The Future of B2C E-Commerce

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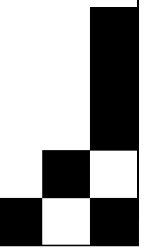

Abstract

Condensing the understanding of Business-to-Consumer (B2C) e-commerce and its causal relations with the environment in a set of future meaningful, specific and exhaustive variables is a prerequisite for long-term forecasting. There is no consensus regarding even present quantitative estimates of e-commerce, nor does current research pinpoint immediate cause or effect. In around 50 semi-structured interviews with cross-functional e-commerce practitioners, academics, users and non-users, 14 variables describing the future structure of e-commerce and 35 environment variables have been identified. The understanding of e-commerce is focusing on the terms 'automation' and 'spatial separated delivery', leading to a differentiation between distance selling e-commerce and automated transactions at retail outlets. The environments investigated include Society, Distribution, Technology, Retail Outlets, Socio-Politics and Market environments, providing a holistic view on the long-term outlook of e-commerce.

Keywords: e-commerce, Habermas, theory of societal evolution, foresight, theory of communicative action, e-commerce framework

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SYSTEM VARIABLES FOR DESCRIBING THE LONG-TERM DEVELOPMENT OF B2C E-COMMERCE

Quantifying the impact and forecasting Business-to-Consumer (B2C) e-commerce activities needs a clear understanding of what e-commerce means and how it is causally related to its environment.

However, current concepts of e-commerce differ, rendering different numbers for both current and past e-commerce activities. While this variance is partly due to measurement issues (cf. Fraumeni 2001: 318), conceptual or coverage differences, too, result in different estimates (cf. Rallet 2003: 158). Although subject to debate, the least common denominator seems to be 'transactions over computer-mediated networks' (cf. Mesenbourg 2001: 4). While there is no consensus regarding even present estimates, forecasting adds a whole new dimension, as given today's language we almost certainly lack the means to describe the future (cf. Kirsch 1997: 48). Thus, a 'transaction over computer-mediated networks' alone might not be a meaningful differentiation for describing future impact, scope and structure of e-commerce.

Additionally, long-term causal relations involving e-commerce are not yet well understood. Based on the analytic approach to scientific research and due to the newness of the e-commerce phenomenon, the research focused on immediate causes and effects of e-commerce adoption, with only few authors taking a longer-term perspective on e-commerce embedded in its environment (Zentes and Swoboda 1998, with a focus on retail in general)[1]. Such immediate causes are, for example, product category (e.g., Choi *et al.* 1997), consumer characteristics such as demographics or lifestyles (e.g., Kau *et al.* 2003), trust (e.g., McKnight *et al.* 2002), or website characteristics (e.g., Kim *et al.* 2002). However, a generally accepted framework of immediate causes of e-commerce adoption has not yet emerged. The effects from a growing e-commerce adoption in other fields received even less attention, as research focused mainly on the impact on traditional forms of retailing (e.g., Lee and Tan 2003). Research does not pinpoint the immediate causes and effects. Embarking on a long-term forecast adds further complexity, as small indirect effects might have a huge impact in the long term.

In order to quantify the impact of e-commerce and enable long-term forecasts, two crucial questions need to be answered:

1. What will be the meaningful *long-term* differences with regard to the structure of e-commerce? What definition of e-commerce

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would render relevant data? *In other words, what is e-commerce?*

2. What will be the meaningful *long-term* differences with regard to the context of e-commerce? How does e-commerce interact with its environment? *In other words, what drives e-commerce?*

In the next section, literature with regard to e-commerce concepts and context is reviewed. Then an alternative definition of e-commerce will be proposed. Subsequently, the theory supporting the framework is discussed, followed by a description of the study and its results. The paper adds to the literature: (a) an overview of B2C e-commerce research; (b) a sustainable definition of what e-commerce is; and (c) a research framework for the long-term development of e-commerce.

LITERATURE

With regard to the measurement of e-commerce, attempts to find a common and comparable concept have led to a shared definition among OECD countries, where 'an electronic transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organizations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted on or off-line.' (OECD 2002: 89). This measurement concept traces back to Mesenbourg (2001). While it may seem straightforward, measurement issues and conceptual differences remain.

Definitions currently employed in statistic agencies implicitly focus on retail transactions made through a personal computer. While according to the stated definition e-commerce includes 'orders received or placed on any online application used in automated transactions such as internet applications, EDI, Minitel or interactive telephone systems' (OECD 2002: 89), in surveys such as Eurostat's 'E-Commerce and the Internet in European businesses' (Garland 2004: 109), the questionnaire explicitly asks for EDI and Minitel, but not, e.g., for interactive telephone. Different e-commerce measurement practices are compared in OECD (2002: 61) along technical differences, such as Web Commerce, Internet Commerce and Electronic Commerce, and along sector differences, such as retail and business with or without the financial sector.

Fraumeni (2001) points out a number of measurement issues, including capturing e-commerce in sectors that are difficult to measure, such as finance or services; the shift from 'fee for products to free products' with information goods leading to an exclusion of economic growth from the measure; the shift from non market-coordinated to market-coordinated activity such as the increased home delivery of physical products, leading to an increase of output without an increase in activity; the blurring distinction between goods such as a newspaper and services, such as an online newspaper; the problem of double counting intermediate inputs and the full value of the product, and other aspects mainly relevant to B2B e-commerce. She concludes with the remark that 'it does not seem feasible to separate e-commerce activities from other activities' (p. 321). In order to recognize the full impact of information and communication technologies (ICT), Rallet (2003) abandons the focus on transactions and proposes a definition of e-commerce that broadens current ones in two directions: (a) include both pre-sales (such as the Japanese MITI/ECOM concept) and after-sales; (b) include the use of ICT also within shops, not only online-transactions such as with distance selling. In a fine overview of current e-commerce measurement, he argues that telephone transactions, if carried out over VoiP or with an interactive telephone system are not captured if focusing only on online sales. On a more general note, he poses the question whether it would not be a paradox 'to measure, i.e. to circumscribe, a phenomenon defined by a generic technology with the characteristic to spread to the entirety of activities' (p. 155), asking for other measures of the impact of ICT. In general, scholars seem to agree that current measures of e-commerce do not adequately describe the impact of ICT, but up until now alternative concepts have not been proposed.

With regard to the e-commerce context, there are roughly two research fields. On the one hand, there are a number of studies trying to achieve a general understanding about why people shop online and what they regard as relative advantages of e-commerce versus the alternatives. Keeney (1999) interviewed around 100 individuals to develop a 'means–end objectives network for Internet Commerce' with 25 objectives, 9 of which are fundamental, and 16 means objectives. The 25 objectives are categorized from 91 more specific ones. Based on Keeney (1999), Torkzadeh and Dhillon (2002) apply a scale development process to derive a 37-item measurement instrument that covers 9 factors. Chen and Dubinsky (2003) show the influence of five constructs on customer value and purchase intention. In a cross-country comparison, Mahmood *et al.* (2004) find that trust and economic conditions explain e-commerce adoption level, but technology savvy and educational level do not exert additional influence. Devaraj *et al.* (2002) develop seven direct and indirect antecedents of channel satisfaction and preference with a structural equation model. Pechtl (2003) for German grocery shoppers, Burt and Sparks (2003) and Couclelis (2004) with a focus on implications for traditional retailers compare online and in-store shopping.

Mathwick *et al.* (2002) compare online and catalogue shopping.

A second stream of research focuses on consumer characteristics such as demographics or lifestyles. Kau *et al.* (2003) and Swinyard and Smith (2003) find groups with different e-commerce and Internet lifestyles. Schenk and Wolf (2003) explore the influence of demographics and generic lifestyle segments on German e-commerce adoption. Wu (2003) is but one example for studies that look at demographic influences on e-commerce adoption (see Table 1).

Many of the concepts mentioned in the general frameworks outlined above are explored in further detail in different studies, especially website characteristics as well as ease of use or trust- and risk-related issues. For example, in a scale development process, Kim *et al.* (2002) obtain six constructs based on metrics for architectural quality, and McKinney *et al.* (2002) come up with 12 measures for website and systems quality. Other examples of studies exploring trust with e-commerce are McKnight *et al.* (2002), Koehn (2003), Yoon (2002), and Miyazaki and Fernandez (2001).

While there seems to be consensus about the importance of aspects such as *product choice*, *price, reduced travel costs, trust, ease of use, Internet experience*, and *different product categories*, there are a number of confirmed drivers that have not been reproduced or even tested by other authors. Additionally, most authors conceptualize the measures in different ways, so studies are not always fully comparable. For example, time savings are accredited to reduced travel, to the convenience of delivery service or to general time efficiency. Moreover, there are only a few frameworks that include concepts indirectly affecting the development of e-commerce. Furthermore, in the long run, the relative advantage of e-commerce over traditional alternatives might increase or wane, as they co-evolve. Shopping in malls, for instance, can become less attractive with an increase in traffic congestion or higher security risks due to terrorism or epidemics. What's more, the influence of e-commerce adoption on other parts of society is not analysed sufficiently, although negative developments might backfire. The most important aspect not covered in present research is the potential change in the understanding of e-commerce, so today's e-commerce drivers are driving something that might be irrelevant tomorrow. This leads to the discussion of the focal concept and the definition of e-commerce.

BACKGROUND

E-commerce definition

Scholars agree that current concepts of e-commerce are not adequately capturing ICT impact. However, no generally accepted definition has been proposed yet. If an alternative suggestion is to succeed in the scientific community it should correspond to the following requirements:

- Measurement results need to be comparable to current ones.
- The benchmark must be comparable to the e-commerce definition.
- Even in the long run, results must not be near zero or one hundred per cent.
- The majority of growth needs to be captured; i.e. if adoption level increases, the figure must rise, too.

Rallet (2003) suggests including in-store as well as pre- and after-sales activities, but also points out that ICT '[have] the characteristics to spread to the entirety of activities'. Such a broad definition, especially the inclusion of pre- and after-sales, does not meet the third criterion. So starting from the OECD's definition, electronic transaction as one conducted over computer-mediated networks (OECD 2002, 89), e-commerce is defined in two-ways:

- With regard to the automation of transactions (e-commerce in a broad sense);
- With regard to the spatial separation of transaction and delivery, with a further separation of physical and digital goods.

The first characteristic follows Rallet's (2003) suggestion with regard to in-store transactions. Placing orders through terminals and computer-mediated networks that are not consumer property will increase. Certainly there would be agreement to include as e-commerce orders placed in an internet café or through a computer terminal in the store of the vendor. However, on the same line of argument, buying tickets at a ticket vending machine or self-checkouts in retail outlets (especially if conducted via RFID) should be called e-commerce. These are also transactions through computer-mediated networks and, therefore, should be considered. To preclude these phenomena would mean to forego analysing positive effects of ITC and of the Internet on traditional retailers.

Obviously, there is a difference in the customer interface. However, special terminals are increasingly introduced for special purposes within the Internet. Paid phone calls over IP-networks through a browser would be considered e-commerce. Similarly, the use of a dedicated IP-telephone should be regarded as such, although it is not a PC. Once smart home appliances allow programming delayed or even self-administered orders, these should be included as well. All these transactions are conducted over computer-mediated networks. Not allowing for them would hinder the analysis of what could be a fundamental change in consumer behaviour. Additional possible factors are:

Table 1. Research on e-commerce context

Source *Research object*	*General Shopping Utility*	*Consumer characteristics*	*Product characteristics*	*Company/website characteristics*
Lee and Tan (2003)[2]	x	x	x	x
Schoenbachler and Gordon (2002)[3]	x	x	x	x
Chen and Dubinsky (2003)[4]	x		x	x
Graumann and Neinert (2004)[5]	x	x	x	
Keeney (1999)[6]	x		x	x
Mathwick *et al.* (2002)[7]	x	x		x
Wu (2003)[8]	x	x		x
Lohse *et al.* (2000)[9]		x	x	
Fenech and O'Cass (2001)		x	x	
McKinney *et al.* (2002)[10]	x			x
Miyzaki and Fernandez (2001)[11]	x	x		
Pechtl (2003)[12]	x	x		
Mahmood *et al.* (2004)[13]	x	x		
Devaraj *et al.* (2002)[14]	x			
Javalgi and Ramsey (2001)[15]		x		
Kau *et al.* (2003)[16]		x		
Schenk and Wolf (2003)[17]		x		
Swinyard and Smith (2003)[18]		x		
Kim *et al.* (2002)[19]				x
Torkzadeh and Dhillon (2002)[20]	x			

[2]Concepts include: Utility service risk, Risk takers, Brands, Low risk products, Well known retailer

[3]Concepts include: Perceived risk, Past direct marketing experience, Motivation to buy from a channel, Product category, Website design

[4]Concepts include: Perceived customer value, Perceived risk, Valence of experience, Product price, Perceived product quality, Ease of use of the website, Relevant information, Customer service , E-tailer reputation

[5]Concepts include: Assortment is larger, Prices are easier to compare, Good bargains are possible, Trying out things is not possible, Disclosure of personal data, Missing service and advice, Payments are complicated, Problems with returns, Shopping is complicated, Demographics, Product categories

[6]Concepts include: Maximize customer satisfaction, Maximize privacy, Minimize time to receive product, Maximize safety, Maximize convenience, Minimize time spent, Maximize shopping enjoyment, Minimize environmental impact, Minimize cost, Maximize product quality, Minimize fraud, Assure system security, Maximize access to information, Maximize product information , Minimize misuse of credit card, Minimize misuse of personal information , Assure reliable delivery, Limit impulsive buying, Maximize accuracy of transaction, Enhance comparison shopping, Make better purchase choices, Maximize product variety, Maximize product availability, Minimize personal travel, Maximize ease of use, Offer personal interaction

[7]Concepts include: Efficiency, Entertainment value, Escapism, Intrinsic enjoyment, Economic value, Intuitive shopping, Analytic shopping, Visual appeal, Excellence

[8]Concepts include: Effectiveness and modern, Information abundance, Multiform and safety, Selection freedom, Purchase convenience, Service quality, Homepage design, Consumer demographics (Gender, Age, Education, Occupation, Income, Interest, Living area), Consumer purchase preference (Times, Methods, Delivery), Company name familiarity

[9]Concepts include: Internet experience and usage, Product category

[10]Concepts include: Access, Usability, Entertainment, Hyperlinks, Navigation, Interactivity, Relevance, Understandability, Reliability, Adequacy, Scope, Usefulness

[11]Concepts include: Risks and concerns of online purchasing, Internet experience, Remote purchasing experience

[12]Concepts Include: Greater assortment variety, Difficulty of money transfer, insecure e-payment, Data protection, Convenience of a delivery service, Independent of opening hours, Excitement of electronic shopping, Losing track when shopping, Better deals, No touch and feel of products, Time stressed, Familiarity with the internet

[13]On a country level, Concepts include: Trust, Economic conditions

[14]Concepts include: Assurance, Time, Uncertainty, Usefulness, Ease of use, Asset specificity, Price savings

[15]On a country level, concepts include: Social/cultural infrastructure, Commercial and legal infrastructure, Information technology & telecommunications infrastructure

[16]Concepts include: On-off shopper, Comparative shopper, Traditional shopper, Dual shopper, s-Laggard, Information surfer

Table 1. (*Continued*)

[17]Concepts include: Establishment, Conservatives, Postmaterialistic, Modern performers, Traditionalists, GDR Nostalgic, Experimentalists, Consumption Materialists, Hedonists, Demographics

[18]Concepts include: Shopping lovers, Adventuresome explorers, Suspicious learners, Business users, Fearful browsers, Shopping avoiders, Technology muddlers, Fun seekers

[19]Concepts include: Internal stability, External security, Information gathering, Order processing, System interface, Communication interface

[20]Concepts include: Internet product choice, Online payment, Internet vendor trust, Shopping travel, Internet shipping errors, Internet shopping convenience, Internet ecology, Internet customer relation, Internet product value

- orders by browser entries, which would forego speech recognition entries on home computers;
- orders through home computers, which would forego orders on portable devices with its implications on the traditional retail business, if customers compare prices at the point of sale with prices online;
- orders of physical goods, which would forego the bulk of revenues from paid content or other digital goods or services; and
- orders of physical and digital goods, but no services, which would preclude the download of ring tones directly to the mobile phone, currently calculated as telecommunication service.

If the aim is to understand the scope of Internet and e-commerce, i.e. the impact of a technical innovation, a complete picture should encompass all these transactions, even if they are not what consumers think of first when talking about e-commerce and would thus not indicate such transactions in surveys.

However, should technology spread and indeed become ubiquitous, and should the Internet be included in the vast majority of transactions, the 'conducted over computer mediated networks' characteristic would not render much information. Therefore, the criterion is changed to *automation of the transaction*, i.e. the extent of human interaction on the vendor side. That means, an electronic payment administered by e.g. a waiter, even if drawing on computer mediated networks, is not considered e-commerce.

However, even if one confines e-commerce to 'automated transactions', it might soon govern the majority of B2C transactions, hence the second feature of the definition, *spatial separation of transaction and delivery*. In the not so distant future, access to the Internet or other computer-mediated networks could become universal. Very shortly, nearly everybody will possess a mobile phone, with 95% penetration in Sweden and 85% in the Czech Republic in 2002 (Graumann and Neinert 2004: 117–18). Should RFID become as universal as bar codes are today, most retail transactions could become computer-mediated. Therefore it seems necessary to further differentiate the term 'automated transaction'. Even if Rallet (2003: 164) calls the separation of transaction and delivery an 'arbitrary reduction' with regard to e-commerce, it makes a big difference for consumers. Whether consumers see and pickup goods in a store or whether they have the goods delivered, and whether goods are delivered physically or electronically (cf. Choi *et al.* 1997: 16) fundamentally changes the shopping experience. Sticking to this differentiation will make future measures comparable to current ones, as this definition is the closest to what is considered e-commerce today. So *automated transactions with delivery spatially separated* would be called *e-commerce in a narrow sense*. We would like to point out that this definition significantly differs from the OECD's definition 'transaction over computer-mediated networks', as it abandons the focus on the underlying technology and explicitly distinguishes between distance and in-store selling.

With regard to the benchmark for measuring the impact of e-commerce, we suggest *private consumption*. What would be a good benchmark is still being discussed. The most commonly employed comparison, total retail sales (such as the US Census Bureau, cf. Mesenbourg 2001: 7) does not seem appropriate, as (online) travel bookings (NACE 63.3x) are not counted as retail sales (NACE 52.x), and thus in the extreme, e-commerce might cover more than one hundred per cent of all retail sales. Additionally, services from telecom operators would not be comparable to retail sales, as well as electronic transactions regarding subscription goods such as utilities (electricity, water, fuel), although they are included according to the above definition. A comparison to GDP is not suggested, although double-counting transactions seems a more salient problem with B2B transactions (cf. e.g. Fraumeni 2001, 321), as savings are not comparable to consumption.[2]

A synopsis of the e-commerce definitional framework proposed is shown in Figure 1.

E-commerce context

To draw the context for long-term forecasts is a difficult task, as a small difference in a distant system – the proverbial flap of a butterfly's wing – can easily influence the focal one a great deal. In this study, the context is defined based on Numberger's (2004) approach to select and frame variables.

Based on Habermas's theory of societal evolution, a comprehensive theory of societal evolution, Numberger (2004) suggests analysing the phenomena at hand both as a social system and a life-world. The social system is a

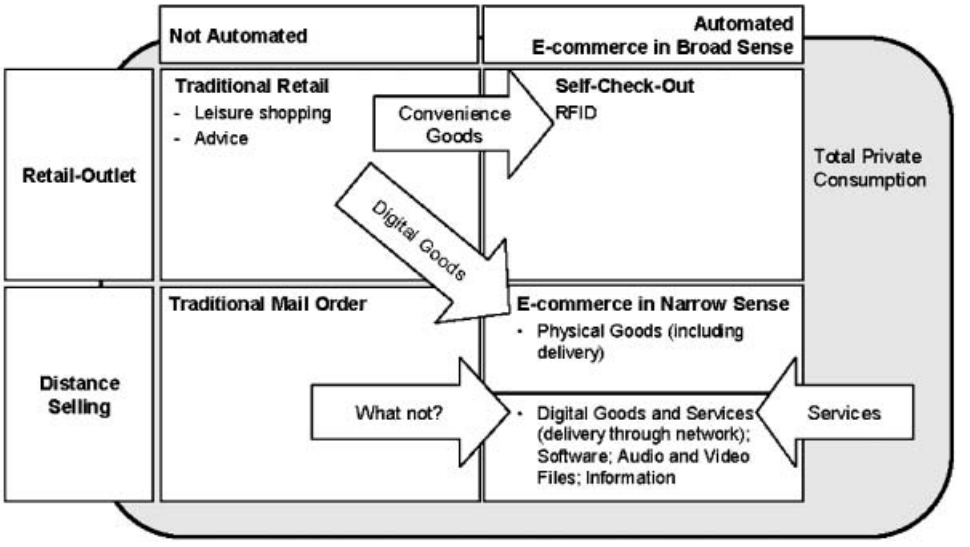

Figure 1. Quantifying e-commerce and potential developments

powerful network of communication governed by media, without the necessity of a largely shared definition of the situation. It is organized in sub-systems, such as the *economic* sub-system with the communication of payments or the *administrative* sub-system with the communication of orders. The social system is entrenched in the *life-world*.

The *life-world* is the organizing principal, the 'unproblematic background of shared experiences and beliefs', the 'horizon, in which the communicating actors have always been moving', the 'intuitive knowledge' of actors (Habermas 1981: 182, 205). Habermas further distinguishes the life-world into the *personalities* and their ability to act and learn, the *culture* incorporating the society's knowledge base of technical and practical know-how, and *society*, referring to norms and the institutional order. He derives this differentiation from communication theory, which holds that every communication is comprised of a statement about:

1. the objective world (as the totality of entities, about which true statements are possible);
2. the social world (as the totality of legitimately regulated interpersonal relations); and
3. the subjective world (as the totality of privileged accessible experiences, which the speaker can truthfully utter to an audience) (Habermas 1981: 183).

The focal system is then analysed together with its direct environment and with the structural parts of the life-world. For market transactions, he suggests focusing on the system governed by payments, and to consider both participants of the focal communication *payment for xyc*. This means equally studying the supply and demand side of a transaction. Additionally, developments with connected payments (such as payments up and down the value chain) and causes for people not entering the offered communication (such as people who could but do not currently use the good or service) are included. With regard to structural parts of the life-world, where the payment system is entrenched, influence might stem from technological developments relevant to the payment and its corresponding good or service (for *culture*); from the interpersonal relations affected through the payment, such as with juridical, administrative and political developments etc. (for *society*); and from personalities affected by the payment (for *person*).

The approach aims at finding variables to adequately describe a system in the long run. Thus it tries to uncover both structural variables, i.e. parts of the system that remain stable (such as a stable speed of development), and seeds of change, i.e. parts of the system that potentially change the focal system. Structural variables are necessarily inductions from the past. Change can occur in the following forms: unforeseen change of *values*, e.g., as a result of exponential growth; change of *relative importance* of a variable, e.g., with changing regression coefficients, changes of the *direction of influence* of variables, e.g., predator–prey relationships and seemingly passive variables, and changes in *variables in general*, in the case of a new variable influencing the system. This leads to an analysis of variables that could *describe* the system, *influence* the system or *are influenced* by the system. Passive parts of the environment that are important to society are included, as they might become active and fire back. Potential structural change can also occur, if the applied structure is not applicable to the antecedents, or if a governing structure is not understood. In such cases, hypotheses with little empiric confirmation might lead to better forecasts than empirically tested models that do not fit reality very well. However, in deciding between different possible explanations, both strength of influence on the focal system as

well as predictability are included, as expressed by empirical evidence and successful previous forecasts based on the chosen variables. In other words, variables are included if they are well predictable, even if their influence on the system is small, and if they are highly interacting with the system, even if the chance of especially influential occurrences is very small.

METHOD

For this study, around 50 semi-structured interviews with representatives of different parts of the e-commerce system and underlying life-world were conducted according to Habermas's theory of societal evolution. Two group interviews were conducted with practitioners, with six to eight participants, each lasting two hours. Practitioners mainly represented different roles in the e-commerce system and its direct environments, such as online vendors, ISPs, etc. With few exceptions they were at the executive level. One group interview was conducted with academics, representing the structural parts of the life world. Most of them have published about e-commerce from the perspective of their academic backgrounds, for example in Electrical Engineering, Computer Sciences, Logistics, Sociology, Law, Psychology, Marketing, and Marketing Research. There was one group interview with seven users. Additional 14 consumers participated in a web survey with 13 open-ended questions similar to the interview guide, available online between February and April 2004. Face-to-face or telephone interviews were carried out with one non-user, two teenagers and nine additional experts. Each function depicted in Figure 2 was represented with two to five interviewees, except for traditional distance selling and non users with one interviewee. Participants had diverse backgrounds also in other regards, with an age range spanning from 15 to 65, with at least seven different nationalities, with professorships or no higher education at all, and all having differing previous Internet experience.

Participants were informed about the purpose of the interview, to uncover (a) variables for an adequate description of the long-term future of e-commerce and (b) variables that influence the development of e-commerce or are influenced thereof. No additional incentive was offered. 'Long-term' in the interviews and survey was fairly arbitrarily specified to the year 2020, as 15 years seemed a far-enough time frame. Also, many interviewees were at least approaching their thirties, so they have consciously experienced this time span at least once. The survey and interview guide started with belief and normative questions about the long-term development and trends of everyday life in Europe. These questions were included in order to make participants familiar with the time frame in a more general context. Additionally, these questions were intended to uncover the important variables to the individual interview participants. The next set included questions about the long-term development of shopping in general and of e-commerce. Participants were given examples of the main categories comprising private consumption. The last set consisted of questions about the influence on the development of e-commerce and the effects from that

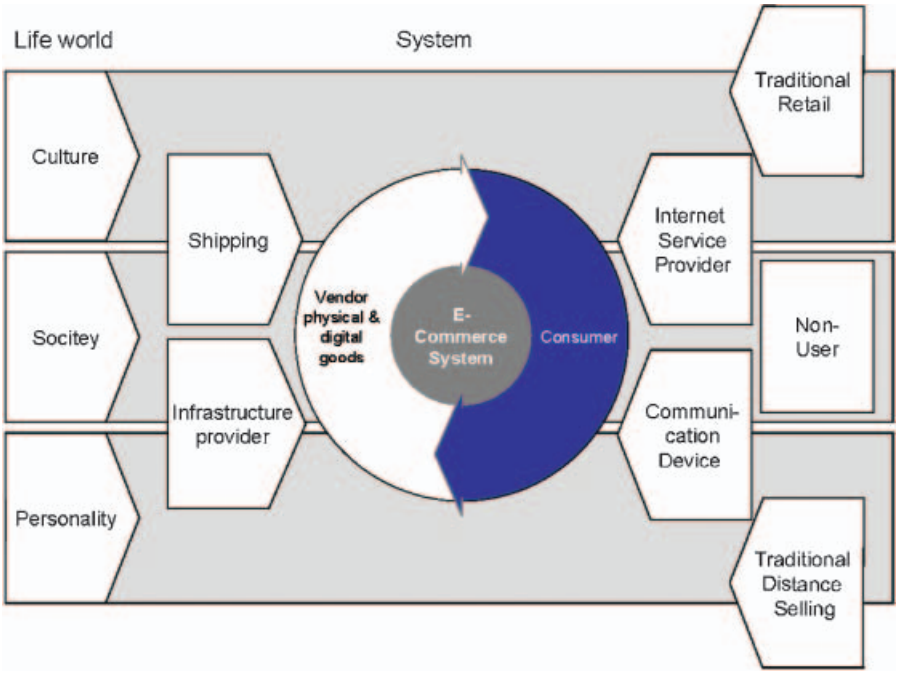

Figure 2. Interview participants

development. The full questionnaire is included in the appendix.

The interviews were videotaped and transcribed. The resulting text document was prepared for an inductive content analysis based on grounded theory (cf. Mayring 2002), i.e., text parts representing one distinct statement were combined and small parts of the text with no relation to the topic were removed. The text was gradually labelled and aggregated based on similarity of statements and according to importance for the e-commerce system. Background knowledge of e-commerce literature proved useful for deciding on semantic similarity. Statements were aggregated, if they contained the same content but were expressed differently. Statements were aggregated, too, if they contained the flipside of each other, such as 'digital goods' and 'physical goods'. For arguments comparing the utility between different channels, every effort was made to keep an e-commerce perspective, such as with 'relative price level'. Statements were sometimes aggregated if referring to the same content, even if their meaning was different. For example, statements about 'information transparency' were combined with statements about the relative bargaining power between suppliers and customers or with statements about time savings because of information transparency.

Statements were also aggregated with regard to their importance to the e-commerce system, as either expressed directly by the interviewees, and even more so if they were experts in that regard, or by the frequency of statements. Important variables were aggregated less, in order to capture smaller differences. Variables with little interaction with the e-commerce system were aggregated the most. However, frequency of statements was not a very valid measure, as in group interviews a discussion about the importance of a statement might lead to a higher frequency score. Additionally, group interviews, individual interviews and self-administered surveys were combined. Categories received at least five statements, with a maximum of 39. In total, 762 distinct statements were coded.

In a first step, labels were derived for the entire text directly from the statements, in order to ensure the categorization process remains independent of the participants in different interview rounds. This step led to 288 categories for the first 35% of the text, 79 categories for the middle 20% and 145 for the remaining parts. In a second step, the 288 categories from the first part were further condensed to 117 categories. In a third step, these 117 categories were combined and aggregated with the 79 categories from the middle part. The fourth step included assigning the 145 variables from the remaining text to the already aggregated high-level categories, which led to only a few more categories. The result was a preliminary framework of 45 categories. In a fifth step, these categories were grouped to seven different environments. In the sixth step, an independent researcher coded 10% of the text according to both, the seven groups and the 45 categories. In the seventh and final step, the categories and codebook were further refined. This researcher independently coded an additional 10% text sample representing different interviews in order to specify inter-coder reliability. Cohen's kappa values of 0.86 for the seven group labels and 0.82 for the 45 categories indicate a high inter-coder reliability, according to Banerjee *et al.* (1999: 6).

RESULTS

Forty-five empirically derived categories describing the e-commerce system and its context were grouped into seven environments interacting with the structure of e-commerce (cf. Figure 3). The first group of categories deals with the description of *e-commerce in general*. Independent of empirical data, a discussion of e-commerce impact measures led to a two fold definition, with e-commerce in a broad sense defined as *generally automated transactions*, and e-commerce in a narrow sense defined as *automated transaction with spatially separated delivery*. A further distinction was made between physical and digital goods and services, and private consumption was suggested as a benchmark.

Apart from the value of transactions made through e-commerce, the fraction of people actually shopping online and the products bought online were seen as important indicators. Interviewees distinguished mainly along *age* and *education*, while technology affinity was mentioned only once. It was pointed out that using the Internet is part of teenagers' everyday lives, and that teenagers are used to making transactions such as downloading ring-tones for mobile phones. On the other hand, meagre adoption of automatic teller machine usage with elderly people was seen as a parallel to a potentially meagre adoption of e-commerce usage. With regard to the products sold online, mainly four distinctions were made: *digital versus physical goods*; *search versus experience goods*; *convenience goods*, and *expensive versus inexpensive goods or services*. Most believed that *digital goods and services* will soon be sold only via the Internet. However, sale of *search goods* through the Internet was thought to depend at least in part on the development of terminal devices, as enhanced virtual reality capabilities with terminals could overcome the current limitations. Disagreement also occurred with regard to *convenience goods*, with some interviewees seeing potential there, e.g., with nappies, and others not believing in a wide acceptance of convenience goods and grocery. This seems to be a chance for further automation in retail outlets such as with Tesco's RFID plans. Some consumers were hesitant with *expensive goods* being sold via the web. Downtown real estate prices potentially drive the *price disparity* in a direction favourable to e-commerce. However, whether

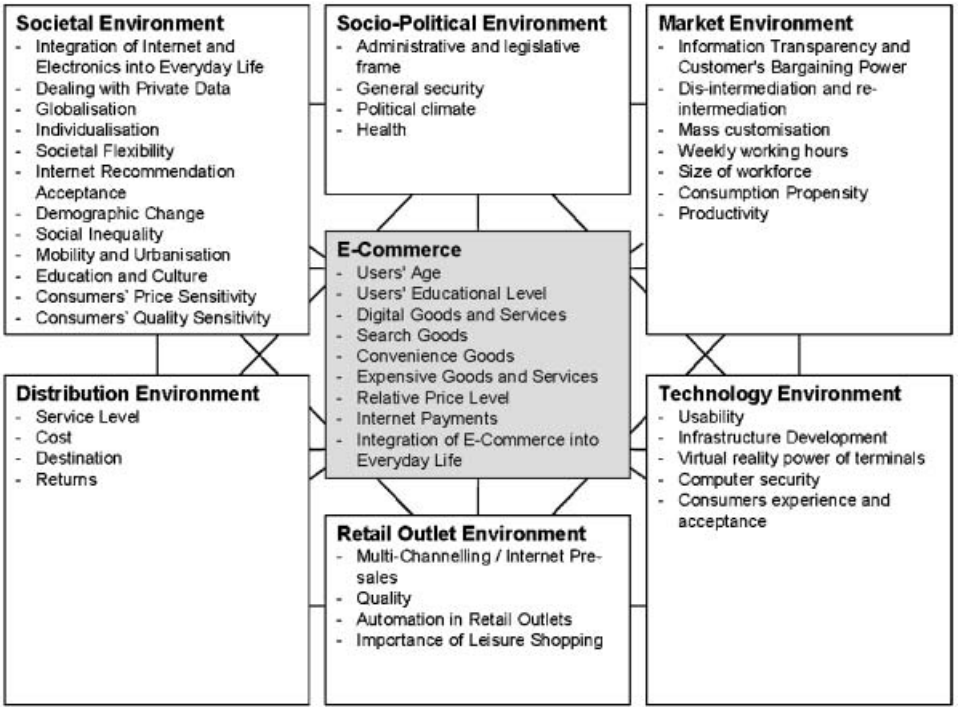

Figure 3. E-commerce and its environments

that will lead to higher e-commerce turnover was also thought to depend on the development of consumers' price sensitivity. Statements about *payment means* dealt with simplicity and security, but also with the emergence of a common standard. *Integration of e-commerce into everyday life* mainly groups statements about the ability to shop everywhere, anytime, in situations in which economic transactions are not possible today. Interviewees expected to have access to the entire assortment through mobile phones or PDAs and to trigger transactions directly from the screen during a movie. People also thought about automatic orders through intelligent home appliances, but saw more potential with consumer goods than with food. A distinction was made between the integration of e-commerce into everyday life and the integration of the Internet into everyday life, because consumer preferences might influence the integration of e-commerce, while the integration of the Internet is less dependent thereon.

The second group of categories deals with *Societal Developments*. Interviewees referred to *integration of the Internet and electronics into everyday life* (i.e., home-networks, media stations, mobile devices, RFID tags, etc) as an important trend. One interviewee said 'every product worth more than 25 dollars will have its IP address.' *Globalization* is a category with less direct e-commerce influence, but one that most participants viewed as a trend so the predictability was considered high. Statements included global consumption patterns, a harmonized legal and economic frame and tensions due to negative consequences of globalization. Global firms were thought to have an advantage in e-commerce because of trust. *Individualization* was expressed as individual consumption, a pursuit of one's own ways and objectives, single life with less 'true' personal contacts, a disintegration of society, and the dislike of seeing people downtown. Interviewees expressed their concerns about the influence of increased e-commerce on personal interaction, although they did not believe that traditional retail outlets would totally disappear. Interestingly, the need for personal conversation and advice was one of the most important arguments for the claim that retail outlets will not completely disappear. Interviewees also thought that individualization might increase the need for personal contact in shopping situations. *Demographics* are probably the most predictable variable and are thus included in the framework. The UN (2000: 137) estimates median ages in Europe to rise from 38 years in 2000 to a range from 41.7 years to 44.3 years in 2020. For countries such as Italy, the range is 48.1 years to 49.6 years, starting from around 40 years in 2000 (UN 2000: 113). Participants mentioned the ageing society with regard to the delivery of bulk products and productivity pressure, with longer working hours and thus less time to shop. Interviewees expressed their perception of rising *social inequality* and a retreat of the welfare state. They were concerned that parts of society could be excluded from e-commerce because they are not computer literate, cannot afford Internet access or because their negative payment history is publicly available. Systematic exclusion of certain

groups could negatively impact the political climate. Additionally, a potentially interesting target group might be foregone. *Mobility and urbanization* were mentioned as trends with interviewees having different opinions about the influence to e-commerce. Some thought e-commerce would profit from urbanization, others believed it to be competition to e-commerce, as it takes less time to get to the mall in urban areas. *Consumers' acceptance of Internet or automatic recommendations* is a variable distinct from the technical ability to make such recommendations, because trust is an important issue there. One interviewee doubted she would believe a machine, 'that told [me] I'd look fabulous in that dress' or that she would be healthy and should not worry. One user found it haunting to get a book recommended that he had searched for for some time. *Dealing with private data* received much attention as a primary concern discouraging consumers to shop online. On the one hand, personalization requires consumers to share data; on the other hand vendors might misuse them. Ever-smaller mobile devices were believed to potentially aggravate the issue. Other societal variables included the development of *education and culture*, such as effects of digital goods on the publishing, entertainment and culture industries, but also a concern about the educational system and European culture in general with regard to demographic change and migration; *consumers' price sensitivity*, such as consumers getting extra satisfaction from shopping for good deals; *quality sensitivity*, such as consumers shopping for quality products and with regard to expected usability in computer-mediated transactions; and *societal flexibility*, with innovation, speed of adoption and mobility.

Distribution as the third group of categories is central to the distance selling of physical goods. Interviewees mentioned different *distribution service* aspects, such as delivery speed, time, flexibility and reliability as important for broader long-term adoption of email orders for physical goods, especially if it is necessary to receive the delivery in person at home. Pickup stations as the *destination* are seen as a potential remedy, especially for people who value flexibility and cannot shop during traditional opening hours. A high share of delivery to pickup stations could come with convenience goods being shopped online during office hours and picked up on the way home. Another aspect interviewees brought up was *distribution cost*. With distance selling, picking, assembling and delivery are turned over to the vendor, and 'somebody has to pay for that.' Other aspects connected with distribution costs are fuel prices, tolls, environmental problems, and further automation in logistics. Interviewed logistics experts called the problem of *returns* the actual cost driver in the delivery function.

The fourth group is comprised of variables that describe the general *Market*. *Information transparency and customers' bargaining power*, together with potential obstacles such as market concentration, brand power and lock-in strategies were among the most frequently mentioned categories. While information transparency through the Internet was generally seen as leading to a 'marketing paradigm shift', some interviewees said the Internet might also lead to reduced transparency, for instance through fictitious currencies, intensive personalization, or because of a lack of signals such as marble floors in department stores. In the early days of e-commerce, information transparency was thought to lead to a *Disintermediation*, and manufacturers would try to circumvent retailers. Interviewees also confirmed that development, mentioning trends such as flagship stores, factory outlets, travel bookings, but also white labels in the retail sector. Some thought that shopping consulting could become a new service, as retailers specializing on their own brands would lose the market function. *Mass-customization and breadth of assortment* in the general product offering was believed to enhance e-commerce. One interviewee said: 'I had the experience of a specialized [high street] retailer telling me: ''we don't have that, look on the Internet.'' Do you think I will ever go there again?' On the other hand, wide adoption of e-commerce could make mass-customization easier. *Size of workforce* contains two aspects: on the one hand, participants thought that people involved in formal jobs had greater difficulties with organizing their shopping. With an increased workforce, increased use of distance selling could be expected. However, unemployment was seen as a huge challenge, and interviewees feared that efficiency gains through e-commerce might lead to increased unemployment. A rising of *weekly working hours* is expected because of the demographic trend and is thought to further distance selling, as less time is available for shopping. Other variables include *productivity*, where increases are expected by more automation in the retail function, and *consumption propensity*, since picking, assembling and delivery are services that have to be paid for.

The fifth group of categories deals with *Technology*. *Virtual reality power of terminals* is seen as influencing the amount of orders placed online; the absence of sensual stimuli was one of the most frequently mentioned obstacles to shopping online. Advanced and widespread virtual reality capabilities including odours were thought to enhance the overall experience by stimulating cognitive processes. Leisure shopping might then move online. On the other hand, more powerful input devices such as web cams, speech recognition and intelligent home appliances will facilitate ordering goods and services. A related factor is *usability*, with standardized shopping processes in-store and online, user interfaces, no redundant inputs, improved search mechanisms, personalization etc. regarded as beneficial for e-commerce. The *infrastructure development* directly influences deployment and thus the importance of orders placed through computer-mediated networks. Especially sales of digital goods and services will benefit

hugely from multiplied bandwidth. *Internet experience and acceptance* was put together with statements about the pace of Internet adoption and about the next generation growing up with the Internet. Generally, interviewees believed that children who play with mobile phones and the Internet early on will be more induced to shop online. Concerns about *Computer security* with its direct implications for trust are raised with statements about viruses that might, though not very likely, severely endanger e-commerce usage. Additionally, it was believed that net-criminality will be contained and Internet transactions will be traceable.

The sixth group of categories concerns the traditional *retail environment*. Whether it will lose ground was thought to be dependent on its perceived relative *quality* with regard to the shopping experience and convenience, advice, and density of the retail network and opening hours. Easy accessibility by car and presentable environments such as in shopping centres or high street have also been mentioned as factors attracting consumers to traditional outlets. *Automation in retail outlets* might lead to cost savings (for instance with self-check-out systems) and could thus vastly increase e-commerce in a broad sense. Additionally, electronic networks at the point of sale can be used to enhance the shopping experience offline and blend the best of both worlds. Additional aspects in retail outlets include the *importance of leisure shopping* and *multi-channelling*. A more important leisure orientation with more leisure shopping would potentially support both traditional quality retail outlets and (distance) e-commerce. *Multi-channelling*, such as a bricks-and-mortar approach, could enhance the compatibility of e-commerce with traditional shopping routines: traditional retailers use the Internet to pre-sell and sell goods and offer additional services, and e-commerce vendors open flagship stores as trust-building activities.

Socio-politics, the seventh group of variables, are important for describing the e-commerce system both because of its direct influence on e-commerce and because of indirect influence through other environments such as market and society. Obviously, the *administrative and legislative frame* influences the adoption of e-commerce. Interviewees referred to intellectual property laws and a corresponding sense of wrongdoing with infringement, which especially affected the sales of digital goods and services. Also mentioned were taxes, digital signatures, and consumer protection laws forcing an increase in information transparency. Administrative interventions were thought possibly to enhance Internet access through subsidies and education programmes. Compulsory use of e-government applications could have a positive influence on e-commerce, German tax authorities for instance made Internet tax declarations compulsory for companies as of 2005. Interviewees mentioned the administrative and legislative would also possess the power to potentially change e-commerce development considerably, although it is unlikely, that political decisions will highly exert any influence. Within *General security* were summarized such statements as 'latent danger of terror could accelerate the adoption of e-commerce, because you do not have to expose yourself to the risk of terror acts in the subway or mall.' However, the reduced security could also result in robbing delivered items from mailboxes or pickup stations. Security was also mentioned as a primary concern for the future. Similarly, *Political climate* was mentioned as a concern for the future. Political climate is a rather aggregated variable, comprising fears of an unbridled capitalism, attitude to foreigners and migration, sexual equality, corruption of democracy, a detached European government and the concentration of power. While interviewees did not see much direct interaction with e-commerce, they believed a deteriorated political climate could lead to the misuse of private data. Additionally, negative effects of e-commerce on society, such as increased inequality, would possibly lead to a worse political climate. Wide adoption of the Internet and e-commerce were thought to potentially threaten the general *Health*. A connection was made between e-commerce and different diseases, such as psychological, orthopaedic and cardiovascular diseases. Also, reliance on e-commerce for vital goods such as grocery or medication might jeopardize the supply thereof. On the other hand, a global super-plague might drive consumers away from crowded places such as shopping centres.

IMPLICATIONS

The research described provides a theoretically grounded, useful and comprehensive list of e-commerce and its context variables. It synthesizes existing research and ideas empirically grounded in expert and consumer interviews about the long-term outlook of e-commerce. It offers a holistic overview of e-commerce while staying parsimonious and specific with the individual variables. It is limited in so far as the majority of interviewees had a German background, so there might be cultural biases reflected in the categories. Additionally, qualitative methods are generally less comparable than quantitative approaches, their reliability and validity are more difficult to judge, and leave more space for subjective interventions on the part of the researchers.

Companies might benefit from the framework when it comes to investment decisions. The suggested e-commerce definition and distinctions allow assessing the role of one's business along the most relevant dimensions. Depending on that role, different parts of the environment can be chosen from the list according to their relevance. Investment decisions will profit from an integrated projection in the different categories, because such an approach will reveal inconsistencies with

isolated forecasts. A greater insight into long-term development also allows longer-term decisions.

Statistical agencies, market research companies and *policy makers* might benefit from a clarified e-commerce definition. Suggestions were made for measurements of the impact of ICT that will be meaningful in the long run, but are still comparable to today's figures. Additionally, the framework points to areas in which monitoring will be relevant.

Research might benefit, not only from the synthesis of the current e-commerce adoption literature provided, but also from the holistic framework geared to long-term forecasting. Potential for further research lies in the applications of different forecasting and foresight methods, such as system dynamics, scenarios, cross-impact and trend impact analyses, etc. Additionally, the framework points to *less salient relations* that were uncovered in the cross-functional approach, such as the perceived general security and the adoption of e-commerce; to *effects from e-commerce on environmental variables*, such as the structure of the culture industries; and to *relations that indirectly interact with e-commerce*, such as the political climate, that open up potential for investigations into cause-and-effect relations and respective quantitative analyses.

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Notes

1. A number of long-term forecasts of general ICT have appeared in recent years, based on different foresight methods such as the delphi method or scenarios. Most of them also contained sections about B2C E-Commerce. Examples are Broy *et al.* (2000), Münchner Kreis (1999), Broy *et al.* (2000), or STAR project (2004).
2. The question whether the financial sector should be included in a general e-commerce statistic was not part of this research project. However, it seems a reasonable suggestion to only include fees, not the actual savings.

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Appendix

If you picture your life 15 years from now …

- In 2020, what would everyday life in Europe be like?
- In your opinion, what should everyday life be like?
- Which current trends could lead to that situation in 2020?
- With regards to the future, which issues concern you?

Purchasing goods and spending money is an important part of every day life. You will normally have to buy what you are going to consume, for example:

- Fresh food
- Apparel

- Vehicles
- Train and plane tickets
- Home appliances
- Telephone units
- Entertainment
- Health care
- Personal care
- Furniture

How might private individuals do their shopping in 2020?
Now let's consider e-commerce:

- How might private individuals shop via the Internet in 2020?
- Will there be any differences between certain goods and services?

During the Internet boom, there were also forecasts, which would now be considered overly optimistic or pessimistic. With regards to e-commerce, what do you believe is not realistic?
Do you find the future scenarios you have just described to be positive or negative? Why?
What could influence the development of e-commerce?
In which parts of life might this development be particular influential?
Which circumstances might noticeably change the development that you described on the previous page? Examples could be the Oil Price Shock in the 1970s or the appearance of the World Wide Web in the beginning of the 1990s.
Which issues regarding the future of e-commerce do you personally find of interest?