Snapshot of e-commerce's opportunities and threats

E-commerce: reason for reconsideration of business processes. Successful e-commerce implementation requires new business strategies

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E-COMMERCE: MORE THAN TECHNOLOGY

Traditionally e-commerce has been fostered by a strong technology push; implementing electronic channels between businesses, governmental organizations and individuals. This digitization of ordering and product information has implications for transaction costs and information availability. But there is more. E-commerce offers profound opportunities if it is properly integrated in the current business processes. If not, the risk of increasing costs and mismanagement are immediate. Therefore, we try in this paper to identify the opportunities offered by e-commerce, as well as the bottlenecks and pitfalls one should be aware of when integrating e-commerce into the current business processes. These opportunities and bottlenecks are being discussed using a theoretical framework that departs from the value chain metaphor (Porter 1985).

FRAMEWORK OF ANALYSIS

We define e-commerce as 'the whole of business activities, carried out by electronic means within customers' and business processes, for the purpose of marketing, production, supply and payment of products, information content, and services' (Franken and Biemans 1998). E-commerce contains five elements (Nissen 1995), but not all five have to be implemented:

- electronic information-providing to customers (marketing);
- electronic ordering (e.g. via Internet sites);
- electronic delivery (only applicable for certain goods);
- electronic payment (currently immature);
- electronic service (current only information service).

The framework that will be used to structure and categorize the implications, opportunities and also bottlenecks consists of four levels or perspectives (Hoogeweegen 1997; Kambil 1992; Porter 1985) (see Figure 1):

- internal organization;
- dyad (supplier-buyer relationship);
- business chain;
- business network.

The first level refers to the internal business processes of an organization. The dyadic level refers to the value-adding relationship between two organizations, a seller and a buyer, which is typical for a value-adding chain. This level of analysis can be extended to the supply chain level of analysis by incorporating the supplier's supplier and so on (Hoogeweegen 1997). The most encompassing level – the business
network level – incorporates also the relationships between the organization and competitors or other stakeholders (e.g. governmental organizations) in the network. Business chains are being formed and broken off within the business network, forming temporary business chains. Organizations can be part of many different chains.

Through this business network we see three interrelated flows:

1. A flow of goods (traditionally physical and increasingly virtual), we call this the primary flow.
2. A flow of information (e.g. ordering and product information), we call this the secondary flow.
3. A financial flow, commonly in a reverse direction to the primary flow.

In Figure 1 the three flows have been depicted, as well as the three levels of analysis. Of course, there are many more interrelationships between actors within the business network, than depicted.

RESEARCH QUESTIONS

For each level of the framework, the possible consequences – both positive and negative – for an organization that uses e-commerce will be pointed out, however the emphasis lies on the internal organization and the dyadic relationships of an organization with its customers and suppliers.

First, we think that it is not a question whether e-commerce will change the way of doing business, but rather how (Sol et al. 1999), as can be illustrated by a simple example of a liquor store in 1980 and the same store in 2005. In 1980 ‘Bits of liquor’ was an ordinary liquor store in the United States. It had a constant number of customers and they came to the store, were informed e.g. about special offers by the salesman, chose their products, paid cash and took them home. The interaction processes are depicted in Figure 2.

By 2005 ‘Bits of liquor’ will have grown into a completely virtual liquor store. It has no physical shopping facilities at all, neither does it have stock! The owner, already at age, runs his store from behind his computer. He has an Internet page – serviced by ‘Spiderservices Ltd’ – on which customers from all over the world can fill in their order form, which is sent to ‘Liquor distributors international’. They automatically send the order to the right local organization (all over the world), which sends a virtual call to Transbit, an international transportation company, to pick up the load at the local organization’s warehouse and deliver it to the customer. In the mean time the credit card company has cashed the money from the customer’s account and has transferred the money to the outsourced financial department of ‘Bits of liquor’, called ‘Bits of finance’. They pay – also on a monthly basis – ‘Bits of liquor’, ‘Spiderservices Ltd.’ and ‘Liquor distributors international’. The latter contracts local distributors and pays them. Consequently, they pay the distributor. The physical flows, the financial flows and the information flows are depicted in Figures 3, 4 and 5.

This fantasy example is currently proved by e-companies like Amazon and Dell, which are able to lower their prices and at the same time improve customer service. Compared for instance to a more traditional computer manufacturer like Compaq, the delivery time of Dell is 33 days shorter (77 versus 44) and at the same time their average stock is 3 times lower (Wright et al. 1999). However, there are still a number of considerations that should be taken into account, for instance:

- What are the (technological) opportunities of e-commerce and how to utilize them?
What are the bottlenecks and how to get round them?

Finally, is it the right time to get online, or are there preconditions for entry and for which industry sectors are they actual?

The bottlenecks and opportunities are the result of extensive desk and case research performed in order of the Dutch Telematics Institute, which resulted in a research report (Sol et al. 1999). For each level of the framework the possible consequences are being analysed, divided into three categories: negative (mainly risks and bottlenecks when integrating e-commerce into the organization’s business processes), neutral (both bottlenecks and opportunities) and positive (mainly opportunities).

THE INTERNAL ORGANIZATION

It may be clear that doing business via electronic media is more than getting online. We describe a number of possible effects on the management of companies that require serious consideration. Not only to avoid pitfalls, but also to utilize opportunities. Subsequently we pay attention to the costs of e-commerce, the influence on the organization’s culture, the necessity of good information management, and the ability to improve the product capabilities.

Negative: High Initial Investments and Uncertainties About Benefits

The possible benefits, weighed against the costs, are a decisive criterion to evaluate e-commerce. The problem regarding e-commerce is that the costs are fairly clear, but the benefits are not. Whereas Internet watchers (IDC, Forrester) forecast explosive growing markets, the current turnover, realized via electronic means, is below 1% of GNP (Sol et al. 1999). The consequence is that companies are still reserved towards large investments in exploitation of business via electronic means, especially via the Internet, except for some pioneers like Amazon, Dell and Cisco.

Neutral: Enabling Learning Organization

Implementing e-commerce technology, integrating it into the business processes and using it, requires technical skills within the organization as well as the ability to adapt to fast changing circumstances. The faster the changes, the faster the organization needs to adapt; this is especially true for IT. Therefore the claim that e-commerce will force companies to adapt quickly and offer them an opportunity to experiment with new products, services and processes, is not far from the truth. Traditionally organizations struggle creating a learning environment for their employees (Martin 1996). What we for example have seen in the Dutch banking sector, are separated Internet banking departments, instead of integrating them with other more or less similar departments.

This observation means that organizations should change their strategies to allow and stimulate steeper learning curves (Martin 1996) and create openness towards new technology. It is likely that to establish steeper learning curves, new organizational approaches are required (Martin 1996, Sol et al. 1999).

Neutral: Information Availability or Information Overload

Using e-commerce as a channel towards the market will result in an enormous flow of information about customers and suppliers towards the internal organization. When comparing the cases of ‘Bits of liquor’ before and after the introduction of e-commerce, this can easily be seen. This consequence of digitization of marketing, ordering, delivery, payment and service can have both positive and negative implications. On the one hand products and services can be improved, customer’s preferences can be stored – Berry (1994) calls this ‘database marketing’ – and managed and more accurate management information can be supplied.

On the other hand some negative effects could arise: the organization may not be able to see the wood for the trees anymore and more information does not always mean
better information. Therefore, it is necessary for an organization to design an information (quality) strategy before entering the e-commerce market. This strategy should incorporate questions like:

- What information do we need to improve the added value of our products?
- How can we gather this information without bothering the customer too much and to respect his privacy?
- What are triggers for a potential customer to provide us with the desired information?

Moreover internal communication and information exchange between the different departments concerned with the different channels towards the market – we call this multichannel management – requires attention. Another point of concern is the privacy of customers. Whereas information becomes available, it is not as obvious that companies can use it in anyway they like. Privacy restrictions limit the possibilities for instance to internal use.

Positive: New Products, Product Capabilities and Services

Information becomes a more and more important product component, sometimes even tending to become the major component, in particular when services are taken into account (Sol et al. 1999). When looking at this from the reverse side: the value of products could increase by innovative use of information, especially in the service industry. The information-based nature of the e-commerce processes allows for innovative customizing of products by smart information management (Bloch et al. 1996). The most eye-catching possibility is that of mass customization (Pine 1993); it endeavours to create specific products for each customer, based on his or her exact needs. The key is the ability to store customer preferences (this is where e-commerce justifies itself), use a flexible manufacturing technique to adapt a product to their particular needs and operate a network of suppliers, jointly manufacture and deliver a product. Dell and Gateway 2000 are good examples of suppliers that sell custom-manufactured personal computers, and are offering product information, which can be adapted to personal needs through their Web site.

Not only the capabilities of product change, there also arise chances for new product and services, that can be exploited via electronic means, such as online gambling, customer-tuned newspapers, information-gathering tools and database access.

DYAD BUYER-SELLER: CONSEQUENCES FOR EACH OF THE ORGANIZATIONS INVOLVED

Historically e-commerce arose from EDI applications that were implemented between companies to reduce communication costs. Therefore the main impact of e-commerce can be expected on the dyadic relationship between seller and buyer, or, in other words, supplier and customer. We discuss successively the difference between the speed of electronic delivery and the slowness of physical distribution, the importance of trust between seller and buyer, the risk of customer disloyalty or, the other way around, reinforcing the relationship with the customer, improved customer responsiveness.

Negative: Speed of Delivery

One major (paradoxical) barrier to e-commerce is the fact that whereas electronic transactions can be closed efficiently and often immediately, the physical delivery of goods is usually very inefficient and slow. Especially when goods have to pass international borders, delivery can take a lot of time. It is nearly impossible to take care of immediate out-of-stock delivery, as it would be very costly to keep stock all over the world. ‘Bits of liquor’ has partly solved this problem by using local traditional sales channels to deliver fast and not too expensively. However it requires extensive – automated, but still – communication (see Figure 3) between the parties involved to get the order executed and paid.

This inefficiency in the physical delivery of goods hampers the true success of e-commerce, since it only results in real gain when companies change their business processes – of which Dell and Gateway are excellent examples as said before. Without larger inventories – even three times smaller (Wright et al. 1999) – Dell delivers two times faster than Compaq. This example shows that, in the case of commodities, integrating electronic market channels also requires reconsideration of the physical distribution. The same applies for the after sales service system; world-wide marketing requires local agents or a fast pick up and return service.

Negative: Creating Trust

It has been known as long as trade exists: commerce depends on confidence (OECD 1997). For e-commerce to become a real success, both buyers and sellers must have at least as much confidence in the outcome of e-commerce transactions as they have in more traditional kinds of transactions. It must be possible for each participant in an electronic transaction to determine that both the transaction and the market environment in which it occurs are legitimate (Bons 1997; Cronin 1995; OECD 1997).

The main problem in establishing trust is that it often depends very much on the user’s perceptions. It may be conceptually useful to distinguish between issues of ‘hard trust’ (technologically oriented), which involve authenticity, encryption, and security in transactions, and issues of ‘soft trust’ (human oriented), which involve human
psychology, brand loyalty and user-friendliness (Bollier 1996). The ‘soft trust’ issues especially ask for new ways of interacting between parties. This trust is not guaranteed yet, because of the relative newness of e-commerce and Internet technology to the public. It is up to the e-commerce organization to create trust, taking the points mentioned into account.

One of the aspects of trust is the way payments take place. Up to now payments for goods bought via electronic channels are most often done by providing credit card numbers. Although these transactions are fairly secure, people are still very reluctant in providing their credit card number via the Internet. Therefore, for e-commerce to become really widespread, it is necessary to establish a payment infrastructure that is more reliable and secure than traditional payment methods. Nowadays, the technology (Digicash, E-Cash) seems to be ready, but public acceptance has still to come.

Negative: Churn

Organizations take customer relations seriously – to ensure that customers come back. This issue is – of course – also of importance regarding e-commerce (Stahl and Bounds 1991). As Sherman stated in Fortune (Cronin 1995: 187): ‘You can’t say it often enough, never lose contact with your customer’.

However churn – meaning customer disloyalty (ENE, 1998) – lies in ambush much stronger than in traditional buyer-seller relationships. This can easily be seen by means of the example of ‘Bits of liquor’. In 1980, the customers came to the store and had personal contact with the salesperson. In 2005, using e-commerce, the relationship with the customer lacks personal contact, so other means have to be found to create loyalty. The answer to free available search engines, comparing tools and the enormous growth of suppliers on the Internet, is found for instance in personalized service or personal logins at Internet sites.

Positive: Strengthening the Relationship with the Customer

In spite of the risk of churn, e-commerce could also create a strong impulse for the seller-buyer relationship, by two means. First, the ability to collect, store and manage information on customer’s characteristics, needs and wishes, which makes it easier for a customer to return to a certain Internet site – one of the methods currently utilized is the use of so called cookies. It also enables proactivity within the supplying organization by providing customers with valuable information (Bloch et al. 1996).

The second reason for a reinforcement of the seller-buyer relationship – especially in the business to business market – is the possible mutual need to invest in information technology, like EDI-equipment. These decisions are hardly done without intensive communication between the actors involved and therefore the implementation processes can tighten the relationships.

Positive: New Channels Towards the Market

E-commerce enables electronic sales and distribution channels, having impact on two categories of primary flows, physical goods (advertised and ordered online and delivered traditionally) and virtual goods (advertised, ordered and delivered online). In the first category e-commerce strategies are of primary value in markets where information is of significant added value to the products being bought, rather than in commodity markets.

The second category consists of products that can be digitized (publishing, insurance, banking, travel industry). For virtual goods, e-commerce provides a new ‘physical’ distribution channel, for example via the World Wide Web or other kinds of value-added-networks between sellers and buyers. ‘Bits of liquor’, for instance, could provide information on the winery, the type and quality of the wine, or the food it goes well with. This information can be of significant value to customers, and is usually hard to get through the traditional sales channel (e.g. supermarkets, liquor stores). Centralizing this information digitally is therefore of significant value for customers.

The adjustment between information flows and physical flows however, is still a point of attention, especially when different parties are involved (see ‘Bits of liquor’). It could mean that additional contracts have to be made with local agents, distributors, Internet providers, etc. Also inventory information has to be transferred online from the local agent to the ordering site at e.g. Spiderservices.

Besides creating new distribution channels, e-commerce offers considerable opportunities for the company’s marketing strategy. It provides a new channel to the market, next to billboards, telemarketing, television, papers and magazines, and direct mail. Because of the availability of better customer information, – which is not as obvious as it seems; it requires a well-designed information strategy – companies are more capable of reaching customers on an individual basis. Thus, one-to-one marketing comes within reach. Customers can profit from this by getting products suited to their individual wishes. In the case of ‘Bits of liquor’ the preferences of customers can be stored (via the ordering information) and customers can be informed when their favourites are on special offer.

BUSINESS CHAIN: CONSEQUENCES FOR THE INVOLVED ORGANIZATIONS

Because the relationship between seller and buyer as well as the possibilities for individual organizations change, the whole value-adding chain from producer to end-customer
changes. Not only by a reduction of costs, but rather because companies can exploit new needs for service and value adding becomes more and more information driven. However, when there are winners, the losers can not be far away. Therefore, we discuss a number of threats, like unequal advantages within the business chain and the problems with liability of e.g. intermediaries like Internet providers. On the neutral and positive side we mention the possibilities for companies to find new roles and redesign their strategies.

**Negative: Unequal Advantages**

The implementation of e-commerce commonly requires effort by more than one party, especially in the business to business market. However the benefits differ among individual participants and can even be negative for some, while there is a net benefit for the whole chain. See for instance the problematic implementation of a screw card within the Port of Rotterdam; this card was expected to lower the costs of container transportation by a significant margin (for the shipper), but at the expense of the truckers. Another example comes from the business to consumer market, where e-commerce provides sellers with loads of detailed information about customers and customers get little information in return (Hagel III and Singer 1999).

Unequal benefits have been shown to affect the initial adoption decision (Riggins and Mukhopadhyay 1994). How trading partners implement and use e-commerce applications internally and externally may directly affect the amount of benefits. Furthermore, when advantages of e-commerce implementation mainly lie on the side of the sellers, it is questionable whether buyers are eager to cooperate, despite the advantages for the business chain as a whole. Thus, unequal advantages are a potential danger for all the participating organizations in an e-commerce business chain.

**Negative: Liability of Intermediaries**

In electronic business, the same illegal actions might take place as in traditional business, resulting in lawsuits. Examples are infringement of intellectual property rights, publication of unlawful material and organizations that default. The main question in this is what the legal status is of the intermediaries involved in electronic messaging, like the information providers, service providers and access providers, for example in concerning the business chain of ‘Bits of liquor’. It is imperative to achieve a certain degree of clarity of the status of these intermediaries in case of illegal actions, to avoid their being involved in lawsuits without being to blame. The legislation issue will get even more complicated with so called intelligent agents or Webrobots. These pieces of software autonomously gather information, compare prices and performance of product and maybe even buy via the Internet.

**Neutral: Changing Roles in the Business Chain**

As was mentioned earlier, e-commerce enables (and requires) new product capabilities and new services. This creates opportunities for incumbents, but equally for new entrants. The other side of the picture is less rosy: positions of current players within the chain are threatened, especially those of some types of intermediaries. Thus we distinguish two main trends: first, e-commerce will bring producers closer to the customer, which will lead to significant disintermediation, a development that has started some years ago in the financial markets and was followed by similar developments in the insurance and travel industry (McCubbrey 1997). Does this lead to mass unemployment? Probably not, in practice disintermediation more often means changing jobs, not eliminating them.

This brings us to the second trend, which is the reverse side of disintermediation: re-intermediation. E-commerce creates opportunities for new and different intermediaries – look at online bookseller Amazon.com and the case of ‘Bits of liquor’. Hagel and Rayport (1997) distinguish two types of intermediary roles, customer-oriented infomediaries and vendor-oriented infomediaries. The first category brings structured supplier information toward customers, the latter informs suppliers about customer’s wishes and demands. For both types there seem to be enormous possibilities. A third role is that of neutral intermediaries, like Trusted Third Parties (TTP). Banks are expected to play this kind of role in the future.

The conclusion from this observation is that incumbents have to reconsider their position within the value chain thoroughly, because they could be out of business sooner than they think. However, timely reconsideration and action could reward incumbents with a rosy future, because they can take their customers and knowledge about the customers with them, while new entrants have to conquer market share.

**BUSINESS NETWORK: CONSEQUENCES FOR THE INVOLVED ORGANIZATIONS**

The most encompassing level of the framework is the network level, which includes relationships between competitors, with governmental organizations and so forth. We discuss some major consequences of e-commerce, which could affect a company’s strategy. First, the hampering mass-market adoption, which is required to earn money on the World Wide Web, is discussed. Subsequently some aspects regarding market transparency are described. This section ends with the consequences of global reach of markets.
Negative: Mass Market Adoption of E-commerce

A key to the success of widespread use of e-commerce, is the large-scale adoption of both buyers and sellers (Bloch et al. 1996), because of the large investments needed. There is much uncertainty as to when mass-market adoption will happen. It depends both on the investments made by companies and on the willingness of buyers to adopt to this new way of doing business using electronic means. This typical chicken-and-egg problem is fed with ever-increasing predictions about Internet trade on the one hand and with persisting losses of leading Internet companies on the other hand. However, it is not that surprising that success has not yet been achieved. The advantages of e-commerce over traditional buying are rather limited, especially where commodities are concerned. In some cases there are possible discounts (books, CDs), but the logistical advantages are not very impressive. Real benefits for both consumers and suppliers are only possible when (new) electronic business models are implemented.

Neutral: Transparency: To Find and to be Found

Whereas a potential buyer traditionally knew the local liquor store around the corner, nowadays he can obtain information about liquor stores, wineries etc all over the globe and can order there too. However, this overview is relative; it strongly depends on the quality of the search engine whether the overview is complete, and even if it is, the list is likely to be dramatically long. So it is most important to have optimal search engines, so products will be found according to and ranked by the criteria specified. Intelligent agents are expected to fulfill these functions across the Web.

One can say that at present suppliers get more and more information about customers. But it is questionable whether suppliers can find their customers. Currently the marketing model of Internet marketing is principally about (passive) presence. The initiative lies with the customer, unlike with direct marketing and mail. In short, with powerful (search and comparison) tools customers could find their ideal suppliers without even visiting the Web-site themselves.

In brief, it is not enough to be present on the Internet; a strategy to be found by customers or even to find and reach customers (in advance of their site visit) is important to make e-commerce successful.

Positive: Global Reach: Extended Markets

One of the most eye-catching opportunities of e-commerce is the fact that national borders do not limit its reach. This provides companies, regardless of the size, with the opportunity of conducting business worldwide. Customers do also benefit from this global scope, since this offers them the possibility to choose products and services from all potential suppliers, regardless of their geographical location. This is mainly important for the market of virtual goods (e.g. software, information and music) and for specialty goods (e.g. Delft Blue).

However, as shown in the example of ‘Bits of liquor’, also with physical goods, global markets can be served, if the organization is equipped to provide rapid and accurate service and delivery. This generally requires organizational change, for instance in virtual organizations, loosely coupled via the central organization (i.e. ‘Bits of liquor’).

DISCUSSION AND QUESTIONS FOR FUTURE RESEARCH

How did ‘Bits of liquor’ deal with the bottlenecks and opportunities mentioned? Throughout the paper some examples are already depicted. Fostered by consequences of e-commerce at all four levels of the research framework, ‘Bits of liquor’ adjusted its processes. It realized that effective internal information management could provide valuable information to its customers. The dyadic relationship with its customers changed dramatically: the customers had to come to the store, nowadays they can order from any place in the world. The business chain also changed completely: a number of new intermediaries entered the chain and the flow of goods became fully loose of the information and financial chain. It is questionable whether the changes have resulted in equal benefits: due to the large amount of parties, the margin of each of them is likely to be smaller than it originally was in 1980. Furthermore on the business network level, the success of the formula of ‘Bits of liquor’ has to prove itself. Significant initial investments are necessary to create the situation as it is in 2005, and to make this virtual organization profitable, the turnover has to increase enormously. The future will point out, whether the effort ‘Bits of liquor’ put into doing business via electronic means, is enough to survive.

Generally speaking, it may be clear that e-commerce is more than just another channel towards the market. Just adding this extra channel does not guarantee success (Keen 1996). On the contrary, successful integration of e-commerce into the current business processes is likely to necessitate reconsideration of business strategies, models and processes.

Thinking of new strategies and new roles within the business chain and then implementing them, is the task most organizations are currently confronted. These steps require courage and vision, because the current market via e-commerce is relatively small (Sol et al. 1999), but will finally pay off.

The changes do not only take place within organizations; dyads, business chains and networks will change as well. Organizations need to be proactive to become a successful competitor in the electronic markets. The
bottlenecks and opportunities, placed in a research framework (depicted in Table 1), may well serve when reengineering the organization integrating e-commerce into the business processes.

FUTURE RESEARCH

The challenge for future research lies in the design of new business models and strategies using e-commerce. Business models and strategies that utilize the opportunities and overcome the bottlenecks have to be designed according to the basic characteristics of (mainly) Internet trade:

- instantaneous and rapid transactions;
- customers power (overview, global supply);
- loosening of primary flow (products, services) and secondary flows (e.g. ordering information, payments);
- possibility of advanced information collecting, storing, sorting and analysing functions at both the buyers’ and sellers’ side;
- remaining need for customized information, personal contact and nearby service.

Furthermore there is a challenge in engineering tools that on the one hand support the change process towards these new business models and on the other hand, support organizations in conducting e-commerce business processes efficiently and effectively. In the first category one could think of component-based chain simulators and gaming environments, in the latter category one could think of intelligent search engines and electronic auctioning tools.

Table 1.

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<tr>
<th>Bottlenecks</th>
<th>Opportunities</th>
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<tr>
<td>Internal organization</td>
<td>+ New product capabilities, new products and services</td>
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<tr>
<td>– Uncertainty regarding actual benefits</td>
<td></td>
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<tr>
<td>+/- Enabling learning organization</td>
<td></td>
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<tr>
<td>+/- Information availability or overload?</td>
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<tr>
<td>Dyad buyer-seller</td>
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<tr>
<td>– Speed Of Delivery</td>
<td>+ New distribution and marketing channels</td>
</tr>
<tr>
<td>– Creating Trust</td>
<td>+ Strengthening of customer relationships</td>
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<tr>
<td>– Churn (Customer disloyalty)</td>
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<tr>
<td>Business chain</td>
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<tr>
<td>– Unequal advantages</td>
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<td>– Liability of intermediaries</td>
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<td>+/- Changing roles: disintermediation and re-intermediation</td>
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<tr>
<td>Business network</td>
<td></td>
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<tr>
<td>– Mass market adoption</td>
<td>+ Global reach: extended markets</td>
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<tr>
<td>+/- Transparency: to search and to be found</td>
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