it can be said that the legal environment has a large influence on business models.

2. Business Environment Analysis

The most popular frameworks of analyzing the business environment are P.E.S.T.E.L. analysis, Porter analysis, Value chain analysis and market types. These frameworks we are going to use in this thesis to understand the factors that affect the business.

2.1 P.E.S.T.E.L.

A P.E.S.T.E.L. analysis allows a company to focus on the external factors that affect them and affect the products that they produce. A company could do a P.E.S.T.E.L. analysis to see what external factors have the most effect on the company and then the company could try internally to counteract the external factors that may cause problems for the company.

The P.E.S.T.E.L. framework categorises environmental influences into six main types: political, economic, social, technological, environmental and legal. These factors are not independent of each other; many are linked. For example, technology developments change the way that people work, their living standards and their lifestyles. As any of these factors changes it affects the competitive environment in which organisations operate.

Political factors: All political factors are external as a company cannot change any political decisions. Those kinds of factors are government stability, taxation policy, foreign

trade regulations, social welfare policies etc. An example of a political factor is the tax placed on petrol this could effect a company like Tesco as they sell cheap petrol but if the tax on petrol went up because of a government decision then Tesco might have to reduce the profit that they make on every litre of petrol to make their petrol cheaper than their rivals after the tax rise so that their consumer numbers would not drop and so that they would rise instead.

Economic factors: The economic factors are external as a company cannot control the economy but the economy has effects on their profits and practices. Economic factors are that effect companies are things like business cycles, GNP trends, interest rates, money supply, inflation, unemployment, disposable income etc. An example factor is inflation, this could effect a company as if an economy suffers inflation then the interest on peoples mortgages go up so they have to pay more of their wages to the mortgage companies leaving them with less money to spend on what they want (disposable income) this would effect the company.

Sociocultural factors: Social issues that could affect companies are mainly trends in society; these are external factors as a company can't have a major influence on the trends of society. Those kinds of factors are population demographics, income distribution, social mobility, lifestyle changes, attitudes to work and leisure, consumerism, levels of education etc.

Technological factors: This is an external factor because like the other factors a company can't influence the development of technology and the technology that the competition uses. This new external technology could affect a company as it could improve the companies' performance and enable them to make more profit by producing more

products to meet the consumers' demand. Those kinds of factors are government spending on research, government and industry focus on technological effort, new discoveries or developments, speed of technology transfer, rates of obsolescence etc.

Environmental factors: Environment and consideration of people and government for environment affect the companies' decisions. Those kinds of factors are environmental protection laws, waste disposal, energy consumption etc.

Legal factors: Legal factors are external as a company can't affect the laws that restrict the industry that they are in. Those kinds of factors are competition law, employment law, health and safety, product safety etc.

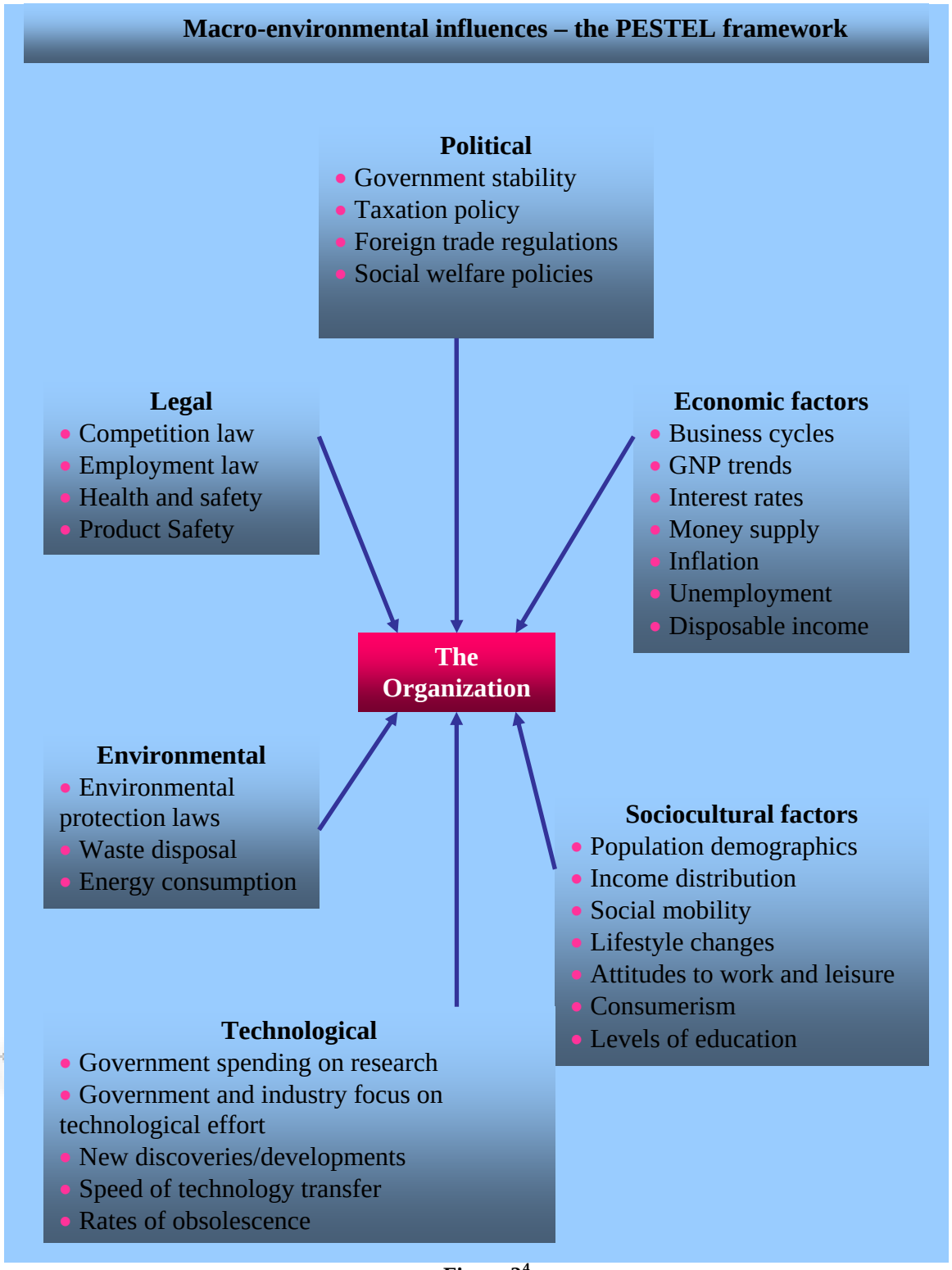


Figure 2[4]

[4] Gerry Johnson, Kevan Scholes, Richard Whittington (2005). Exploring Corporate Strategy Text and Cases (7th ed.). England: Pearson Education Limited

2.2 PORTER'S ANALYSIS

The intensity of competition in an industry is neither a matter of coincidence nor bad luck. Rather, competition in an industry is rooted in its underlying economic structure and goes well beyond the behavior of current competitors. The state of competition in an industry depends on five basic competitive forces, which are shown in Figure 3. The collective strength of these forces determines the ultimate profit potential in the industry, where profit potential measured in terms of long run return on invested capital. Not all industries have the same potential. They differ fundamentally in their ultimate profit potential as the collective strength of the forces differs.[5]

[5] Michael E. Porter (1980). Competitive Strategy: Techniques for analyzing industries and competitors. New York: Free Press

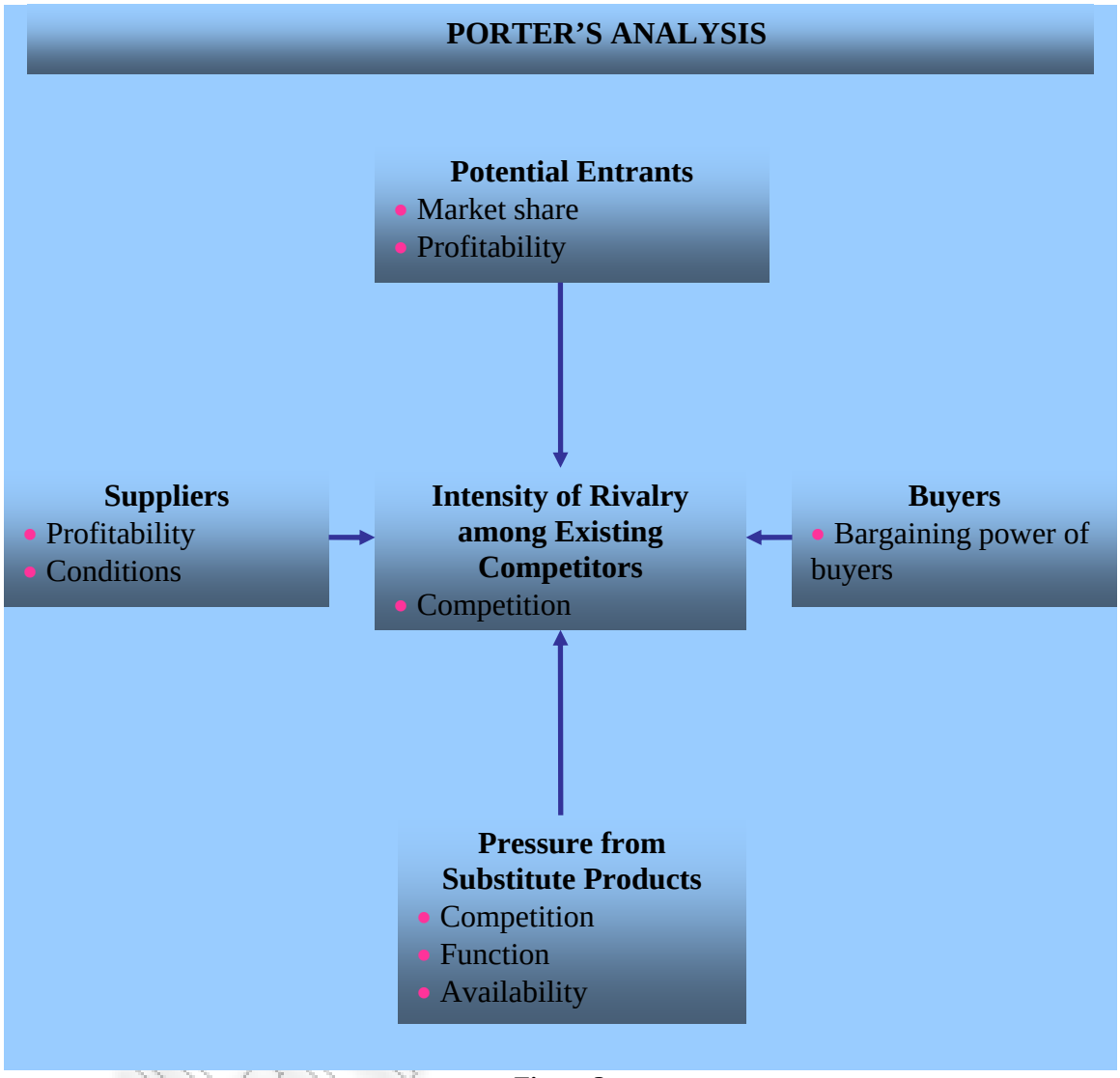


Figure 3

Potential Entrants: The market share and the profitability are from the most important characteristics of an industry. These characteristics are drawing the picture of the industry. An industry with high profitability attracts new rivals. The attraction of the industry is being defined by the economies of scale, the product differentiation, the capital requirements, the switching cost, the access to distribution channels, the cost disadvantages independent of scale and the government policy.

Buyers: Depending on their power buyers can determine a price and of course profitability. The buyers' groups are powerful if they are concentrated or purchases large volumes relative to seller sales, if the money they spend are not a significant fraction of their cost or purchases, if the product is standard, if the switching cost is low, if the industry's profits are low, if there is a backward integration, if the product is unimportant and if there is full information.

Substitutes: Substitutes are putting a pressure in the industry businesses and they make the competition more intensive. Their importance is validated according to their function and their availability.

Suppliers: Bargain power of suppliers is of significant importance for the profitability of the industry. The conditions that define that power are concentration, substitutes, the importance of the costumer to the supplier group, the suppliers' product and its importance to the buyer and the forward integration.

Rivalry: Rivalry is being identified by the competition. Its characteristics comes from the number of competitors and their balance, of the industry growth, fixed and storage costs, differentiation or switching cost, capacity augment, diverse competitors, strategic stakes and exit barriers.

2.3 MARKET TYPES

The firms establish their prices and output levels in order to achieve their business objective. The price and output decision is being answered within the framework of four basic types of markets: perfect competition, monopoly, monopolistic competition and oligopoly.

MARKET TYPE				
MARKET CHARACTERISTICS	PERFECT COMPETITION	MONOPOLISTIC COMPETITION	OLIGOPOLY	MONOPOLY
Number and size of firms	Very large number of relatively small firms	Large Number of relatively small firms	Small number of relatively large firms	One
Type of product	Standardized	Differentiated	Standardized or differentiated	Unique
Market entry and exit	Very easy	Easy	Difficult	Very difficult or impossible
Non-price competition	Impossible	Possible	Possible or difficult	Not necessary
KEY INDICATORS OF COMPETITION				
Market power	None	Low to high	Low to high	High
Long-run economic profit	None	None	Low to high, subject to mutual interdependence	High, subject to regulation

Table 1[6]

	NUMBER OF FIRMS		
TYPE OF PRODUCT	Large	Few	One
Standardized	Perfect competition	Pure oligopoly	Monopoly
Differentiated	Monopolistic competition	Differentiated oligopoly	

Table 2[7]

[6] Paul G. Keat, Philip K.Y. Young (2003). Managerial Economics: Economic tools for today's decision makers (4th ed.). New jersey: Pearson Education
[7] Miltiades Chacholiades (1990). Microeconomics I. Athens: Kritiki A.E.

2.3.1 Perfect Competition

In the perfect competition we have a large number of small firms and the product is standardized. That means that the quantity of output per firm is too small to that of the industry. The insignificance of the output makes the firm a price taker – the price is given. The number of buyers is large and the quantity of consumption per buyer is small. The buyers are also price takers.

In the perfect competition we have perfect mobility of production coefficients. There is perfect mobility of labor and capital. In this type of market we also have perfect information, lack entry and exit barriers and no uncertainty.

Some good examples of perfect competition are the markets for agricultural products, financial instruments, precious metals and the global petroleum industry.

PERFECT COMPETITION	
Number and size of firms	Very large number of relatively small firms
Type of product	Standardized
Market entry and exit	Very easy
Non-price competition	Impossible
KEY INDICATORS OF COMPETITION	
Market power	None
Long-run economic profit	None

Table 3

2.3.2 Monopolistic Competition

In this type of market there is a large number of small firms with differentiated product. The acts of a firm have no impact in the market. In monopolistic competition we also have relatively easy entry and exit of the industry. There is investment in research and development and in advertising.

According to augment the sales the firm can reduce the price, differentiate and advertise its product.

Small businesses, particularly retail and service establishments, provide the best examples of this kind of market. Among them are boutiques, luggage stores, shoe stores, stationery shops, restaurants, repair shops, laundries and beauty parlors.[8]

MONOPOLISTIC COMPETITION	
Number and size of firms	Large Number of relatively small firms
Type of product	Differentiated
Market entry and exit	Easy
Non-price competition	Possible
KEY INDICATORS OF COMPETITION	
Market power	Low to high
Long-run economic profit	None

Table 4

[8] Paul G. Keat, Philip K.Y. Young (2003). Managerial Economics: Economic tools for today's decision makers (4th ed.). New jersey: Pearson Education

2.3.3 Oligopoly

In oligopoly there is a small number of firms with close dependence from each other. The product can be differentiated or standardized. The market entry and exit is difficult. In the case of differentiated product the non-price competition and advertising is very important among the firms. Also among the firms there is uncertainty.

The oligopoly market is generally considered to be the playing field of big businesses. The manufacturing sector, oil refining, certain types of computer hardware and software, chemicals and plastics, processed foods, tobacco, steel, automobile, copper and soft drinks can all be considered oligopoly markets. Parts of the service sector also contain good examples of oligopoly markets. For example, airline travel, long-distance telecommunications service and internet access are dominated by a relatively small number of very large companies.[9]

OLIGOPOLY	
Number and size of firms	Small number of relatively large firms
Type of product	Standardized or differentiated
Market entry and exit	Difficult
Non-price competition	Possible or difficult
KEY INDICATORS OF COMPETITION	
Market power	Low to high
Long-run economic profit	Low to high, subject to mutual interdependence

Table 5

[9] Paul G. Keat, Philip K.Y. Young (2003). Managerial Economics: Economic tools for today's decision makers (4th ed.). New jersey: Pearson Education

2.3.4 Monopoly

In this type of market there is one firm, firm is the industry. There is a unique product or no close substitutes. Market entry and exit is difficult or legally impossible. The entry barriers exist because of economies of scale, control of resources, special privileges and patents. In this form of market advertising is necessary.

Examples of pure monopoly are not easy to find. Good examples could be found among government-sanctioned and regulated monopolies in the telecommunications and gas and electric industries. Patent laws sometimes provide companies with temporary monopolies. The pharmaceutical industry definitely can be said to earn economic profit during the time in which its products are protected by patents.[10]

MONOPOLY	
Number and size of firms	One
Type of product	Unique
Market entry and exit	Very difficult or impossible
Non-price competition	Not necessary
KEY INDICATORS OF COMPETITION	
Market power	High
Long-run economic profit	High, subject to regulation

Table 6

[10] Paul G. Keat, Philip K.Y. Young (2003). Managerial Economics: Economic tools for today's decision makers (4th ed.). New jersey: Pearson Education

2.4 Value Chain Analysis[11]

The value chain

All organizations consist of a collection of value activities that are performed to design, produce, market, deliver, and support their products or services. Value activities can be viewed as building blocks by which an organization creates products or provides services valuable to its customers. An organization's value activities can be listed systematically using the value chain framework. Developing the value chain and analyzing value activities in detail provides the analyst with an understanding of how an organization performs its activities, how activities interact, and what the relative importance of each activity is.

Value chain components

The value, chain consists of primary and support activities and added value, as illustrated below. Primary activities are activities involved in the physical creation of the product or service, its sale and delivery to the buyer, and the support after the sale. Support activities complement the primary activities by providing such functions as human resources, procurement, technology development, and administrative support. Added value, sometimes called margin, is the difference between the collective cost of the value activities and the amount customers are willing to pay for the organization's product or service. In a profit-making organization, added value is the equivalent of pretax profit. In a not-for-profit organization, added value represents the benefits achieved less the total cost of creating such benefits.

[11] Per. O. Flaatten, Donald J. McCubbrey, P. Declan O'Riordan, Keith Burgess (1991). Foundations of Business Systems (2nd ed.). Harcourt Brace College Publishers

Primary Activities

There are five generic categories of primary activities involved in any industry:

- Inbound logistics includes activities associated with receiving, storing, and disseminating materials and other inputs necessary to create the product or service. Examples are warehousing and inventory control.
- Operations activities are associated with transforming inputs into the final product form. Examples are such activities as machining, assembly, and packaging.
- Outbound logistics activities are associated with collecting, storing, and distributing the product to customers, Examples are activities such as finished goods warehousing, order processing, and delivery.
- Marketing and sales activities are associated with methods of persuading buyers to purchase a product or service and providing them with the means to do so. Examples are activities such as advertising, sales efforts, and retailing.
- Service activities are associated with providing after-sales services such as installation, repair, or follow-up services, which enhance or maintain the value of the product or service delivered.

Each cell can be broken down into distinct activities.

Support Activities

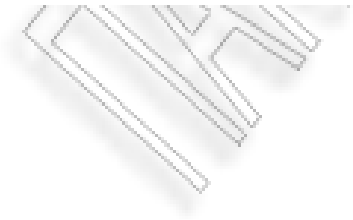
Support activities can be divided into four generic categories:

- Procurement activities are associated with the acquisition of all inputs necessary

to produce the product or provide the service. Examples include activities such as purchasing raw materials, searching for new supplier sources, and monitoring supplier performance.

- Technology development activities are associated with the design and creation of the product or service. Examples are activities such as product design, technology selection, or development of a new service line
- Human resource management activities are associated with all aspects of hiring, training, evaluating, and. rewarding personnel. Examples are activities such as hiring, administering benefit programs, or conducting training programs.
- Firm infrastructure activities are those activities that collectively support all elements in the value chain. Examples are activities such as general management, planning, finance, and legal.

The dotted lines for the support activities in Figure reflect the fact that procurement, technology development, and human resource management are often associated with specific primary activities as well as supportive of the entire value chain. Firm infrastructure is not associated with specific primary activities but supports the entire value chain.



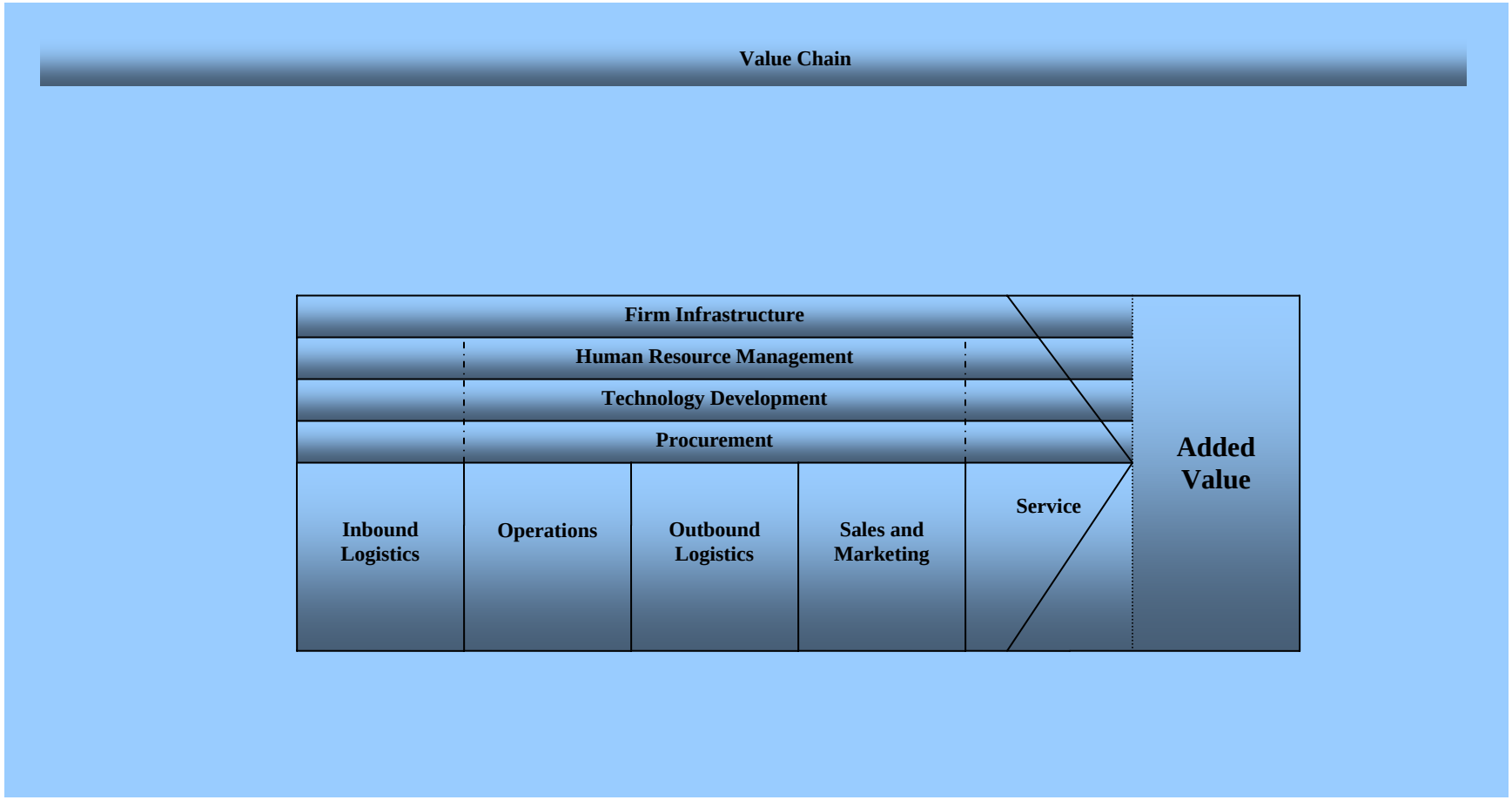

Value Chain
Firm Infrastructure
Human Resource Management
Technology Development
Procurement
Inbound Logistics
Operations
Outbound Logistics
Sales and Marketing
Service
Added Value

Figure 4

Cost Maps

Cost maps express the cost of each activity in terms of percentages of the total cost. Preparing a cost map requires that costs be distributed to specific value activities. In practice, this often requires a redistribution of costs from the way they are kept in the accounting records because, in many cases, costs are not classified precisely according to activities. For example, the salary of an aircraft maintenance manager may be classified as "management salaries" when in reality 85 percent of the salary should be associated with the maintenance activity.

Activities on the cost map may be further aggregated or disaggregated in accordance with the following guidelines:

- Disaggregate, or separate, activities that represent significant or rapidly growing percentages of cost
- Aggregate, or group, activities that represent small, stagnant, or decreasing percentages of cost

Cost maps

Cost maps are useful for identifying high-cost activities as targets for cost reduction efforts. Significant savings could result if this activity could be performed more efficiently.

Cost maps are also useful for making comparisons between competitors in a particular industry. Although the information to make precise comparisons is not always readily obtainable, much of it is public information. What is not available publicly can be obtained or imputed through observation or other means. For example, the number of

maintenance employees and their average wage may have been disclosed in a newspaper article concerning a competitor labor contract negotiation.

An organization derives important information about itself by classifying its costs according to activities. Very often, organizations may find that certain activities cost them much more than was thought. Usually, there is a tendency to focus cost improvement efforts on primary activities. A cost map, however, may indicate that support activities represent a larger portion of total casts than was thought and are thus a more logical target for cost reduction efforts.

Summary

The objective of value chain analysis is to help an organization better understand its activities and costs and search for ways to enhance its position in the competitive arena. The value chain and analysis of value activities are the base on which the other tools are built. In building value chains, primary and support value activities are identified, categorized, and analyzed. Costs and assets are assigned to value activities in building cost and asset maps. The costs of each activity are expressed as a percentage of total costs and total assets, respectively. To reduce costs, the behavior of costs must first be understood.

3. Ontology of business environment

Based on the above tools for the environmental analysis we will try to draw the ontology of each factor.

3.1 Economic Factor

NAME	Economic Factor
AFFECTED FROM	Business Cycles
RELATED TO	Sociocultural Factor, Legal Factor, Rivalry

Table 7

The economic factors are external as a company cannot control the economy but the economy has effects on their profits and practices. The economic factors are being affected from the Business cycles and being related to Sociocultural Factor and the legal Factor.

Depending on the point on the Business cycle that the economy is on there are different situations for the population demographics and the lifestyle of the people. That means that there are different needs and pressure from the people to the political factor that affects and makes up the legal factor which forms the conditions in which the economy works. It works as a cycle where the one affects the other.

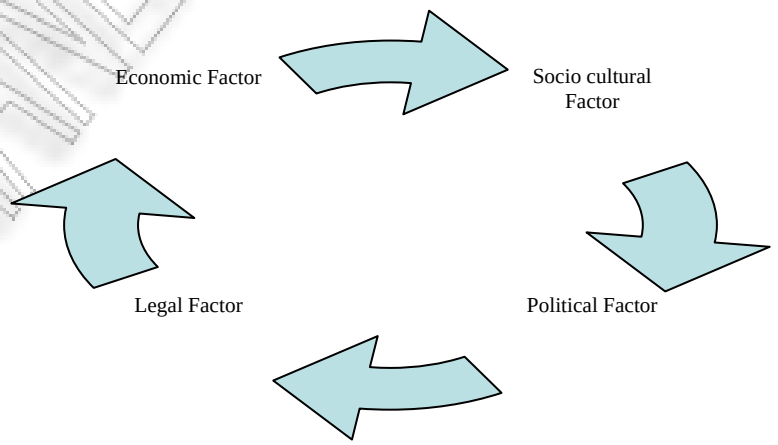


Figure 5

NAME	Business Cycles
DESCRIPTION	GNP Trends, Interest Rates, Money Supply, Inflation, Unemployment, Disposable Income
RELATED TO	Economic Factor

Table 8

The **business cycle** refers to the ups and downs seen somewhat simultaneously in most parts of an economy. The cycle involves shifts over time between periods of relatively rapid growth of output (recovery and prosperity), alternating with periods of relative stagnation or decline (contraction or recession). These fluctuations are often measured using the real gross domestic product.

To call those alternances "**cycles**" is rather misleading as they don't tend to repeat at fairly regular time intervals. Most observers find that their lengths (from peak to peak, or from trough to trough) vary, so that cycles are not mechanical in their regularity. Since no two cycles are alike in their details, some economists dispute the existence of cycles and use the word "fluctuations" (or the like) instead. Others see enough similarities between cycles that the cycle is a valid basis of studying the state of the economy. A key question is whether or not there are similar *mechanisms* that generate recessions and/or booms that exist in capitalist economies so that the dynamics that appear as a cycle will be seen again and again.

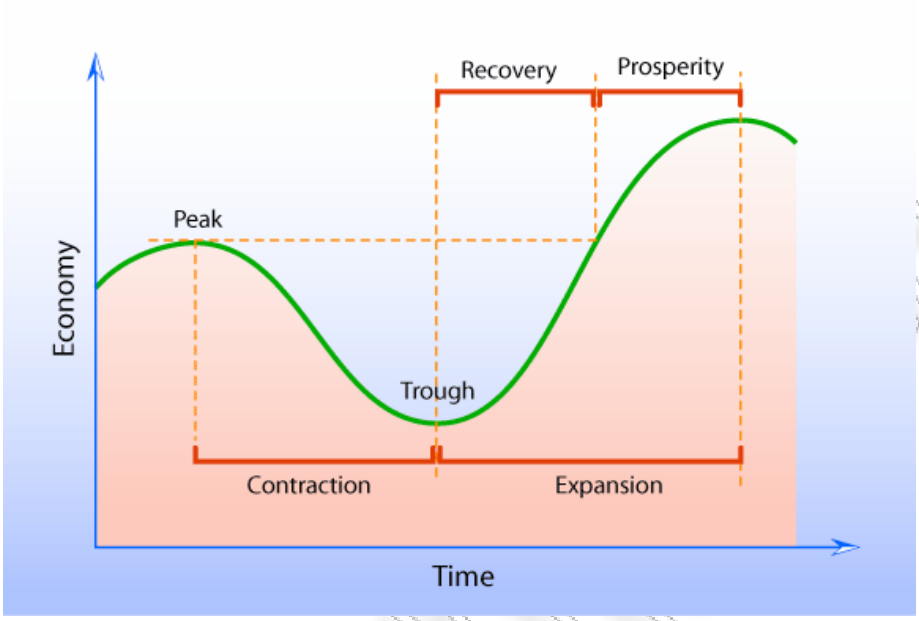


Figure 6

Some argue that modern business cycle theory often measures growth by using the flawed measure of the economy's aggregate production, i.e., real gross domestic product, which is not useful for measuring well-being. Accordingly, there is a mismatch between the state of economic health as perceived by many individuals and that perceived by the bankers and economists, which most likely drives them further apart politically. However, unlike with issues of long-term economic growth, the economists and bankers may be right to use real GDP when studying business cycles. After all, it is fluctuations in real GDP, not those of measures of well-being, that cause changes in employment, unemployment, interest rates, and inflation, i.e. economic issues which are their main concern of business cycle experts.[12]

[12] Wikipedia.org - The multilingual free internet encyclopedia – www.wikipedia.org

That means that for the description of the Business cycles we can use GNP trends, interest rates, money supply, inflation, unemployment and disposable income. These thinks affect rivalry also.

3.2 Political factor

NAME	Political Factor
AFFECTED FROM	Government Stability
RELATED TO	Sociocultural Factor, Legal Factor

Table 9

All political factors are external as a company cannot change any political decisions. As we have seen in the economic factor analysis depending on the economic state that we are in there are pressures from the people to the political factor so as to make laws according to their needs (see figure 1). So the political factor is being related to sociocultural factor and legal factor.

NAME	Government Stability
DESCRIPTION	Taxation Policy, Foreign Trade Regulations, Social Welfare Policies
RELATED TO	Political Factor

Table 10

The political factor is being affected from government stability. Government stability is being measured from the development. The factors that contribute to the development and differ from the phase of the development are taxation policy, foreign trade regulations and social welfare policies. These factors describe and the government stability.

3.3 Legal Factor

NAME	Legal Factor
AFFECTED FROM	Competition Law
RELATED TO	Economic Factor, Political Factor, Environmental Factor, Rivalry

Table 11

Legal factors are external as a company can't affect the laws that restrict the industry that they are in. Those kinds of factors are competition law, employment law, health and safety, product safety etc.

As we have seen in the economic factor analysis depending on the economic state that we are in there are pressures from the people to the political factor so as to make laws according to their needs (see figure 1), either these needs have to do with economy or well being. That means the legal factor is related to the economic factor and the rivalry, the political factor and the environmental factor (well being).

NAME	Competition Law
DESCRIPTION	Employment Law, Health and Safety, Product Safety, Environmental Protection Law
RELATED TO	Legal Factor

Table 12

Trusts and monopolies are concentrations of wealth in the hands of a few. Such conglomerations of economic resources are thought to be injurious to the public and individuals because such trusts minimize, if not obliterate normal marketplace competition, and yield undesirable price controls. These, in turn, cause markets to stagnate and sap individual initiative[13]. **Antitrust** or **competition laws** are laws which prohibit anti-competitive behavior and unfair business practices. The laws make illegal certain practices deemed to hurt businesses or consumers or both, or generally to violate standards of ethical

[13] Cornell law school web site – www.lawschool.cornell.edu

behavior. Government agencies known as competition regulators regulate antitrust laws, and may also be responsible for regulating related laws dealing with consumer protection[14].

So the legal factor is affected from the competition law which is being described from employment law, health and safety, product safety and environmental protection laws.

[14] Wikipedia.org - The multilingual free internet encyclopedia – www.wikipedia.org

3.4 Rivalry

NAME	Rivalry
AFFECTED FROM	Market Type
RELATED TO	Legal Factor, Environmental Factor, Substitutes, Potential Entrants, Buyers, Suppliers, Technological Factor, Complementary Goods, Economic Factor

Table 13

Rivalry is being identified by the competition. Its characteristics comes from the number of competitors and their balance, of the industry growth, fixed and storage costs, differentiation or switching cost, capacity augment, diverse competitors, strategic stakes and exit barriers.

First rivalry is being specified from the laws that the political factor has determined. Also depending on the environmental protection laws and the first material sources Rivalry is related to the Environmental Factor. Specifying the market type we can specify the substitutes, the potential entrants, the buyers, the suppliers the technological factor and the importance of the complementary goods.

NAME	Market Type
DESCRIPTION	Competition, Market Share
RELATED TO	Rivalry

Table 14

Rivalry is being affected from the market type. The firms establish their prices and output levels in order to achieve their business objective. The price and output decision is being answered within the framework of four basic types of markets: perfect competition, monopoly, monopolistic competition and oligopoly. So the market type is being described fully from the type of competition and the market share.

Factors like the market type, the competition, the market share and of course rivalry have characteristics that affect economy, the way it works and the level where it is. They define the point on the business cycles where the economy is, where it is heading and how quick it moves there.

3.5 Sociocultural Factor

NAME	Sociocultural Factor
AFFECTED FROM	Population Demographics, Lifestyle Changes
RELATED TO	Economic Factor, Political Factor, Legal Factor, Infrastructure Management, Buyers

Table 15

Sociocultural factor refer to social issues that could affect companies and are mainly trends in society. The two main categories of the sociocultural factor are the population demographics and lifestyle changes. And it is related to economic factor, political factor, legal factor and infrastructure management.

NAME	Population Demographics
DESCRIPTION	Income Distribution, Social Mobility
RELATED TO	Sociocultural Factor

Table 16

Population demographics are being described from income distribution and social mobility. Both have characteristics that are external to the company; income distribution and social mobility can be affected or restricted from economic, political and legal factors; factors that are out of the company's influence.

On the other hand income distribution and social mobility can be affected from the company in certain cases and in a limited area. A company for example that starts its production in a designated area, lets say because of a material source, can contribute to the local income and keep or attract people to this area. So a company can affect population demographics in a limited way.

NAME	Lifestyle Changes
DESCRIPTION	Attitudes to Work and Leisure, Consumerism, Levels of Education
RELATED TO	Sociocultural Factor

Table 17

Lifestyle changes are being described from attitudes to work and leisure, consumerism and levels of education. All three have characteristics that are external to the company; attitudes to work and leisure, consumerism and levels of education can be affected or restricted from economic, political and legal factors; factors that are out of the company's influence.

On the other hand consumerism can be affected from the company in certain cases. Companies have certain plans for marketing campaigns and spend money on attracting and convincing buyers to consumer their product. So a company can affect lifestyle changes and sociocultural factor can be affected from infrastructure management.

Population demographics and lifestyle define buyers so sociocultural affect buyers.

3.6 Environmental Factor

NAME	Environmental Factor
AFFECTED FROM	Environmental Protection Laws, First Material Source
RELATED TO	Legal Factor, Rivalry, Sociocultural factor, Infrastructure Management, Technological Factor

Table 18

Environment and consideration of people and government for environment affect the companies' decisions. The two main categories of the environmental factor are environmental protection laws and first material source. And it is related to legal factor, rivalry, sociocultural factor and infrastructure management.

NAME	Environmental Protection Laws
DESCRIPTION	Waste Disposal, Energy Consumption
RELATED TO	Environmental Factor

Table 19

Environmental protection laws are being described from waste disposal and energy consumption. Both have characteristics that are external to the company; waste disposal and energy consumption can be affected or restricted from legal factor. And both can affect sociocultural factor.

But according to the laws, restrictions, fines and rivalry a company decides how much it will aggravates the environment. These kinds of decisions affect people that leave near the company. So it is environmental factor is related to legal factor, rivalry, sociocultural factor and infrastructure management.

NAME	First Material Source
DESCRIPTION	Utilization Laws
RELATED TO	Environmental Factor

Table 20

First material source is being described from utilization laws. Utilization laws have characteristics that are external to the company. Laws come from legal factor and affect and the company since it has to do with installation decisions.

The technological factor can affect environment since new discoveries can make less damage or old instruments that can not be recycled can make more damage.

3.7 Potential Entrants

NAME	Potential Entrants
AFFECTED FROM	Market Share
RELATED TO	Rivalry, Infrastructure Management, Buyers

Table 21

The market share and the profitability are from the most important characteristics of an industry. These characteristics are drawing the picture of the industry. An industry with high profitability attracts new rivals. The attraction of the industry is being defined by the economies of scale, the product differentiation, the capital requirements, the switching cost, the access to distribution channels, the cost disadvantages independent of scale and the government policy.

NAME	Market Share
DESCRIPTION	Profitability
RELATED TO	Potential Entrants

Table 22

As it is obvious market share and profitability are being defined from factors that are external to the company and are being defined by rivalry. But also other factors that are being affected from the infrastructure management of the company like product differentiation and access to distribution channels. That means potential entrants are being affected also from buyers and their attitude.

3.8 Substitutes

NAME	Substitutes
AFFECTED FROM	Competition
RELATED TO	Rivalry, Infrastructure Management, Buyers

Table 23

Substitutes are putting a pressure in the industry businesses and they make the competition more intensive. This factor is being affected from competition.

NAME	Competition
DESCRIPTION	Function, Availability
RELATED TO	Substitutes

Table 24

Their importance is validated according to their function and their availability. These are both external to the company but there are thinks that are being affected from the company since the relationship with the buyers, the distribution channels and the marketing campaigns can affect the availability and the way the buyers see the substitute and its function compared to the product of the company.

3.9 Suppliers

NAME	Suppliers
AFFECTED FROM	Partnership
RELATED TO	Rivalry, Infrastructure Management, Technological Factor

Table 25

Bargain power of suppliers is of significant importance for the profitability of the industry. The suppliers are being affected from partnership.

NAME	Partnership
DESCRIPTION	Channel
RELATED TO	Suppliers

Table 26

Partnership is being described by the channels between the company and the suppliers. The conditions that define the suppliers' power are concentration, substitutes, the importance of the costumer to the supplier group, the suppliers' product and its importance to the buyer and the forward integration. These conditions are external to the company and are being defined by rivalry. But they are not only external since the importance of the company and its bargain power is being defined to one point from the infrastructure management and the company's partnerships.

The conditions that define suppliers' power are the suppliers' product and its importance to the buyer. That means that a new discovery can change the importance of the suppliers' product and so technology to affect suppliers.

Supplier's power is being affected also from technological factor if there are alternative ways for the production and the first materials.

3.10 Buyers

NAME	Buyers
AFFECTED FROM	Relationship
RELATED TO	Rivalry, Infrastructure Management, Potential Entrants, Complementary Goods, Substitutes, Sociocultural Factor, Technological Factor

Table 27

Depending on their power buyers can determine a price and of course profitability. They are being affected from relationship with the company.

NAME	Relationship
DESCRIPTION	Channel, Marketing Spending
RELATED TO	Buyers

Table 28

The buyers' groups are powerful if they are concentrated or purchases large volumes relative to seller sales, if the money they spend are not a significant fraction of their cost or purchases, if the product is standard, if the switching cost is low, if the industry's profits are low, if there is a backward integration, if the product is unimportant and if there is full information. These are external to the company and are being affected from the rivalry.

But the relationship is being described also from the marketing spending of the company. Spending that affect the company's relationship with the buyers, the way the buyer's see the company's product and the loyalty the buyers show to the company and its products. This loyalty is the reason why buyers affect potential entrants, substitutes and complementary goods also. This attitude of customers is a lifestyle and affects sociocultural factor.

New discoveries and developments affect buyers and their consuming practice that changes along with their demands.

3.11 Technological Factor

NAME	Technological Factor
AFFECTED FROM	Government Spending on Research, Industry Focus on Technological Effort
RELATED TO	Rivalry, Legal Factor, Infrastructure Management, Buyers, Complementary Goods, Suppliers

Table 29

Technological factor is being affected from government spending on research and industry focus on technological effort. The first one is external to the company since the company can affect it. But the second is internal and being affected only from management decisions.

NAME	Government Spending on Research
DESCRIPTION	New Discoveries, Speed of Technology Transfer, Rates of Obsolescence
RELATED TO	Technological Factor

Table 30

Government spending on research is being described from new discoveries, speed of technology transfer and rates of obsolescence. All of them are external to the company and being affected from the type of market, the rivalry and the legal factor that sets the limits.

NAME	Industry Focus on Technological Effort
DESCRIPTION	New Discoveries, Synergies
RELATED TO	Technological Factor

Table 31

Industry focus on technological effort is being described from new discoveries and synergies. Both descriptions are internal factors. New discoveries are being affected from

the spending of the company on research and development and its technological effort and focus. Companies often turn to synergies so as to have better results on research and development so as to acute technological effort, ameliorate distribution channels and empower their status.

New discoveries and developments affect buyers and their consuming practice that changes along with their demands.

New discoveries do not affect only buyers but also complementary goods since after a new discovery a complementary good might not be needed any more and the demand will change.

The conditions that define suppliers' power are the suppliers' product and its importance to the buyer. That means that a new discovery can change the importance of the suppliers' product and so technology to affect suppliers.

The technological factor can affect environment since new discoveries can make less damage or old instruments that can not be recycled can make more damage.

Technological factor affects also supplier's power if there are alternative ways for the production and the first materials.

3.12 Complementary Goods

NAME	Complementary Goods
AFFECTED FROM	Competition
RELATED TO	Rivalry, Infrastructure Management, Buyers

Table 32

Complementary goods are being affected from competition. The type of the market defines the role of such goods. The importance of complementary goods varies from perfect competition to monopoly.

NAME	Competition
DESCRIPTION	Function, Availability, Synergies
RELATED TO	Complementary Goods

Table 33

Competition is being described from function availability and synergies. The first two characteristics are external to the company since they change according to the choices of another company.

Since we have complementary goods it is often between companies to have synergies for the common good. Synergies are being done according the company's decisions and therefore are affected from infrastructure management and affect buyers and their decisions.

After a new discovery a complementary good might not be needed any more and the demand will change so technological factor affects complementary goods.

3.13 Financial

NAME	Financial
AFFECTED FROM	Profit
RELATED TO	Infrastructure Management

Table 34

Financial is being affected from profit. Financial aspects are composed of the company's revenue model and its cost structure. Together they determine the firm's profit- or loss-making logic and therefore its ability to survive in competition.

NAME	Profit
DESCRIPTION	Cost, Revenue
RELATED TO	Financial

Table 35

The revenue model measures the ability of a firm to translate the value it offers its customers into money and incoming revenue streams. A firm's revenue model can be composed of different revenue streams that can all have different pricing mechanisms. The revenue streams a company can capture from its value creating activities are pivotal to its long term survival. A company can generate income through selling, lending or licensing a product or service, taking a cut of a transaction or relying on different sources of advertising. So the financial is related to buyers, infrastructure management and complementary goods.

The cost structure measures all the costs the firm incurs in order to create market and deliver value to its customers. It sets a price tag on all the resources, assets, activities and partner network relationships and exchanges that cost the company money. And there is always an important potential for cost savings in the value creation process. So because

of the cost structure financial is being related to suppliers, technological factor and infrastructure management[15].

[15] Osterwalser Alexander (2004). The business model ontology: a proposition in a design science approach. Phd Thesis, University of Lausanne

3.14 Infrastructure Management

NAME	Infrastructure Management
AFFECTED FROM	Value Configuration
RELATED TO	Buyers, Suppliers, Technological Factor, Complementary Goods, Financial, Environmental Factor, Substitutes, Sociocultural Factor

Table 36

Infrastructure management describes the value system configuration that is necessary to deliver the value proposition and maintain customer interfaces. This comprises the value configuration of the firm, in other words the activities to create and deliver value, and, the relationship between them.

NAME	Value Configuration
DESCRIPTION	Capability
RELATED TO	Infrastructure Management

Table 37

The Infrastructure Management is about the how a company creates value. It describes what abilities are necessary to provide its value propositions and maintain its customer interface. Infrastructure Management outlines the value network that generates economic value through complex dynamic exchanges between one or more enterprises, its customers, suppliers, strategic partners and the community. In other words, it specifies the business model's capabilities and resources, their owners and providers, as well as who executes which activity and how they relate to each other.

Wallin (2000) describes capabilities as repeatable patterns of action in the use of assets to create, produce, and/or offer products and services to the market. Thus, a firm has to dispose of a set of capabilities in order to provide its value proposition. These

capabilities depend on the assets or resources of the firm (Bagchi and Tulskie 2000). It helps companies streamline their organization and build competitive advantages.

In order to create value, a firm needs resources (Wernefelt 1984). In this regard Grant (1991) distinguishes between tangible and intangible assets and people-based skills. Tangible resources include plants, equipment and cash reserves. Intangible resources include patents, copyrights, reputation, brands and trade secrets. Human resources are the people a firm needs in order to create value with tangible and intangible resources.

As outlined above, the main purpose of a company is the creation of value that customers are willing to pay for. This value is the outcome of a configuration of inside and outside activities and processes. The value configuration shows all activities necessary and the links among them, in order to create value for the customer. Activities are at the heart of what a business does. They are actions a company performs in order to create and market value and generate profits. An activity is executed by an actor, which can be the firm or one of its partners. Activities relate to owned or partner resources and they are linked in a value configuration[16].

As it is obvious infrastructure management defines the financial aspects will be used and financial aspects puts the limits in which the infrastructure management must move in. so there is circle connection between them.

[16] Osterwalser Alexander (2004). The business model ontology: a proposition in a design science approach. Phd Thesis, University of Lausanne

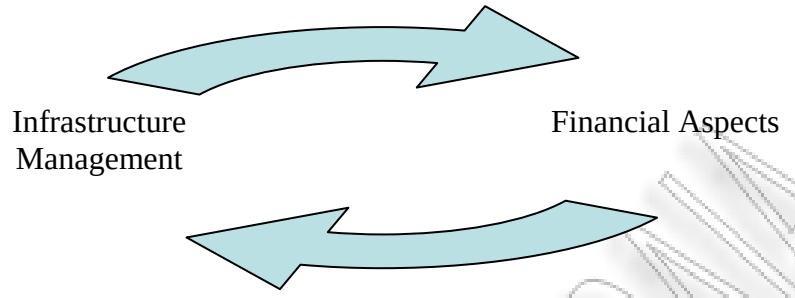


Figure 7

The way the company combines its assets and its capability affects the production. Any production affects the environment. The first material that are being used, the waste disposal and energy consumption are thinks that the management of the company decides about.

The value configuration of the company is the preposition to the buyers. The relationship that the company accomplishes with the customers and the loyalty that they have to the company's product affects the substitutes.

The competition, the market share, the profitability and the loyalty that the customers show to the company are thinks that affect the entry barriers and consequently potential entrants.

A company can affect income distribution and social mobility. It can contribute to the local income and keep or attract people to this area. So it can contribute to the local income and keep or attract people to this area. That way a company can affect population demographics in a limited way. Companies have certain plans for marketing campaigns and spend money on attracting and convincing buyers to consumer their product. In that way the company contributes in lifestyle changes. Since the company affects the characteristics of sociocultural factor affects and the factor itself.

4. Ontological Business Environment Map

Based on the analysis above for the business environment we can draw an ontology tree. In order to simplify the analysis and make it more intelligible we will use the ninth form according to the Ryan's narrative structure, action space or epic wandering.

Action space is a system with defined plot and with user choices for action. And each of the factors is an individual episode. In business environment each factor is from the one side independent (individual episode) and from the other side it affects certain other factors (defined plot).

According to the classic analysis (Porter, P.E.S.T.E.L. etc.) the environmental factors are divided into external environment and internal environment. External environment contains the factors that are external to the company and the company can not affect them. External environment contains factors that are being configured from other thinks other than the company. Internal environment contains factors that are being affected directly from the company and being configured under the company's decisions.

From the above ontological analysis and the below figure (figure 6) it is obvious that the classic analysis of the environment (Porter, P.E.S.T.E.L. etc.) it is not accurate. It is easy to see that all the factors influence each other either in a direct way or in an indirect way. Starting from any of the factors you can end up influencing any of the others.

Based on that we will try to categorize the factors on them that are affect the company and being affected by her indirectly (external environment), on them are being affected by the company directly (internal environment), and on them that are being affected from both internal and external environment (middle environment).

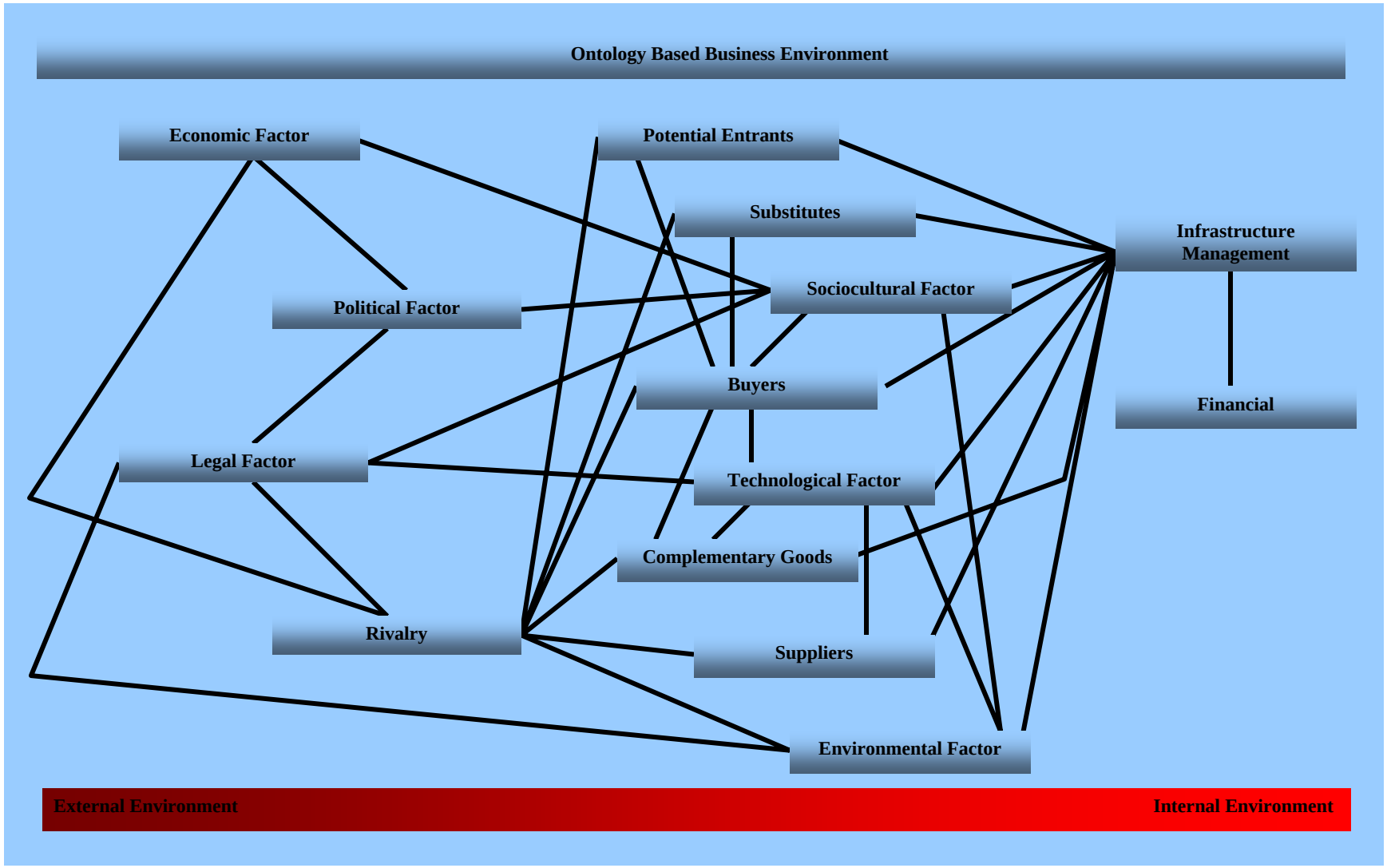

Ontology Based Business Environment
Economic Factor
Potential Entrants
Substitutes
Infrastructure Management
Sociocultural Factor
Political Factor
Buyers
Financial
Legal Factor
Technological Factor
Complementary Goods
Rivalry
Suppliers
Environmental Factor
External Environment
Internal Environment

Figure 8

4.1 External environment

In the external environment we will put all these factors that are affect the company and being affected by her indirectly through other factors. From our analysis these factors are the economic factor, the political factor, the legal factor and the rivalry.

These factors do affect each other in a cycle way. Economy and its conditions affect the political factor so as to take the appropriate decisions for the future. The political factor according to the decisions that has taken affects the legal factor. From the legal factor now we have the set of limits in which the companies will compete, so the rivalry is being affected. At the end now according to how the industries are doing the economy conditions are changed and the cycle closes.

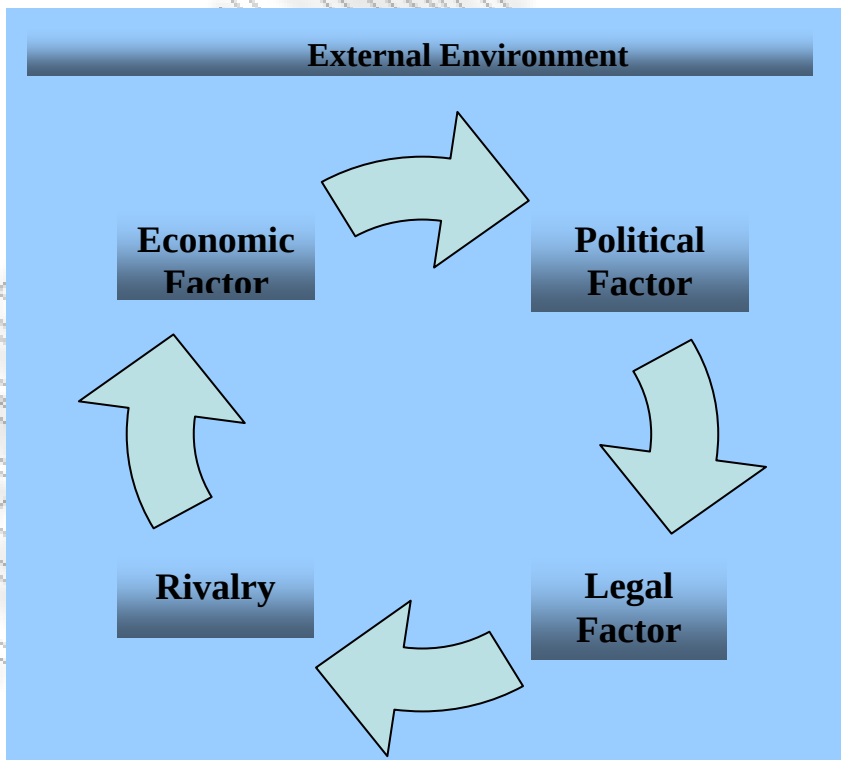


Figure 9

4.2 Internal Environment

In the internal environment we will put all these factors that are being affected by the company directly. From our analysis these factors are the infrastructure management and financial factor.

These factors do affect each other in a cycle way. Financial factor sets the limits in which there must be taken the company's decisions. The company's decisions, partnerships, relationships and synergies are these factors that affect costs, revenues and profit for the company.

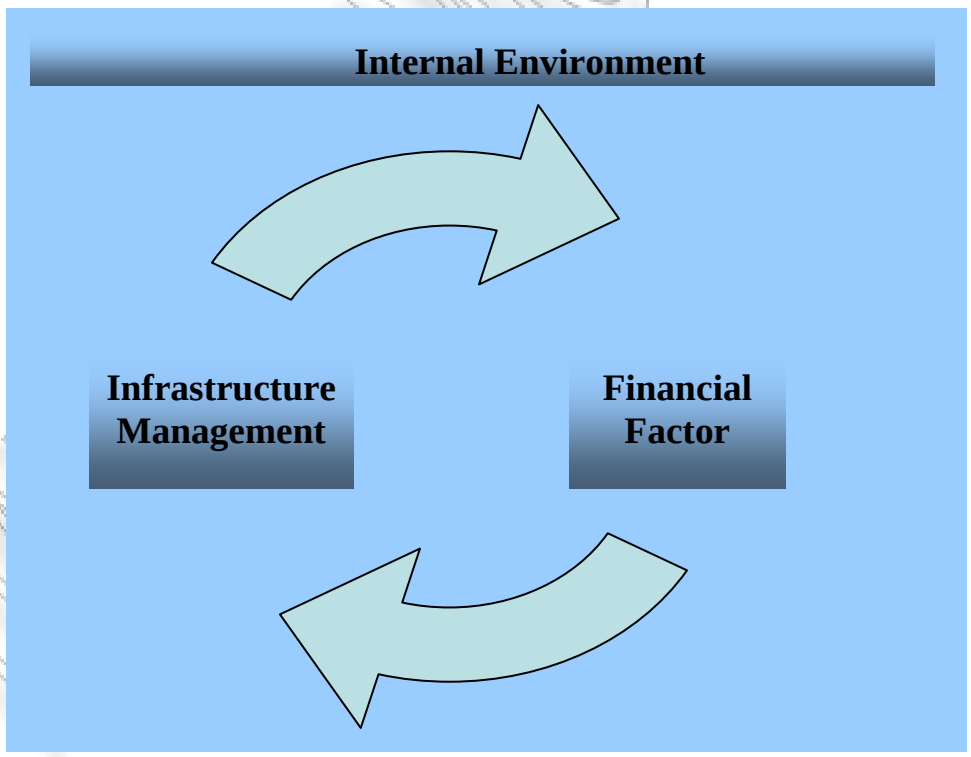


Figure 10

4.3 Middle Environment

In the middle environment we will put these factors that are being affected from both internal and external environment. From our analysis these factors are the potential entrants, the substitutes, the complementary goods, the buyers, the sociocultural factor, the technological factor, the environmental factor and the suppliers.

All these factors connect to each other directly or indirectly. In order to simplify the analysis and make it more intelligible we will use the ninth form according to the Ryan's narrative structure, action space or epic wandering.

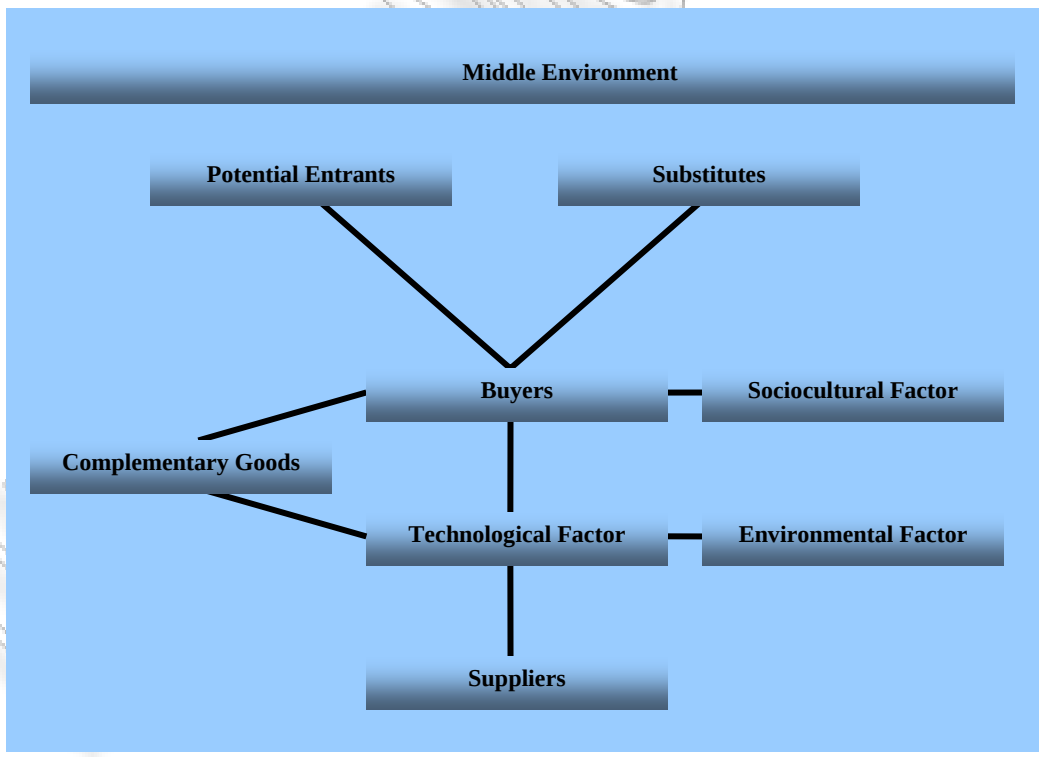


Figure 11

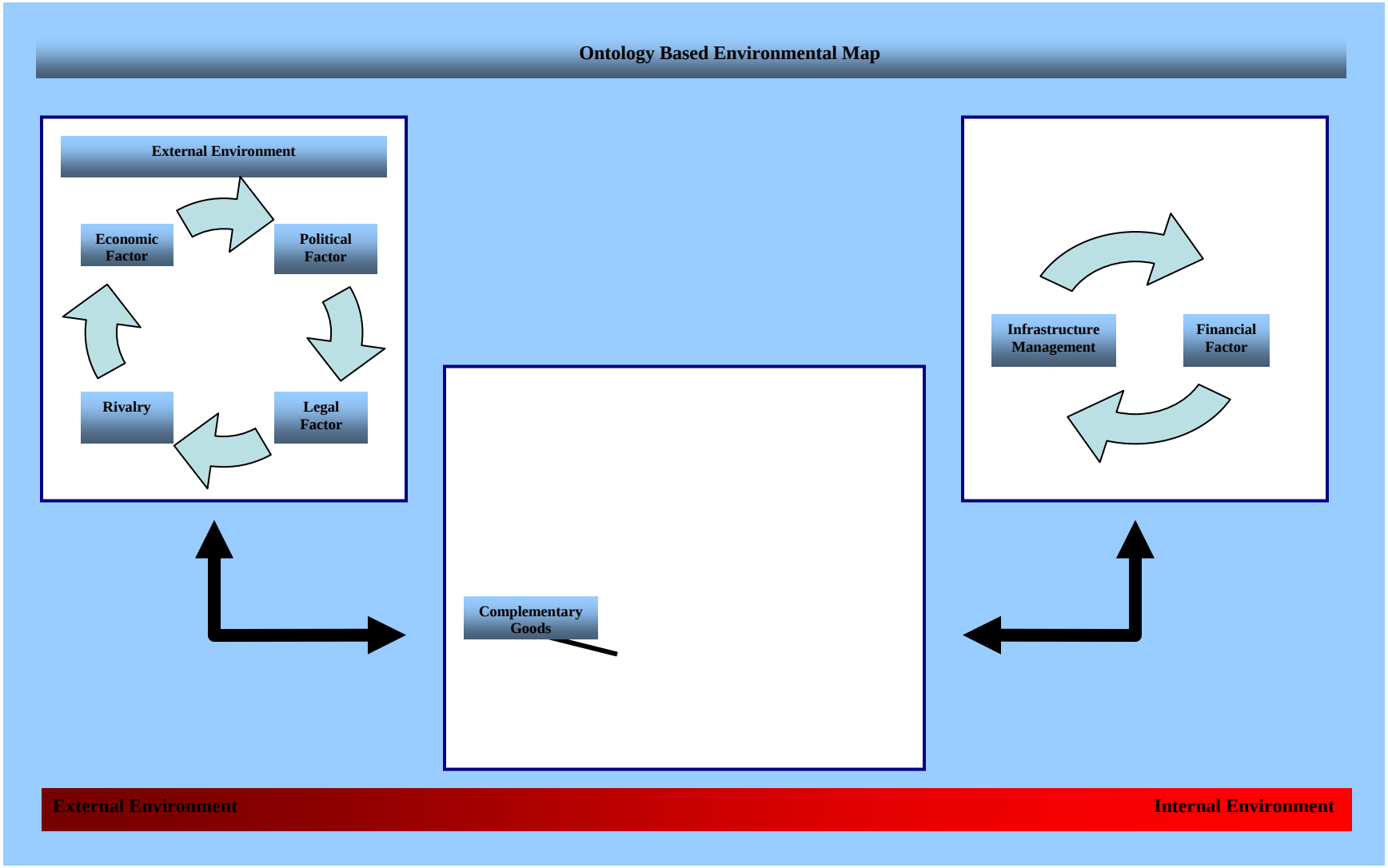

Ontology Based Environmental Map
External Environment
Economic Factor
Political Factor
Legal Factor
Rivalry
Infrastructure Management
Financial Factor
Complementary Goods
External Environment
Internal Environment

Figure 12

5. Ontology Based Business Environment Matrix

Traditional strategic management theory and research have emphasized the importance of matching a firm's internal resources and capabilities with the opportunities and risks found in the external environment. This dominant paradigm of competitive strategy has evolved from the industrial organization (IO) or industrial economics approach which argues that the external environment (i.e., the industry's structure) guides a firm's strategy for competitive advantage and that the main purpose of the firm is to identify innovative ways to defeat competition. Extensions of the IO paradigm are Porter's well-known theory of competitive advantage and the PIMS marketing initiative.

However, recent research in strategic management emphasizes the emergence of a new paradigm of the strategy formulation process: the *resource-based approach*. The resource-based theory of the firm proposes that a successful competitive strategy is one that places more emphasis on the firm's internal resources and capabilities and thus develops strategic plans based on such capabilities rather than primarily focusing at the competitive environment[17].

[17] Yannis A. Pollalis Sustainable competitive advantage in turbulent environments: an integrative model of the industrial economics and resource-based theories in strategic management. Spoudai Volume 55, No 4 (p.11-37)

5.1 Strategy from the Outside-In: The Industrial Organization Model

Industrial organization (IO) is the field of neoclassical economics that studies industry structure and process and the way they affect firm performance and profitability. The IO model focuses on the external environment (i.e., stakeholders and the competition) and it favors the *outside-in* approach for competitive advantage: a firm determines what the environment's pressures, constraints, and stakeholders' demands are and then builds the appropriate resources and capabilities to meet those pressures and demands. In summary, the IO model suggests that in order for a firm to develop a successful strategy for competitive advantage, it first has to establish an *industry's attractiveness* (i.e., the elements that define an industry's capacity for profits such as the competition, economies of scale, prices, cost structures, technological developments, etc.) and then identify what resources it should acquire to enter that industry or to defeat the competitors already in it. In general, the IO view assumes that a firm's potential for superior performance is based on its ability to generate monopolistic or oligopolistic market conditions.

The IO approach to strategy formulation dominated research and practice in strategic management from the 1950s through the 1980s and still influences strategic thinking today. Emphasizing the role of the external environment in a firm's strategy, IO proponents claimed that organizations with the ability to learn about and adopt to the competitive environment will generate substantially higher profits than those organizations without that ability. Thus, firms that are able to *match or fit* their internal resources, skills and capabilities with the opportunities and threats of the environment, will be likely to

sustain competitive advantage. As an extension of the IO model, Michael Porter introduced the concept of *competitive forces* which emphasized five structural dimensions of any industry that a firm should be responding to in order to improve its competitive position: competitors, new entrants, customers, suppliers, and substitutes. Porter's model, along with his *generic strategies' toolkit* (i.e., low cost leadership, differentiation, and focus strategies) resulted in an emphasis towards the alignment between the industry's pressures and the firm's potential to build resources to meet such pressures: alignment was the prerequisite to success, misalignment was likely to guarantee failure or exit from the industry[18].

[18] Yannis A. Pollalis Sustainable competitive advantage in turbulent environments: an integrative model of the industrial economics and resource-based theories in strategic management. Spoudai Volume 55, No 4 (p.11-37)

5.2 Strategy from the Inside-Out: The Resource-Based Model

The *resource-based approach* proposes that organizations should focus on their unique resources and build capabilities based on those resources to "appraise their rent-generating potential", as well as to sustain competitive advantage. Second, the organization should select a strategy which best exploits the firm's resources and capabilities relative to the external environment's opportunities and threats. Finally, the organization has to reinvest in those unique resources that provide competitive advantage by either augmenting or upgrading them.

The resource-based model emphasizes that each organization has a unique set of resources, capabilities, and competencies that provide the basis for their competitive strategies. Thus, the resource-based model emphasizes a *proactive* approach to strategy formulation. Examples of firms that exemplify the resource-based model include US companies such as 3M and Motorola that used their expertise in R&D to grow in a wide range of products and markets and Japanese companies such as Honda and Matsushita that used their expertise and technical excellence in one market to expand in other but related product markets[19].

[19] Yannis A. Pollalis Sustainable competitive advantage in turbulent environments: an integrative model of the industrial economics and resource-based theories in strategic management. Spoudai Volume 55, No 4 (p.11-37)

5.3 The Rationale for an Integrative Model: Synergy

The following arguments are in favor of an integrative approach, illustrating that neither approach is *sufficient* on its own:

(a) Regardless of what resources and capabilities a firm owns, its long term success is primarily determined by the willingness of its customers to buy its products and services. Thus, firms that can "listen" to customer needs and can add value not only to their services but also to their customer's services will sustain a better position in their perspective markets. Furthermore, as others have argued, a firm's relationships with its customers can *become* a unique resource for the firm, leading to other unique resources and competencies such as reputation, brand loyalty, and corporate image. Similar arguments can be made for the firm's relationships with its suppliers, brokers and other significant stakeholders. In other words, a firm's strategy cannot ignore the external environment by mainly focusing on its internal resources, neither can it ignore its own resources and capabilities and start searching the external environment for opportunities. The two ideologies have to be integrated and support each other's strengths toward sustainable competitive advantage.

(b) Developments in information technology (IT) have spurred collaboration and partnerships among firms around the globe or within an industry resulting in synergistic benefits that do not require ownership of unique resources other than the ability to integrate each other's IT systems (e.g., EDI-based information partnerships). Thus, firms that have a strength or weakness in one area can quickly overcome it by collaborating with other firms that have a complementary set of strengths and weaknesses. Here again, a firm does not have to follow either the IO or the resource-based model to take advantage of the IT-based

alliances: it can follow a combination of both approaches and exploit the market's technological developments and thus leverage its own limited resources. Similar arguments can be made for situations where a firm has to decide on whether to *outsource* or *develop-in-house* IT capabilities.

(c) Finally, three other factors reinforce the use of an integrative approach: *uncertainty* about the external environment, *complexity* concerning the interrelationships across an industry's forces and *intraorganizational conflict* among those who are involved in the strategy formulation process within a firm. Other researchers have also demonstrated empirically that the integration of both models can result in better overall performance.

In summary, due to the environmental turbulence and change (e.g., information technology advances, global forces, customer trends, and competitive actions), as well as due to the factors of uncertainty and complexity, firms have to continue updating and changing their sets of resources and industry-based critical success factors (CSFs) in order to continue to exist and sustain their advantages. The next Table summarizes the key characteristics, assumptions and differences between the IO and resource-based[20].

[20] Yannis A. Pollalis Sustainable competitive advantage in turbulent environments: an integrative model of the industrial economics and resource-based theories in strategic management. Spoudai Volume 55, No 4 (p.11-37)

Model Attributes	**Industrial Organization**	**Resource-Based**
Strategies for Competitive Advantage	*[Reactive]* a. Concentration on the external environment to determine the competitive forces and the industry's cost structure and potential rent-generation capability (industry attractiveness). b. Low-cost, differentiation or focus strategies can be employed to combat the competitive forces. c. Once the competitive strategies are selected, appropriate resources are acquired and/or developed to match them (strategic fit).	*[Proactive]* a. Focus on the firm's own resources, strengths and weaknesses before any attempt is made to adapt to the environment b. Development of capabilities and core competencies by integrating or innovatively combining the firm's unique resources. c. Selection of strategies that best exploit the firm's resources and capabilities (i.e., seeking costly-to-copy inputs for production and distribution functions).
Major Assumptions	i. The external environment determines the strategies a firm has to adopt in order to compete successfully within an industry. ii. The firms within an industry or w/in a strategic group are identical in terms of the resources they own and their generic strategies. iii. A firm's resources are highly mobile and any resource difference between firms is short-lived.	i. The firms within an industry or strategic groups are heterogeneous in terms of the resources they own and the capabilities they can develop based on these resources. ii. The resources a firm owns are not perfectly mobile across firms and the advantage they (or the capabilities based on them) might generate can last long.
EnvironmentConditions for Success	Stable environment (preferably monopolistic or oligopolistic) Perfect information on competition Resources are not scarce	Turbulent Environment Perfect information available about a firm's capabilities Resources are scarce
Related References	Schumpeter (1950); Bain (1956); Porter (1980, 1981, 1985); Hill (1988).	Lippman & Rumelt (1982); Wernerfelt (1986); Barney (1986, 1991); Lado et al. (1992); Grant (1991); Conner (1991).

Table 38[21]

[21] Yannis A. Pollalis Sustainable competitive advantage in turbulent environments: an integrative model of the industrial economics and resource-based theories in strategic management. Spoudai Volume 55, No 4 (p.11-37)

5.4 Description of O.B.B.E. matrix

Now we can design a matrix showing the sensitivity of the firm to the environment and comparing it to that of the entire industry. We will measure the external environment on the vertical axis and the internal environment on the horizontal axis.

Depending on our ontological analysis and because our intentions are to see the environmental sensitivity compared to that of the competitors we will not take under consideration those factors that are the same for all the industry. These are the economic, political, legal, sociocultural, environmental factors and the external part of the complementary goods and the technological factor. Also according to the market type we can describe fully rivalry, potential entrants, substitutes and the external part of suppliers. So we have ended up with buyers, suppliers, technological factor, infrastructure management and financial factor. These factors and their relations are shown on figure 13.

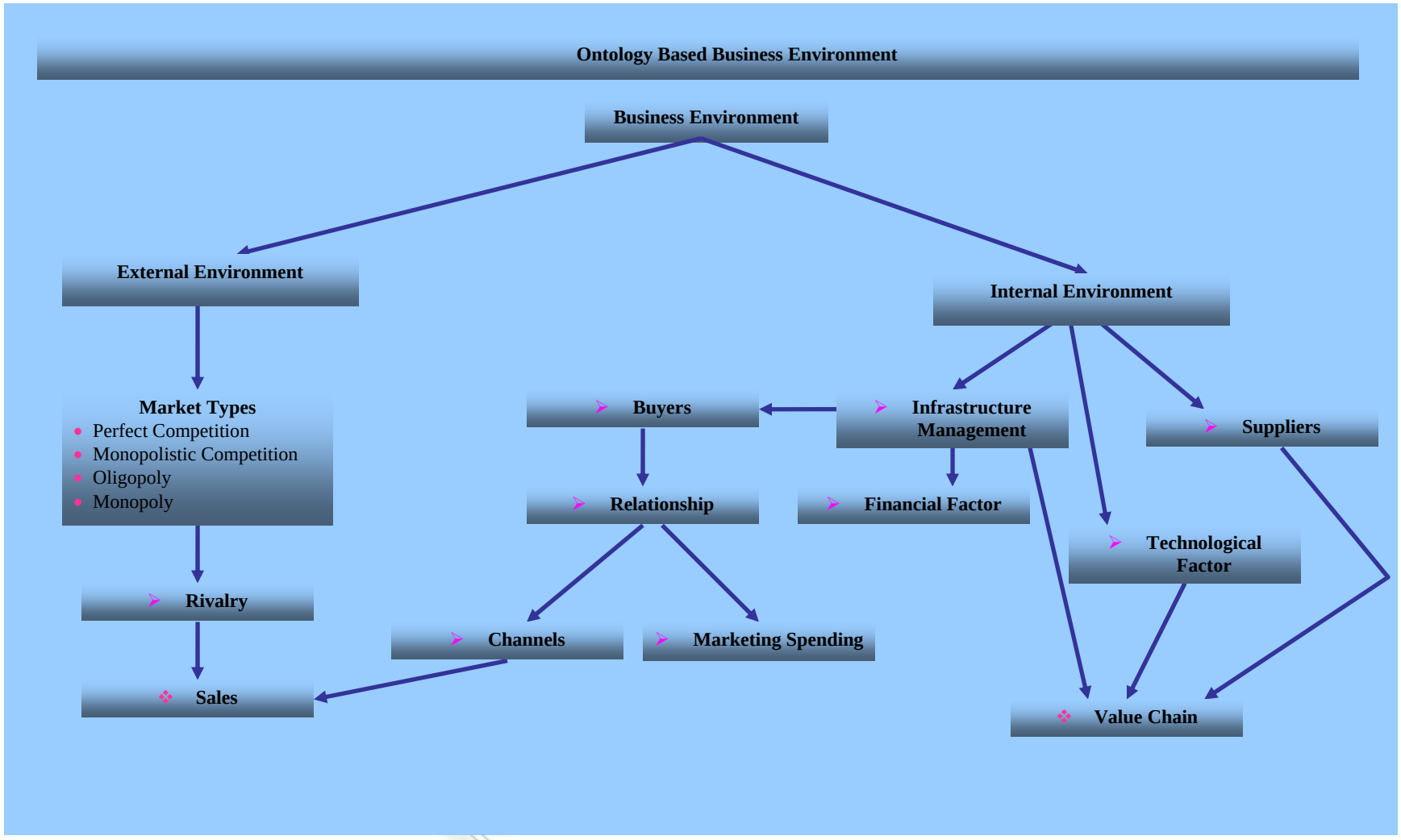

Ontology Based Business Environment
Business Environment
External Environment
Internal Environment
Market Types
Perfect Competition
Monopolistic Competition
Oligopoly
Monopoly
Buyers
Infrastructure Management
Suppliers
Relationship
Financial Factor
Technological Factor
Rivalry
Channels
Marketing Spending
Sales
Value Chain

Figure 13

On the vertical axis we will measure the sales that play the definitional role of external environment. On the axis we will put the difference of the firm's sales from the mean of the industry measured in percentages. That means that axis' scale will be from minus 100 to 0 and from 0 to plus 100. The zero will be in the middle of the axis and reflects the industry's mean. If for example the mean the industry sales is 20% and the company has 30% sales the point on the axis will be on +10%.

On the horizontal axis we will measure the value chain that plays the definitional role of the internal environment. On the axis we will put the algebraic aggregate of the differences of the firm's activities from those of the industry's mean as they measured and defined at the cost maps. That means that horizontal axis' scale as vertical axis' scale will be from minus 100 to 0 and from 0 to plus 100. The zero will be in the middle of the axis and reflects the industry's mean.

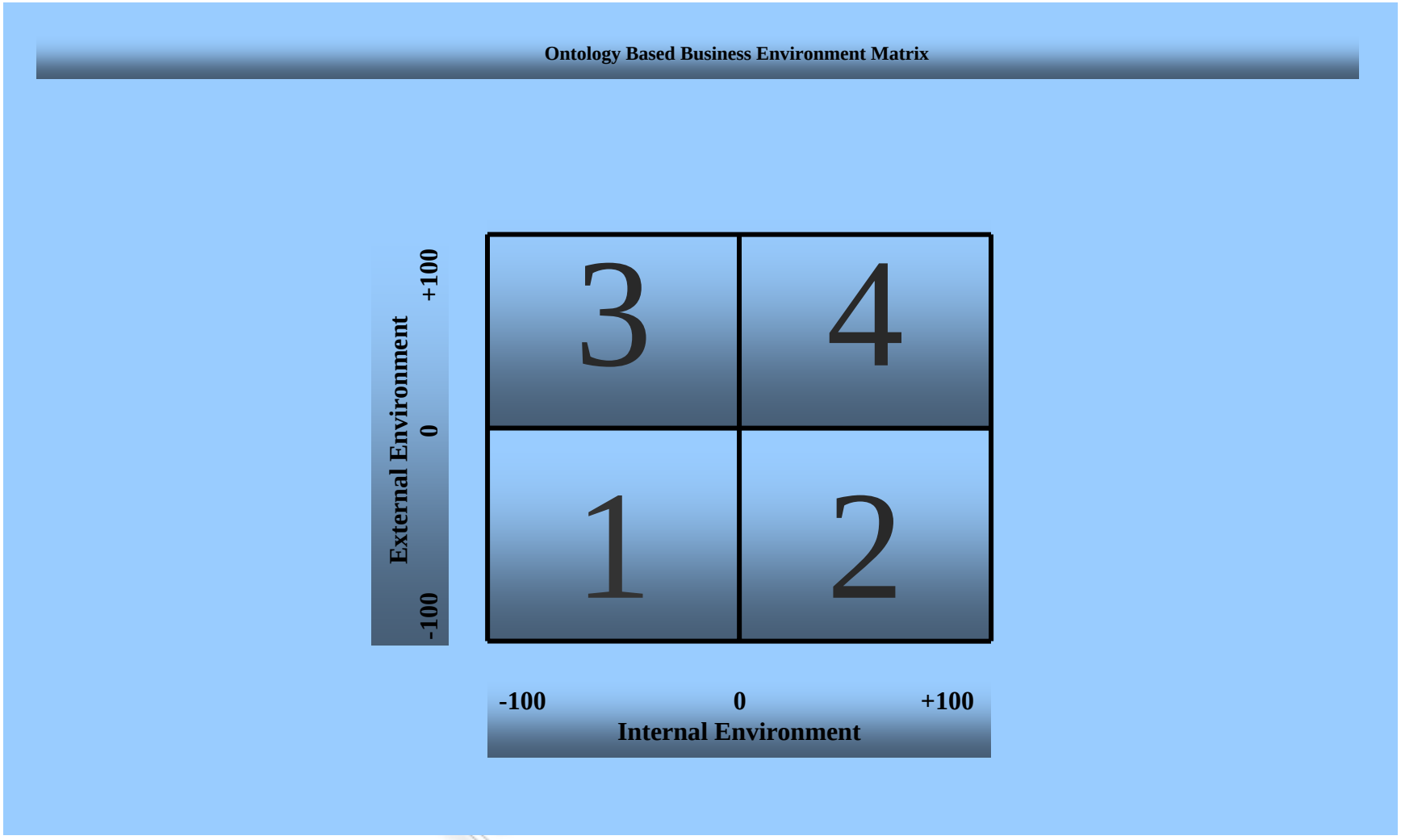

Ontology Based Business Environment Matrix
External Environment
+100
0
-100
3
4
1
2
-100
0
+100
Internal Environment

Figure 14

5.4.1 First Square – Low Cost and Low Sales

In the first square the company's costs are under the average of the industry and also the sales are under the average of the industry. A company that appears to be in this position has managed to lower its costs under the average of the industry but its market share- sales- is under the average of the industry and it is the point where it has to concentrate its efforts.

Following the ontological tree we have drawn above and starting from the think that we have the problem and going step by step we can find and change the factor or the factors that appear to cause the problem.

In this particularly situation the problem starts from the revenue part of the profit. Profit affects the financial factor. The financial factor affects the capability, description of the value configuration and part of the infrastructure management. Let's say now that there is no problem with the infrastructure management. We move more in the ontological tree to the buyers and from there to relationship part of the buyers. Here there are two ways the channels and the marketing spending. Let's also say that from the value chain we can see that the marketing spending is on the industry's level. The channel part is what remains to examine. The channel is being affected from synergies part of industry focus on technological effort and technological factor. That means that the solution of our problem can be the synergies, acquisitions and even some diversifications.

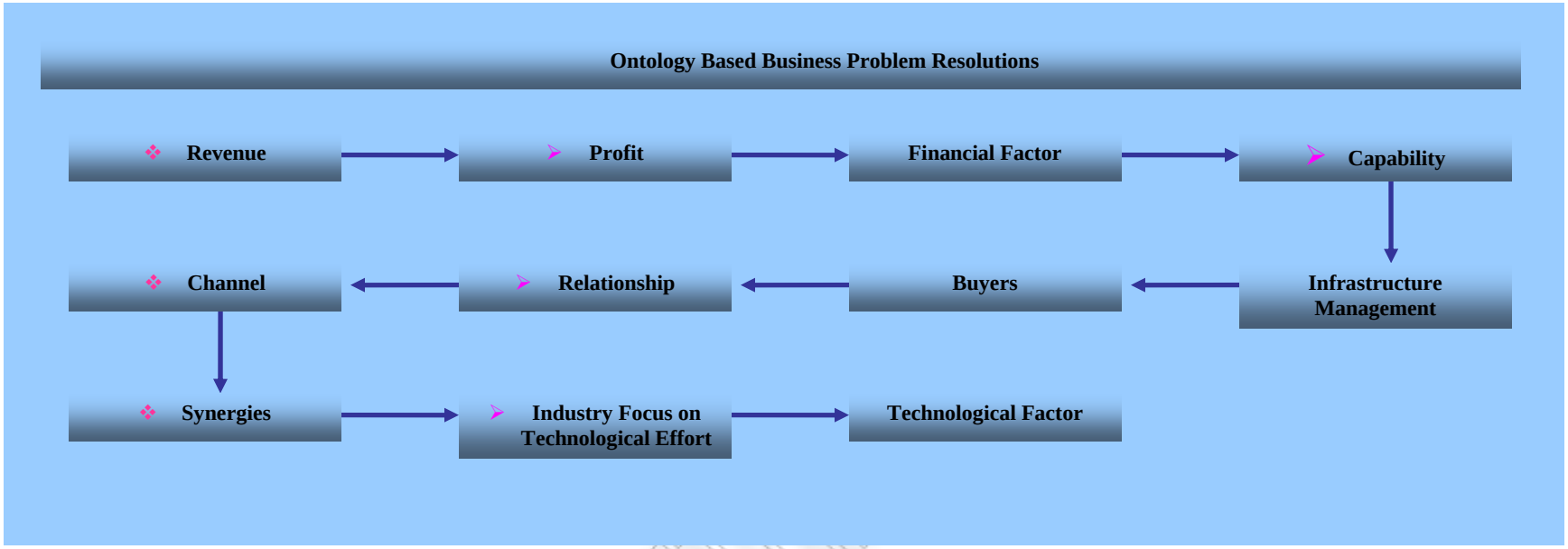

Ontology Based Business Problem Resolutions
Revenue
Profit
Financial Factor
Capability
Channel
Relationship
Buyers
Infrastructure Management
Synergies
Industry Focus on Technological Effort
Technological Factor

Figure 15

5.4.1.1 Case Study: Zodiac[22]

An organization may seek the benefits of synergies by building a portfolio of businesses through related diversification

The Zodiac company was founded near Paris, France, in 1896 by Maurice Mallet just after his first hot-air balloon ascent. For 40 years, Zodiac manufactured only dirigible airships. In 1937, the German Zeppelin *Hindenburg* crashed near New York, which abruptly stopped the development of the market for airships. Because of the extinction of its traditional activity, Zodiac decided to leverage its technical expertise *and* moved from dirigibles to inflatable boats. This diversification proved to be very successful: in 2004, with over one million units sold in 50 years, the Zodiac rubber dinghy (priced at approximately €10,000) was extremely popular worldwide.

However, because of increasing competition, especially from Italian manufacturers, Zodiac diversified its business interests. In 1978, it took over Aerazur, a company specialising in parachutes, but also in life vests and inflatable life rafts. These products had strong market and technical synergies with rubber boats and their main customers were aircraft manufacturers. Zodiac confirmed this move to a new market in 1987 by the takeover of Air Cruisers, a manufacturer of inflatable escape slides for airplanes. As a consequence, Zodiac became a key supplier to Boeing, McDonnel Douglas and Airbus. Zodiac strengthened this position through the takeover "of the two leading manufacturers of airplane seats Sicma Aero Seats from France and Weber Aircraft from the USA. In 1997, Zodiac also took over, for €150m, MAG Aerospace, the world leader

[22] Gerry Johnson, Kevan Scholes, Richard Whittington (2005). Exploring Corporate Strategy Text and Cases (7th ed.). England: Pearson Education Limited

for aircraft vacuum waste systems. Finally, in 1999, Zodiac took over Inteltechnique, a leading player in active components for aircraft (fuel circulation, hydraulics, oxygen and life support, electrical power, flight-deck controls and displays, systems monitoring, etc.). By combining these competences with its traditional expertise in inflatable products, Zodiac launched a new business unit: airbags for the automobile industry.

In parallel to these diversifications, Zodiac strengthened its position in inflatable boats by the takeover of several competitors: Bombard-L'Angeviniere in 1980, Sevylor in 1981, Hurricane and Metzeler in 1987.

Finally, Zodiac developed a swimming-pool business. The first product line, back in 1981, was based on inflatable structure technology, and *Zodiac* later moved - again through takeovers - to rigid aboveground pools, modular in-ground pools, pool cleaners and water purification systems, inflatable beach gear and air mattresses.

In 2003, total sales of the Zodiac group reached €1.48bn with a net profit of €115m. Zodiac was a very international company, with a strong presence in the USA. It was listed on the Paris stock exchange and rumours of takeovers from powerful US groups were frequent. However, the family of the founder, institutional investors, the management and the employees together held 55 per cent of the stocks.

Far above the marine and the leisure businesses, aircraft products accounted for almost 75 per cent of the total turnover of the group. Zodiac held a 40 per cent market share of the world market for some airline equipment: for instance, the electrical power systems of the new Airbus A380 were Zodiac products. In 2004, Zodiac even reached Mars: NASA Mars probes *Spirit* and *Opportunity* were equipped with Zodiac equipment, developed by its US subsidiary Pioneer Aerospace.

5.4.2 Second Square – High Cost and Low Sales

In the second square the company's costs are higher than the average of the industry and also the sales are under the average of the industry. A company that appears to be in this position is in the worst position of the others that are in other squares. It has to deal with high cost and low sales.

Following the ontological tree we have drawn above and starting from the think that we have the problem and going step by step we can find and change the factor or the factors that appear to cause the problem.

In this particularly situation the problem starts from the revenue and the cost part of the profit. Profit and cost affects the financial factor. The financial factor affects the capability, description of the value configuration and part of the infrastructure management. Let's say now that there is a problem with the infrastructure management and the value configuration. Then there have to be changes in functional and management structures.

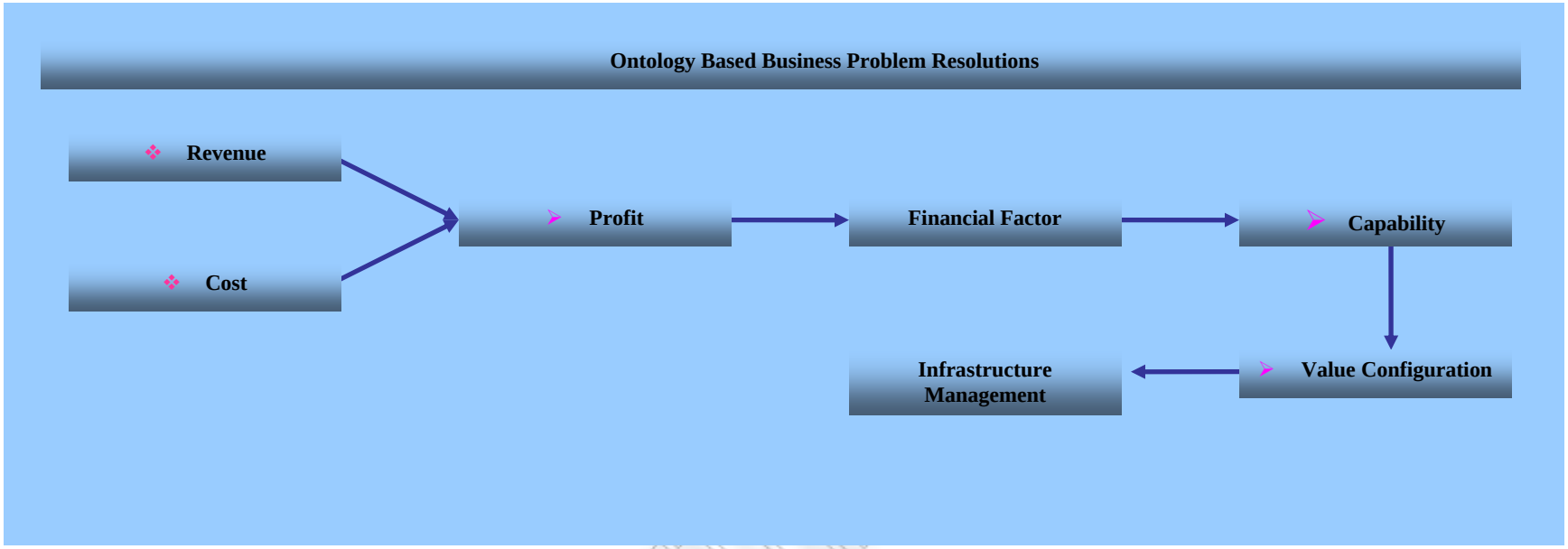

Ontology Based Business Problem Resolutions
Revenue
Cost
Profit
Financial Factor
Capability
Value Configuration
Infrastructure Management

Figure 16

5.4.2.1 Case Study: Electrolux Home Products Europe[23]

In January 2001, Electrolux Home Products Europe completely realigned its structure *as* part of its competitive strategy in Europe. The Swedish multinational company manufactured a range of consumer durables - such as cookers and fridges - and had grown through several decades of acquisitions to become a dominant player in Europe. But the market in Europe was fiercely competitive and the company needed to find a way to capitalize on its size - both to reduce costs and also to improve product and service standards. Its solution was to introduce a Europe-wide functional structure to replace the geographical structure (resulting from its acquisitions). The new structure is shown in the diagram.

The management explained the rationale for the restructuring: 'the realignment of EHP Europe is a part of a program to ensure profitable growth as the organization drives more simplicity into its business, while reducing the number of organizational hand-offs, and creating more focus on areas where increased effort is required to meet the tougher challenges of the market-place'.

The functional departments would operate as follows:

Purchasing, Production and Product Development was the manufacturing arm of the business. It also included product development and purchasing to provide a 'seamless flow' from supplies to finished products. This was felt to be essential to maintaining a stream of innovative and cost effective products.

[23] Gerry Johnson, Kevan Scholes, Richard Whittington (2005). Exploring Corporate Strategy Text and Cases (7th ed.). England: Pearson Education Limited

9 **Supply Chain Management and Logistics was** responsible for getting products to the customer and was the link between sales forecasts and factory production.

& Product Businesses, Brand Management and Key Account Management was responsible for the marketing activities to support products and brands. It also included key account management, service and spare parts.

Sales divisions, grouped geographically into seven multi-country clusters. The first three divisions were managed as cost centers whilst the sales clusters were focused on sales revenue.

5.4.3 Third Square – High Sales and Low Cost

In the third square the company's costs are lower than the average of the industry and also the sales are higher than the average of the industry. A company that appears to be in this position is in a better position than the others that are in other squares. It has to maintain low cost and high sales.

Following the ontological tree we have drawn above and starting from the think that we want to maintain and going step by step we can find and change the factor or the factors that can be enhanced.

In this particularly situation we will start from the revenue and the cost part of the profit. Profit and cost affects the financial factor. The financial factor affects the capability, description of the value configuration and part of the infrastructure management. Let's say now that there is no margin to ameliorate infrastructure management and the value configuration. Then there have to be changes lets say in marketing spending, expanding target group, cutting margin and core competence.

5.4.3.1 Case Study: Dell Computers[24]

In an interview with the *Financial Times* in November 2003, Kevin Rollins, the CEO of Dell Computers, explained how he was putting his job on the line by leading a major strategic change in the company.

The US company famous for selling PCs is planning a big push into consumer electronics. If things go according to plan, Michael Dell could eventually become the Henry Ford of the information age.

For a maker of desktop personal computers who founded his company, famously, in a University of Texas dormitory 20 years ago, this may sound unlikely. But the ambitions of Dell Inc are boundless - and thanks to a simple business idea that has proved highly adaptable, and a fearsome relentlessness... Consumer electronics are about to provide what could well be the biggest test of the Dell way of doing business. Until now, the company has sold mainly to corporate customers: only a fifth of its sales in the US are to consumers, and much less than that elsewhere.

... Dell's simple but effective idea has been to sell standardized electronic products direct to customers, usually over the internet. That removes most of the research and development that is normally required, while also cutting out retailers and other middlemen. Armed with the information it gets from taking orders directly from customers, Dell has gained two other powerful advantages. One is the ability to build products to match orders as they come in, slashing its inventory costs. The second is a

[24] Richard Waters, *Financial Times*, 13 November 2003, p. 16.

highly efficient marketing machine that can adapt its message based on real-time results as orders arrive.

With its lower costs, Dell sets out to undermine profits in the markets it enters and destroy the margins that sustain its more entrenched competitors. “Our goal is to shrink the profit pool and take the biggest slice,” says Mr. Rollins. Consumer electronics companies, often with gross profit margins of more than 30 per cent, make an obvious target for this ruthless approach. 'Our gross margins are in the 18-19 per cent range: we don't need 40 per cent,' he says.

A former partner from Bain (management consultants), the Dell president applies the cool analytics and familiar jargon of the strategy consultant to this relentless expansion: search out the markets with the biggest 'profit pools' to be plundered; pick ones with close 'adjacencies' to those Dell already serves to reduce the risk of wandering into unknown territory; and apply its 'core competences' to conquering new ground. As a textbook case of applying a proven and repeatable formula, Dell takes some beating. It used the formula to move from selling PCs to businesses to selling them to consumers. Next it followed its business customers into servers, then into storage hardware. Now it wants to follow consumers into other areas of electronics as well. It has started with products closely linked to the PC, such as MP3 digital music players and 17-inch flat-panel television sets that resemble computer monitors. According to Dell's rivals, success in the PC business in the US has disguised the fact that the company has found it harder to break into other products and new geographic regions. 'Dell's success is backward-looking,' claims Jeff Clarke, head of global operations at Hewlett-Packard.

According to Steve Milunovich, technology strategist at Merrill Lynch, not all markets are as susceptible to all aspects of the Dell approach as the PC business. Yet he adds that the company has shown great discipline in attacking only those areas where its strengths still give it a clear economic and operational advantage.

Even most of the company's competitors concede that the shift in consumer electronics from analogue to digital technology plays to Dell's strengths. It is already the biggest purchaser of liquid crystal display screens and computer hard-drives, for instance, putting it in a strong position as these components come to play a bigger role in television sets and other household items.

“When you combine monitors and LCD televisions, we will blow away the consumer electronics guys,” says Mike George, chief marketing officer. More importantly, Dell also benefits from the standardization that brings down the cost of components and removes the advantage once enjoyed by companies that invest in their own technology. As more of a product's functions come to reside in standardized components such as microprocessors and hard drives, the differentiation that comes from making new versions declines.

The contrast with others is stark. Sony chief Nobuyuki Idei, for instance, told the FT that the Japanese company was putting a growing emphasis on proprietary components to differentiate its products. In the past four years, 70 per cent of Sony's investment has been in silicon chips. While the digitization of consumer electronics may have played to Dell's core strengths, though, there are at least three things about the market that are likely to test its business model. One is the fact that it will rely, at least for now, on manufacturing by other companies, reducing its ability to drive down costs. Also, the

consumer electronics business is based on common products that are not configured individually for different customers: according to Mr. Clarke, that removes one main advantages of Dell's build-to-order model, the ability to customize products for each buyer.

Using outside manufacturers is also likely to mean the company "'will not be able to operate on inventory that is as thin as it is in PCs," says Charlie Kim, a consultant at Bain. Company executives suggest that once manufacturing volumes reach a high enough level, Dell is likely to start reduction itself.

Also, while the cost advantages may be less in 'back-end' activities such as production and sourcing, the real opportunity for Dell in consumer electronics lies in the "front-end"' marketing and sales area, says Mr. Milunovich. "There's a big chunk of money to be taken out of: distribution,"' he says.

Whether Dell can take advantage of this opportunity with its direct sales system will be the second big challenge. Retail stores suit consumer products best because they bring an instant mass market and let users test the look and feel of products, says Mr. Clarke. That is particularly important for products such as television sets, which buyers want to see, or handheld devices, which they want to pick up, say rivals.

Dell executives retort that similar doubts were once expressed about its efforts to sell PCs online, and that its early sales of personal digital assistants suggest that consumers familiar with the quality and style of the company's PCs are willing to buy other items online too. The third test will be whether the Dell brand and marketing approach can be adapted to suit the new market. High name-recognition helps, but will get Dell only part

of the way. “Everyone knows who Dell is - but it's still a PC-focused brand,” says Mr. Kim at Bain.

For a company that still relies heavily on selling to corporate customers this will pose a big challenge. “We're very humbled by the fact that there are virtually no other companies that are both consumer and enterprise brands,” says Mr. George. He adds, though, that the basic attributes of the Dell brand - with its connotations of a certain level of value, quality and service - should extend across both types of market.

Overcoming obstacles such as these will stretch the Dell model in ways that it has never been stretched before.

5.4.3 Forth Square – High Sales and High Cost

In the forth square the company's costs are higher than the average of the industry and also the sales are higher than the average of the industry. A company that appears to be in this position even though its sales are high it has to deal with high cost.

Following the ontological tree we have drawn above and starting from the think that we have the problem and going step by step we can find and change the factor or the factors that appear to cause the problem.

In this particularly situation the problem can be started lets say from the external environment the rivalry. If a rival bends the law with its tactics it affects rivalry. Rivalry affects relationship, part of the buyers, and buyers affect infrastructure management and financial factor. This kind of tactics affect the cost of the company since it has to make more expenditures and discounts to attract customers.

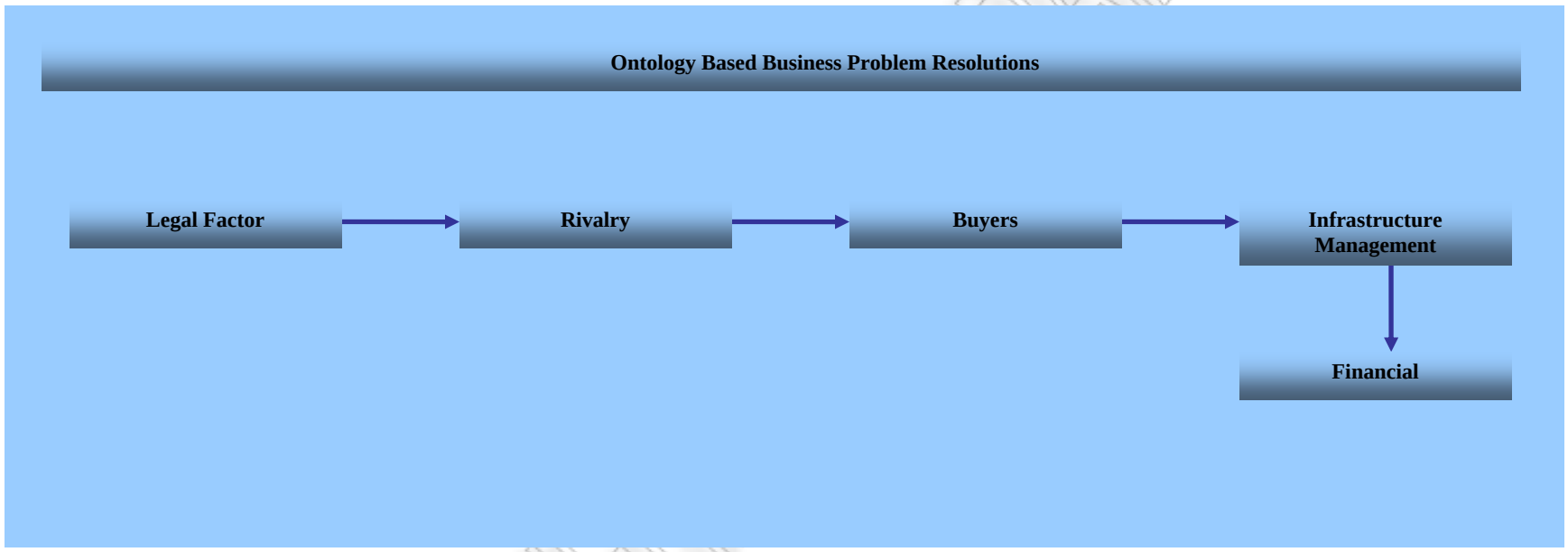

Ontology Based Business Problem Resolutions
Legal Factor
Rivalry
Buyers
Infrastructure Management
Financial

Figure 17

5.4.3.1 Case Study: Visa[25]

In late 2003 MasterCard International filed a legal action in the USA in an attempt to block enforcement of Visa's so-called "Settlement Service Fee". This settlement fee imposed coercive and prohibitive fines on the top 100 Visa issuers if they made *a* change in brand strategy and reduced their Visa debit volume. "Visa's intentions are clear: instead of developing value-added programs and solutions that benefit issuers, merchants and consumers, they seek to lock in their dominant position in off-line debit by penalizing members who want to change brands," said MasterCard's lawyer. "Visa is changing the rules mid-stream and bullying its members so it becomes virtually impossible for them to switch brands. It's like telling airline passengers halfway through a flight that if they want to fly on another carrier any time over the next 10 years, they'll have to pay a huge fee to get off the plane. This is nothing more than a thinly-veiled effort to block competition and cling to business they might otherwise lose," the MasterCard lawyer said. The rule, which aims at unfairly stifling Visa debit issuers' freedom of choice, is not based on legitimate brand dedication concerns, and, by undermining competition, will ultimately hurt consumers. Financial institutions who issue MasterCard and Visa cards should have the ability to make brand decisions based on their best judgment about strength of brand, quality of service and other competitive factors that benefit their cardholders. Instead, Visa's rule sets up prohibitive fines and contrived exit barriers which sharply limit issuers' options," the lawyer claimed.

[25] Gerry Johnson, Kevan Scholes, Richard Whittington (2005). Exploring Corporate Strategy Text and Cases (7th ed.). England: Pearson Education Limited

About the Case Studies

It is obvious from the cases that have been selected that the problems might have several causes and several impacts. The impacts may all be visible to the internal environment, infrastructure management and financial factor, but their causes might be more than one and even from the external environment.

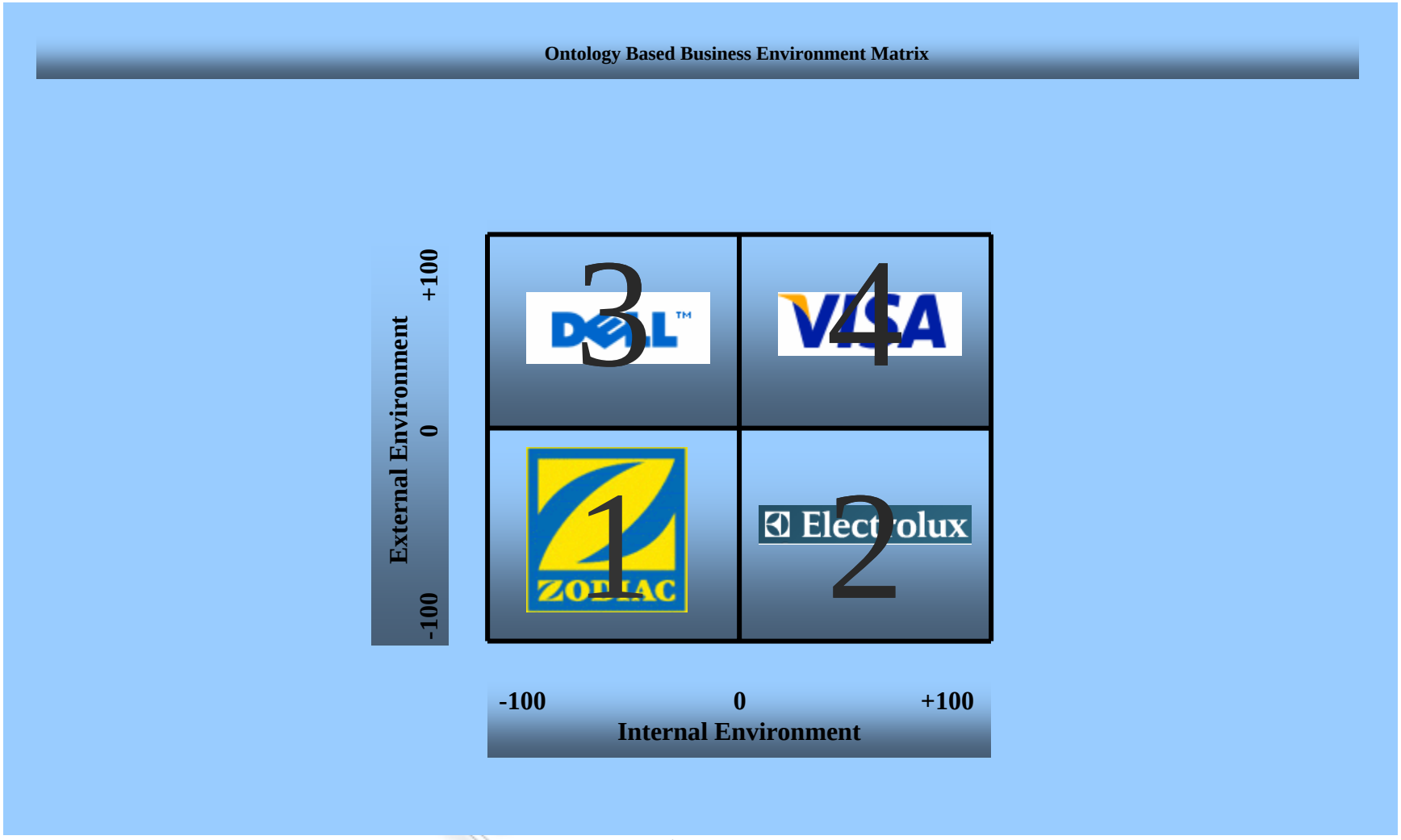

Ontology Based Business Environment Matrix
External Environment
+100
0
-100
3
4
1
2
-100
0
+100
Internal Environment

Figure 18

6. Conclusions – Ontological Analysis Outcomes and Usefulness of O.B.B.E. matrix

According to the classic analysis (Porter, P.E.S.T.E.L. etc.) the environmental factors are divided into external environment and internal environment. External environment contains the factors that are external to the company and the company can not affect them. External environment contains factors that are being configured from other thinks other than the company. Internal environment contains factors that are being affected directly from the company and being configured under the company's decisions.

Using an ontological analysis we show that the classic analysis of the environment it is not accurate. It is easy to see that all the factors influence each other either in a direct way or in an indirect way. Starting from any of the factors you can end up influencing any of the others.

Based on that we categorized the factors on them that are being affected by the company and being affected by her indirectly (external environment), on them are being affected by the company directly (internal environment), and on them that are being affected from both internal and external environment (middle environment).

By designing that ontological tree, the main objective is to capture and represent the knowledge which is implicit in the application domain so that it can be made reusable.

The ontological analysis and O.B.B.E. matrix are showing the sensitivity of the firm to internal and external environment compared to that of the industry and to that of its

competitors. That kind of analysis can show to the firm its vulnerability to environmental changes compared to the industry.

Behind the model there is an ontological tree. That means that the firm can interfere and change the factors that give its position. By changing one or more factors the firm can see the outcome and the importance of that factor.

P.E.S.T.E.L. analysis, Porter's analysis, market type analysis and value chain analysis are static models. O.B.B.E. matrix accomplishes combining the above analyses to make a dynamic model. The O.B.B.E. matrix uses the previous models to show the evolution of the firm in its environment and the factors that affect it.

Each of the four quarters in the matrix has certain characteristics so as the firm to understand its position. These characteristics imply a general strategy for the firm to improve and enhance its position.

Future Research

In this section we outline some ideas of future research on the ontology based business environment that draw from and build on the research of this thesis. As business environment is a very broad domain and ontology still a young research stream this list of applications is of course non-exhaustive. It contains some research directions that we think worth pursuing and that form an extension to the business environment ontology.

In the analysis above we described the business environment and the relationships between its factors. By doing that we managed to draw a matrix that shows the company's position opposite to that of the industry and to that of the rivals. That implies a strategy for the company so as to develop or maintain its position. So we described how environment affects strategy, a development of this relationship could be the opposite analysis how strategy affects environment.

The ontological tree that we have drawn and the relationships that it implies are drawn according to a healthy business environment. We have assumed that there are no distortions like cartels and that a company can not affect directly the political or the legal factor. That assumption is not always correct and it is a field of future research.

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