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Most companies are hardly ready to address current business challenges as far as their knowledge resources are concerned. Instead of making best use of their non-tangible assets they keep their knowledge to themselves. This effect is even stronger in virtual enterprises, which provide value to the user only when they combine their knowledge resources. There is a clear lack of a methodology to turn knowledge resources into profitable goods by a suitable business model. This article presents an approach to address this issue. A case study is presented for the automotive after-sales service sector taken from the European Research project MYCAREVENT.

1 VALUE GENERATION FROM KNOWLEDGE RESOURCES IN ENTREPRENEURIAL NETWORKS

The European economy faces an ever increasing competition by Asian “Tiger States” as well as other emerging economies. Being characterized by rather high wages, economic growth can thus only result from innovative products and especially services making best use of available resources. The European Commission has realized this fact in due time and set out the well-known “Lisbon Objectives”. These formulate the political goal to turn Europe into the most dynamic knowledge economy in the world. Following this trend, companies consider knowledge to be a major success factor in today’s business environment.

In parallel it can be observed that the complexity of value generation is ever increasing. Customer value is more and more not only delivered by a single company, but a network of partners up to completely virtual organisations. While research has tackled a number of issue which are related to these developments, the implication of business modelling in the area of virtual organisations have rarely been addressed. In order to make best use of their knowledge resources, however, entrepreneurial networks require a systematic guidance on how to *design* their businesses in order to provide customer value based on their knowledge.

This can be observed on numerous industry sectors, but is especially visible in such industries which deal with complex products (which means a high demand for sophisticated knowledge) but are traditionally based on expensive physical goods. Examples are the automotive sector and heavy investment good industries, such as textile machinery.

2 CHALLENGES, REQUIREMENTS AND NEED FOR ACTION

Service-oriented virtual enterprises require sophisticated methods to make best use of their combined knowledge resources. In order to successfully develop a business, a dilemma needs to be solved: on the one hand, clear strategic guidelines are required. They ensure a coherent and consistent progress in the business. On the other hand, this must not lead to a static, inflexible organisation, as this would prevent a quick re-adjustment of the business to changes in the market arena and render the idea of a virtual organisation useless. A clear area for flexible development is thus required.

Consequently, a successful business design approach needs to cater for both requirements. In coherence with the concept of integrated management presented by (Bleicher, 2004) this can be achieved by defining a hard (normative) aspects as a static framework and a soft development aspects in each of the design areas laid out above. Service-oriented virtual enterprises require sophisticated methods to make best use of their combined knowledge resources.

3 STATE OF THE ART

In management literature there are various descriptions and definitions of business models (Chesbrough, Rosenbloom, 2002), (Afuah, Tucci, 2001), (Osterwalder, Pingneur, 2002), (Timmers, 1998), (Wirtz, Kleineicken, 2000), (Knecht, Friedli, 2002). Accordingly, there is little common understanding about the term business model. In order to select a suitable starting point for the elaboration of an innovative approach to do business modelling for a networked organisation, a systematic and analytical research of business modelling approaches has been performed. The following criteria were analyzed:

- *descriptive or design oriented*: Is the approach aiming at providing an action plan (how to elaborate a business model) or does it 'only' describe different types or elements of business models?
- *service oriented, production oriented or unspecific*: Business models for services differ from business models for organisations in the production sector. Is the business modelling approach for one of these categories or is it on a more generic level?
- *inter- or intra-organisational*: Does the business modelling approach consider the environment of the organisation (e.g. partners, markets) or does it focus on the internal organisation (e.g. products, services, processes).
- *e-business oriented*: Is the approach especially targeted for e-business issues?
- *micro- or macro-level*: How detailed is the business modelling approach?
- *information/knowledge oriented*: Does the business modelling approach include information and/or knowledge as part of the business model?
- *theory-based or based on empirical data*: is the approach built on well-recognized theories or are there mainly case studies/empirical data to validate the approach?
- which *sub-models* (if any) does the approach include?

Based on the preceding focus categories, different concepts for business models were classified. (Afuah, Tucci, 2003), (Alt, Zimmermann, 2001), (Scheer, Deelmann, Loos, 2003), (Gordjin, Akkermans, 2001), (Chesboom, Rosenbloom, 2000), (Kim, Mabourgne, 2002), (Knecht, Friedli, 2002), (Kollmann, 2003), (Osterwalder et al., 2004), (Timmers, 1998), (Wirtz, Kleineicke, 2000), (Wölfle, 2000), (Forzi, Laing, 2002). The HVC approach, presented by (Forzi, Laing, 2002), was selected as best fit with the requirements of a virtual enterprise which aims at enabling extended, knowledge based services. This result was mainly based on three arguments:

1. The HVC is design and service oriented. (preceding points 1 and 2)
2. It includes all important sub-models which are discussed within other modelling concepts and therefore can be seen as a superset of relevant sub-models.
3. It is extendable and adoptable to special requirements for virtual enterprises.

Although HVC being the best fit, extensive enhancements within each sub-model had to be performed to further develop an innovative methodology to support extended products and services for different sectors.

4 RESEARCH APPROACH AND RESULTS

The design of new business models for networked organizations, which are feasible and sustainable is a challenging task. On the one hand, all partners in a virtual enterprise are independent entities taking their own decisions. On the other hand, the network is the perceived entity delivering value to the customer and is thus the body competing on the market. Consequently, business decisions need to be taken on both levels. Considering the sub-models suggested by (Forzi; Laing 2002), these can be defined as “*local* business modelling”. Thus, the sub-models are below referred to as the local models. The local business modelling takes into account the fact that a company always only has full control over its internal state. Even companies acting in a network of partners can only enforce decisions which are limited to their own processes and behaviour. Despite this, the companies in the network depend on each other and thus have a strong general interest to foster their common market. Thus, *global* aspects, which cover the network as a whole, also play a crucial role in the modelling of networked businesses. These aspects influence decisions made by the members of the network. Therefore, the local models have to be carefully designed.

Following the approach of (Bleicher 2004), the design of these models is performed by a number of dichotomic positions within the different design areas. Subsequently, these are presented for two example sub-models: the network model and the revenue model.

4.1 Network Sub-Model Design

The HVC network sub-model defines the parameters which are the basis for the interaction of a company in question with its environment. In case of knowledge centred services, these dimensions have been found to be:

- *application of information and communication technology*: This defines whether newest (pioneer) or well-established (follower) technologies are used to interact with others. Pioneers can leverage recent technology potentials, but cannot rely on a general compatibility of their systems with other partners
- *contract negotiation*: All business related activities rely on customer-supplier relationships. This is also true for knowledge centred services. However, as explicit knowledge is immaterial, it can be easily transferred via electronic networks. Consequently it has to be designed, whether any source of knowledge is acceptable ad hoc (dynamic) or only validated, pre-selected sources can be used for customer value generation (static)
- *technical protection of intellectual property*: Recent discussions (Jobs, 2007) have again demonstrated the dilemma between strict technical enforcement of digital rights management as a technical means of intellectual property protection and customer acceptance.
- *application of standards*: Cooperative business requires standards to operate. It is thus necessary to decide whether they are set up making use of existing standards (conformist) or rather define their own standards (trend-setter).
- Figure 1 below shows the design frame for the network sub-model in knowledge centred cooperative businesses:

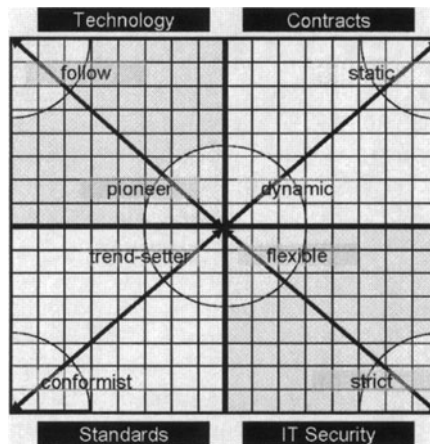


Figure 1: Network sub-model design dichotomy

4.2 Revenue Sub-Model Design

One obvious aspect in designing a business is the consideration of how revenues are generated. Examining the crucial aspects in this field, it was found that four considerations define the design of the respective sub-model:

- *pricing policy*: The price charged for the value created is obviously one of the most decisive factors for the sustainability of any business. It is essential to define a congruent pricing policy. Depending on the market environment, prices can follow a penetration, neutral or skimming approach.

- *granularity*: The value created for the user and thus the achievable turnover needs to cover variable as well as fixed costs. Consequently, a balance has to be found between the sales of large, static packages (e.g. chunks of information, access time intervals) and small, flexible portions provided to the market.
- *degree of dependence*: The generation of values is usually not independent from other resources and other companies which deliver complementary products or services. In some cases, the value of a service is not a direct benefit to the user of the service, but rather an increase in efficiency for another company which can then deliver their products or services more efficiency. In this case it is required, that this company subsidizes the knowledge based service in form a reserve charging.
- *point(s) of sale*: One more crucial aspect for knowledge services, especially in networked environments, is the number of “points of sale”. This refers to the number of different (virtual) places from where the user gets invoices. This is especially sensitive in relation to information based services, as these are particularly characterized by ease-of-use. This concept is also expected to be pursued for the invoicing processes. However, this is associated with large hurdles (e.g. due to the lack of standards in this field, company politics, confidentiality reasons, etc.). In the design process for knowledge businesses, this has to be carefully considered.

Figure 2 shows the design dimensions as a diagram:

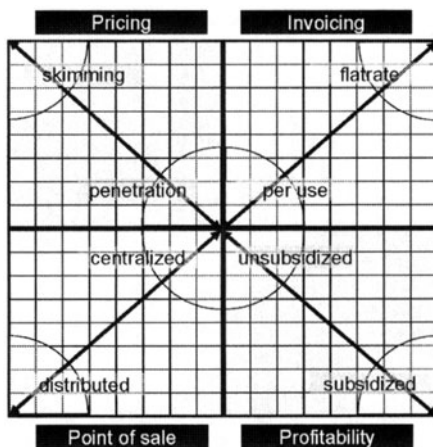


Figure 2: Revenue sub-model design dichotomy

4.3 Global Business Aspects: Business Aspects

Business models for virtual organisations will obviously need to take the (virtual) enterprises’ strategy into explicit account, in order to guarantee a sustainable success. This means, that the strategic directives of each individual company, as well as those of the business network as a whole has to set the frame for all business operations.

The “House of Value Creation” as a methodical approach structures and describes all business elements in partial models and thus allows for detailed analysis of

companies *and collaborative networks* (Forzi, Laing, 2002). In order to represent the complex business structure of the market a composition/decomposition derivate of the HVC approach is required in order to enable each network partner of the virtual enterprise to plan its business on its own while keeping the overall business structure in mind.

In order to understand business relationships partners these have to be made transparent. In a network like the automotive industry, such relationships are extremely complex and reach far beyond a simple customer-supplier relation. In order to capture these, a business map has been found to be a valuable tool. The business map has been developed to display how changes to the business models of one company have an impact on its environment, i.e. cooperation partners. The different sub models of the relevant companies as defined by the HVC approach are analysed. Subsequently, the business relations are examined and documented on sub model level. The result is a graphical representation of the market relations between different players. This can be either focused on one particular player (as seen in Figure 3) or represent a wider view on all relevant market players. For early analysis of markets it has proven to be helpful to define more generic roles rather than individual companies as the starting ground for the development of business maps. Figure 3 shows an example for a business map focussing on the role of an “application service provider” in a knowledge provision market situation.

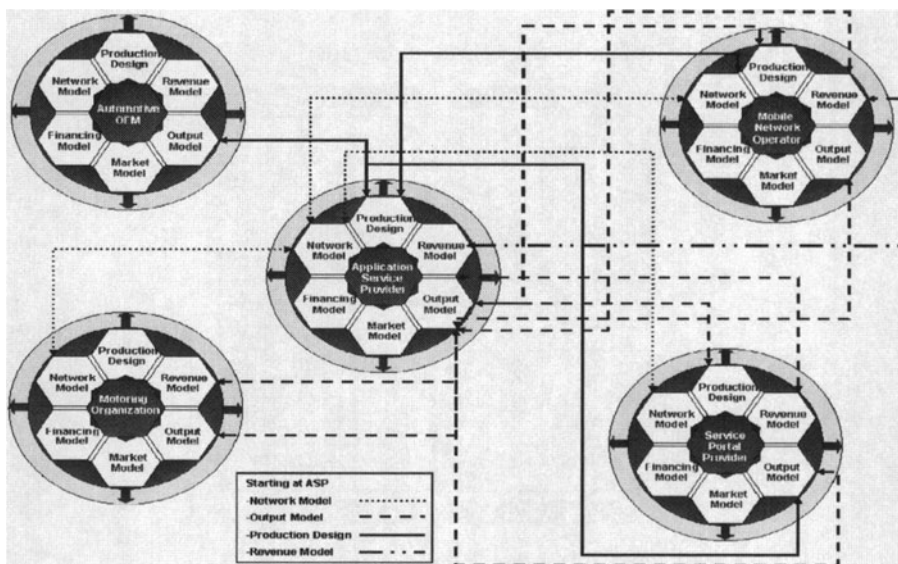


Figure 3: Application Service Provider Business Map

On the basis of these business maps for the different roles or partners within the virtual enterprise, each of the sub-models of the HVC can be adjusted or refined. Therefore, a definition of all valid types of relations between partners for all sub-models and for all interactions within the sub-models is required. On that basis the explicit specification for each of the interactions can be made respecting the overall business structure and at the same time each partners’ business strategy.

5 CASE STUDY IN THE AUTOMOTIVE INDUSTRY

The methodology presented above has been used in a European research project to establish not only breakthrough research results, but at the same ensure their take-up by commercial companies. In the MYCAREVENT project (IST – 04402) more than 20 partners develop an infrastructure to provide mechanics and drivers with exactly the required information in situations of vehicle maintenance and breakdowns. In congruence with the previous sections, Figure 4 presents the results of the analysis for the network and pricing sub-model for the entity operating the service portal.

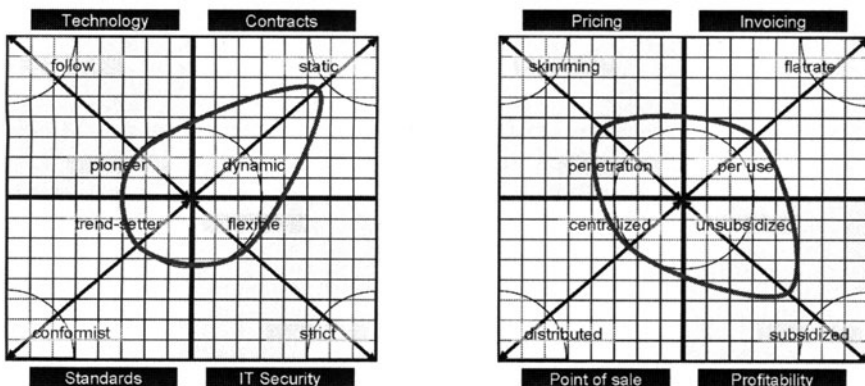


Figure 4: Design results for the portal operating entity of MYCAREVENT

It can be seen, that very clear design decisions have been made to ensure a successful take up of businesses. To further break down this example the cash flow model implemented within the network sub-model for all participants serves as a good case. Figure 5 presents a scenario to provide mobile extended services to the end customer via a central service portal. In this example the applications provided by the application service provider are paid by the service portal provider. The service portal passes applications on to the user, who only pays to the service portal for both services, repair information and application provision (centralized point of sale, see Figure 4). The service portal provider distributes the funds from the user to the service, information and application provider.

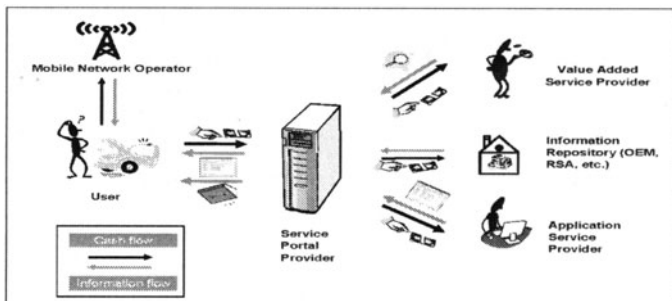


Figure 5: Example for the cash and information flow within MYCAREVENT

Based on the results of these designs an in-depth market analysis has been performed (MYCAREVENT 2005). The businesses which have been designed using

this approach have been analysed especially in regards to what customer value can be achieved by their application. The results of this market analysis and sub-sequent business planning exercise were extremely encouraging. It was found that applying the business models as they were laid out, a considerable market potential can be tapped into. Thus, the goal of a knowledge based economy can be argued to be very much facilitated by the approach presented.

6 CONCLUSION

The tendency towards a knowledge based economy even in virtual enterprises cannot be denied. However, during our research work it has become clear that designing businesses in such fields is an extremely challenging task. Consequently, structured methods are a definite requirement to achieve this important goal. The impressive result of the application of such methods is demonstrated by the results of the case study. The discovery of a substantial market volume along with the proof of feasibility of the calculations for a complex network with 20 partners shows that the methodology developed represent a major step to support virtual enterprises to reach the goal of knowledge based business operations.

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