Important Factors for E-Commerce

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E-Commerce is not only having a webshop: one has to differentiate between the actual participants and their individual aims. In this article we distinguish between communication from person to person, person to computer, computer to person and computer to computer and point out the different aspects of what one has to think of and the most important factors for success, like putting more emphasis on offline than online services. We also describe a possible use of intelligent agents, including XML standardization and the use of business process reengineering for improving success of E-Commerce.

1.Motivation

E-Commerce (EC) is often reduced to webshops, but this is only a small part of the whole picture of E-Economy [8]. This singular focus leads to ignoring other, also important, aspects like e. g. the partners of communication. In Internet-shops it is always a person contacting a computer, but in a broader view of E-Commerce this need not always be the case: for example in B2B E-Commerce communication from computer to computer is very important (EDI, electronic data interchange). This narrow view obscures certain aspects, which are very important for alternative ways, but could also improve webshops, e. g. the need for an added value for the customer, the problem of standardization or detection and correction of errors or misinterpretations.

First, we will take a look at which combinations of communication partners are possible and then identify some important factors for the success of E-Commerce, which are the same for all types. Afterwards, two very important sub-elements for B2C and B2B E-Commerce respectively are discussed: Person-to-Computer and Computer-to-Computer communication.

2.Communication possibilities in E-Commerce

E-Commerce can not only be divided in groups according to the role of the participants (B2C, B2B, B2A, etc.) but also according to the type of the sink/source of communication (which need not be the same: a consumer using a software agent uses B2C, but communicates probably computer-to-computer). Here the division is done by whether it is a person or a computer program communicating with another entity. For the classification, the selection and/or specification of the content to be delivered is used, not the technical implementation. Four combinations are possible, which will be discussed briefly.

In this context it is very important to distinguish between data, information and knowledge: it is rather trivial to provide data, but much harder to offer information (data + semantics), especially if it should be generated by a computer. If the recipient is a computer, we can define knowledge as the knowledge of the person this data is intended for, or who uses this machine, to avoid the problem that, according to some of the definitions of knowledge, it can only exist within humans (see e. g. [4]). This requires the sender to know about the context of both the data and the user to ensure that both partners of the communications link mean the same thing. If knowledge should be transferred even more meta-knowledge about the recipient is needed: only if the special situation and the desires are known, the information to be provided can be adequately selected and presented to represent knowledge for the recipient. This leads to the concept of personalization on the one hand if the recipient is a person. If, on the other hand, the knowledge is to be transferred to a computer, it results in definitions of semantics (generating information) and processes (producing the importance and special meaning for the recipient at a certain time).

2.1.Person-to-Person (P2P)

No fundamental difference to “normal” commerce exists: a person tries to buy/sell something from/to another person. Similar to usual commerce success depends mostly on the persons communicating. EC has the advantage of allowing to use more elements (e. g. sound, video) for discussing a transaction over distance. Typical examples include videoconferences, E-Mail and newsgroups.

2.2.Person-to-Computer (P2C)

This is the standard form of communication in B2C E-Commerce. It is the cheapest way to enlarge the customer base, as the whole world can be reached at the same cost. However, competition also increases steeply; the more because usually rather cheap and standardized products are content of the transaction. This makes differentiating between providers difficult for customers. Typical examples include webshops and automatic reply systems (e. g. E-Mail inquiries).

2.3.Computer-to-Person (C2P)

This is a very rare category that is seldom used and then mostly unintentionally as no human person likes being addressed by a computer. Examples are automatically generated inquiries or requests, or advertisements (spam). However, massive advertisement (in any form whatsoever) has a special property in the Internet: as long as there is advertisement, new users might be acquired, but as soon as it stops, the influx also stops. The initial draft to be used by the computer should always be created with a human recipient in mind (even when a person is not the intended recipient but might sometimes receive it) and made to seem like originating from a human as best as possible. However, the last must also be taken with a grain of salt: pretending to be a person is rather hard for a computer and if it fails, it can be counterproductive as users are offended or think it is ridiculous.

If this type of communication is seen in a broad view it also includes Human-Computer-Interface – Design (HCI), but this is a necessity in any case and the main point is the content and not the representation of it, as in HCI. So also webpages are not considered to be of this type but rather in P2P, as they are designed by and for persons. If, however, the content of the page is dynamically assembled based on information about the viewer, we speak of C2P.

When this mode of communication is used, legal issues are of special importance: even though the communication originates by a computer, it can be nevertheless legally binding. It is therefore necessary to take a close look at all possibilities of responses and when they will occur. Often a complete test will be impossible, so it has to be substituted by a special focus that the process creating them is correct (substitution of the determination of the content by a determination of the process for creating the content, see also Business Process Reengineering; BPR).

2.4.Computer-to-Computer (C2C)

Communication between computers (EDI) is not a new idea, but receives slightly more attention since the rise of E-Commerce. However, EC is more than exchanging documents between companies: it includes the possibility to improve success through a redesign of the company's processes (see Business Process Reengineering below) to fully use the advantages available through the use of information and communication technology (ICT). This communication mode promises the largest reductions in cost and time, as full automation is possible. Examples are integrated procurement systems with access to the provider's data or automated replication of data to subcontractors or branch offices.

3.Common factors for all classes

A very important factor for all types of E-Commerce is the advantage for the customer: why should he change his ways of doing business, if there is no advantage in it for him (increasing the price or otherwise worsening „normal" business won't be an option for most companies). Possibilities of this added value for the customer/business partner are faster transactions, cheaper prices, one-stop-shopping (all products bought/sold in the same way), availability, positive experiences and added services (both online like additional information and offline as the option for express delivery). The only alternative to this advantage for the customer is just power, either through a monopoly or market power (e. g. large companies can press small providers to use certain software or systems), but this is an option for very few only. Nowadays most companies have to compete in a buyers market, where the customer decides, what to buy and where, and therefore a competitive advantage over other companies is required.

The following issues are an advantage for the customer:

? Faster transactions: Through avoiding the transportation time of the post or not being bound by business hours (either through automatic systems or providers in a different time-zone), transaction times can be reduced. Depending on the partners of the communication this can be even more reduced e. g. when automated communication of two computers is used. Another reduction is possible if electronic goods or certain services (e. g. translation) are ordered: these can be delivered through electronic means and therefore do not need shipment and can be retrieved and transported (and perhaps also worked on or used) directly by computers. If ordering is integrated

into the production, a shortening of the delivery time could also result from automatic integration or rescheduling of production or a new allocation of tasks.

? Cheaper prices: Because of the easy way to compare providers, competition according to price increases vastly concerning standardized products. This requires creating unique products or services through modifications, extensions, or additional services. Otherwise a producer/seller would have to provide the best and cheapest products every time, which will be next to impossible. Another option, which is however only seldom under control of the company, is the cost of shipping. If physical goods are sold, they have to be transported to the customer. At least two forms of shipment must be offered, which should be excellent in their respective area: fast or cheap shipment. This is a chance for local companies, as they can often deliver faster and sometimes also cheaper than large companies, who have their distribution center far away.

? One-stop-shopping: Another important aspect is, that acquiring a customer is a very expensive proposition. Usually it is impossible to cover these costs on the first order, so repeated orders are a necessity, especially if there is fierce competition and therefore only a small margin for profits. A chance for overcoming this challenge is to provide a shopping portal, where many producers offer their goods. In this case synergy effects can enlarge the orders while distributing some of the basic costs (e. g. related to credit-card payment). The profit arises through the customer being able to buy everything in one place (like a conventional shopping mall), but also being able to buy everything in the same way: one need not know how to use yet another search-system or where specific information is located. If C2C communication is used, this reflects the need to implement only a single protocol for communication with the store, which is a big advantage. The customer can, in addition to finding everything in one place and buying it in the same manner, still benefit from certain providers being rather local and specialized on their own subject area.

? Availability: Especially in some countries or remote regions not all products are easily available (or perhaps not available at all). Using E-Commerce can bridge this gap. Virtual shopping moreover allows retrieving more information beforehand on the product than in conventional shops, where in such cases only ordering on request is possible.

? Positive experiences: They bring customer loyalty either through a good reputation when persons are communicating or few errors and positive feedback if computers use services. These need not be part of the product but can also and especially be in the communication: friendliness, error tolerance, help for configuration or the buying procedure, unbureaucratical handling of returns or

differences between shipment and invoice, and so on. Especially the last items mentioned can be of a large value for customers as international legal actions are very expensive and complicated, so avoiding them even in cases of conflict can be a large advantage compared to competitors.

? Added services: Additional services for customers can be either directly related to the products like decision helps (comparison of products) or rather independent. These independent "goodies" can range from actually useful (product configurator, utilities, FAQs, documentation, hints and tricks, etc.) to more of an entertainment type (small games, desktop wallpapers, screensavers, quizzes, …).

The greatest challenge for E-Commerce is producing customer loyalty. Some other problems are: ease of changing the supplier, equidistance of providers, anonymity (mostly in B2C), domain names (obtaining, defense and protection) and advertisements (where to advertise, which medium to use, taking care of spam, …).

? Easy change of seller: In E-Commerce it is rather easy to change the provider of goods or services and therefore binding customers is the most important issue. This depends largely on the communication, as it is rather unpersonal and over a distance and the partner can be changed without expenses (see below). Because of this easy movement to the competition great care must be given to avoid errors: if the first order (and to a somewhat lesser degree later ones) fails, the customer probably changes the seller, never returns and often will persuade others to also leave or not use this provider.

? Equidistance of providers: the customer has the same distance to all providers: one mouse-click. This is only moderated if physical shipping is required. So all providers have the same potential for communication and they can no longer rely on the customer to be forced to communicate with them (either through being locally available or by just initiating communication e. g. by sending leaflets or through advertisements). The problem is therefore extended from getting the customer to buy during a communication to first having to stimulate the customer to initiate communication and only then convincing him to buy. Solving this problem can be really difficult as advertisement if much harder to do in cyberspace: banners have been shown to be of little effect and there are no passers-by to talk to or hand a leaflet. Sending unsolicited E-Mail is mostly counter-productive (if not outright unlawful, as in some countries, e. g. Austria) through people being angry about it (which is very distinct from leaflets, which are seen with much less resentment). Because this equal distance is also very short, the customer might be tempted to use one

provider as a source for information on a product and another one for actually buying it (in case both are only resellers or the products are identical). This is a big problem as many additional services are currently only providing additional information. See more on this below on the distinction between online and offline services.

? Anonymity: This can be seen in connection with equidistance of providers: through the number of potential providers the single one is rather anonymous and only very large companies will be known throughout the whole internet. It is therefore important to not only get the customer to communicate with you but first tell the customer about your existence. This can be done either through passive (waiting for the consumer to take significant action: directories, search engines, advertisements in all forms, also perhaps in conventional media , …) or active means (links in related pages, newsletters, placing mentions of the company in answers to questions, …). Obviously this is easier for material than virtual companies, as they are already in contact with some customers, which can be directly informed (e. g. through mentioning the URL on letters, cars, etc.). However, one of the main aims of E-Commerce is extending the customers base and all face the same problems in this area. Obtaining and defending an appropriate domain name is also very important in this context, as customers often try to find companies through its name or the name of a product.

4.Person-to-Computer

Factors for the success of E-Commerce in connection with communication of a user and computers are especially the usability, knowledge about the customer, and adaptation of the presentation and the offer according to it. Another item is the design of the process (check-out, payment, order tracking). This category of communication is typical for online stores, regardless who are the intended customers (administration, businesses or consumers)

Similarly, offline value-added-services (e. g. handling of complaints, delivery time) are necessary, as online ones are rather too easy to imitate by competitors to be a critical issue. Offline services do consist at least partially on items or processes which are not available online. For example, graphical features on websites or small games are very easy to imitate: only a small one-time investment is required and no new idea need be found. Usually only a rather small effort in programming (without need for special knowledge) is needed, the implementation cannot be kept secret (often even the source-code is available, e. g. for scripts) and observation is possible indefinitely at no cost. If, on the

other hand, more elaborate and new technology is used (which is harder to imitate), users will first of all not be familiar with it. Moreover this usually requires installing additional software and most people are reluctant to do this. Therefore online services can hardly be used as a competitive advantage, as they can be fast and easily copied by competitors. Therefore a race for more and better services/elements would start. But an increase in updates required can hardly be in the interest of all parties: the cyberspace is dynamic enough, we need not make changes even more rapid. Another important aspect to take note of is, that online services are by definition only useful for online customers: conventional customers do not gain anything from it. From a business perspective it is therefore better to provide services, from which both online and offline customers can profit, as the investment is distributed amongst more persons.

However, especially for acquiring new customers, a certain amount of online services might be needed. But even then the focus should be on services which aid customers more than prospective buyers. An example for this is offering the possibility of re-ordering: business customers often need "the same I ordered last month, with some modifications". This service cannot be imitated by competitors and is therefore highly valuable, although an online service.

In this type of communication currently an important point is missing: psychological factors for buying are mostly ignored. This limits the products and services to be sold to those, which are bought rationally. While this might still be an important part, many offers are missing. It is therefore necessary to improve this type of communication to include more than just the statistics of the products. This requires an understanding for the feelings of the customers, in contrast to their thoughts. Therefore an emotional model of customers is required for selling these products. In this connection the research on emotional agents [1], [6] could be useful, where agents try to simulate emotions or detect emotions or attitudes of users. This would also help in understanding the customers when rationally buying: even then a small bit of irrationality is included and "friendly" service might be the last drop for the decision to buy here.

Providing more of a different type of information could help this emotional buying. Through using the WWW it is possible to provide an equivalent to a glossy leaflet for each and every product rather easily, which is next to impossible for a conventional store. Examples are pictures in different resolutions, short videos or interactive VRML demos. Using multimedia to its full extent can also serve to transport the brand name and a reputation feeling to customers. Also, additional "advice" what is currently en vogue, completely with links to designers or information sites can improve this. How-

ever, care has to be taken, as these are mostly online services and possess therefore all the problems described before.

Another special part of communication between persons and computers are “wizards”. Usually they are constructed according to a tree-structure with linear guidance of the user, where decisions on previous stages determine the options at the later parts of the communication. Research in user interfaces [2] has shown that this structure is not really suited for handling programs. These findings could also be applied to the communication using webpages, as the software behind can be seen as a kind of program the customer uses. Fast and easy accessibility to different parts of a website are therefore necessary, even when in the middle of a transaction, e. g. check-out. Many websites still adhere to one designed and desired part of handling by the user, as it is then easier to implement. But as users and their needs differ, their way through the webpage also differs: a very simple example is that some users prefer search engines integrated into a site while others want to locate information through a hierarchical structure. Also, while most wizards serve to reduce the choices of the user to avoid errors or problems (e. g. misconfiguration), communication to customers should be the exact opposite: the user should not be confined, but set free. Errors should therefore be detected and automatically corrected or at least possible solutions and advice offered to the customer.

A special difficulty of this type of communication is the need for a different style of selling: getting to talk to a person, explaining the advantages and praising the product as in P2P communication will not work because of two issues. Firstly, the user usually does not wish a long communication and also cannot be compelled to remain, as it is at least in a limited way possible in face to face communication. Therefore the important elements for this customer must be identified very fast and then immediately used. Secondly, the technical nature of the WWW and also the common habit of using it are more a monologue than a dialogue as the computer provides information, but receives only a very limited reply. This improves the need for feedback by the user(s), which should therefore be taken very seriously (for 1 complaint at least 10 persons were angered by this issue). Every bit of information should be used (see also personalization) and feedback encouraged through optional possibilities for doing this and also encouragement (e. g. bonus points or discounts).

5.Computer-to-Computer

If E-Commerce with the use of direct communication between computers is to be successful, tolerance against errors (fail-safety), standardized communication (both syntax and semantics, [9]) and

integration of processes of both partners (avoids many problems with software engineering and has also intrinsic value) are necessary. One of the approaches for standardized communication, EDI, proved to be too complex, inflexible and requiring high development costs and was therefore used only in a rather small area. New proposed standards like ebXML [3] try to avoid these problems by focusing more on the communicative aspects than modeling the content (electronic documents).

ebXML is a set of specifications for enabling a modular, yet complete electronic business framework, is promoted by the United Nations (UN/CEFACT) and OASIS and based on XML [10].

The ebXML architecture provides:

? A way to define business processes and their associated messages and content.
? A way to register and discover business process sequences with related message exchanges.
? A way to define company profiles.
? A way to define trading partner agreements.
? A uniform message transport layer.

The specification includes a shared repository where enterprises can register and discover each other's business services via partner profile information. Business process models and related message structures are also stored there. This allows retrieving information on the capabilities of potential trading partners (the processes they employ), the syntax and semantics of the messages they send, and how they will interpret incoming messages. This will probably reduce the costs for development as standard blocks will emerge which are widely used, allowing easy adaptation or reuse of components. In contrast to this creating even a semi-standard could prove difficult, because at the time many participants use it, it will be already out of date, so waiting for a standard to emerge might not be a possible option. The semantics are (or have to be) clearly defined for the message structure, the content data, the sequence of individual messages and the business process a communication is part of. This allows an interested party to implement/configure its software without requiring additional information from the prospective partner. In this way errors can be minimized as clearly defined semantics can perhaps be even automatically verified beforehand.

In addition to the distinction between online and offline services made before, in this context offline services are also better suited as computers as a partner of the communication can also benefit from them (perhaps indirectly), while online services will usually be useless for them (like fancy presentation, elaborate graphics, gadgets, or videos).

Particular attention in this type of communication has to be paid to errors and error-handling. Although fewer possibilities for errors or misinterpretations exist because the computer can check many things for correctness and plausibility without tiring, the consequences are probably worse than when communicating with a person. This is because errors usually either result from syntactical differences (and are then very easily detected) or from semantic differences. The latter are very hard to detect, and if, only at a very late stage. See also for this the software lifecycle: the cost for correcting errors rises exponentially the later it is detected.

Similar as XML or ebXML are tools one can use, BPR (Business Process Reengineering [5]) can also be a method to bring enterprises in the direction of E-Commerce, because, as mentioned above, building a webshop is only one part of E-Commerce. When an enterprise goes online, independent from the reason (because it wanted to or the customers or the competition forced it), its organisation and its organisational structure must be prepared for this. Not only the part of webdesign has to be thinked of, or the marketing must be considered, but also the enterprise must be able to cope with an increasing production (assemblance), delivery and maintance of the products. So what happens if the online-selling increases sales of the product by 20% - is the enterprise able to handle this?

BPR can help analyzing the existing processes [7], see where potential problems may arrise, and form other processes, which are more adequate for the goals of the enterprise and where e.g. buffers of time, of staff and so on are included. Also positions where a direct integration with processes of other companies are possible can be identified (especially in the context of C2C communication). So the aim is to create an action space within which the enterprise will not only be able to fulfill the existing situation of orders, but also to be flexible enough to cope with new or unforeseeable future situations.

BPR is very common these times and is able to produce very good results, but one also has to say that there can be problems, espacially if there is not enough support from the management and if the enterprise is not able to include their partners into the BPR-process, and therefore ignores a part of the communication to external parties.

6.Conclusion

For E-Commerce to be successful more is required than programming a webshop or simple exchange of data with customers, providers or administration. The turn to an EC-focused company requires giving attention to many other aspects, technical, managerial and organizational. Important factors

were mentioned like the need to provide not only online but also more offline services and the importance of adapting communication and the processes behind them to the type of interaction used. Identifying the important facets of success and prioritizing them allows a company to focus its effort and improve the odds or the amount of success when introducing or extending E-Commerce.

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