

ON THE EVALUATION OF E-COMMERCE ABILITY

This chapter develops a concept to evaluate the e-commerce-ability of a corporation and applies the framework to basic roles of the e-commerce environment. The concept comprises two components: A four dimensional framework is proposed which can be used to represent the degree of external coordination, the degree of alignment of business towards organizational and cultural rules of the networked economy, the degree of orientation towards customer needs and the degree of systematic and integral use of information and communication technology (ICT). Based on this framework, an evaluation approach is presented which supports a maturity analysis.

INTRODUCTION

While many companies are still implementing or improving their Internet-facilitated e-commerce activities, a new wave of technology-driven innovation has arrived - mobile (m-)commerce. Enabled by the progress in wireless technology and the increasing number of mobile devices, expectations are high again. We deduced from our current research that electronic forms of buying / selling (i.e. e-commerce including m-commerce) can only be successful if the corporation is structured according to specific requirements. That means that e-commerce and m-commerce projects are at failure risk if realized solely based on the Internet as a new distribution channel without changing the internal view on customer processes and without restructuring certain elements such as internal processes and structures and inter-business networking. However, corporations which want to implement successful e-commerce activities first of all need to have a framework for reflecting and analyzing their current status before measures can be defined to achieve e-commerce-ability.

The first step of such a systematic approach has to include not only a framework of dimensions which allows the reflection and analysis of patterns of e-commerce business models or roles, respectively, but also a set of parameters which represent measurable success. We therefore developed a concept consisting of two "pillars":

1. A four dimensional framework is proposed which can be used to represent the degree of external coordination, the degree of alignment of business towards organizational and cultural rules of the networked economy, the degree of orientation towards customer needs and the degree of systematic and integral use of information and communication technology (ICT). Each of the framework's dimensions is described by a set of characteristics which are used as a metric to render the creation and moreover the comparison of the patterns possible. Our hypothesis is that there are success patterns which depend on the specific roles existing in an e-commerce environment.
2. Based on this framework, an evaluation approach is presented which supports the analysis of the corporation based on value-driven quantitative and qualitative parameters reflecting economic success. The concept can be put to use by visualizing the pattern of the respective corporation to be analyzed, comparing it with the success pattern of the role, analyzing the status regarding the important value drivers, then identifying the gap and finally defining measures to close the gap.

But before we can start to develop the concept of e-commerce-ability we have to take a closer look at the terms and models which represent a basis for this chapter: on the one hand we reflect the understanding of the terms e-commerce and m-commerce and on the other hand we have to look at already existing e-commerce maturity concepts and decide whether they can be used for developing our e-commerce-ability concept.

DEFINITIONS OF E-COMMERCE

The understanding of e-commerce is widespread. A common definition is difficult to give because of many inconsistent approaches (Wigand 1997). Therefore a discussion of an appropriate definition is necessary.

Many definitions do not strictly separate e-commerce and e-business. However, the definition space of e-business is more complex and inconsistent. In this study e-business is interpreted as a superset of e-commerce: e-business are those business activities which (1) are a part of a value network, (2) address the customer process and (3) use information and communication technologies (ICT) in an integrative way based on the organizational and cultural rules of the networked economy.

Mostly definitions assume that e-commerce is enabled by the development and implementation of electronic media such as Internet, whereby it is not uniform in how far "old" electronic media like telephone, telex and television are included.

The definition of e-commerce as "doing business electronically" (European Commission 1997) is too broad and interpretable, whereas Gartner Group's definition (1999) "e-commerce is a dynamic set of technologies, applications and business processes that link corporations, consumers and communities" is too narrowly focusing on the transactional aspect. This focus is more explicitly followed by Timmers (1998) who defines e-commerce as "any form of business transaction in which the parties interact electronically rather than by physical exchange or direct physical contact". Other approaches in this direction mostly differ in the degree of detail of the trade / transaction process or in the selection of specific processes such as procurement or distribution (Aldrich 1999, Morasch et al. 2000). A further approach stresses the enhancements

evoked by the enabling technologies in form of more effective and efficient processes (cf. Baldwin et al. 2000).

Resuming this discussion, Kalakota et al. (1997) can be cited: "depending on whom you ask, electronic commerce has different definitions", particularly with regard to communications, business process, service and online necessity.

The definition used for the purposes of this article focuses on the transactional approach and uses the definition of Kalakota et al. (1997) as a basis: "buying and selling over digital media", whereas buying can be left out: if the buying process is electronic the selling process is electronic as well. To be more precise: goods can also be services and the selling process can be either sale, commerce or distribution, as digital goods can be sold for free. So e-commerce is the trade (sales, commerce, distribution) of goods and services, i.e. products, by electronic means.

As a consequence, e-commerce activities are mostly objectively observable activities of corporations. Implicitly it is also assumed that those activities have a deep impact on the structure of the corporation.

As already mentioned, m-Commerce can be interpreted as a subset of e-commerce by referring to those e-commerce activities that involve wireless technologies (i.e. mobile devices like handphones, personal digital assistants or handheld computers) (cf. Shih, 2002; Siau, 2001; Kalakota, 2002).

The conceptual differences between e-commerce and m-commerce are primarily based on the mobility or the location, respectively. Beyond transactions and information access, the location of m-commerce users can be determined which opens up new forms of services and transactions. On the other side corporations can reach specific users anytime and anywhere not only with regard to a specific person but also with regard to a specific geographical region which again

enables new forms to disseminate information to consumers (Siau, 2001).

Despite these differences we believe the e-commerce ability framework to be appropriate for m-commerce as well.

DIFFERENT APPROACHES AND FRAMEWORKS TO MEASURE E-COMMERCE-ABILITY

E-commerce-ability or readiness, the focus of this chapter, describes the capability of a corporation to perform e-commerce successfully. Generally, to analyze the capability, two questions should be answered: (1) What are the impacts or opportunities of e-commerce (2) How can e-commerce activities be analyzed and evaluated with regard to the specific situation and the strategy of the corporation? Numerous approaches give answers to those questions in different ways.

Many models that reflect, explain, or forecast factors and impacts on corporations often have a special and narrow focus. Schwartz (1998) for example claims essential principles to grow the business especially on the world wide web, as for example offer of experiences, compensation for personal data, high customer comfort, continual adaptation to the market or establishment of brands. Zerdick et al. (2000) and Kelly (1998), in contrast, are more general and describe ten theses for the new economy, e.g. digitalization of the value chain, attainment of critical mass or competition and cooperation by value networks.

Approaches of that kind are numerous, but even though most of them seem to be valid, the transformation into business is difficult. Reasons are a missing methodology as well as the absence of a holistic view or framework in which the interconnection and most important dimensions are considered.

An approach given by the European Commission (1998) partly considers those aspects and distinguishes several levels of e-commerce-activities in a continuum between easy and complex to implement into business respectively a continuum between standard and custom applications. Examples are electronic presences, national payment and international electronic distribution. The latter usually implies a high risk and high financial investments, whereas the others are mostly covered by standard and easy-to-realize applications. This model may give a clue for corporations on what they can do and which standard applications might exist, but a statement concerning their ability to do so or to know what to do cannot be made.

A model which takes this into account is proposed by Canter (2000). Starting point is the need for agility in the information age because corporations have to react faster on their quickly changing environment. Bases of the framework are the capability maturity model (CMM) of the Carnegie Mellon University's Software Engineering Institute (cf. Paulk et. al. 1993) and the decision cycle OODA (Observation-Orient-ation-Decision-Action). The five levels of the CMM are transformed into five levels with different characteristics of changeability and agility also known as the Change Proficiency Maturity Model (CPMM). This model can be used for business areas as vision and strategy, innovation management or relationship management. The aim is to assist the OODA-process supported by given tools to develop and reach a better maturity.

Even if the need for agility is accepted, the strong internal perspective which excludes external areas like external relationships or customer needs is the disadvantage of this model.

For the same reason approaches of Whitely (1998) and Grant (1999) cannot be used in this study. Likewise the maturity of businesses is treated by Anghern (1997), but with an external focus on business activities on the Internet as: information, communication, distribution and transaction.

With those he distinguishes levels concerning the customization and sophistication. Additionally

the author identifies a set of core competencies which are necessary to succeed within those levels. To summarize, this framework can be used for the "analysis of business-related Internet strategies, as well as a systematic approach to guide the strategic building process..." (cf. Anghern 1997).

However, the neglect of internal matters also excludes this and the similar approach of Burgess et al. (1999). Indeed those implementations demonstrate that multidimensional models are more adequate for the complex e-commerce environment but a holistic approach is missing.

Although PriceWaterhouseCoopers (PWC 2000) and similar Bain and Company (2000), presents such an integrated approach, they both refer to e-business. The PriceWaterhouseCoopers approach consists of nine dimensions:

- (1) E-business strategy
- (2) Organization and competencies
- (3) Business processes on the e-business value chain (advertising, ordering, delivery, billing, debt collection, customer care)
- (4) Web site performance (financially or otherwise)
- (5) Taxation issues
- (6) Legal and regulatory aspects
- (7) Systems and technology used
- (8) ICT and logistics processes
- (9) E-business security.

These dimensions are used on the one hand to evaluate the readiness of the corporation to develop and on the other hand to benchmark e-business performance.

Comparing those approaches with the proclaimed aim of the study we believe only the latter approaches of PriceWaterhouseCoopers (PWC 2000) and Bain and Company, respectively, to be appropriate. Nevertheless, they both have a too wide and complex scope for a quick and effective analysis of e-commerce activities.

Consequently a framework has to be developed which offers an integrative approach to the corporation and its capabilities as well as the coverage for most important success-defining factors.

DEDUCTION OF A CONCEPT FOR THE EVALUATION OF E-COMMERCE-ABILITY

The analysis concept for e-commerce-ability consists of two essential elements. First of all the framework for reflecting and comparing the patterns of e-commerce role profiles and secondly a valuation approach for analyzing the economic success of the e-commerce activities with regard to the value drivers of the corporation. Both elements combined enable the evaluation of the e-commerce-ability of a corporation. Moreover, after analyzing the current status of the e-commerce activities, management can decide on further steps to be taken to render them e-commerce-able in a successful way.

First pillar of the concept: A four dimensional framework for creating patterns

This basic framework consists of four dimensions which represent characteristics we think to be important for a corporation of the net economy (also cf. Figure 2).

Degree of orientation towards customer needs

All ideas presented in this paper are based on the strong belief that in the information age every corporation has to align its activities with its customers' needs. Information and communication technology (ICT) has on the one hand been an enabler for the extensive gathering and processing of customer data. On the other hand, ICT made possible the adaptation of a corporations range of services to customer needs. Therefore intensive consideration of customer needs seems to be an important means of differentiation. Often customers do not want to purchase a product or service, but rather intend to get a solution to a certain problem. This solution can be single goods and services or, more likely, bundles of goods and services. Successful e-commerce corporations offering those problem solutions therefore might be able to differentiate from their competitors (cf. Österle 2000, pp. 45-47).

Another means of differentiation might be the ability of a corporation to provide highly customizable products and services to their customers, i.e. to a certain extent enabling them to modify product characteristics.

Therefore, we define the following categories for the measure "Degree of orientation towards customer needs":

- Standard products: A corporation offers a range of products whose specifications are not modifiable.
- Mass customization: After intensively analyzing the customer needs, on the basis of standard products a set of customized products will be derived. Corporations offering those variations pursue the aim of making the product more attractive to groups of customers while at the same time limiting the costs of individualization.

- Full coverage of needs: This category is an extension of the previous one. A corporation does not only offer goods and services which are highly customizable as far as the individual customer needs are concerned, but also individual problem solutions consisting of a bundle of goods and services.

Degree of systematic and integral use of ICT

Over the past ten years, the role of information and communication technology has changed from a mere support function to a strategic tool for the generation of competitive advantages. We believe that e-commerce corporations need to pay special attention to the way of using ICT since they cannot – like in "normal" shopping marts – differentiate from their competitors by individualized face-to-face customer care. Instead they have to use electronic means for establishing the best possible customer relationship.

Venkatraman (1991) describes five levels of ICT-induced business reconfiguration:

- (1) Localized exploitation: On this level corporations use ICT to support selected business functions. Thus they can realize efficiency gains in isolated functions, without any influence on daily operative business. However, localized exploitation does not lead to gains in effectiveness. If ICT is used only localized, i.e. without any strategic vision, a corporation's competitors can easily copy it. Therefore no long-term competitive advantages can be generated from its usage.
- (2) Internal integration: This level is based on the localized exploitation of ICT. Internal integration enhances the benefits of localized exploitation by building an internal electronic infrastructure that enables the integration of tasks, processes as well as functions and therefore links all local ICT "islands". Internal integration aims at enhancing both efficiency (by reducing time and distance) and effectiveness (by improving information sharing

between business processes). It has the potential to be an effective means of differentiation from a corporation's competitors, since it enables the creation of unique business processes. According to Venkatraman (1991) those two levels form the basis for the purposeful deployment of ICT to 3. redesign business processes or 4. business networks and 5. redefinition of the business scope. Only by performing these activities, the potential of ICT can be fully exploited.

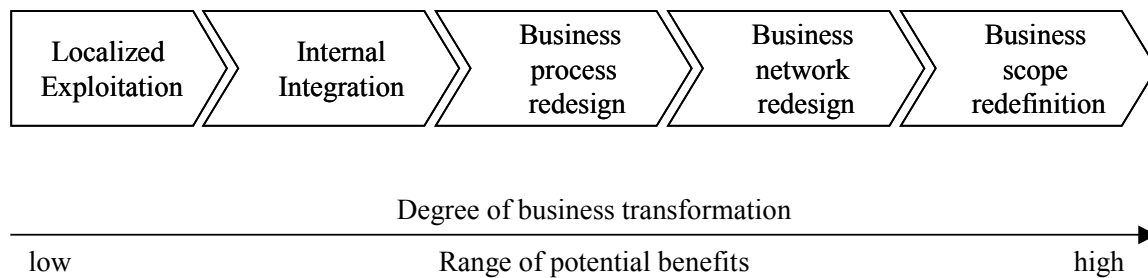


Figure 1: Five levels of ICT-induced reconfiguration (cf. Venkatraman 1991, p.127)

For the dimension "Degree of systematic and integral use of ICT" this results in the following three measures:

- Support of internal or external business processes: This degree corresponds to Venkatraman's level of internal integration. Moreover, integrated internal or external workflows become possible by integrating ICT solutions that support local business functions.
- Support of internal and external business processes: This degree enhances the first one by enlarging the extent of supporting business processes not only internally *or* externally, but both at the same time.
- Support of internal and external as well as inter-organizational business processes: ICT in this case is also used to support inter-business processes and thus enables the design of more efficient and effective processes throughout a business network.

Degree of the alignment of the business towards organizational and cultural rules of the net economy

Besides answering the question of the optimal degree of external coordination, a successful e-commerce corporation also has to think about how to align its internal organization towards organizational and cultural rules of the net economy. It has to review whether its organizational structure corresponds to the requirements resulting from the fast changing environment.

Basically there are two extreme values within this dimension: on the one hand structures characterized by a high degree of organizational rules and hierarchy (e.g. matrix organization, divisional organization), and on the other hand very flexible organizational forms (e.g. project organization) where durable structures only exist during a certain project or task. The question whether the one or the other form of internal organization is more appropriate for a successful e-commerce corporation cannot be answered in general terms.

The fast changing environment (technological innovations, new competitors, etc.) and an increased necessity to satisfy the ever rising customer needs require the ability to flexibly make changes in the internal organization. However, there might be a critical size where corporations cannot exist anymore without a set of organizational rules (i.e. hierarchies).

Degree of external coordination

This dimension has been added to our framework since we recognized that in the information age some general conditions have been changed which allow new efficient forms of interorganizational coordination. Our ideas are based on the relation established by Coase (1988) between the cost of using the price mechanism of a market and the existence of firms. The main reason for the existence of a firm is that "... the operation of a market costs something and that, by allowing some authority (an "entrepreneur") to direct the resources, certain marketing costs

are saved" (Coase 1988, p. 40). Examples for those marketing (or transaction) costs are the costs of information procurement and processing or the costs of contracting.

The emergence of internet technologies has resulted in a dramatic decrease of transaction costs. Examples are the costs of looking up business partners in electronic directories or the costs of exchanging data with them.

At the same time, internet technologies also contributed to decreasing costs of intraorganizational activities. E.g. internal workflow management systems and document management systems dramatically reduced the processing time of certain business transactions and therefore increased the throughput.

Depending on the individual corporation, the decrease in transaction costs may exceed the decrease in intraorganizational costs or vice versa. Therefore forms of external coordination via markets may become more efficient than the currently prevalent coordination within a firm.

Successful e-commerce corporations need to observe these trends, analyze their coordination of production and possibly adapt it to the new situation.

One possible form of adaptation might be to form alliances with certain corporations and to split the value chain into single steps, each of them to be provided by one corporation. An even more ambitious approach could be to participate in a value network, where each partner performs a dedicated role and is responsible for maintaining and driving both communication and cooperation concerning his "node" in the network.

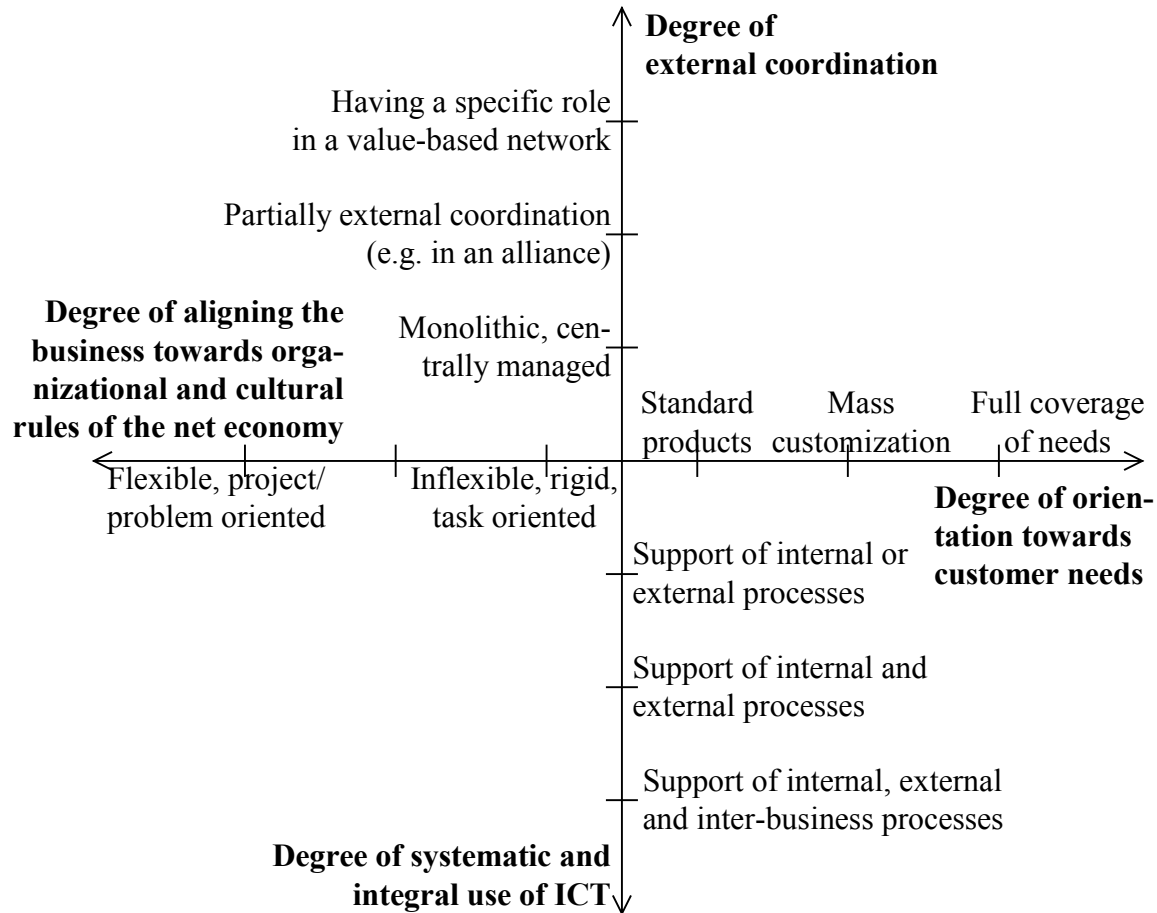


Figure 2: Framework for creating patterns of roles in the e-commerce environment

ROLES IN THE E-COMMERCE ENVIRONMENT AND THEIR PATTERNS

A large number of classification approaches for e-commerce have already been proposed (cf. Dubosson-Torbay et al 2002). The most simple is based on the reflections of Coase (1988) or the intermediation and disintermediation thoughts of Benjamin et al. (1995). Basically there are two roles in the e-commerce environment which we included into our framework. This is first of all the role "service provider (SP)" who is specialized in the production of very specific goods or services that correlate to its core competencies. Secondly, there is the "service integrator (SI)"

whose main goal is to fulfil a certain need of a customer which mostly consists of many different goods and services which must be combined to one solution. The SI integrates all the necessary products and sells this individual solution to the customer. Thus, the definition of these roles bases on different requirements.

The SP role requires very good logistics, i.e. deliver the product at the right time, in the right amount, in the right quality, to the right addressee. The addressees or customers, respectively, can be both different SIs needing the product for creating the individual customer solution and the end customer him- or herself, who only expects a certain product, but not a specific solution or service. Since the performance of this role is very specific and mainly targets effectiveness and efficiency of the process, thus also focusing on economies of scale, for example, it shows a pattern with the following characteristics regarding the different dimensions (also cf. Figure 3):

Dimension	Characteristic
Degree of orientation towards customer needs	The SP only produces standardized or mass customizable products due to reasons of efficiency, e.g. to be able to realize a very short "time to customer".
Degree of systematic and integral use of ICT	In this case, it is not necessary to realize the highest possible degree, because the external processes are fixed and do not request a fully flexible integration or coordination of constantly changing services, for example.
Degree of the alignment of the business towards organizational and cultural rules of the net economy	Due to reasons of efficiency and a short time to market, the organization should be task-oriented and have a hierarchical structure. This leads to standardized processes which seem to be helpful as far as the implementation of a short lead

	time of the core processes is concerned.
Degree of external coordination	Since the SP has a very specific and clearly defined role in a value-based network, the degree of external coordination is high, although with a limited set of partners.

Table 1: Characteristics of the SP regarding the dimensions of the e-commerce-ability framework

The SI role, however, requires a maximum amount of flexibility as regards the creation of the performance needed. Therefore, effectiveness and efficiency, although of course still being important due to economic reasons, are not considered main targets. Much more important is the good and lasting customer relationship which is established by the ability to coordinate many different partners to establish a large "pool" of goods and services from which the most eligible ones can be chosen dynamically to create the best possible solution for the end customer. Taking this into account, we can deduce the following characteristics as regards the dimensions of the framework for the SI, also depicted in Figure 3:

Dimension	Characteristic
Degree of orientation towards customer needs	The SI provides full coverage of any need the customer states.
Degree of systematic and integral use of ICT	The maximum degree of this dimension should be reached in order to establish the most efficient integration process possible.
Degree of aligning the business towards	Since each need is individual, the organization must be very flexible and problem-oriented. Creativity for problem

organizational and cultural rules of the net economy	solving is mandatory and is difficult to create in a rigid environment.
Degree of external coordination	The SI also has a very specific and clearly defined role in a value-based network, thus the degree of external coordination is very high.

Table 2: Characteristics of the SI regarding the dimensions of the e-commerce-ability framework

Integrated into the framework, the following patterns evolve:

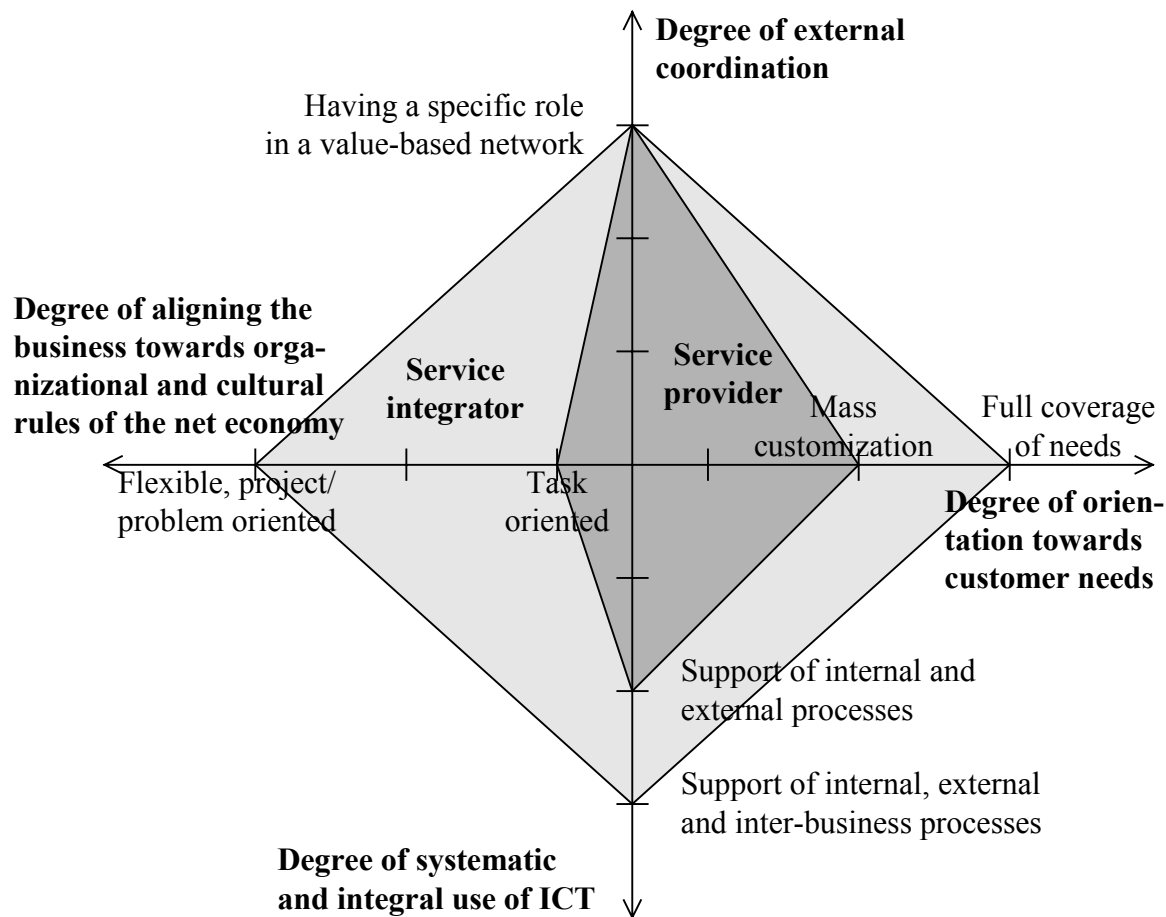


Figure 3: Patterns of the roles of SI and SP in an e-commerce environment

Having identified the patterns the different roles in an e-commerce environment should have, we now have to define the second part of being successful, i.e. we have to develop a concept for evaluating the economic success of e-commerce activities.

VALUE AS SECOND PILLAR OF EVALUATING THE SUCCESS OF E-COMMERCE ACTIVITIES

The success of a business model can be measured in many different ways. The most common way is to quantify it using financial figures such as the Return on Investment (ROI), Earnings before Interest and Taxes (EBIT), Cash Flow (CF). The shareholder value discussion focuses on long term sustainability and thus uses ratios such as the Discounted Cash Flow (DCF) or Economic Value Added (EVA) (Stern et al. 2000). Business models of the net economy, however, have proven that the mere consideration of financial figures is not sufficient. Especially in the first stages of a start-up (i.e. the lowest point of the so called "hockey stick", where the main financial figures take a dive) financial ratios are not sufficient for reflecting the real value of a corporation. Therefore, we think that although financial figures still play an important role, they have to be complemented by qualitative parameters. Moreover, we base on the shareholder value approach for evaluating success. The term "value" implies that we drop the short-term perspective and analyze the medium to long-term substance and sustainability of a corporation. Value is often defined using operating performance and long-term growth. Since this does not represent all perspectives of shareholder value, but only the financial ones, the important elements of creating shareholder value are depicted in Figure 4 (Copeland et al. 2000, p. 91).

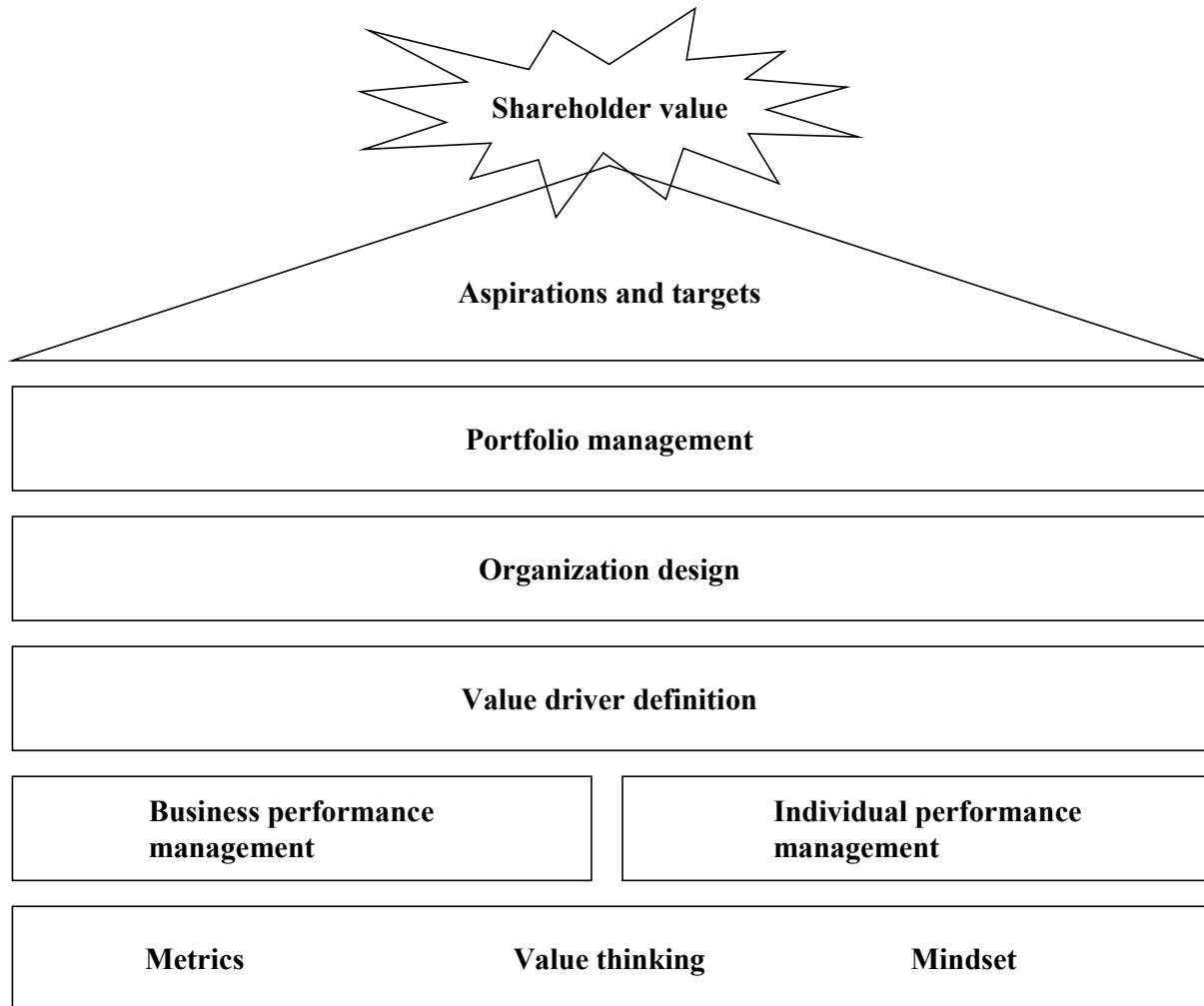


Figure 4: Important elements of value creation

The main reason for our decision to choose this approach is our definition of "successful" as the creation of value over a medium- to long-term period of time.

Applying the shareholder value approach for these kinds of business models we base on Copeland, Koller and Murrin (cf. here and in the following Copeland et al. 2000) and thus choose the quantitative as well as the qualitative parameters from the value drivers discussed there. Value drivers are those factors which have the highest impact on value both as regards day-to-day business as well as investment decisions having a medium- to long-term horizon.

Thus, value drivers are performance indicators that differ from corporation to corporation, but have to be fully understood on each management level to be able to control value.

Copeland et al. suggest the drawing of a value tree for the representation of the value drivers chosen. We now adapt this for our purposes of valuating e-commerce activities of a corporation.

The e-commerce value tree is built by the following value drivers

- *Contacts over electronic channels* with the "branches" *types of information requested, customer segments attracted, and time to reaction*
- *Goods and services traded over electronic channels* with the "branches" *types of products traded, lead time of process and customer satisfaction*
- *Traditional profit and loss tree* with *ROIC (Return on Invested Capital)* and the "branches" *revenue, costs and capital charges*

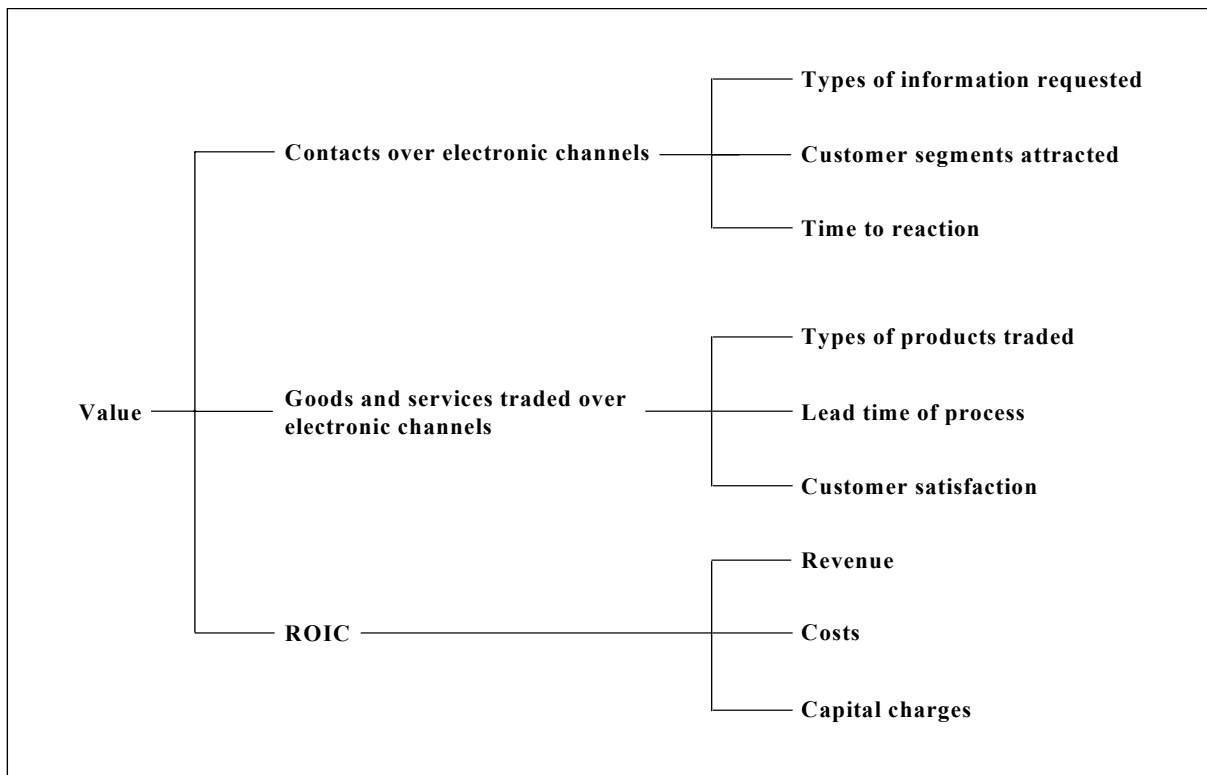


Figure 5: Value tree for valuing e-commerce activities

The value tree can be enlarged or modified according to the analysis needs of management. Moreover, key performance indicators (KPI), which serve as metrics for operationalizing the value drivers, have to be defined (e.g. for the value driver "customer satisfaction" a KPI "# of returned products" and/or "% of returned feedback questionnaires below the evaluation <satisfied>" could be defined). There are a few more points which ought to be observed for successfully using the value tree: Firstly, it must be designed according to the specific analysis needs, the operative and strategic requirements and the environment of the corporation. Secondly, it must be appropriately cascaded down to each management level in order to ensure that its implications and the individual contributions to success become clear. Thirdly, it must be analyzed over several consecutive periods to be able to observe changes and decide on actions in case of unwanted deviations. Moreover, it must be regularly adapted in order to be able to take the current requirements of e-commerce and competition into account.

CONCLUSIONS

The above developed concept is a first step towards analyzing e-commerce activities in a broader context of qualitative and quantitative parameters. It is designed to support management decisions regarding the medium and long-term strategies focusing on e-commerce activities and moreover to enable the evaluation of the current status or rather position as far as e-commerce-ability, i.e. the ability to perform successful e-commerce, is concerned.

The next step must be the validation of the concept by applying it to e-commerce corporations and enhance it by developing a rule base for e-commerce success patterns regarding different business models within the role profiles.

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