UNIVERSITÄT KOBLENZ · LANDAU

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Fachbereich Informatik
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CORPORATE STRATEGIES FOR ELECTRONIC COMMERCE - STEPWISE REFINEMENT AND MAPPING TO GENERIC BUSINESS PROCESS MODELS

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Die Arbeitsberichte des Instituts für Wirtschaftsinformatik dienen der Darstellung vorläufiger Ergebnisse, die i.d.R. noch für spätere Veröffentlichungen überarbeitet werden. Die Autoren sind deshalb für kritische Hinweise dankbar.

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Abstract

This working paper presents a method that supports the development of E-Commerce systems that are in line with a company's long term strategy. The method, E-MEMO, is being developed within the project ECOMOD that is funded by the German National Research Foundation (DFG). The method includes two major steps. Firstly, it guides the stepwise derivation of a business strategy for E-Commerce from a given set of generic strategies. For this purpose, it takes into account general approaches to support strategic design as well as the peculiarities of strategies for E-Commerce. Secondly, it supports the refinement of a strategy down to the operational level, namely to a set of business processes and the resources that are required by these processes. This is done by selecting appropriate business processes based on certain features of the strategy.

1 Introduction

ECOMOD, a project funded by the German National Research Foundation (DFG), is aimed at supporting companies, especially small and medium sized companies (SME), both with developing successful strategies to exploit the potential offered by the Internet and with implementing a particular strategy on the organisational level. For this purpose, we are adapting MEMO, a method for multi-perspective enterprise modelling ([Fran97], [Fran02]). The resulting method, called E-MEMO, guides the development of infrastructures for E-Commerce, by two process models. An evolutionary model shows a long term path of development into E-Commerce (see [FrLa04] pp. 3). It includes four prototypical stages. It is accompanied by a micro process that provides a guideline for concrete projects (see [FrLa04]). The micro process includes five prototypical stages, each of which is described in further detail according to a certain structure (see Figure 1).

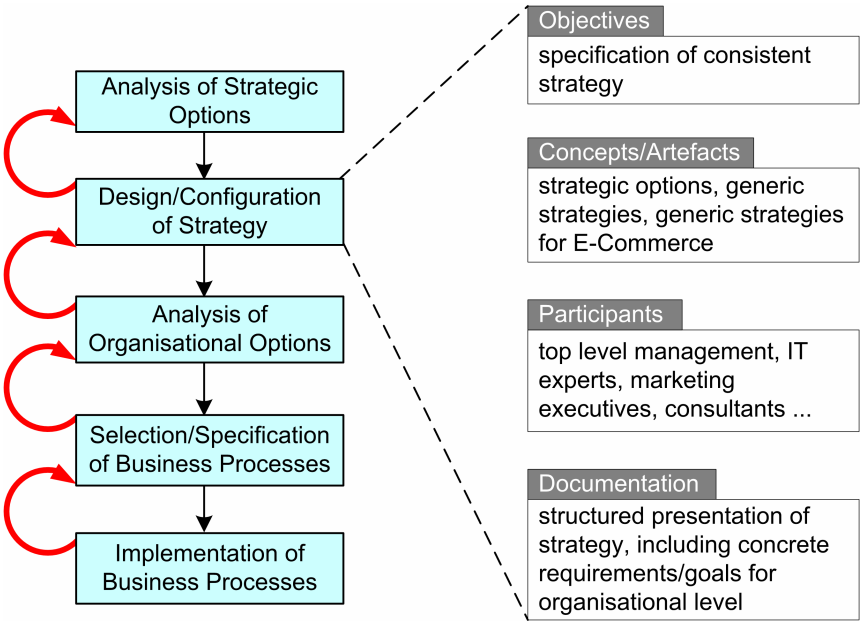

Figure 1: Micro Process of E-MEMO.

A previous report [Lang03] introduces a comprehensive framework to support the development of business strategies for E-Commerce. In this report, we will show how to bridge the gap between a business strategy and its implementation. For this purpose, we

will consider a smaller scope of strategic options, which are refined in a way that prepares for the following selection/refinement of business processes.

2 Scope of ECOMOD

There is an enormous range of possible strategic and organisational settings that somehow make use of E-Commerce. Therefore, feasibility reasons demand to focus on a sub range. Since E-MEMO is intended to be a generic method, we will primarily focus on generic patterns of strategic design and their transformation into corresponding organisational settings. This excludes, for instance, strategies that are based on peculiarities of special products or customers. Within ECOMOD, the main approach to support the implementation of business strategies is on reference models of business processes. For this reason, our emphasis is on strategies that are being implemented through the (re-) design of business processes. In addition to these considerations, we suggest a focus that is defined by three dimensions: *generic strategy*, *evolutionary stage*, *internal value chain*. In his seminal work on strategic planning, Porter differentiates three generic strategies: *focus*, *cost leader* and *product leader* [Port85]. In this dimension, the focus of ECOMOD is on cost leader. This is for two reasons. Firstly, we assume that especially with SME, the potential for cost reduction through Internet technologies is of crucial importance for sustainable competitive advantages. Secondly, we assume that this generic strategy is better suited to find general patterns both for particular strategies for E-Commerce as well as for corresponding business processes. Focus and product leader require taking into account specific peculiarities of customer demands or products. With respect to the dimension *evolutionary stage*, we focus on performing transactions. We assume that this stage is of pivotal relevance for most SME for a number of years to come. Despite its potential, cross-organisational value chain will be too much of a challenge for many SME these days. Finally, there is the internal value chain. Particular aspects of E-Commerce may penetrate the entire value chain. Our focus is on *procurement* and *sales*. Note that we use a conceptualisation that is different from the one Porter suggested: procurement includes aspects of inbound logistics, and sales include outbound logistics. We do not take into account operations, such as production, especially because of the tremendous contingency of this activity. Figure 2 illustrates the focus taken in ECOMOD.

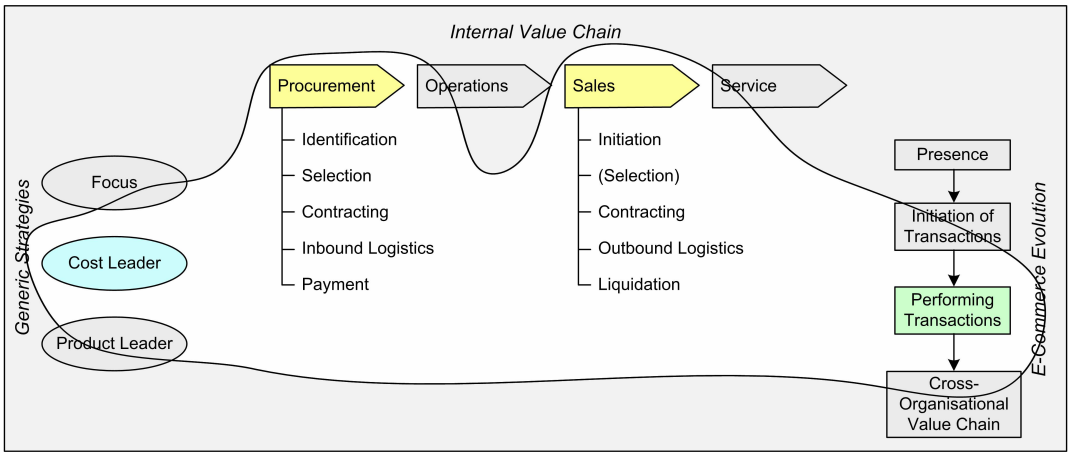

Figure 2: Focus of ECOMOD.

Note that we do not intend to take the focus too seriously. In some cases, it makes sense to take into account aspects that are outside the focus. If, for instance, cost reduction results in opportunities for new products and services, this should not be neglected. This is also the case, if after-sales service allows for competitive advantage. Furthermore, structural change may imply the elimination of intermediaries, which can lead to an internalisation of former external services. Hence, in those cases, the focus is not strictly on the internal value chain. In general, the *integration* of procurement and sales with other activities cannot be neglected.

3 Integration of Strategic and Operational Level: Requirements

The framework should not only support the stepwise refinement of business strategies. In addition to that, it should promote a tight integration of strategic and operational level. Within ECOMOD, the operational level is mainly specified through business processes. Hence, there is need to integrate strategy models with business process models.

Integrating two systems – or two universes of discourse - implies the existence of *common terms*. The more specific these terms, or in other words: the more semantics they include, the higher the level of integration. In this context, we consider semantics very much as information content, i. e. the more possible interpretations of an expression are excluded, the higher its semantics. If, for instance, a particular strategy includes the

term ‘cost reduction’ or a proposition like ‘substantial cost reduction is mandatory’, it leaves a lot of room for interpretation of how this should be realized on the operational level. This would be different with terms such as ‘automated contracting within order processing’. However, the borderline between strategic and operational level is not static. The strategic perspective is aimed at concepts or propositions that are regarded to be essential for a successful evolution of a company. At the same time, it should exclude concepts or propositions that are subject to change, which can be replaced by functionally equivalent or better alternatives. Of course, the level of abstraction to choose for strategy design depends on the time frame. Within ECOMOD, the operational level is essentially defined by a set of generic business process models. Hence, strategy design should eventually result in targets, guidelines or aspects that can directly be used to describe – and eventually select - corresponding business process models. Fig. 5 illustrates the integration of strategy design with business process models.

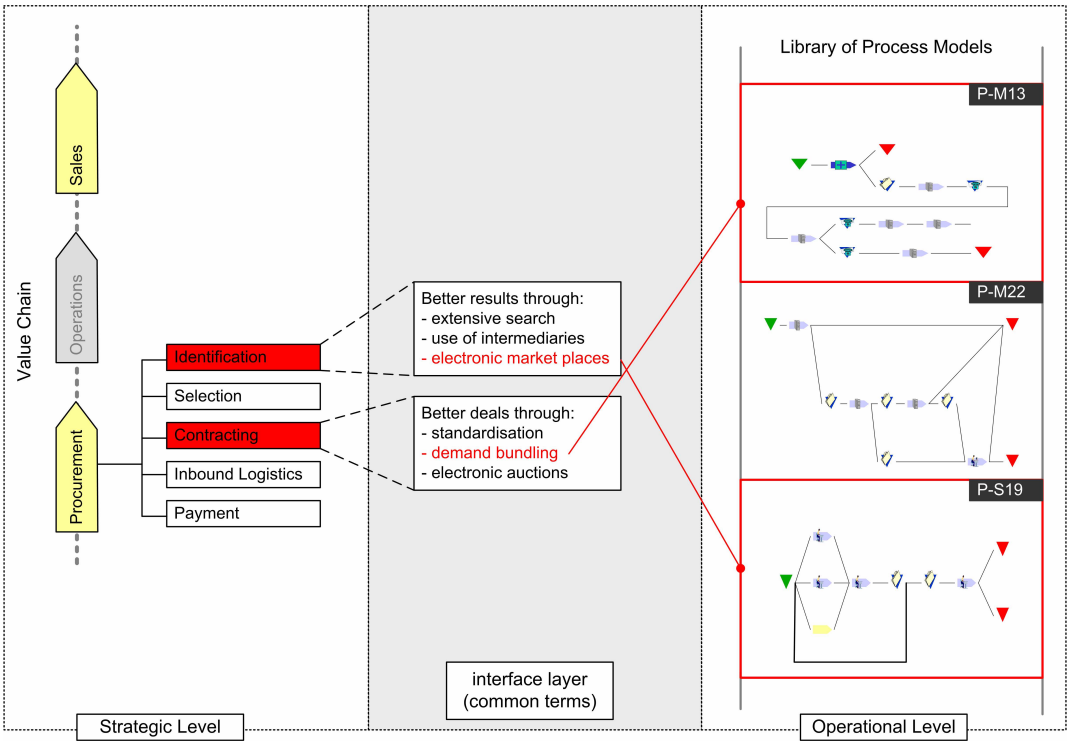

Figure 3: Integration of Strategic and Operational Level through common Terms.

4 Categories of Generic Strategies

The conceptual framework that we introduce in this report is to guide the stepwise refinement of generic strategies, where our main, but not exclusive, focus is on the generic strategy 'cost leadership'. The approach we suggest includes five parts. The first two parts are not directly focussed on cost reduction. Instead they emphasize revenues and customer relationships, which are of crucial importance for increasing margins. The third part includes concepts that support the refinement of strategies to make *sales* more competitive. The fourth part is focussing on *procurement*. Finally, the fifth part is dedicated to the *integration* of the internal value chain. Note, that there is overlapping of these parts. Every part will be illustrated by a decision network that is intended to show essential strategic options and their relationships. We do not claim, however, that the decision networks are comprehensive. Each strategic option can be characterized by the volume of investment required, the cost structure (variable vs. fix) and the associated risk. Strategic options can often be combined into an individual strategy. The terms that constitute the interface to the process library are printed in blue. The level of refinement that can be accomplished varies with the strategic options. In some cases, an option allows for numerous variations, in other cases, a strategic option is related to one or a few implementation alternatives only. Some of the strategic options that are named in the decision networks do not require the (re-) design of business processes (or the selection of a process in the library). These options are displayed in grey boxes.

4.1 Focus on Revenues

Increasing revenues can directly contribute to growing margins, if costs do not grow too progressively. Increasing revenues can also indirectly contribute to growing margins by taking advantage of economies of scale, which result in diminishing costs per unit – both in operations and procurement. Figure 4 shows the corresponding decision network.

4.2 Focus on Customer Relations

Among other things, E-Commerce is affecting communication with customers. On the one hand, this will often mean that communication get poorer. On the other hand, however, Internet based communication media offer the chance to gather data about customers that allow for individualized communication and services, hence, for an effective

customer relationship management. Strategic options for Internet -based CRM are shown in Figure 5.

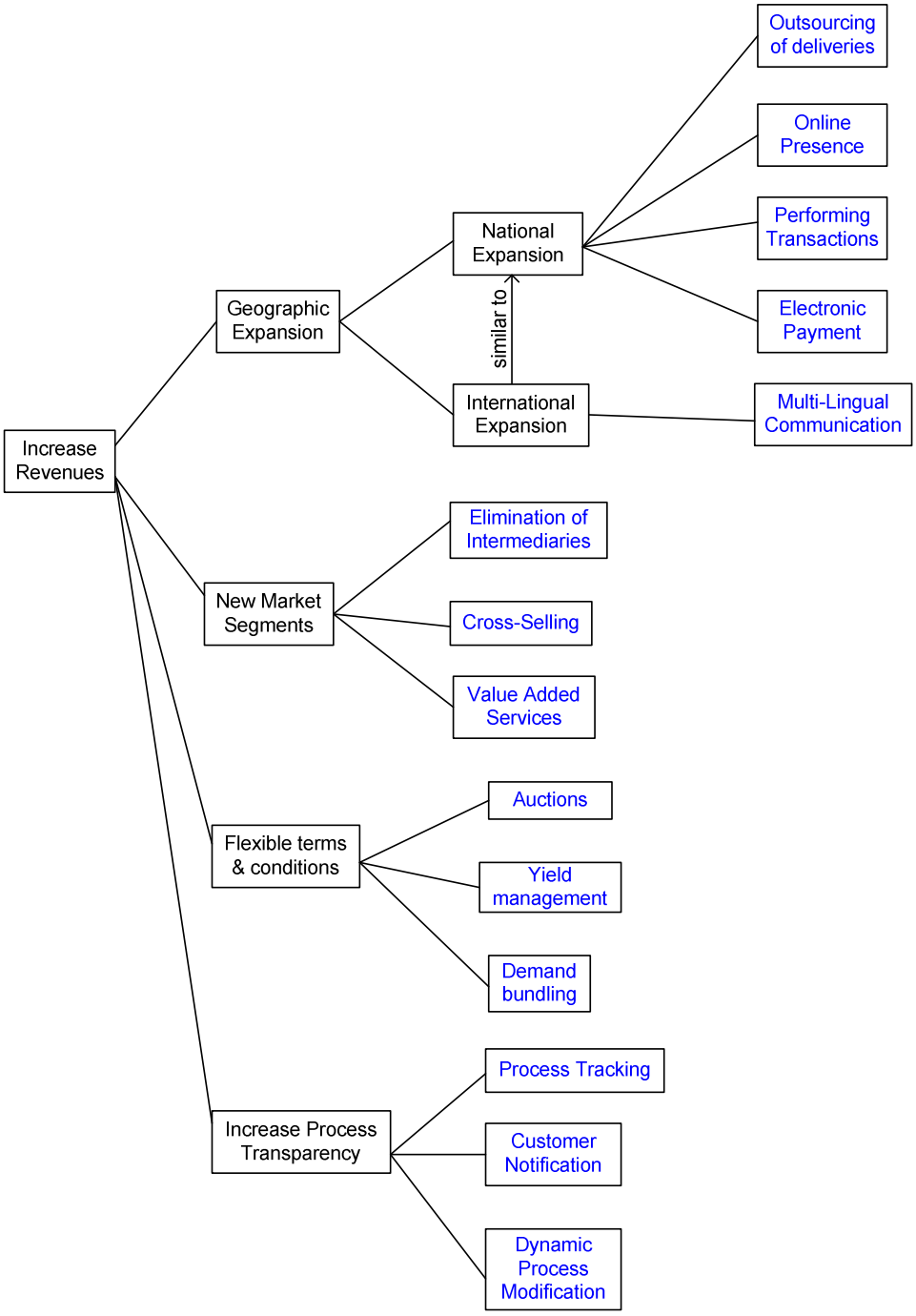

Figure 4: Decision network "Focus on Revenues".

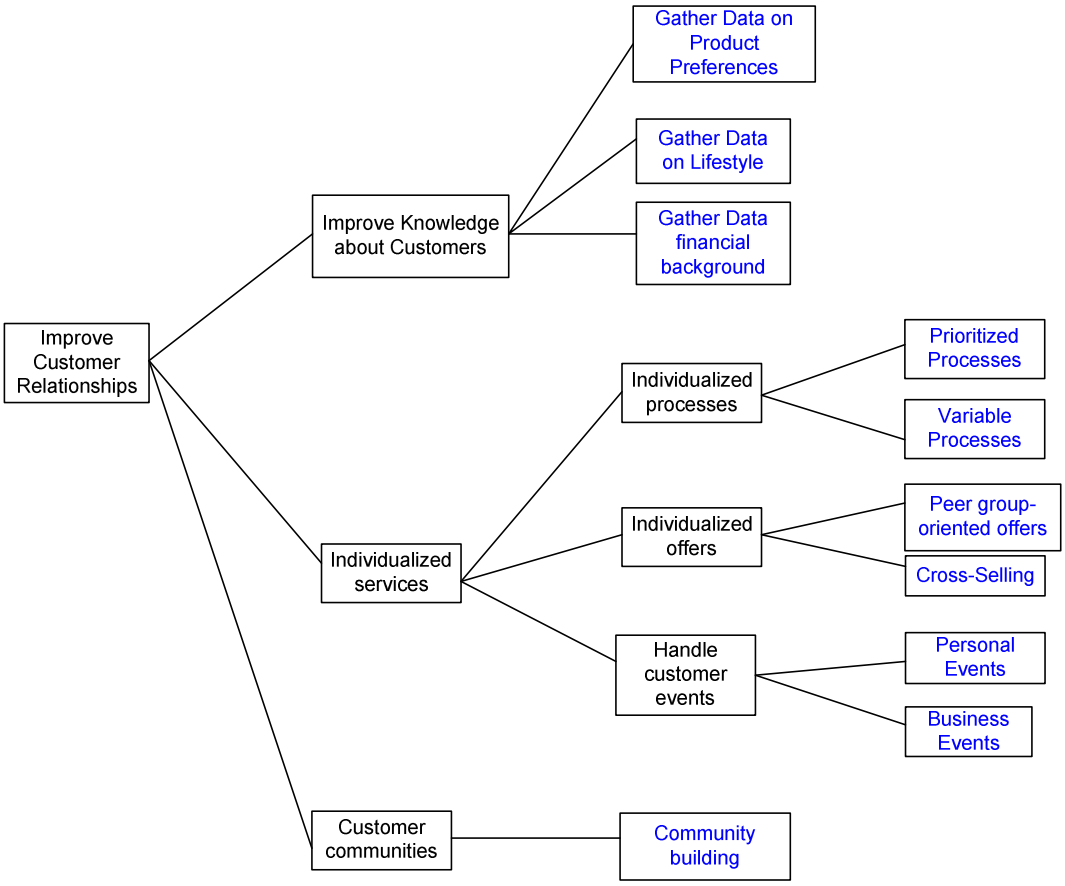

Figure 5: Decision Network "Focus on Customer Relationships"

4.3 Focus on Sales

We differentiate five main stages of a sales transaction: *initiation, selection of customer (identification, evaluation, and authentication), contracting, outbound logistics* and *financial transaction.* For each stage, the framework offers a network of refinement options. The options are either aimed at the primary goal ‘cost reduction’ or supplementary goals such as ‘create customer benefit’, ‘increase revenues’ or ‘create entry barriers for potential rivals’. In addition to these generic aspects, each stage is assigned specific aspects, such as security or creditworthiness with financial transaction. The decision network in Figure 6 illustrates relevant options and their refinement.

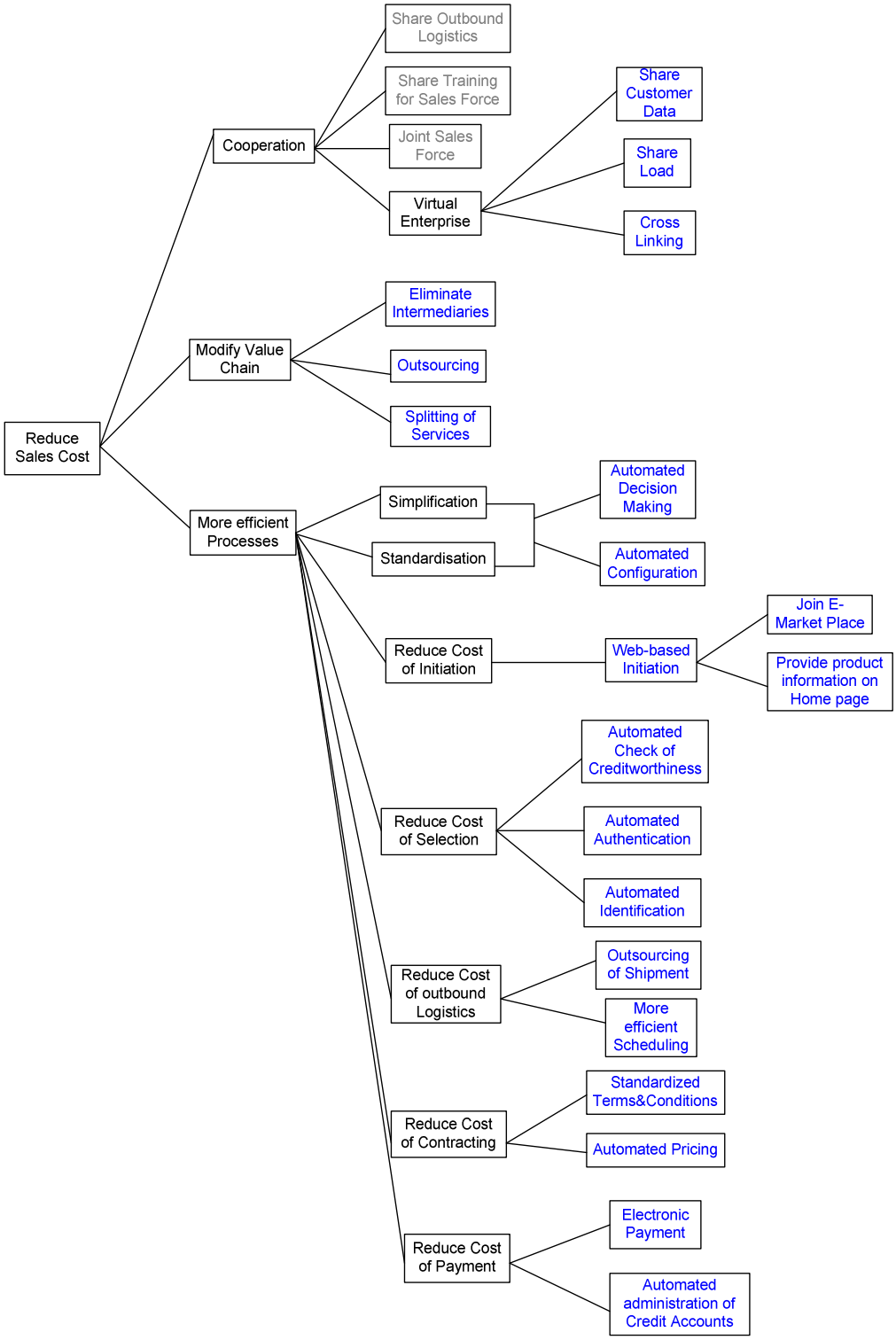

Figure 6: Decision Network "Focus on Sales"

4.4 Focus on Procurement

Analogous to sales, within procurement we differentiate five main stages of a transaction: *initiation, selection (of product, supplier), contracting, inbound logistics* and *payment*. For each stage, the framework offers a network of refinement options. The options are either aimed at the primary goal 'cost reduction' or supplementary goals such as 'improve quality' or 'create entry barriers for potential rivals'. The decision network in Figure 8 (page 10) illustrates strategic options to improve the efficiency of procurement.

4.5 Focus on Integration of the Internal Value Chain

It is evident that an isolated optimization of sales and procurement will hardly result in an overall optimum. Instead, it is more promising to integrate these to value chain activities in order to avoid friction and redundancy. For the same reason, operations should be integrated with sales and procurement, too. However, in ECOMOD we do not take into account the peculiarities of operations. Instead, we regard operations as a black box. Nevertheless, it is possible to analyse integration issues by focussing on generic interfaces only. Process integration of this kind is not restricted to E-Commerce. It will, however, often be necessary for making E-Commerce strategies successful.

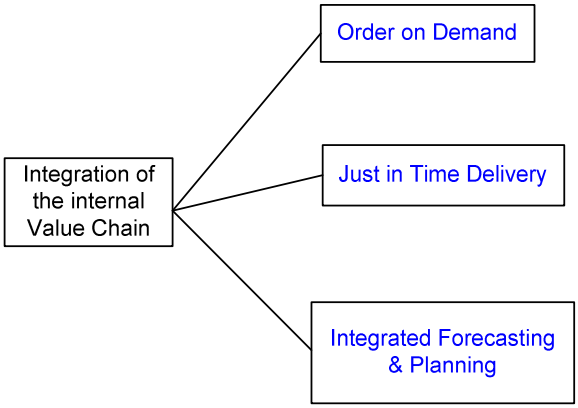

Figure 7: Decision Network "Focus on Integration of the Internal Value Chain"

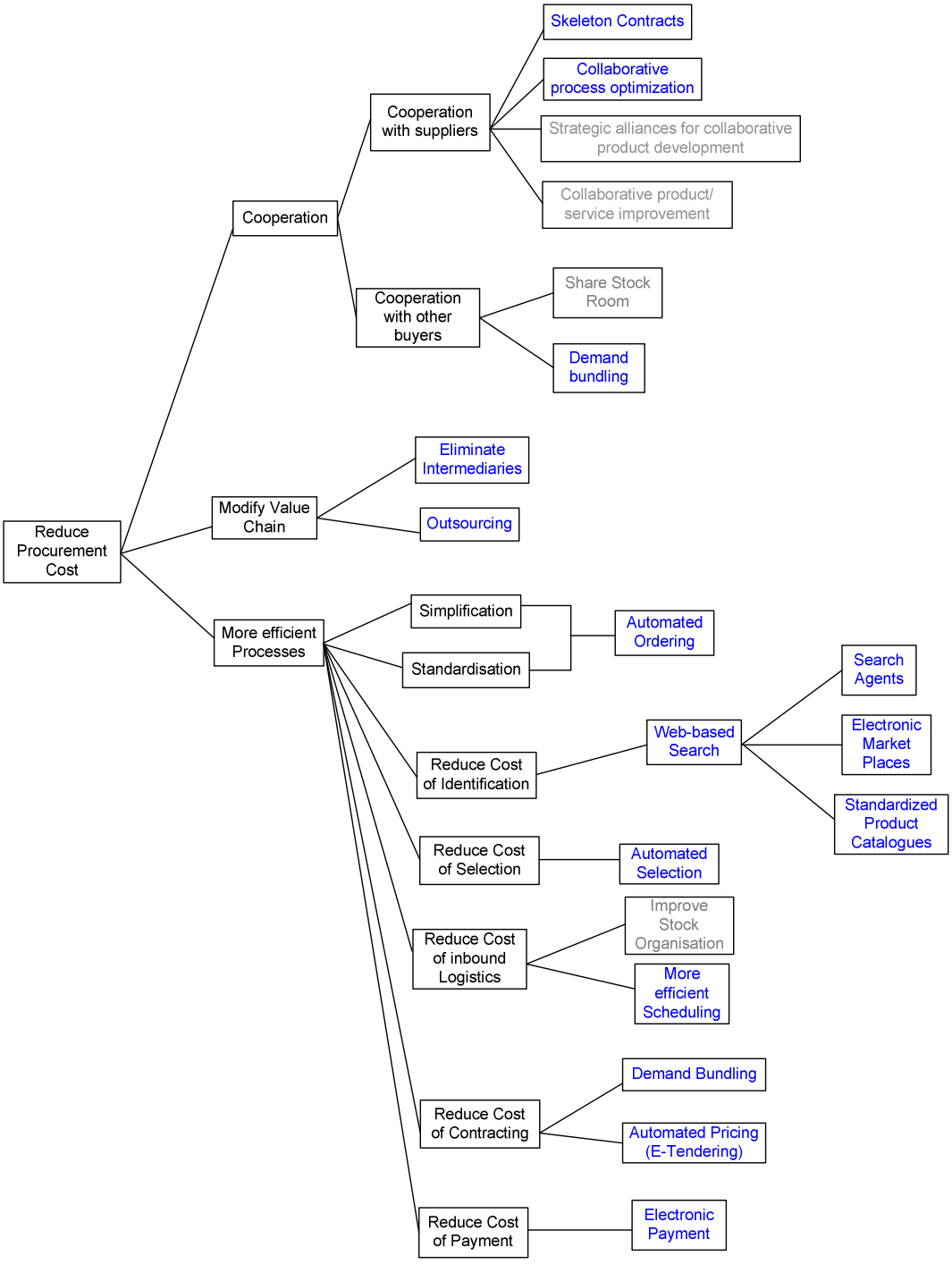

Figure 8: Decision Network "Focus on Procurement"

5 Refinement of Generic Strategies and Guidelines for their Implementation

The preceding introducing chapter showed the fundamental structure of the decision network of each strategy focus. Figure 9 displays the general structure of the strategy decision networks including the refinement levels and attributes for guiding their implementation: The highest level strategy (*strategy focus*) and optional *derived strategies* for structuring several strategic options are assigned a name only. A name and a short description are given to explain the basic characteristics of a particular *strategy*. The leaves of the decision network are named *strategic options* and described in further detail in terms of investments necessary as well as common opportunities and risks for their implementation, and selected critical success factors. Some descriptions are augmented by remarks on useful reference models or procedures and/or competences necessary for successfully implementing this strategic option.

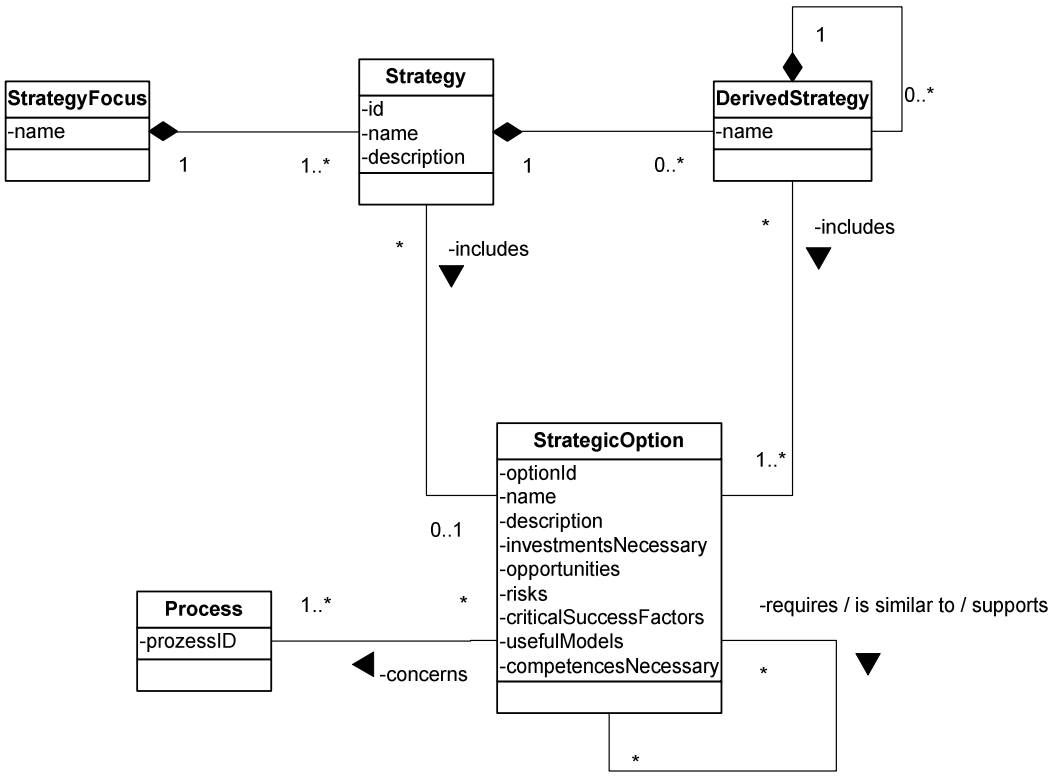

Figure 9: Static structure of strategy refinement and descriptions.

Strategic options can be associated with other strategic options in several ways: they might require the implementation of other options as a prerequisite; they can be similar to other options (of another strategy focus), or support the successful implementation of another strategic option. In the following subsections these relationships will be indicated through the annotation of the ID of associated strategic options.

As explained earlier, mapping to business processes is supported on the interface layer of strategic options (common terms). However, since presenting the library of business processes is out of the scope of this report, we will not annotate the concerned processes as part of the strategy descriptions (see [FrJu+04]). Please refer to www.uni-koblenz.de/~ecomod for updated information on the library of reference process models and strategies.

5.1 Focus on Revenues

5.1.1 Geographic Expansion (Rev_1)

The opportunity to reach a geographically wider market through the Internet is one of the strategic opportunities of the Internet most frequently mentioned (see e. g. [Venk00], [JCB01]).

National expansion

Outsourcing of deliveries (Rev_1.1)

Outsourcing of physical deliveries formerly performed by in-house logistic functions can be advantageous, if

a) additional customers or delivery destinations require expertise in logistics, which currently is not available in the company and is risky to establish;

b) the forecast of future increase in revenues is uncertain and, therefore, investing in additional logistical capacities implies considerable risks;

c) seasonal or cyclic fluctuation of markets and sales are expected.

Necessary investments: The analysis of current and forecast of future sales related to the estimated geographical expansion is necessary in order to define optimum skeleton contracts with new distributors. Outbound logistic processes might have to be adapted as well.

Chances: Cost transparency usually increases when the delivery function is being outsourced: prior fixed costs are changed to variable costs and in the short run money income increases through disintegrating former logistical functional units. Furthermore, better concentration on the core business is enabled.

Risks: Outsourcing of the delivery function to an external logistics provider implies the risk of less transparent delivery processes from the customer's view point. The options for differentiation through physical distribution are diminished and the distribution process itself is harder to control (e.g. in terms of reliability or timeliness).

Critical success factors:

Integration: Appropriate interfaces to the information systems of the distributors should be added to the company's business application systems, in order to allow the customers better access to delivery status information.

See: Sal_2.1 (Outsoucing)

Online presence *(Rev_1.2)*

An online presence is usually developed in order to take advantage of the unlimited availability of the Internet for an effective and low-cost representation of the company. In many cases the design, implementation and maintenance of the Web pages is outsourced, because there are only very few interfaces with business specific functions. (Useful: Reference models to structure typical Web site content.)

Necessary investments: There are only relatively few investments necessary for technical infrastructure, such as Web Servers and Software for developing and administrating the Web sites. Additionally, the general business contact information should be augmented by the Web site's URL and E-mail address.

Chances: Basically, the mere online presence represents just another 'shop window' of the company. This can lead to a better reputation for two reasons: first, because of having an online presence and therefore showing that your company is using the Internet, second, because of specific content on the Web site that promotes existing differentiation characteristics (e.g. particular reference projects and customers). A Web site also allows acquiring customers in a wider geographic area.

Risks: Reputation can be tarnished significantly if the critical success factors are not considered.

Critical success factors:

Timeliness: A vital factor for the success of an online presence is the correctness and timeliness of the presented information. This can better be achieved by initially designing and implementing an administration process.

Media adequate design: The Internet should not be used as just another channel to promote and publish existing brochures. But it should be used taking advantage of the medium specific characteristics, which are, for example, hyper links, and intuitive user oriented navigation. It is also important to place relevant keywords on your Web site and register your site at prominent search engines.

Communication channel: E-mails are a fundamental new way for asynchronous communication, that has been opened through the wide spread of the Internet. In order to allow your potential customers a seamless way of communication, a specific E-mail address should be placed on your Web site. Furthermore, a process for examining messages coming in over this channel has to be established.

Necessary competences: Crucial competences for implementing this strategic option are Web site design and administration as well as Web-Server administration (if operated internally and not outsourced).

Performing transactions *(Rev_1.3)*

In order to support order entry on the Internet a customer data management, online order forms and security mechanisms have to be provided. In many cases means for electronic payment or online product configuration has to be have to be implemented, too. Inside the company incoming orders have to be processed and integrated in existing business processes.

(Useful: Reference models and general processes for consumer transactions and pricing mechanisms.)

Necessary investments: For performing transactions on the Internet, investments are necessary not only for improving the technical infrastructure but also for adapting the incoming order processes. The technical infrastructure needs to be extended by a customer database and authentication mechanisms. In order to interact with the customer over the Web security mechanisms for placing orders and electronic payment have to be implemented, too. For adapting the order processes current business processes need to be analysed and redesigned. If multiple channels for communication with the customer are maintained, processes have to be adapted in order to coordinate orders and contacts coming in from different channels.

Chances: Costs can be reduced considerably, if the incoming order process is fully automated over the Internet. The savings are due to decreased transaction costs and the unlimited temporal and geographic availability of the system. Hence, the objective of extending the geographic reach can fully be achieved (given that there are no logistic related constraints).

Risks: It should not be underestimated, that there is always the danger of increased costs if more than one channel of communication has to be maintained. If customers still want to be able to contact you through traditional channels, parallel order processes need to be kept up, which tends to be more costly than having just one channel for customer interaction (see [BHK02] p. 35). Problems with outstanding payments and customers' abuse of transaction relationships are likely to increase.

Critical success factors:

Powerful and robust application system: The Internet application has to be sufficiently powerful and robust. It has to provide appropriate mechanisms to ensure the transactions to be secure (see e. g. [ZPS+00] p. 241).

Channel coordination: Different channels for communicating and interacting with the customers need to be coordinated. Customer and transaction data should be available for staff working on all the different channels in order to avoid contradicting behaviour towards the customers and to take advantage of the specific characteristics of each way of interaction.

Consideration of standards: Standards should be used for the product catalogues (as described above) but also for implementing the security mechanisms. This is necessary for, on the one hand, supporting further integration on the customer's side and, on the other hand, to make the application appear more trustworthy and attractive for new and (Web-) inexperienced customers.

Integration with existing application systems: Another critical factor is the integration of the new Web applications and databases with existing business information systems. An integrated process control (as provide for example by Workflow Management Systems) is necessary in order to ensure the integrity of the product data provided over the Web but also to ensure business processes to be efficient.

Control collection of accounts: Appropriate measures and processes have to be implemented in order to enforce claims for outstanding payments, because with the use of the Internet new ways of misusing means of payment and illegal breach of contract have emerged.

Comprehensible pricing: Attained cost savings can be used to reduce prices with the aim of steering the customers toward cheaper communication channels. For example, many banks have reduced prices for performing transactions over the Internet as opposed to transactions performed by a clerk in a branch location; or they might give favourable terms for accounts run only over the Internet. However, if a channel oriented pricing strategy is pursued, it has to be examined, if reduced prices are also comprehensible for traditional customers using the traditional channels (for example mail-order).

Necessary competences: Special aspects of contract law on the Internet, process analysis and aspects of channel coordination, as well as knowledge on data mining techniques are fundamental for implementing this strategic option.

Required: Rev_1.4 (Electronic Payment)

Electronic payment (Rev_1.4)

There are different options for customers to pay over the Internet or to initiate a **payment over the Internet after an order has been placed**: for example, using credit cards, allowing direct debit authorization, or payment through charging of a customer debit account, which is balanced out on a regular basis. Furthermore, there are numerous intermediaries, who provide services for handling payment processes or serve as trustees. Liabilities and the common price level compared to transaction costs are important factors for determining the appropriate payment mechanism (see e.g. [DaUl04]).

Approaches for **Electronic Bill Presentment and Payment** (EBPP) include not only options for electronic payment but also for interactive electronic bill presentment integrated with various payment mechanisms (see e.g. [SpPf01], [Scha02], [DaUl04]). Systems supporting EBPP strive to electronically represent the entire process of invoicing through the supplier and payment by the customer. In this way, the common disadvantages of paper-based billing and posting of invoices – such as media breaches leading to higher error rates and processing costs – can be overcome. Whereas, the actual order placement can be performed traditionally via mail or over the Internet.

Common EBPP-applications provide invoices digitally on a Web-site, where the customer can initiate the payment process through clicking a certain button. In business to business relationships EBPP-systems have been used earlier on proprietary networks using EDI-Documents. Since the wide availability of the Internet investments for EBPP have decreased significantly allowing its application in business to business as well as business to consumer relationships.

Necessary investments: Due to the wide variety of possible approaches for electronic payment, no detailed information can be given concerning the necessary investments. However, in any case it is necessary to support appropriate security mechanisms on the relevant Web sites; for example, transmission of credit card information is usually supported by SSL-encrypted pages. Furthermore, liability issues have to be faced (see e.g. [Trit02]). Additionally, business processes for invoicing and checking for incoming payments might have to be adapted.

Implementing EBPP-systems can be highly expensive; estimations of $400,000 have been suggested for introducing EBPP-systems to American companies (see [Stef02]). Moreover, costs for using such systems have to be taken into account, too.

Chances: Significant decreases in processing costs can be achieved through fully automated invoicing and collection processes with EBPP-systems.

Risks: In particular the usage of EBPP-systems promises high cost reduction through fully digital processes. However, at the same time there is the risk of the new infrastructure not being accepted, and therefore not used by customers. This implies the prior invoicing and collection processes still having to be supported.

Critical success factors:

Transparent and reliable security mechanisms: In order to enhance the customers' trust in using the electronic payment systems, it is necessary to present its usage being secure and reliable.

Control collection of accounts: Appropriate measures and processes have to be implemented in order to enforce claims for outstanding payments, which allow minimizing the abuse of Internet transaction relationships and payment mechanisms.

Spread: In the face of geographic expansion it is crucial to take into account the expected availability and acceptance of the payment mechanisms in the target market.

International expansion

Multi lingual communication *(Rev_1.5)*

Considering target group specific requirements – such as language, cultural issues as well as tax or law related aspects – is crucial for the success of international market expansion.

Supporting multi lingual communication is predominantly important, since the ability to communicate is a fundamental prerequisite for interacting with customers on new international markets.

Necessary investments: Conversion to multi lingual communication supported by information systems usually requires the adaptation of data models and stored data as well as, to a certain extent, the information systems themselves.

Chances: Chances are better opportunities for sales communication initiatives and, in this way, better entry into new international markets.

Risks: There is the risk of the costs for adapting business processes, data, and systems to exceed the additional revenues of multi lingual communication. This applies, in particular, in small markets where the supported language is not widely used.

Critical success factors:

Professionalism: Terms and concepts should be used in ways appropriate for the target group.

Completeness: The multi lingual communication has to be thoroughly implemented. Besides the provision of multi lingual content people working at customer touch points should be sufficiently capable of speaking the required language.

5.1.2 New Market Segments (Rev_2)

Apart from the geographic expansion, the Internet allows entry into new market segments. Here, the vertical forward integration, in particular, should be mentioned: it involves incorporating additional value creating activities in the direction of the end-customer. The Internet allows direct contact with the customer for minimal additional costs (elimination of intermediaries). Furthermore, new market segments can be attained by offering existing customers new products through active cross-selling initiatives. Internet technology allows offering new value added services in combination with existing product lines.

Elimination of Intermediaries (Rev_2.1)

The Internet offers new economic ways for taking over the functions of former value chain partners. Special consideration should be given to the opportunity of vertical integration, i.e. the adoption of intermediary functions towards the consumer. By directly serving the end-customers over the Internet, fees for mediation – formerly paid to intermediaries – can be saved for increased profit margins or allowing reduction of prices for consumers, respectively.

Useful: Process models for analyzing markets of the subsequent value chain level according to industry specific characteristics; process and reference models for developing new sales and logistics processes; reference models for customer interaction.

Necessary investments: It is essential to precisely analyze the relevant factors and economical conditions on the new market, before the decision about taking over functions of the subsequent value chain level can be made. When the decision has been made to surpass traditional intermediaries and directly serve the (new) market it is necessary to design and implemented processes for logistics and distribution and, if applicable, to establish new organisational units to supervise and perform these processes (see [ZPS+00] p. 241).

Chances: Charges formerly paid to intermediaries can now be saved and, if applicable, be passed on to the customer in the form of price reductions. It is possible to better differentiate from competitors, because sales channels can be controlled directly and services of superior quality are possible [Port98].

Risks: If the company's market share on the end market is too small, it is likely that the costs for providing the additional functions (of this next value chain level) cannot be compensated by the sales. This can be the case, if sales volumes are so low that scale effects cannot be realized, which former intermediaries did take advantage of.

Critical success factors:

Realistic market assessment: If you want to expand your activities along the value chain it is crucial to analyse the conditions on the new market and to accurately assess the competitive factors.

Appropriateness of the Internet: It has to be evaluated if the Internet can serve as platform for entering the new Market, i.e. if it can support all the functionality necessary for the next level in the value chain.

Recognizable benefits: The customer will only adopt the direct access if there are recognizable benefits in comparison to the added values already offered by (former) intermediaries. Additional incentives can be given if cost advantages are passed on to the customer in terms of lower prices.

Necessary competences: It has already been pointed out, that it is crucial to assess and analyse the new markets. So, knowledge in market and industry sector analysis is necessary.

Cross-Selling

See Rel_2.4 (p. 28)

Value Added Services *(Rev_2.2)*

There is a multitude of options for offering new products and value added services over the Internet taking advantage of synergy effects. There is, for example, the opportunity to provide professional information, to provide consulting services, or to support a technology infrastructure that can be used by customers or suppliers to establish their online presence. When providing these additional services, a company take advantage of existing professional knowledge or of further information about their customers (through log file analysis for example).

The Internet can be used cost-effectively to offer contents as additional services. It requires converting the professional information to a common digital format and, if applicable, to implement a system for direct (synchronous) communication between consultants and customers.

Necessary investments: It is necessary to invest in additional technological infrastructure in order to adequately manage the professional contents (Content Management Systems). Additionally, it is required to establish as well as integrate new processes and, if applicable, a new organisation unit.

Chances: The company can take advantage of synergies by utilising existing professional knowledge. Additionally, it is possible to create new opportunities for access to other company products or services (cross-selling).

Risks: There is the risk of revealing important core-competences by providing others access to internal professional knowledge.

Critical success factors:

Cooperation: In order to fully take advantage of existing potentials it is crucial for professionals and service providers in the company to cooperate.

See: Rel_3.1 (Communities), Rel_2.4 (Cross-Selling)

5.1.3 Flexible Terms and Conditions (Rev_3)

General support of information and communication systems as well as Internet technology allow for the cost-effective performance of various pricing mechanisms (see e.g. [Lang02]). Common examples are auction mechanisms, which aim at determining fair

market prices, Yield Management for maximizing load, and approaches for bundling demand for dedicated increase in sales.

Auctions *(Rev_3.1)*

The English auction is the most common auction in business to business relationships; it starts with a good being offered to a certain minimum price, which is being increased successively by the bids placed. The bidder who has placed the highest bid at a certain point in time (e.g. ebay.com) or, more traditionally, after a certain period has been passed since bid placement ("going, going, gone") wins the auction. There is a great number of other auction formats, such as (reverse auction, Yankee-auction, see e.g. [Lang02]).

Necessary investments: Using auction for pricing on sales markets initially requires the definition of appropriate rules and processes for the course of an auction. Additionally, it is necessary to implement an information system supporting these rules. Subsequently, the different instances of an auction can mostly be performed fully automatically.

Chances: Using electronic auction mechanisms allows achieving fair market prices with low costs. Generally, the prices achieved through an English auction process are equal to or higher than the customer willingness to pay. Since participating in an auction is frequently rated as an 'event' from the customer's view point, sporadical auctions can improve customer relationships.

Risks: Applying auction mechanisms is only beneficial for markets and product types with certain characteristics. Therefore, an analysis is necessary in order to avoid the achieved prices being below production costs or common market prices.

Critical success factors:

Target groups: It is crucial to make sure that appropriate target groups are addressed by an auction in order to at least achieve fair market prices.

Maximised automation: An auction process usually implies several steps for determining the price; hence, the process itself is more complex than static pricing via electronic catalogues for example. Therefore, it can only be cost-effective if the process is fully automated. This requires reliable and robust application systems.

Yield Management *(Rev_3.2)*

Yield Management (YM) as an instrument for combining controlling of prices and capacity utilisation is known from passenger flight and tourism industries. YM is applied for pricing of perishable goods, which do not keep their value until consumption through a customer, but cannot be stored and loose their value at a certain point in time. Very high fixed costs (such as providing an aircraft) lead to prices being determined not on the basis of variable costs, but on the basis of available capacity (seats) or the willingness of the customer to bind to certain restrictions. In this way, YM tries to maximize capacity utilisation and sales simultaneously.

Necessary investments: YM requires a thorough analysis of markets and market segments in order to determine adequate customer groups and temporally graduated prices. An (Internet) application has to be designed and implemented providing timely information on prices and conditions to the customer and allowing orders to be placed.

Chances: Maximised capacity utilisation and maximised sales through taking advantage of the willingness to pay of appropriately segmented customer groups.

Risks: From the customer's view point pricing using YM can be irritating, because prices for the same good can vary considerably.

Critical success factors:

Analysis: The appropriate segmentation of customer groups and analysis of their willingness to pay are crucial for the successful usage of YM concepts.

Timeliness: It is important for the communication channel provided to the customers to allow for timely updates of pricing information. Additionally, it should be placed to place orders via this channel (e.g. the Interne).

Demand bundling *(Rev_3.3)*

Demand bundling as a pricing mechanism aims at increasing sales through lower prices. Because of bigger quantities procurement can be more cost-effective and initiation costs per customer are decreased respectively. The supplier usually provides the necessary functionality for customer to coordinate their demand. The price is determined on the basis of the number of purchasing offers for a certain product.

Necessary investments: It is necessary to develop a system supporting the coordination and bundling processes for a cost effective implementation of demand bundling. Additionally it is necessary to design and implement the business processes for initialising a demand bundling process and for controlling the results.

Chances: Increase in profits through higher sales rates together with attractive margins.

Risks: Transaction costs perceived by customers for coordination must not be higher than the achieved price through quantity discount. If this is not the case, sales cannot be increased through the offer for demand bundling.

Critical success factors:

High demand: A critical mass of buyers is necessary for successful demand bundling. Therefore, on the Internet this function is frequently supported by intermediaries, which can take advantage of economies of scale through attracting different buyers and seller.

Regulation of contract law related issues: Since the price is determined on the basis of the number of prospective buyers, conflicts can arise if a buyer is not be able (or willing) to carry out a prior confirmed intent to purchase. The price might have to change if fewer buyers purchase a certain product; therefore, contract related issues have to be determined and communicated initially.

5.1.4 Increase Process Transparency (Rev_4)

Process transparency can include better traceability of order processing and delivery processes from the customer's view point and a certain influence on the execution of business processes. From the customer's view point process transparency can be further improved through regular messages on order processing or delivery status and through the opportunity for the customer to access relevant status information by himself, respectively. Therefore, a higher process transparency frequently leads to higher customer satisfaction and, in this way, to an increase in sales.

Process tracking (Rev_4.1)

The Internet itself can be used to increase the transparency of business processes from the customer's perspective by, for example, providing product development and order status information online. This, however, requires adequately tracking relevant customer related processes.

Useful: Reference models and descriptions of relevant aspects of process transparency from the customer's viewpoint.

Necessary investments: First of all, process tracking requires a thorough analysis of relevant customer processes and possibly the adaptation of existing business processes. It is necessary to invest in additional process controlling software and integrate the relevant business information systems with a Web front-end the customer has access to. It might also be necessary to implement security and authentication mechanisms.

Chances: Business processes oriented towards customer needs being transparent for the customer can serve as sustained criterion for differentiation from the competitor.

Risks: The relatively high investments for an integrated process control can be transformed into sustained competitive advantage. However, no direct increases in sales stand alongside these investments.

Critical success factors:

Reliability and timeliness: It is critical for the order status information to be reliable and updated on a regular basis.

Availability: If multiple channels of communication and interaction with the customer are supported, he should also be enabled to access process status information through all channels.

Integration: In order to provide reliable sources of information over the Internet it is crucial to appropriately integrate the respective information systems.

Necessary competences: It is necessary to know the needs and requirements of the customer concerning process transparency and to know how to implement the new functionality on the Web.

Customer notification *(Rev_4.2)*

Notifying customers about a certain order processing status usually does not require much additional efforts, if the notification can take place fully automatically. Cost-effective and timely notifications, however, require the customer to be available over an electronic communication channel (e.g. E-Mail, SMS).

Necessary investments: It is necessary to implement adequate interfaces at the relevant process stages allowing for an automatic notification. This requires the relevant customer data to be available, too.

Chances: Proactively notifying customer on a certain order processing status can serve as differentiation characteristic but it can also contribute to a decrease in processing costs, since possible requests initiated by customer can be prevented.

Risks: -

Critical success factors:

Reliability and timeliness: It is critical for the order status information to be reliable and updated on a regular basis.

Integration: In order to provide reliable sources of information over the Internet it is crucial to appropriately integrate the respective information systems.

Dynamic process modification *(Rev_4.3)*

Dynamic modification of order processes at runtime can be beneficial for example in business to business transactions. Examples are changes in the sequence or location of quality checking to take place or in the invoicing process.

Necessary investments: In order to reliably implement a dynamic process modification, a business process management software is required supporting process control across different functional units. The system has to support not only the various typical business processes (i.e. process type definitions), but also the different options for process adaptation.

Chances: Dynamic process modification allows a better response to specific customer requirements and, in this way, better differentiation from competitors.

Risks: The high variability of processes usually comes with an increase in coordination and management costs. Hence, there is the risk of additional processing costs being higher than the additional value perceived by customers. Furthermore, there is the risk of processes being inconsistent after dynamic modifications.

Critical success factors:

Process control: Integrated process control software across functional boundaries is vital for the management of dynamically modified processes.

Process models: The process models and options for modifications have to be thoroughly and consistently defined and modelled in order to support reliable process modification at runtime.

5.2 Focus on Customer Relationships

5.2.1 Improve Knowledge about Customers (Rel_1)

For improving customer relationships it is vital to improve knowledge about customers by gathering (and evaluating) data on background and preferences.

Gather data on product preferences (Rel_1.1)

Data on product preferences can be gathered through interviews, online questionnaires, analysis of Web site click streams, as well as analysis of buying behaviour itself and of correlations with purchasing patterns of other customer groups.

Necessary investments: A data warehouse for storing customer data and its development over time has to be implemented. Interfaces to business application systems as well as Web based application systems have to be defined and implemented in order to allow access to up-to-date customer data on a regular basis.

Chances: Gathering individual customer data and data analysis allows classifying existing customers in terms of their (expected) profitability. On this basis, allocation of resources can be planned considering the expected customer life time value of each customer. This allows individualized purchase offerings to be derived and communicated to each customer.

Risks: With inadequate data models there is the risk of gathering huge amounts of 'senseless' data.

Critical success factors:

Privacy: From the customer's view point it has to be clear, which data is being stored and passed on to third parties, respectively.

Sophisticated data model: The data models should be sufficiently detailed and sophisticated in order to adequately support data analysis.

Up-to-dateness of data: Data gathering should take place fully automated at every customer touch point, in order for the collected information to be constantly up-to-date.

Gather data on lifestyle (Rel_1.2)

Data on customer life style can be gathered through interviews, online questionnaires, analysis of Web site click streams, as well as analysis of buying behaviour itself.

Necessary investments: : A data warehouse for storing customer data and its development over time has to be implemented.

Chances: Gathering individual customer data and data analysis allows classifying existing customers in terms of their (expected) profitability. On this basis, allocation of resources can be planned considering the expected customer life time value of each customer. This allows individualized purchase offerings to be derived and communicated to each customer.

Risks: With inadequate data models there is the risk of gathering huge amounts of 'senseless' data.

Critical success factors:

Privacy: From the customer's view point it has to be clear, which data is being stored and passed on to third parties, respectively.

Sophisticated data model: The data models should be sufficiently detailed and sophisticated in order to adequately support data analysis.

Up-to-dateness of data: Data gathering should take place fully automated at every customer touch point, in order for the collected information to be constantly up-to-date.

Gather data on financial background *(Rel_1.3)*

Data on financial background can usually be gathered through specific service providers, which support queries on credit worthiness of individual customers. Additional information can be collected through interviews (e.g. regarding place of residence, income, or type of job).

Necessary investments: Interfaces allowing access to information systems of the specific service providers have to be implemented in order to allow for automated querying of individual customer's credit worthiness.

Chances: Gathering individual customer data and data analysis allows classifying existing customers in terms of their (expected) profitability. On this basis, allocation of resources can be planned considering the expected customer life time value of each customer. This allows individualized purchase offerings to be derived and communicated to each customer.

Risks: Negative credit ratings and wrong conclusions based on some personal information imply the risk of misinterpreting the potential spending capacity of individual customers.

Critical success factors:

Up-to-dateness and reliability: The data gathered on financial background have to be up-to-date and absolutely reliable.

Hide assessment from customers: The customer should not be able to notice conclusions regarding his credit worthiness, willingness to pay, and the expected customer life time value drawn on the basis of personal information.

5.2.2 Individualized Services (Rel_2)

Customer relationships can be improved through individualized customer interaction on the basis of gathered customer data. Interaction with customer can be individualized through individual process adaptations (e.g. order processing), individual offers and pricing, or through consideration of customer specific events.

Individualized processes

Prioritized processes (Rel_2.1)

Relationships to particularly valuable customers, i.e. those with a high expected sales volume, can be improved through prioritizing certain process instances. For example, orders of regular customers or of high volumes can be processed preferably.

Necessary investments: A powerful process management system is required to support continued prioritized execution of processes. Furthermore, it is vital to define rules for setting priorities on certain process instances.

Chances: Better relationships to selected customers.

Risks: Overall customer relationships might worsen if a certain prioritization of processes leads to delayed delivery of less-preferred orders.

Critical success factors:

Hide low prioritization from customers: The customer should not be able to notice conclusions regarding low priorities set on processes related to his order, i.e. regarding his expected customer life time value.

Variable processes (Rel_2.2)

Particularly in business-to-business relationships, frequently certain processes are adapted with respect to specific customer requirements. For example, it is common for quality checks to take place at the location of the seller and according to the particular guidelines of the buyer.

Necessary investments: Customer data models have to be extended by customer specific requirements for process adaptations. In order to minimize costs for additional business processes, relevant adaptations should be supported and communicated to the respective employees by a process management system

Opportunities: Closer relationships can be established to selected customers (lock-in effect).

Risks: Mutual dependencies are created through individually adapting processes (lock-in): in general, high customer specific transaction costs are necessary for individualized processes. Hence, there is the risk of costs trough individualization being higher than sales generated in this way.

Critical success factors:

Proportionality: The expense ratio (i.e. additional costs to additional sales ratio), has to be adequate. Additional process costs can be reduced further through defining a limited number of possible customer specific process adaptations.

Reliable implementation: If you want to take advantage of individually adaptable processes for further differentiation from competitors its implementation has to be reliable usually requiring a supporting information system.

Individualized offers

Peer-group oriented offers *(Rel_2.3)*

Deriving specific offers for groups of customers requires the analysis of various customer data. On this basis customer groups (segments) related to product preferences can be identified.

Necessary investments: Initially, an integrated data model representing relevant customer information has to be developed. The respective information systems and databases have to be adapted to support this new model; this integration can be relatively cost intensive, because usually data models are chosen individually for each application. Since the data necessary for generating product offers comes from different departments and information systems, processes have to be implemented which support merging all the relevant data. A central database storing customer data has to be implemented and connected to relevant information systems. This Data Warehouse should relate customer data to product information also representing changes over time; and techniques for evaluating the data should be supported.

Opportunities: Individualized offers can be derived by creating certain customer groups based on product preferences. Using these offers certain customers can be provided with more targeted offers and services.

Risks: Direct product offerings and aggressive customer communication might not harmonise with your company's traditional image. Furthermore, focussing too much on existing customers incorporates the risk of neglecting initiatives for acquiring new customers or extending your business activities to new markets and target groups.

Critical success factors:

Privacy: Implementing this strategic option requires the collection and evaluation of customer related data. Therefore, it is crucial to consequently implement a privacy policy and publish it in a way easily accessible for customers.

Up-to-dateness: In order to maintain the usefulness of the collected customer data, it is necessary to regularly *update the databases*.

Continued data model improvement: It is vital to constantly optimize the data models in order to represent the improved knowledge about relationships between customer characteristics and purchasing behaviour.

Required: Rel_1.1 (Gather data on product preferences), Rel_1.2 (Gather data on life style)

Cross-Selling (Rel_2.4)

The Internet allows your company to cheaply individualize the communication to the customers. This can be used to suggest individual customers certain product offers after a purchase has been performed. Such a cross- or up-selling initiative requires consequently selecting and evaluating customer data through data mining techniques.

Necessary investments: Initially, an integrated data model representing relevant customer information has to be developed. The respective information systems and databases have then to be adapted to support this new model; this integration can be relatively cost intensive, because usually data models are chosen individually for each application. Since the data necessary for generating product offers comes from different departments and information systems, processes have to be implemented which support merging all the relevant data. A central database storing customer data has to be implemented and connected to relevant information systems. This Data Warehouse should relate customer data to product information also representing changes over time; and techniques for evaluating the data should be supported.

Chances: Purchasing frequencies can be improved for each customer by customizing individual product offers according to his interests and needs. By collecting and evaluating purchasing data for each customer individually, classifications of customer types can be derived, which give further insights into their expected profitability; on this basis, it is possible to allocate resources according to expected sales volumes (customer lifetime value).

Risks: Direct product offerings and aggressive customer communication might not harmonise with your company's traditional image. Furthermore, focussing too much on

existing customers incorporates the risk of neglecting initiatives for acquiring new customers or extending your business activities to new markets and target groups.

Critical success factors:

Privacy: Implementing this strategic option requires the collection and evaluation of customer related data. Therefore, it is crucial to consequently implement a privacy policy and publish it easily accessible for your customers.

Up-to-dateness: In order to maintain the usefulness of the collected customer data, it is necessary to regularly update the databases.

Continued data model improvement: It is vital to constantly optimize the data models in order to represent the improved knowledge about relationships between customer characteristics and purchasing behaviour.

Necessary competences: The competences vital for implementing this option are related to data modelling methods and data mining techniques.

Required Rel_1.1 (Gather data on product preferences), Rel_1.2 (Gather data on life style).

Handle customer events

Personal events *(Rel_2.5)*

Considering personal customer events requires the relevant information being available. However, given the relevant information is available, customers can be communicated to more personally leading to improved customer relationships.

Necessary investments: Information on personal customer events has to be represented in an appropriate information system (e.g. WFMS). This system should be able to notify certain employees of customer events and/or automatically send a prior specified message to the customer.

Opportunities: Improved customer relationships through personal communication.

Risks: Some customers might feel annoyed by interrogations regarding personal events or by subsequent event related contacts.

Critical success factors:

Privacy: The customer should be informed about privacy related issues.

Timeliness: The events have to be considered on time.

Business events *(Rel_2.6)*

Considering business related events can improve business to business relationships.

Necessary investments: Information on customer events has to be represented in an appropriate information system (e.g. WFMS). This system should be able to notify certain employees of customer events and/or automatically send a prior specified message to the customer.

Opportunities: Relationship to business customers can be improved. Locking in of these customers can be achieved through customer specific configuration of event related messages and/or processes.

Risks: -

Critical success factors:

Timeliness and reliability: The events have to be considered on time and attended to reliably with respect to specific customer requirements.

5.2.3 Customer Communities (Rel_3)

Better customer retention can be achieved by on a regular basis sending, for example, newsletters with information about new products and professional information. Another approach are Web based communities, in which customers can interact with each other by exchanging experiences about purchases and discussing other fields of interest.

Community building *(Rel_3.1)*

Communities can facilitate emotional retention, because they provide infrastructure for building social networks with other customers.

Necessary investments: If an Internet presence has already been built, there are only very few initial investments necessary. Sending a newsletter requires the creation of a database to hold all the relevant customer information and the integration of the database with an E-mail application. Building a Web community requires defining the functionality that should be provided inside the community and selecting an appropriate platform; here, it is usually sufficient to configure already existing software.

Chances: After a newsletter has been set up it is possible to reach a (theoretically) unlimited number of customers for almost no costs. (However, spam mail has grown to be a relatively big problem on the Internet. It is therefore crucial to provide information subscribers consider useful, too.) A Web community can lead to enhanced emotional

customer retention. Additionally, it is possible to retrieve information about customer preferences and attitudes by analyzing the community platform.

Risks: Software for building communities on the Web is freely available; this is also the case for newsletters and databases. Hence, these strategic options can easily be imitated and, therefore, cannot be used as long-term sustained competitive advantage.

Critical success factors:

Web communities in particular are frequently used successfully for further customer retention. However, a few fundamental aspects need to be considered:

Critical mass of functionality [WiCo01]: a Web community has to provide its users with a certain minimum of functionality in order to provide real added value.

User feedback [WiCo01]: in particular at the beginning of building up a Web community user feedback should be taken seriously and considered for further aligning the community with the needs of current and future customers.

Using information about customers: a community usually provides various ways for its users to communicate about relevant topics and experiences. So, apart from using the Web community for emotional customer retention, it should be used for retrieving better information about customer preferences and attitudes related to products and purchasing experiences.

Personalizing functionality and content (see [Rais01] p. 121 ff): the community design should provide options regarding the selection of certain functionalities and contents in order to allow the customers to individualize their view onto the community according to their personal preferences.

Necessary competences: Implementing this strategic option does require some knowledge in configuring the respective technical infrastructure and purposefully using the community functionality for your business.

5.3 Focus on Sales

5.3.1 Cooperation (Sal_1)

Throughout the value chain cooperation is an important approach for taking advantage of economies of scales and for better focusing on the core business. The Internet supports new economic ways of cooperation with value chain partners as well as suppliers of complementary products.

For cooperating with value chain partners over the Internet two consecutive steps can be distinguished: the first step is fundamental and involves coordinating and optimizing processes across the companies' value chains. The second step involves automation of these processes, which requires the additional integration of relevant business information systems and the implementation of an integrated process management and control.

On the Internet costs of communication can be reduced significantly. This allows cooperating with suppliers of other, usually complementary, products with very few additional costs. This type of cooperation is frequently named network or virtual enterprise. We will concentrate on the strategic option of sharing customer related data, cooperation in terms of sharing load, and cross linking in terms of mutual usage of resources and business functions for order fulfilment.

(Share outbound logistics)

(Not our focus.)

(Share training for sales force)

(Not our focus.)

(Joint sales force)

(Not our focus.)

Virtual enterprise

Share customer data *(Sal_1.1)*

Two cooperating companies can take advantage of mutually exchanging customer data allowing customer profiles to be completed and purchasing offers to be more targeted.

Necessary investments: It is required to agree on a specific standard or a mutual data model for storing customer information. Adequate interfaces have to be implemented allowing to electronically exchange customer data. Furthermore, usage and passing on of personal data has to be coordinated in terms of privacy.

Opportunities: More complete information about customers can be gathered and new cross-selling opportunities can be taken advantage of.

Risks: Data quality might deteriorate if customer data maintenance is distributed.

Critical success factors:

Privacy: Privacy of customer data has to be guaranteed although it is exchanged and in this way passed on to third parties. Customers of both companies have to agree to this way of dealing with their personal data (e.g. by agreeing the general terms and conditions)

Share load *(Sal_1.2)*

Sharing load with competitors can be advantageous, if sales volumes are of high variability and your resources are in certain time periods used to full capacity. Distributing orders to another company however, requires to coordinate central business processes and to hide passing on of orders from customers.

Necessary investments: For coordinating relevant processes it is necessary to initially analyse business processes of both companies. To further reduce costs of coordination the cooperation partners should agree on standardized formats for electronically exchanging data and they need to agree on mechanism for secure data transfer. Since passing on of orders to third parties should be hidden from customers, it is necessary to agree on certain quality standards and to integrate information systems of both parties in order to enable updated information on order status to be available to customers.

Opportunities: Keeping an established clientele through reliable order processing in spite of variable load.

Risks: There is the risk of processes of the cooperating partner being more or less out the sellers control (e.g. with respect to delivery times and quality); this can lead to an inconsistent appearance towards his customers. When cooperating with competitors, it is particularly important to preserve your current competitive advantages and differentiation characteristics. Sharing load with competitors can be an immensely complex enterprise, whose risks cannot be fully determined.

Critical success factors:

Keeping differentiation characteristics: For sustained competitive advantages it is of utmost importance, not to level former differentiation characteristics through cooperation with competitors.

Exchange standards: In order to allow the integration and communication of application systems of different companies it is crucial to agree on appropriate standards.

Cross linking *(Sal_1.3)*

Mutual exchange of goods or services (cross linking) in an industry allows to further concentrate on the core business. At the same time costs are reduced through procuring goods or services from specialized providers.

Necessary investment: To enable close cooperation and reduced transaction costs it is necessary to coordinate relevant business processes and agree on standards for electronically exchanging business documents. Appropriate interfaces have to be implemented allowing the business application systems to exchange the relevant information.

Opportunities: Cross linking with other companies enables a company to better concentrate on its core business and to reduce costs through goods or service procurement from specialists.

Risks: There is the risk of processes of the cooperating partner being more or less out the sellers control (e.g. with respect to delivery times and quality); this can lead to an inconsistent appearance towards his customers.

Critical success factors:

Exchange standards: In order to allow the integration and communication of application systems of different companies it is crucial to agree on appropriate standards.

5.3.2 Modify Value Chain (Sal_2)

Many industries have been affected by structural changes due to the Internet allowing companies cost-effective and immediate access to their end-consumers but also due to new options of cost-effective cooperation with other companies along the value chain.

Here, we will look at strategic options concerning elimination of intermediaries, outsourcing and splitting of services in terms of rearranging entire value chains.

Eliminate intermediaries

See Rev2_1 (p. 18).

Outsourcing *(Sal_2.1)*

(Equivalent to Sal_1.3)

Outsourcing of certain (non-core) business functions allows to further concentrate on the core business. At the same time costs are reduced through procuring goods or services from specialized providers.

Necessary investment: To enable close cooperation and reduced transaction costs it is necessary to coordinate relevant business processes and agree on standards for electronically exchanging business documents. Appropriate interfaces have to be implemented allowing the business application systems to exchange the relevant information.

Opportunities: Cross linking with other companies enables a company to better concentrate on its core business and to reduce costs through goods or service procurement from specialists.

Risks: There is the risk of processes of the cooperating partner being more or less out the sellers control (e.g. with respect to delivery times and quality); this can lead to an inconsistent appearance towards his customers.

Critical success factors:

Exchange standards: In order to allow the integration and communication of application systems of different companies it is crucial to agree on appropriate standards.

Splitting of Services *(Sal_2.2)*

Structural change might lead to services, formerly provided by other intermediaries, now being provided by specialised companies. In this way services along the supply chain are split and rearranged forming new levels in the supply chain. A structural change in the car industry might lead to car repairs or test drives being offered by new, specialized companies.

5.3.3 More efficient processes (Sal_3)

When using the Internet sales costs can be reduced significantly through more efficient and automated processes. For every stage of customer interaction the Internet offers new potentials for rationalization. Here, process efficiency can be improved in particular through more standardization and coordination of business processes.

Simplification / Standardization

Automated decision making *(Sal_3.1)*

Processes can be simplified through principally not considering specific requirements of single customers, i.e. by highly standardizing products and services offered. Such standardization supports automated decision making.

Automated configuration

See Sal_3.92.

Reduce costs of initiation (Web-based initiation)

Join e-market place (Sal_3.2)

Joining an electronic market place on the Internet allows cost-effective presentation of products and services for large number of prospective buyers in a geographically unlimited market.

Necessary investments: Interfaces have to be implemented to enable updating of product catalogues and accepting of orders. Relevant processes have to be adapted as well (e.g. order processing).

Opportunities: A geographically unlimited market can be reached. Costs for maintaining your own Web site can be saved.

Risks: In general, using Internet for selling products and services implies the risk of more transparent markets and reduced switching costs for customers which might lead to more competitive prices (see e.g. [BHK02] p. 35). Electronic markets, which display offers of several suppliers tend to tighten competition in the market even further.

Critical success factors:

Critical mass: The selected electronic market place should address a critical mass of buyers. Otherwise there is the risk of additional processing costs being higher than the sales volumes generated on the electronic market place.

Up-to-dateness: In order to provide the customers with a reliable source of information, it is necessary to continually update the product catalogue and product descriptions. Here, an appropriate integration of the electronic market place software with existing business application systems is necessary.

Quick response: Order coming in from the electronic market place should be properly accepted and confirmed quickly.

Standard: In order to foster the usage of your product catalogue data by (prospective) customers, an appropriate open standard for formatting the product catalogue has to be chosen.

Provide product information on home page (Sal_3.3)

Providing product information on a corporate Web site allows decreasing costs of transaction initiation.

Useful: Reference models for categorising and describing products.

Necessary investments: The product and price data should be provided using a standardized catalogue format. This might require costly evaluations before the decision can be made and subsequently reformatting the existing product descriptions according to the chosen standard. After a standard has been chosen and a procedure has been implemented to map the internal product data to the respective catalogue format, the maintenance of the corresponding Web pages usually does not require much effort.

Opportunities: Costs for customer interaction and communication can be reduced, since the customer himself can now access all the necessary data and the Internet imposes (virtually) no limit on the number of concurrent site calls. Providing structured product information in a standardized format is a fundamental basis for further ways of differentiation over the Internet for more sustained competitive advantages.

Risks: The risk of immediate comparability with competitors is not as high compared to participating in electronic marketplaces. However, a general increase in market transparency can be expected, since information is made digitally available, which enables automated price comparisons.

Critical success factors:

Up-to-dateness: In order to provide the customers with a reliable source of information, it is necessary to continually update the product catalogue and product descriptions. This requires appropriately integrating the catalogues and Web applications with the existing business information systems.

Quick response: To encourage the customers to access the product information provided on the Web by themselves, customer requests coming in from all the different channels should be reacted to and answered quickly.

Standards: In order to foster the usage of your product catalogue data by (prospective) customers, an appropriate open standard for formatting the product catalogue has to be chosen.

Necessary competences: It is necessary to know the relevant criteria to assess current standardisation initiatives. It is also helpful to know how to model products and product catalogues on the appropriate level of abstraction.

Reduce costs of selection

Automated check of credit worthiness *(Sal_3.4)*

In general, checking for credit worthiness can be performed fully automated using interfaces to specific service providers.

Necessary investments: For automated checks for credit worthiness interfaces to the application systems of a specialized service provider have to be implemented. Additionally, relevant processes have to be adapted.

Opportunities: Costs for checking credit worthiness can be reduced and the electronic information can be passed on seamlessly to other processes. Additionally, information on credit ratings of individual customers can be gathered more reliable and faster.

Risks: There is the risk of wrongly assessing the potential purchasing power of single customers due to negative credit checks.

Critical success factors:

Up-to-dateness and reliability of data: The data gathered should be absolutely reliable and up-to-date.

See: Rel_1.3 (Gather data on financial background)

Automated authentication *(Sal_3.5)*

In E-Commerce two levels of authentication have to be distinguished: The initial verification of the existence of a customer usually requires special measures (i.e. Post Ident) before the first transaction can take place. When the existence of a person has been verified, a particular mechanism (e.g. PIN, TAN) can be used for authentication for further interaction. Automatic authentication on a Web site can take place using personal PIN numbers or digital signatures.

Necessary investments: Appropriate authentication mechanisms have to be implemented, which enable giving each customer a unique signature or PIN. Additionally, mechanisms have to be implemented which ensure the security of each transaction (e.g. using encryption).

Opportunities: Authentication – generally exceeding mere identification mechanisms – is a central requirement for performing transactions. Its usage in the selection phase already inhibits abuse of existing customer identities.

Risks: -

Critical success factors:

Security: The authentication mechanism has to be supplemented by secure data transmission.

Reliability: The applied systems have to be reliable and robust.

Automated identification *(Sal_3.6)*

Fully automated identification of customer is usually implemented using a unique user name and is frequently combined with a password.

Necessary investments: The Web sites have to be augmented by a software supporting user and access management. Customer touch points should have access to customer specific views and contents, too, in order to refer to it when communicating with the customer.

Opportunities: Automatic customer identification enables individualizing contents and layout of Web sites according to personal preferences. After identification processes of customer interaction can be adapted according to customer preferences.

Risks: Mere identification mechanisms imply the risk of misuse. Therefore, if critical data is being transferred the identification should be supplemented by an authentication mechanism. Extra effort has to be invested in managing user data. Here, you need to consider ‘sporadic’ customers, forgetting their user data.

Critical success factors:

Reliability: The applied systems have to be reliable and robust.

Authentication as supplement: For performing transactions and transmission of personal data it is important to supplement the identification mechanism by an authentication mechanism.

See: Sal_3.5 (Automated authentication).

Reduce costs of outbound logistics

Outsourcing of shipment *(Sal_3.7)*

There are several ways for outsourcing shipment and delivery functions to an external provider. In order to allow a close cooperation, the number of shipment providers should be limited to a few. Adequate interfaces should be established to enable reliable information on delivery status and delays to customers.

Necessary investments: It is necessary to analyse and adapt relevant processes and to create adequate interfaces for reliable exchange of delivery data.

Opportunities: Outsourcing of shipment can lead to reduced delivery costs by taking advantage of economies of scales of specialized providers. At the same time geographic reach is increased and a better focus on the core business enabled.

Risks: The main risk lies in reduced control over the timeliness and reliability of shipment processes. Furthermore, high switching costs are likely if shipment providers have to be changed.

Critical success factors:

Integration: It is vital to sufficiently integrate the relevant business application systems, in order to provide your customers with reliable information.

See: Sal_2.1 (Modify value chain – Outsourcing)

More efficient scheduling *(Sal_3.8)*

More efficient scheduling in outbound logistics enables cost reductions due to shorter cycle times.

Necessary investments: It is necessary to analyse and, if need be, to adapt current business processes. The continued support through information systems has to be implemented.

Opportunities: Process costs can be reduced significantly due to shorter storage and cycle times.

Risks: With a tighter schedule the risk of delayed deliveries increases if problems occur in procurement or production.

Critical success factors:

Integration: It is vital to sufficiently integrate the relevant business application systems in order to achieve overall efficient scheduling.

Reduce costs of contracting

Standardized terms & conditions *(Sal_3.9)*

Terms and conditions can be standardized, or unified, respectively, in several ways. Usage of skeleton contracts is well known in business-to-business relationships; they allow simplify the contracting phase significantly. You can also think of standardized

terms and conditions for certain customer groups or storing of customer specific conditions as part of the respective customer data.

Opportunities: Transaction costs are reduced, since individual negotiations concerning terms and conditions are not necessary any more. Using standardized conditions for individual customer retention is improved (Lock-In effect).

Risks: Standardized terms and conditions come with restrictions, for example, concerning the options to adapt conditions to seasonal fluctuation or changes in interest rates.

Automated pricing *(Sal_3.91)*

Pricing can be fully automated in electronic auctions or automated demand bundling.

See: Rev_3.1 (Auctions), Rev_3.3 (Demand bundling).

Product configuration by customer *(Sal_3.92)*

The Internet allows customers to participate in specifying the requirements of services or the configuration of products with relatively few additional costs. It has to be ensured that the specification is integrated in the production process. Apart from the aspects of transaction initiation and implementation, a customer guiding specification process has to be implemented, which automatically validates the specification.

Useful: Generic or industry sector specific reference models for products and product specifications.

Necessary investments: In order to allow the customers themselves to specify the requirements for their products, first a model has to be developed which describes and structures the different possibilities for product specifications. On this basis a Web-based specification tool has to be implemented. Furthermore, planning and production processes have to be adapted in order to appropriately integrate the product specifications.

Chances: By allowing individual product configurations the aim of further differentiation can be achieved through individualised products. At the same time the thread of substitute products as well as market transparency can be decreased. Additionally, because the customer performs some activities himself, transaction specific costs can be reduced significantly.

Risks: Employees might object to the idea of customers performing former business functions, if their area is affected by necessary changes in processes or tasks. Addition-

ally, it should be considered that production cost structures might increase, since unit numbers usually decrease if more configuration parameters are offered.

Critical success factors

It makes sense to encourage customer participation for specifying products only if the specification can be appropriately represented and supported by Internet technology. Hence the requirement specification needs to be 'formalisable' to a certain extend.

Another critical success factor for this strategic option is to find the appropriate abstractions and concepts for an integrated model (i. e. structured description) of the product characteristics and specification options.

Necessary competences: Knowledge and experience in data and process modelling is fundamental for successfully implementing this option.

Reduce cost of payment

Electronic payment

See Rev_1.4 (Geographic Expansion – electronic payment)

Automated administration of accounts receivable account (Sal_3.93)

Automated administration of accounts receivable account includes automated control of open payments including management of reminders as well as automated updates on incoming payments. These approaches are frequently applied in conjunction with Electronic Bill Presentment and Payment.

Opportunities: Automated administration of accounts significantly decreases process costs.

Risks:-.

Critical success factors:

Integration: In order to fully automate administration of collection accounts it is necessary to adequately integrate the system with other relevant business application systems.

See: Rev_1.4 (Geographic Expansion – electronic payment)

5.4 Procurement

5.4.1 Cooperation (Pro_1)

Different ways for cooperation with suppliers can be suggested depending on the supplier's market power and competitive position as well as the specifity of the procured products and services. The term Supplier Relationship Management (SRM) is used to embrace approaches for integrating suppliers in procurement processes (see e.g. [RiKl02], [Groß04]). This changes the traditional role suppliers used to have – i.e. being an opponent in price negotiations – to value chain partners, whose integration in procurement processes can lead to sustained competitive advantage. These advantages can be based on cost reductions due to overall process optimization and/or based on differentiation advantages due to a closely coordinated product development.

Using the Internet for communication and interaction with a supplier opens further opportunities for optimizing and automating processes and in this way reducing transaction costs (see e.g. [Wild01]).

The Internet not only enables opportunities for cooperation with suppliers but also supports cooperation with other buyers. Demand bundling is a prominent example, because using the Internet as communication platform significantly reduces the required costs for coordination.

Cooperation with suppliers

Skeleton contracts (Pro_1.1)

In long term relationships a skeleton contract with one supplier is defined serving as basis for procuring a product or service over a certain period of time. Assuming a planned volume prices as well as terms and conditions are determined. Such a long term commitment requires demand to be stable over a longer period of time. Each single order refers to the volume contract and specifies the required article number, quantity and delivery date.

Skeleton contracts are usually applied for sourcing direct products, which require specific investments at the supplier's side, and for sourcing low-value indirect goods to reduce transaction costs, respectively.

Necessary investments: Before a long-term commitment to a certain supplier can be constituted in a skeleton contract various aspects should be thoroughly analysed:

- contribution of the respective good or service to differentiation from competitors, and the ratio of current transaction costs to its value added , and
- your own market position as well as
- the market power of the supplier.

Opportunities: In particular costs for negotiation can be reduced through long term skeleton contracts: negotiations on prices and conditions are not needed for single orders any more. At the same time, it is (theoretically) possible to largely automate the order process and in this way to further reduce transaction costs.

Risks: Entering into long term contracts always implies a certain dependency, which is likely to turn into a disadvantage if competition or technology changes rapidly.

Critical success factors:

Periodical reconsideration: In order to still take advantage of changing competitive powers on procurement markets it is vital to periodically reconsider, and if need be, renegotiate and adapt the conditions of existing skeleton contracts.

Process adaptations: It is necessary to adapt procurement processes with respect to skeleton contracts in order to maximize reductions in transaction and processing costs.

Standards: In order to avoid the risk of been locked in to a certain supplier due to supplier specific process adaptations, you should utilise non-proprietary standards for electronic data and document exchange.

Collaborative process optimization *(Pro_1.2)*

Optimizing procurement processes in collaboration with suppliers usually requires a long term contract based commitment.

Necessary investments: Optimizing processes requires initial analysis of existing processes in order to identify opportunities for improvement (e.g. redundant data storage, media clashes). Processes should then be adapted with respect to the analysis results. For a frictionless support of processes in both companies through information systems it is necessary to agree on certain exchange standards and other communication interfaces.

Opportunities: Transaction and processing costs can be reduced significantly through optimizing and automating processes across business boundaries.

Risks: Coordinating and optimizing processes with a certain supplier always implies a higher dependency to this supplier (Lock-In effect). Implementing this strategic option requires considerable effort and – due to the high complexity – implies high risks.

Critical success factors:

Standards: In order to avoid the risk of been locked in to a certain supplier due to supplier specific process adaptations, you should utilise non-proprietary standards for electronic data and document exchange.

See: Pro_1.1 (Skeleton Contracts), Pro_3.1 (Automated ordering).

Collaborative product/service improvement

(Not our focus.)

Strategic alliances for collaborative product development

(Not our focus.)

Cooperation with other buyers

(Share stock room)

(Not our focus.)

Demand bundling *(Pro_1.3)*

The wide spreading of the Internet allows multiple – usually geographically remote – suppliers to bundle their demand through new intermediaries. This opens up new opportunities, in particular, for small and medium sized enterprises to take advantage of procurement prices comparable to conditions of their larger competitors, which they would not be able to take advantage of by themselves. (Useful: General process models for analyzing and centralizing procurement processes.)

Necessary investments: A prerequisite for bundling your company's demand is selecting an appropriate intermediary and – if necessary – adapting the procurement data formats accordingly. In order to fully take advantage of the benefits the internal procurement processes should also be adapted; in particular for indirect goods (MRO goods: Maintenance, Repair, Operations) it might be necessary to centralise current processes.

Chances: The fundamental benefit of demand bundling is the opportunity to reduce wholesale prices, which is due to increased bargaining power and higher volume discounts, which could not be realized by each individual company itself.

Risks: Obstacles for implementing this type of cooperation can come from attitudes of employees, such as „We have never cooperated with competitors before!“. For indirect goods the argument of risks stemming from disclosing procurement data to competitors obviously does not hold true; but it might be legitimate, if material requirements for the core business have to be revealed to competitors. Additional problems can come from inflexible processes or employees, since procurement processes usually have to be re-structured in order to implement this strategic option.

Critical success factors:

Ability to plan demand: Bundling demand usually requires long-term planning. It is therefore fundamental to be able to plan demand for the required period and to implement procurement processes accordingly, which support techniques for estimating future demand.

Standards: Cooperation for demand bundling requires interaction with different business partners or intermediaries, respectively. This interaction and communication can only be achieved if a (communication) standard is agreed upon and supported by all parties.

Necessary competences: In order to implement this initiative and maximize possible benefits it is necessary to be innovative and flexible in adapting procurement processes. The responsible managers also have to know how to organise mid- and long-term planning of the company’s demand.

5.4.2 Modify Value Chain (Pro_2)

Using the Internet can support structural change in procurement markets and value chains. We will look at options for eliminating intermediaries (i.e. in-sourcing instead of outsourcing) and for outsourcing current business functions.

Eliminate Intermediaries (Pro_2.1)

When looking at procurement, eliminating intermediaries implies to produce certain products or services internally instead of outsourcing. This can be beneficial if the required product or service is very specific or requirements for production are so complex, that in-sourcing is more cost-effective in particular in volatile markets. In both cases it can usually be assumed, that the respective goods are central for differentiation from competitors.

Necessary investments: Prior to deciding on in-sourcing or outsourcing the production of a certain good central market and product related aspects should be analysed: market

and competitors, relevancy for competition, options for controlling production. If intermediaries are to be eliminated, new procurement processes have to be established and the new production processes have to be integrated with current production.

Opportunities: The goods produced in-house can enable a better differentiation from competitors. The production process can be controlled more easily and cost-effective.

Risks: There is the risk of production costs being relatively high, since you cannot take advantage of economies of scales as former intermediaries did.

Outsourcing (Pro_2.2)

In the context of procurement outsourcing relates to issues of outsourcing the production of goods and services which have formerly been provide in-house.

See: Sal_2.1 (Sales – Outsourcing)

5.4.3 More Efficient Processes (Pro_3)

Procurement processes can be automated, or at least, supported through continued usage of integrated information systems. Additionally using the Internet allows further improving the efficiency of transaction processes in the different stages.

Simplification / Standardisation

Automated ordering (Pro_3.1)

Fully automated ordering on the basis of existing skeleton contracts promises to minimize transaction costs for procurement. A total automation can only be advised for stable procurement markets. Furthermore, full automation is only applicable for repeatedly purchased products, whose requirements can be specified formally.

Necessary investments: It is necessary to coordinate purchasing processes with the respective business processes of the supplier. In order to allow full automation it is required to agree on exchange standards and to establish interfaces for the electronic exchange of business documents.

Opportunities: Automation leads to significantly reduced transaction and processing costs for purchasing.

Risks: The necessary commitment and therefore dependency to a particular supplier implies the usual risks (Lock-In effect). Since prices are fixed through skeleton contracts there is the risk of purchasing prices being higher than current market prices.

Critical success factors:

Standardization: It is necessary to use standardized interfaces in order to minimize the dependency to a supplier.

See: Pro_1.1 (Skeleton contracts)

Reduce cost of identification (Web-based search)

Search Agent (*Pro_3.2)*

Using special software programs (search agents) for searching for particular suppliers or offers on the Internet promises significantly reduced costs of identification. However, usage of a search agent demands requirements of a product or service to be formally specifiable

Necessary investments: The necessary software has to be implemented or purchased. Appropriate interfaces have to be established allowing the search agent access to other business application systems and vice versa. Additionally, access to the Internet has to be provided.

Opportunities: Usage of search agents leads to a higher market transparency, because the information overload of the Internet can better be managed. Through an automated search costs for searching can be reduced significantly.

Risks: There is the risk of suppliers not supporting automated access to their product information in order to avoid higher market transparency.

Critical success factors:

Availability of information: The information on suppliers and their products or services has to be available on the Internet in a structured format.

Standards: In order to achieve meaningful results, the search agent software as well as the product information provided by suppliers should utilize relevant standards.

Electronic market places *(Pro_3.3)*

Electronic market places are central platforms on the Internet, which support communication and interaction between buyers and sellers in different ways. From the buyer's viewpoint the search is usually supported through structured listings of suppliers and there offers as well as through further search functions. Electronic market places utilise either static pricing with product catalogues or they support electronic tendering.

Necessary investments: In order to seamlessly access to data on the electronic market place appropriate interfaces have to be implemented. Procurement processes might have to be adapted, too.

Opportunities: Electronic marketplaces allow access independent of time or location and they lead to higher market transparency, because products can be compared more easily. In this way, they offer the chance, to decrease prices as well as costs for searching for suppliers and offers.

Risks: There is the risk of non-representative prices if the number of suppliers is too small.

Critical success factors:

Standards: In order to support reuse the interfaces of the business application systems to the electronic market place should utilize non-proprietary standards.

See: Pro_3.4 (Standardised product catalogues), Pro_3.8 (Automated Pricing – E-Tendering).

Standardised product catalogues (Pro_3.4)

Standardised electronic product catalogues allow direct access to relevant product data through an information system. In general, buy-side and sell-side systems are distinguished. In buy-side systems buyers collect the information on products from different suppliers. Sell-side systems are maintained by the supplier supporting access through application systems of different buyers. Product catalogue based systems are usually applied for procuring indirect goods (C-parts, MRO-material).

Necessary investments: Apart from adapting processes and formatting supply data, it is necessary to integrate the existing business information systems with the respective system of the supplier. The integration might involve the definition of exchange standards and the definition of interfaces for process control.

Chances: Costs can be reduced through the internal bundling of procurement activities and through optimizing procurement processes. Apart from the potential for cost reductions, an E-procurement platform leads to higher market transparency, which tends to result in lower wholesale prices on these market places (see [BHK02] p. 34).

Risks: A potential drawback of engaging in a certain product-catalogue based electronic procurement platform comes from the fact, that usually not all suppliers are willing (or able) to provide their goods over the same platform or channel. It is therefore frequently necessary to concurrently maintain different procurement processes. So, many times the

potential of reducing transaction and process costs can not fully be taken advantage of (see [BHK02] S. 34).

Critical success factors:

Centralise procurement processes: In order to take advantage of all the potential benefits, it is necessary to centralise procurement processes, particularly for indirect goods.

Standards: Exchange standards for product catalogues and open standards for business documents need to be considered.

Integration: In order to maximize the benefits in terms of reduced transaction costs it is necessary to fully integrate the existing business information systems with the platforms or systems of suppliers.

Necessary competences:

In order to decide upon the right E-procurement approach it is necessary to know the criteria to assess electronic procurement platforms. Since process redesign is necessary, it is also useful to know process modelling and analysis techniques.

Reduce costs of selection

Automated selection *(Pro_3.5)*

Automated selection of a certain supplier or offer requires the decision process to be formally specified. Furthermore, fully automating decision making for selection is only reasonable, if the decision is made repeatedly.

See: Pro_3.1 (Automated ordering)

Reduce costs of inbound logistics

Improve stock organisation

(Not our focus)

More efficient scheduling *(Pro_3.6)*

Inbound logistics can be scheduled more efficiently if, for example, incoming goods are processed more quickly.

Necessary investments: Improving the efficiency of inbound logistic processes requires the identification of potential trouble spots through (e.g. delays, media clashes) a detailed process analysis. Subsequently, new processes have to be defined and imple-

mented and a system supporting overall process management and control should be introduced, that is capable of access to relevant data of other business application systems.

Opportunities: Processing costs decrease through the higher integration of relevant business application systems.

Risks: If storage times prior to production are reduced the dependency on suppliers increases as well as the risk of production downtime, if necessary input supplies are not available as planned.

Critical success factors:

Integration: In order to increase process efficiency it is vital to integrate the relevant business application systems.

Reduce costs of contracting

Demand bundling *(Pro_3.7)*

If demand bundling is applied, you can not only take advantage of reduced procurement prices due to volume discounts. If demand is bundled inside a company (e.g. for office supply and MRO goods), processing costs for purchasing can also decrease.

See: Pro_1.3 (Cooperation – demand bundling)

Automated Pricing (E-Tendering) *(Pro_3.8)*

Costs for contracting can be reduced significantly if the process of price negotiation can be (fully) automated. For example, a fully automated access to relevant product catalogue data could be provided. More complex pricing mechanisms – such as electronic English auctions and request for tenders – require more steps for negotiation and pricing. Electronic tendering is usually applied for high-priced and complex products, which require intensive descriptions (see [BHK02] p. 17). The electronic support allows for automated control of the tendering process and the electronic submission of requests and electronically receiving tenders.

Useful: Reference models, which describe and assess typical auction processes and possible features and variations.

Necessary investments: Electronic reverse auctions usually do not require many initial investments. It is however necessary to adapt the data format of the requests to a common standard, so that it can be automatically searched for and processed by potential suppliers.

Chances: Since tender based procurement processes are standardized, transaction costs can be reduced significantly (see [BHK02] p. 35). Without significant additional costs a request can be sent to multiple potential suppliers; because of the standardized format proposals can more easily be compared; and using the Internet the search for potential suppliers is less costly. Since Requests for Proposal are usually used for high volume projects and only very few initial investments are necessary, electronic tendering promises quick returns (see [BHK02] p. 35).

Risks: There are no immediate risks.

Critical success factor:

Standards: In order to allow the comparability of proposals, standards for requirements specification and product modelling have to be considered.

Necessary competences: It is very helpful to know the different kinds of reverse auctions, their special characteristics and implications for the final result of the tendering process.

See: Rev_3.1 (English Auction), Pro_1.3 (Demand bundling), Pro_3.4 (Standardized product catalogues).

Reduce costs of payment

Electronic payment *(Pro_3.9)*

Costs for payment can be reduced considerably through the elimination of media clashes in terms of seamless electronic bill presentment and payment. This requires the supplier to support electronic invoicing. If this is given, the process of invoice checking and payment initiation can be performed fully automated.

Necessary investments: Current processes should be analysed with respect to automation potentials and, if need be, processes should be adapted. Furthermore, it is required to agree with the supplier on a standard for the exchange of business documents.

Opportunities: Cost reduction can be achieved through more seamless processes and less errors through data entry. At the same processing times for checking invoices and payment can be improved.

Risks: There is the risk of having to support different processes at the same time, if not all suppliers support the same electronic bill presentment and payment mechanisms.

Critical success factors:

Standards: In order to maintain the same interfaces to different suppliers it is crucial to agree on a non-proprietary standard.

Integration: For a maximised automation of processes it is necessary to integrate the relevant business application systems.

See: Sal_3.12 (Sales – Electronic Payment)

5.5 Focus on Integration of the Internal Value Chain

Order on demand *(Val_1.1)*

This strategic option aims at procuring the required parts after an order has been placed.

Necessary investments: In order to quickly purchase the parts required for a specific order sales application systems have to be integrated with procurement systems. Furthermore, procurement processes have to be optimized with respect to minimized cycle times. In order to allow electronic ordering of procurement goods it is necessary to agree on certain standards. Procedures have to be implemented to reliably determine your own demand on time.

Opportunities: Differentiation advantages can be realized through individual product configuration. Warehousing costs can decrease significantly through order on demand.

Risks: The dependency on the suppliers' assertions on delivery times increases. There is the risk of significantly longer delivery times of your own products.

Critical success factors:

Skeleton contracts with suppliers: In general, long term skeleton contracts are prerequisite for quickly performing (automated) purchase orders.

Integration: Coordination of order processing and procurement processes as well as adequately integrated supporting business application systems are vital for reliably and timely determining demand.

Standards: In order to minimize the dependency to selected suppliers non-proprietary standards should be chosen for the electronic exchange of business documents.

Required: Pro_1.1 (Procurement – Skeleton contracts)

Just in time delivery *(Val_1.2)*

This strategic option aims at the delivery of production parts when they are actually needed in the production processes, in this way leading to minimized inventory stocks.

Necessary investments: Just-in-time delivery requires integration of production scheduling and control systems with procurement systems. Furthermore, procurement processes have to be optimized with respect to minimized cycle times. In order to allow electronic ordering of procurement goods it is necessary to agree on certain standards. Procedures have to be implemented to reliably determine your own demand on time.

Opportunities: Inventory stocks as well as corresponding capital lock up can be minimized.

Risks: The dependency on the suppliers' assertions on delivery times increases. This leads to the risk of idle times in production as well as the risk of not being able to meet your own delivery times.

Critical success factors:

Integration: In order to submit purchasing orders on time it is vital to integrate production scheduling and planning systems with procurement systems.

Skeleton contracts with suppliers: In general, long term skeleton contracts are prerequisite for quickly performing (automated) purchase orders.

Standards: In order to minimize the dependency to selected suppliers non-proprietary standards should be chosen for the electronic exchange of business documents.

Required: Pro_1.1 (Procurement – Skeleton contracts).

Integrated forecasting and planning *(Val_1.3)*

Demand planning is performed on the basis of sales forecasts, which succeeding value chain levels might also have contributed to. The derived demand is made available to previous value chain levels (i.e. suppliers) to support their planning. Implementing this strategic option requires a long term contractual commitment of all involved value chain partners.

Necessary investments: Planning processes have to be coordinated and the respective value chain partners have to agree on certain standards for exchanging planning data. Additionally, the application systems supporting forecasting and planning should be integrated with procurement systems in order to avoid redundant data storage and to support adaptation of plans later on.

Opportunities: Planning across the boundaries of single value chains enables overall optimization of processes and resource allocation. In this way, it is possible to significantly reduce costs.

Risks: Early communication and passing on of your own demand planned requires commitment to selected suppliers leading to a high dependency on their ability to meet the requirements. Integrated forecasting and planning implies high risks with respect to implementing the required technological infrastructure and the partners' ability and willingness to cooperate.

Critical success factors:

Cooperation and trust: The respective companies must be willing to pass on their forecast and planning data. They should be protected from misuse of this information through contractual agreements.

Standards: In order to minimize the dependency non-proprietary standards should be chosen for the electronic exchange of business documents.

Required: Pro_1.1 (Procurement – Skeleton contracts)

6 Guidelines for Structuring the Business Process Library

The structure of the business process library is based on the structuring of general strategies as presented previously (see [FrJu+04]). Modelling of reference processes implies the intention of being (largely) independent from particularities of certain firms or industries. Therefore, in order to achieve the required level of abstraction we suggest different levels of aggregation. On the highest level, sales and procurement processes can be distinguished[1]. For procurement, purchasing processes can be distinguished from inbound logistics and payment processes. Initiation and pricing as well as order processing and collection of payment can be identified as typical sales processes. Additionally, processes for supporting the improvement of customer relationships and for supporting pre-sales contacts (such as user registration on Web sites and requests for information) can be classified as relevant sales processes.

[1] As introduced in section 2 (page 2) procurement and sales are assumed to include inbound and outbound logistics, respectively.

In order to support a thorough description of each process as well as the integration with strategy concepts, a detailed structure of attributes has been chosen (see Figure 10). It allows annotating aspects of process administration and related processes. The purpose of each process can be described including strategy related key words (or identifiers, respectively) and constraints concerning the applicability of the current process in terms of particular industries, products or market segments it is (or is not) applicable to. Furthermore, vital aspect of implementing and managing this process, such as opportunities and risks or investments necessary, can be described.

Associated processes	**Process administration**
Interacting processes Required processes Processes served Similar processes Specialised processes Higher level process	Modeler / Creator Creation date Last update
Purpose and (strategic) orientation	**Business management issues**
Objectives Description of basic activities Strategy related key words Industry sector (if applicable) Products (if applicable) Market segments (if applicable)	Implementation costs Differentiation opportunities Benefits Critical success factors Efficiency criteria Risks
Required Resources	**Abstract organisational units**
Personnel Basic technological infrastructure Security mechanisms Specific application software External interfaces Required information Other resources	Responsible organisational unit Supporting organisational unit Executing organisational unit
Automation	**Standards**
Further automation potentials Suitability for workflow support	Common business processes Business documents

Figure 10: Overview of reference process characteristics.

In order to give further information regarding the operational requirements of a process, required resources – such as abstract organisational units and information technology infrastructure – can be annotated (for further details on resource modelling concepts see [JuKi04]). Potential for automation as well as current standard initiatives supporting a certain process are two other vital characteristics of business processes in Electronic Commerce.

7 Conclusions

Developing an appropriate business strategy for becoming a competitive contender in Electronic Commerce is very demanding. Not only that it requires rethinking the existing strategy, it also may result in changing the existing value chain substantially and to refocus on new markets or market segments. In addition to that, there is need for redesigning business processes as well as for planning and eventually implementing a supporting IT infrastructure. In this paper, we presented a method that fosters the systematic refinement of generic strategies for E-Commerce according to the specific situation of a particular company. The method also shows how to structure and document business strategies in order to support the search for corresponding business processes within the ECOMOD process library. While the method is suited to reduce time, cost and risk of strategic planning for E-Commerce tremendously, it should not be mistaken for a simple cookbook. Although the method takes into account numerous strategic options, which are described in detail, it does not cover the entirety of possible requirements and options that have to be taken into account in a particular firm. For this reason, the method should be used as a guideline for professionals who are able to evaluate the options offered by the method – and who are prepared to adapt or enhance them to their specific needs.

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