

AN ONTOLOGY FOR E-BUSINESS MODELS BASED ON S.C.O.P.E. OF CRM

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ABSTRACT

This paper tackles to contribute to e-business model literature by improving one of the most referred e-business model ontologies, which is developed by Osterwalder and Pigneur. To do so, some new aspects are added to the previous ontology. Also some existing elements are altered. These changes are based on the S.C.O.P.E. of CRM. This ontology might be worthy as a common language in communications between information system designers and strategic planners. It also can be useful in simulating business strategies before implementing them.

Index Terms— e-Business Model Ontology, S.C.O.P.E. of CRM, Relationship

1. INTRODUCTION

After recognizing the fact that no company can survive solitarily, firms have organized in groups called business networks. Emergence of phenomena like outsourcing is the result of this change. Maybe Information and Communication Technology (ICT) can be named the glue of the bonds between these networks' members, hence the name e-business.

This trend makes the business models more and more complex. An example of such an elaborate business model is mobile business landscape [1]. M-business includes numerous actors (e.g. device manufacturers, content providers and aggregators, mobile network operators, and regulation authorities) which have complex interactions in order to deliver value to customers.

"For managers it is ever harder to keep track of how their companies really work and how and where exactly the money is made [4]." Because a business model is a significant element in any strategic decision making process, and regarding the facts addressed above, there is a high priority need to an implement which can depict the e-business model in an easily understandable way. Ontologies can be an appropriate choice for developing such a device, because they are both simple and general. So some researchers have tackled to exploit ontologies in modeling e-businesses.

There have been a few researches in this area. Some ones are discussed in section 2 of this paper. This paper attempts to enhance one of these ontologies by adding some

currently unconsidered elements and also amending some of the existing ones.

The remainder of the paper is organized as follows. In the next section a brief definition of some basic concepts, including ontology and S.C.O.P.E. of Customer Relationship Management (CRM), is provided. The next section also covers an overview of existing e-business model ontologies and details of the ontology on which this research is grounded. Section 3 introduces the new ontology and involves explanation of its elements. Section 4 is dedicated for conclusion. Appendix A includes the tables inferred to in the paper.

2. BACKGROUND

In this section, first two fundamental notions of this research, ontology and S.C.O.P.E of CRM, are introduced. The current researches in the field of e-business models ontology are partially attempting to combine these two concepts, because all of them are depicting the relationships between the members of the S.C.O.P.E by using ontology, but they need further refinement. Regarding this fact, a brief review of current researches is provided then.

2.1. Ontology

As defined in [6], ontology is "a common vocabulary for describing the concepts that exist in an area of knowledge and the relationships that exist between them. An ontology allows for a more detailed specification of the relationships in a domain than is the case with a thesaurus or taxonomy. The resulting vocabulary can be used by computers as well as understood by humans."

Osterwalder and Pigneur [4] have adopted the general definition of D. Fensel who, in 2001, declared an ontology as nothing else than a rigorously defined framework that provides a shared and common understanding of a domain that can be communicated between people and heterogeneous and widely spread application systems.

From these definitions can be understood that an ontology encompasses the concepts of a specific area of knowledge and detailed specifications of the relationships between them in a rigorously defined framework which can be easily communicated between and recognized by people and computer systems.

This paper and similar researches try to exploit these features of ontologies in the field of business models.

2.2. S.C.O.P.E of CRM

Most of the content of this subsection is derived from Buttle [11]. The mnemonic S.C.O.P.E. stands for S=Supplier, C=Customer, O=Owner/Investor, P=Partner, and E=Employee. These are the constituencies of a focal company's network in which it works. Four of these elements are external to focal company. Those are suppliers, customers, owners, and partners. But employees are as a resource for the company.

The relationships between the components of the so called S.C.O.P.E. is like this: suppliers, owners, partners, and employees work together to meet the needs of customers. This is specially the pattern of customer-centric firms. A brief definition and explanation of each element is provided below:

- **Supplier:** WordNet [5] defines supplier as "someone whose business is to supply a particular service or commodity". But they are more than that, since they can also contribute directly to their customers' competitiveness by helping in product improvement, new product development, process improvement and quality management programs. Also suppliers are strategically significant, because procurement is the most expensive activity in most companies. That is, savings in purchasing have direct effects on benefits.
- **Customer:** In a simple definition, customer is "someone who pays for goods or services" [5]. As mentioned before, all the company and its network members do is to meet the obligations of customers. So choosing an apt mechanism to make solid relationships with customers will probably yield in success.
- **Owner/Investor:** Someone who commits capital to the focal company in order to gain financial returns is called an investor. They contribute to the resources of the focal company and their wanted is the growth of their stock price.
- **Partner:** In general, the main function of business partners is to help to create and deliver value to focal company's customers. Some examples of partnerships are joint ventures, franchising, lobbying with regulators, etc. The notions of supplier and partner may seem so similar at the first sight, but there are some delicate differences. In general, the relationship between the focal company and its suppliers is a one-way demand and supply relationship. That is, company gives money and supplier provides requisite product. But in some partnerships, such as category teams and CAGs, there may be no exchanges between partners. Partners are independent from each other and they join each other just for more revenue. This holds while the concept of supplier has no meaning without a customer notion.
- **Employee:** The employee is a person who is hired for a job. The value of employees (i.e. human resource) is being recognized more and more nowadays. Good

employees yield in good performance and so in good customer experience which results in more revenue and less costs in its right.

The life cycles of all these five stakeholders are similar. At one day, they begin the business with the focal company. Then the prosperous relationships persist and get deeper and they are ruined at a time. Nevertheless, it should be noted that different strategies and mechanisms should be exploited to treat each of these five parties in their diverse lifecycle stages, because of the variety in their expectations and the benefits they have for focal company. These mechanisms are mentioned in section 3.

2.3. Current Researches

Amongst the various proposed business model taxonomies, e³-value developed by Gordjin and Akkermans [15] and Osterwalder and Pigneur's ontology are somewhat more detailed.

Developers of the former ontology state that [15]: "We propose a interdisciplinary approach, e³-value, to explore an innovative e-commerce idea with the aim to understand such an idea thoroughly and to evaluate it for potential profitability. Our methodology exploits a requirements engineering's way of working, but employs concepts and terminology from business science, marketing and axiology."

This ontology describes an e-commerce information system from the *value* viewpoint among three different viewpoints (i.e. value, process, and information system) [15], hence the name. "The contribution of this viewpoint to the evaluation of an e-commerce idea is a statement of revenues and expenses, caused by the exchange of valuable objects between actors [15]." So it can be induced that this ontology is focused on the business actor and network aspects of a business model [4].

The idea proposed in this paper is based on the second named ontology (i.e. Osterwalder and Pigneur's), so we are going to explain it in a more comprehensive way. This ontology, which is claimed to be sounder than former alternatives, is developed to highlight the following aspects of a business model [4]:

- **Product innovation:** What business the company is in, the product innovation and the value proposition offered to the market?
- **Customer relationship:** Who the company's target customers are, how it delivers them the products and services, and how it builds a strong relationship with them?
- **Infrastructure management:** How the company efficiently performs infrastructure or logistics issues, with whom, and as what kind of virtual enterprise?
- **Financials:** What is the revenue model (transaction, subscription/membership, advertising, commission, licensing), the cost model (cost of goods sold, operating expenses for R&D, sales and marketing, general and administrative) and the business model's sustainability?

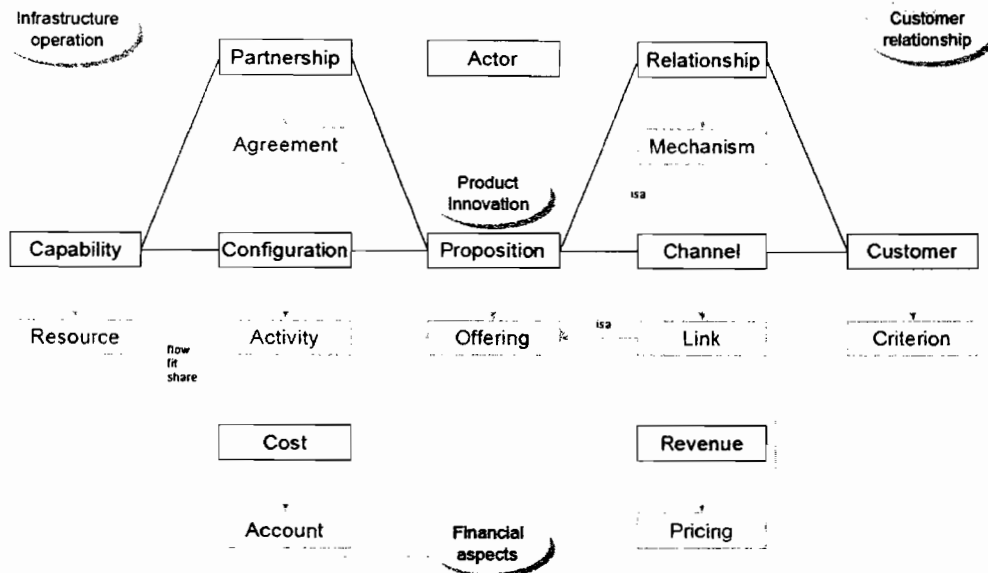


Figure 1: An ontology for e-business models [4]

These are the four pillars constituting the first level of ontology. Those are the “what”, the “who”, the “how”, and the “how much” of a firm. The ontology is exhibited in figure 1. It might be seen that each of these four main elements are decomposed to a second level. Because of spatial restrictions, the readers are referred to [4] for more details. Here, just its flaws are discussed.

In this ontology ACTORs have a very important role in almost all aspects of a business, but this notion is not declared appropriately. Also it is stated that an actor can be the firm itself or one of the partners, while the notion of partners is not discussed well and the author has not distinguished between different kinds of business partners (i.e. suppliers and partners). Also, there is no consideration of concepts such as owners and employees. The next section tries to complement this ontology by adding such aspects to it.

3. AN ONTOLOGY FOR E-BUSINESS MODELS

As addressed in section 2, the proposed ontology is based on the e-business model ontology proposed by Osterwalder and Pigneur [4]. So, due to spatial restrictions, here, only the new and altered notions are discussed and although the previous ones are briefly mentioned in section 2, readers are referred to [4] for more information on the adopted ontology. Before introducing the proposed ontology, it is needed to declare some preliminary concepts:

- One of them is *relationship*. “A relationship is composed of a series of episodes between dyadic parties over time. Each episode in turn is composed of a series of interactions [11].” Regarding this definition, relationships should be dynamic phenomena. Here we adopt the three stage model of relationship management which is consisted of acquisition, retention, and development or sacking stages.

- The other is *channel*. Channels are the vessels through which information and material flow. It is obvious that each party of this dyadic relationship requires a media or channel to reach the other one in order to establish and consolidate the relationship.

Our ontology is based on these facts and assumes a set of mechanisms and a set of channels for the focal company to interact with its S.C.O.P.E. network members during their different life cycle stages. These concepts are also considered in Osterwalder and Pigneur’s ontology [4] in the CUSTOMER RELATIONSHIP pillar.

The proposed ontology (figure 2) is consisted of 5 main pillars: Value Network, Internal Infrastructure, Product Innovation, Customer Relationship, and Financial Aspects. Value Network illustrates the relationships between the other members of the supply network, which contribute to value creation, and the focal company. Internal Infrastructure depicts the internal parts of a company and the relationships between them. Collaboration of Value Network and Internal Infrastructure yields the Value Proposition, which is delivered to customer through Customer Relationship management. More detailed explanation of each element of the ontology is provided below.

3.1. Supplier

SUPPLIERS are a major segment of external network members. By providing inputs they contribute to the capabilities and resources of a focal company. They also may provide some services thus improving focal company’s value configuration and activities.

It is stated by Aberdeen Group [14] that the point of purchase is the only place where there is a direct 100% relationship between costs and benefits. It means one dollar reduction in procurement costs results in one dollar

increment in company's benefits. Also procurement is the largest expense in most firms [2].

According to these facts, supplier relationship requires a sound management system for reducing the costs. One way is to depend on the suppliers' CRM, but the better way is to make a Supplier Relationship Management (SRM) system [2]. By taking the help of IT, there have been a lot of progresses in this field. Electronic SRM (eSRM), which is a response to the realities such as [12] increasing requirements for supply chain collaboration, changing nature of the marketplace, increased demand for risk sharing, etc, is the fruit of these progresses.

In order to develop an ontology for eSRM systems and identify its components, we adopted the idea of Andre Lang et al. [2] who believe that SRM and CRM systems are addressing the same issue but from an opposite perspective. They illustrate the similarities between SRM and CRM as what is shown in figure 3. This figure shows that supplier relationship management cycle starts with supplier selection, continues with supplier attraction, and ends in supplier retention or departure. This is consistent with the three stage model of relationship management introduced at the beginning of this section.

What is inferred is that, there is a need to some mechanisms to attract, retain, develop or sack the suppliers. These mechanisms have become more important as the supplier relationship patterns have evolved from traditional adversarial purchasing with many competing suppliers, contracts focused on price, clear boundaries of responsibility, etc, to collaborative supplier management [12].

SRM mechanisms may have one or many of the following functions: ATTRACTION, COST REDUCTION, PERFORMANCE ENHANCEMENT, and DEPARTURE. These functions contribute to supplier relationship consolidation through the relationship management stages. Two examples of ATTRACTION mechanisms can be eRFP/RFI and auctions [2]. Some of the COST REDUCTION mechanisms are category management and vendor reduction programs [11]. PERFORMANCE ENHANCEMENT mechanisms may be VMIs and product development alliances [11]. Also some companies may bid low to depart their inappropriate suppliers.

The mechanism a firm chooses influence the DEGREE OF INTEGRITY of relationship it has with its supplier. This degree may vary from low, such in traditional adversarial relationships and ITXs, to high, as in VMIs. The notion of supplier relationship (S-RELATIONSHIP) is declared in table 1 (Appendix A).

It goes without telling that all of these mechanisms are based on some execution and communication media. Thanks to IT, there are a vast variety of communication channels for B2B interactions. The oldest and the most famous one is EDI. E-marketplaces are newer phenomena which include Independent, Consortium, and Private Trade Exchanges and also 4PLs [12]. Companies should declare which one of

these channels they are going to exploit to interact with their suppliers. As stated in [4], a channel is a set of links. So S-CHANNEL is a set of one or more S-LINK(s) that represent the SRM tasks or roles. Each of these roles, which are played by suppliers, partners, or the company itself, belongs to one or many of four stages of e-procurement process (i.e. information, negotiation, settlement, and after-sales) [10].

The last point to be concerned about is how to detect good and bad suppliers. This is carried out using some selection criteria (S-CRITERION). These criteria may include geographical location, historical records like affiliations, firm size, etc.

3.2. Partner

Buttle [11] classifies PARTNERS into two categories: partners in value creation and partners in value delivery. The former class includes joint venture and alliance partners, category teams, benchmarking groups, regulators, customer advocacy groups, and sponsors. The latter group involves agents, brokers, management contractors, consortia, licensees and franchisees.

D. Ross [12] wrote on the emergence of necessity of close relationships with delivery partners that: "During the 1990s many sectors of the economy had begun to explore ways to disintermediate wholesale/distribution partners ... By the end of the decade the Internet seemed to portend the day when all forms of channel intermediary could be eliminated. In reality ... it was obvious companies had actually become more and not less dependent on their channel partners."

He states the reason as "No single company can hope to fill all of the needs of its companies" and emphasizes the need to make solid and close relationships with partners. But, how establish such a partnership? And what are the components of such structure? The answer is any relationship requires a set of mechanisms and channels to exist as addressed before.

Buttle [11] also counts partner recruitment, development, and profiling as one of the functionalities of Partner Relationship Management (PRM). So some mechanisms are obliged to recruit and develop partners. Functionality of these mechanisms can be ATTRACTING partners (e.g. meeting sessions, advertisements), creating TRUST (e.g. overt procedures, historical business records), or ENTICEMENT (e.g. acclaiming first ranked partners). Each of these mechanisms may contribute to one or many of the partner relationship or PARTNERSHIP stages (i.e. recruitment and development).

As related in the previous ontology, PARTNERSHIP is composed of a set of AGREEMENTs [4]. But previous model has omitted the concept of relationship MECHANISM. This paper adds this notion based on the fact that partnership is also a kind of relationship. The definition of PARTNERSHIP can be found in table 2 (Appendix A).

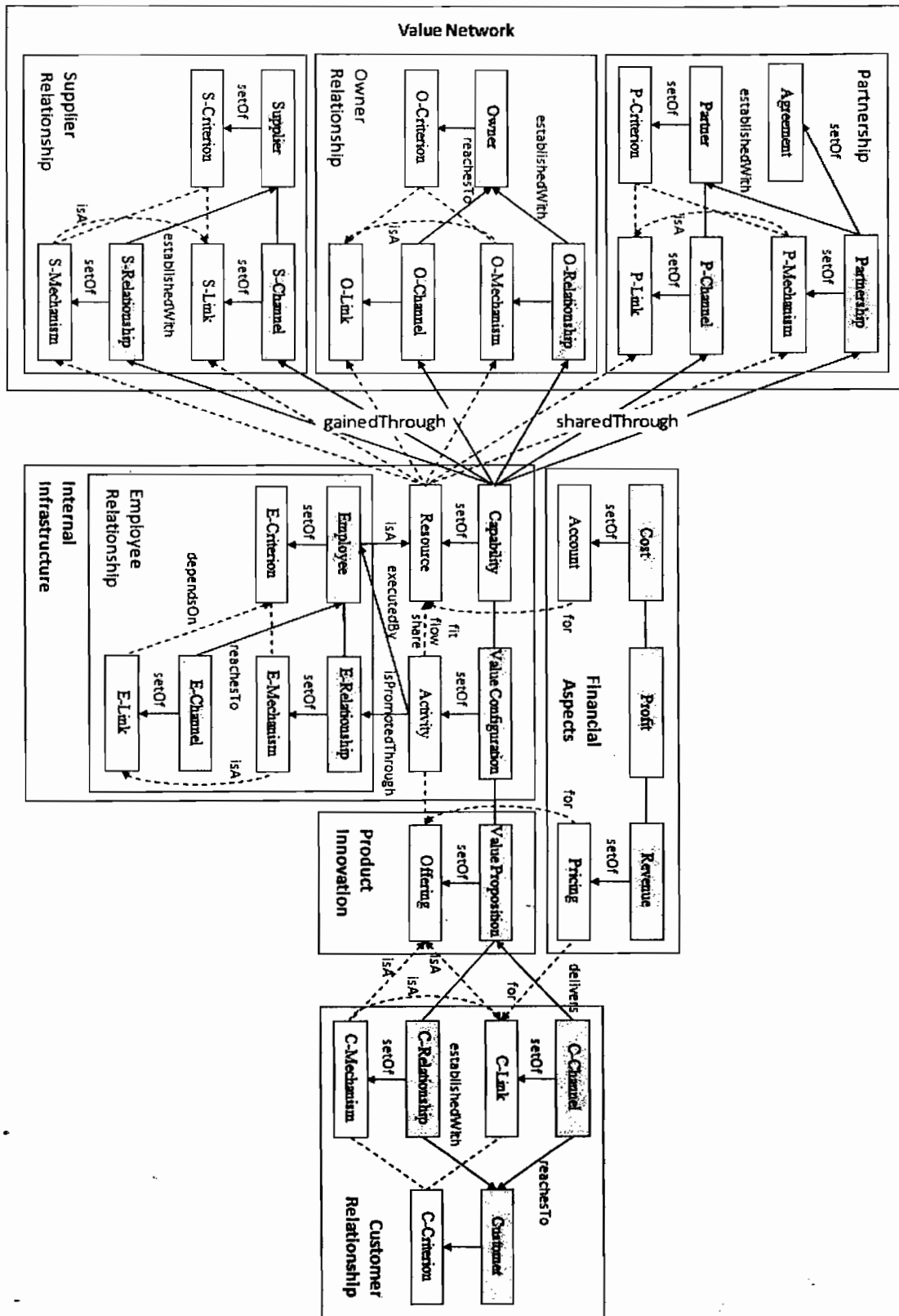


Figure 2: Proposed ontology

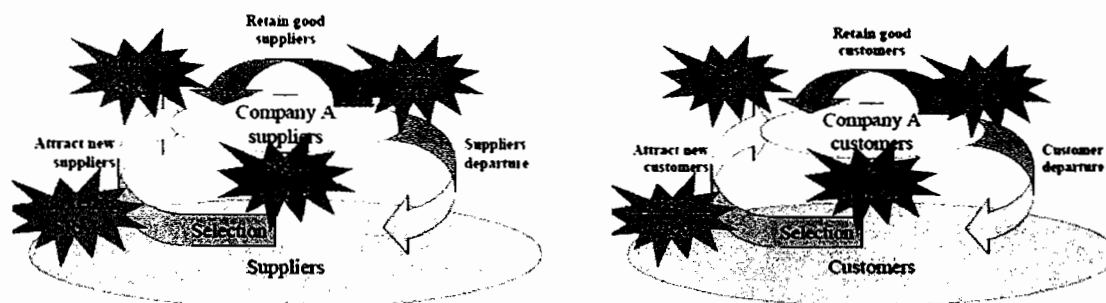


Figure 3. The similarities between SRM (left) and CRM (right) processes [2]

There is also a need to define some channels. P-CHANNELS or partnership channels in information technology era can be SHARED INFRASTRUCTURES, PORTALS, EDIs, etc. P-CHANNEL is a set of P-LINKs in turn which illustrate specific partner marketing and collaboration roles. The channel P-LINK(s) of the different P-CHANNELs may sometimes be interrelated, in order to exploit cross-channel synergies.

It is noteworthy that in this model direct relationships between PARTNERSHIP and VALUE CONFIGURATION and VALUE PROPOSITION are omitted because PARTNERSHIP contributes to VALUE CONFIGURATION and VALUE PROPOSITION indirectly through CAPABILITY(ies). This is also true about S-RELATIONSHIP and O-RELATIONSHIP.

3.3. Owner

OWNERS aid the company by providing money resources for it in return of a pre-specified dividend of benefits the company gains. So, attaining suitable investors/owners for projects and enhancing relationship with them would have a remarkable effect on firm's resources and so performance.

As Reichheld [13] claims, "just as there are customers and employees who are right for your business there are investors who are right." The typical investor, focused on the short term, is not the right investor. He suggests that even if you are a publicly owned company you can pursue one or more of four ways to create a stable group of long-term oriented investors: educate current investors, shift the investor mix to institutions that avoid investor churn, attract the right kind of core owner, and operate as a privately owned company. These four suggestions are discussed as the owner relationship improvement mechanisms.

When founding a new project, some points should be declared for current investors. One of them is the value of the project they are investing on. Most of the investors judge projects by their return on investment and the time it lasts to take such a return. Thus the owners should be educated enough to have an insight to the effects a project have on different aspects of a company and the probable time it may take to harvest the fruits of that projects. Usually strategic

projects, unlike operational plans, require a long time to yield profit.

Attracting the right kind of main owners requires the company to know the criteria (O-CRITERION) of investor selection. In fact shifting the investor mix to institutions that avoid investor churn addresses one of these criteria, which is orientation. It means firms should segment their investor markets based on this criterion and target the segment with long-term oriented investors [11]. Anyway, this is not always the true way. Other attributes of investors to be considered can be stage of development of business, capital required, industry, geography, and leadership [8].

Jonas Nilsson et al. [9] consider orientation to social responsibility and financial performance as important investor segmentation variables.

Buttle [11] also advice firms to go private because "companies that are privately owned do not need to dance to the tune of the stock market [11]."

Regarding above discussion, owner relationship mechanisms can be classified in ATTRACTION, EDUCATION, TRUST making, and SHIFTING classes. These classes, which are discussed briefly former, may also have overlaps. O-RELATIONSHIP element is described in table 3 (Appendix A). DEGREE OF DEPENDENCY shows the influence of owner's investment on company. In other words, it indicates the share of stocks of company an owner owes.

An example of the channel used to interact with owners, for example during stock purchasing, can be a portal, through which an owner can login and carry out activities such as investment or stock list checking. These channels, which are named O-CHANNELs here, are also consisted of many links or O-LINKs which are provided by suppliers or partners. O-CHANNELs that share O-LINKs may gain the benefits of cross-channel synergies.

3.4. Employee

Employees are the most important among the resources of a firm. They also have profound effects on customers' perceptions especially in service industry, because they are the company/customer interface [11]. "Employee turnover is

a huge cost in some industries [11].” These facts make it vital to architect an appropriate relationship with them and companies should be capable of identifying, recruiting, retaining, and developing suitable employees [11].

Employee Relationship Management (ERM) systems provide a solution for this challenge. As stated by Buttle [11], ERM systems contain functionality that enables companies to manage their recruitment, objective setting, performance management and training programs. Like any other relationship management systems and adopting the definition of [4] for relationship (i.e. relationship is a set of mechanisms), ERM systems also contain some relationship mechanisms and channels through which they conduct their mechanisms.

E-MECHANISMS or employee relationship mechanisms may have functionalities like PERSONALISATION and ENTICEMENT. Companies should be able to entice employees to hasten achieving firm’s goals. An enticement mechanism can be *empowerment*. Employee empowerment is “a method of improving customer service in which workers have discretion to do what they believe is necessary - within reason - to satisfy the customer, even if this means bending some company rules [7].” It should be noted that empowerment is not used only for customer service employees. “Empowerment helps to create an environment in which employees feel trusted and valued, leading to greater job satisfaction and motivation, which in turn can improve customer satisfaction and retention [11].” Another enticement mechanism is appraisalment of prospect employees or so called heroes.

Like customers and suppliers, marketing should be conducted for employees too, but from a little different perspective. Employee marketing which is called *Internal Marketing* is “a planned effort to overcome organizational resistance to change and to align, motivate and integrate employees towards the effective implementation of corporate and functional strategies [11].” This mechanism divides employees into different segments according to some criteria (E-CRITERION) and devises specific marketing mix to target each of the segments, so improving employee retention and development. Definition of E-RELATIONSHIP may be found in table 4 (Appendix A).

Companies may use different kinds of channels to stay in contact with their employees and conduct their mechanisms. These channels, which are composed of links in their own right, can take shape of a portal, a special handheld device, bulletin, etc. Table 5 (Appendix A) explains the E-CHANNEL notion.

3.5. Other Aspects

We adopt Osterwalder and Pigneur’s [4] notion for other aspects, including Capability, Value Configuration, Value Proposition, Customer Relationship and Financial Aspects. Just some name conversions are conducted (e.g.

RELATIONSHIP to C-RELATIONSHIP) to indicate the differences between the concepts of the new model.

4. CONCLUSION

In this paper, one of the most referred e-business model ontologies is improved by adding some unconsidered elements and refining some existing concepts. This enhancement is done in order to complement the previous ontology to include all members of S.C.O.P.E. of CRM. In a time that e-business models are getting more and more intricate, it is claimed that this ontology will help strategic planners and information system developers by providing an implement that will ease the communication between them. This device also can be used to simulate e-business strategies before any costly real world establishment.

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APPENDIX A

Table 1: Supplier Relationship

S-RELATIONSHIP
<i>The SUPPLIER RELATIONSHIP component describes the relationship a company establishes with a SUPPLIER SEGMENT for contributing to the RESOURCES of the company by improving acquisition, retention, development and sacking.</i>
- it is established with SUPPLIER(s) - it contributes to company CAPABILITY(ies) {ACQUISITION, RETENTION, DEVELOPMENT, SACKING} - it has a DEGREE OF INTEGRITY
Set of one-or-more S-MECHANISM(s)
<i>A supplier relationship MECHANISM describes the function it accomplishes between the company and its suppliers. It may also be a supplier channel S-LINK.</i>
- it has a FUNCTION {ATTRACTION, COST REDUCTION, PERFORMANCE MANAGEMENT, DEPARTURE} - it inherits from the supplier channel S-LINK component

Table 2: Partnership

PARTNERSHIP
<i>A PARTNERSHIP is a voluntarily initiated cooperative agreement formed between two or more independent companies in order to carry out a project or specific activity jointly by coordinating the necessary CAPABILITIES, RESOURCES and ACTIVITIES.</i>
- it relies on CAPABILITY(ies)
It is composed of a set of one-or-more AGREEMENT(s)
<i>An AGREEMENT specifies the function and the terms and conditions of a partnership with an ACTOR</i>
- It has a REASONING - It has a DEGREE OF INTEGRATION - It has a DEGREE OF DEPENDENCY - it contributes to company CAPABILITY(ies) {RECRUITMENT, DEVELOPMENT} - It is made with PARTNER(s)
It is also composed of a set of one-or-more P-MECHANISM(s)
<i>A partner relationship MECHANISM describes the function it accomplishes between the company and its partners. It may also be a partner channel P-LINK.</i>
- it has a FUNCTION {ATTRACTION, TRUST, ENTICEMENT} - it inherits from the partner channel P-LINK component

Table 3: Partner Relationship

O-RELATIONSHIP
<i>The OWNER RELATIONSHIP component describes the relationship a company establishes with an OWNER for contributing to the CAPABILITY(ies) of the company by improving acquisition, retention, and development.</i>
- it is established with OWNER(s) - it contributes to company CAPABILITY(ies) {ACQUISITION, RETENTION, DEVELOPMENT} - it has a DEGREE OF DEPENDENCY
It is composed of a set of one-or-more O-MECHANISM(s)
<i>An owner relationship MECHANISM describes the function it accomplishes between the company and its owners. It may also be an owner channel O-LINK.</i>
- it has a FUNCTION {ATTRACTION, EDUCATION, TRUST, SHIFTING} - it inherits from the owner channel O-LINK component

Table 4: Employee Relationship

E-RELATIONSHIP
<i>The EMPLOYEE RELATIONSHIP component describes the relationship a company establishes with an EMPLOYEE for contributing to the CAPABILITY(ies) of the company by improving acquisition, retention, development, and sacking.</i>
- it is established with EMPLOYEE(s) - it contributes to company CAPABILITY(ies) {ACQUISITION, RETENTION, DEVELOPMENT, SACKING}
It is composed of a set of one-or-more E-MECHANISM(s)
<i>An employee relationship MECHANISM describes the function it accomplishes between the company and its employees. It may also be an employee channel E-LINK.</i>
- it has a FUNCTION {ATTRACTION, PROMOTION, EDUCATION} - it inherits from the owner channel E-LINK component

Table 5: Employee Channel

E-CHANNEL
<i>An EMPLOYEE CHANNEL describes how a company gets in touch with its employees. Its purpose is to make right information available at the right time for and from the right employees.</i>
- it has a TYPE { PORTAL, MOBILE DEVICE, BULLETIN}
It is composed of a set of one-or-more E-LINK(s)
<i>An employee channel E-LINK illustrates specific internal marketing roles. The channel E-LINK(s) of the different E-CHANNELs may sometimes be interrelated, in order to exploit cross-channel synergies.</i>
- it may be delivered by a SUPPLIER(s) or a PARTNER(s)