Abstract
Accelerated globalisation since the 1980s and particularly the 1990s and the development of web/based ICT go hand in hand. Nonetheless, there has been little explicit research on the influence of ICT on the globalisation of firms. Despite a rich literature of the implementation ICT and the design of global information systems in firms, the influence of information and communication technologies (ICT) on the globalisation of firms has not been explicitly researched from a management perspective. This paper serves to provide an overview on existing literature in this field and to develop a basic framework for the study of the influence of ICT on the globalisation of firms. Specifically, the paper reflects on the influence of ICT on the three subprocesses of globalisation: internationalisation, global network building, and global evolutionary dynamics.

1. The role of ICT in the globalisation of firms

The development of global competitive structures implies both a decreasing role of boundaries and an increasing density of global competition. This process causes a global "liquefaction" of competition with an increasing number of autonomous economic actors such as small and medium-sized enterprises (SMEs) or decentralised units of multinational enterprises (MNEs) that both co-operate and compete in the global context (Welge/Borghoff 2003). The unfolding network competition is marked by an increasing extension and density of economic interactions and interdependencies on global scale.

A major driver of globalisation is technological progress. The rise and commercialisation of the Internet and the maturing of information and communication technologies (ICT) are making organisations' business environments increasingly more international, and as a consequence also their communication and business processes (Bicak 2005: 5). ICT encompass the full range of the production, distribution, and consumption of information, across all media from radio and television to satellites and the Internet. The information revolution facilitated the shift from analogue to digital technologies; convergence merges computers, telecommunication, television, and the Internet into a single multimedia environment (Wilson III 1998: 6). The radical development of ICT is an essential factor for the continuing globalisation of organisations' political, social, and economical environments. The most significant factor is the continuous development of the Internet and the WWW as the fundamental infrastructure for e-commerce (Ibid. 7). The Internet has become known as the "global network of networks" or "global information infrastructure" (Hauben/Hauben 1995).

Knowledge and innovation have taken a quantitative jump over the last decade in the wake of the "explosion" of ICT, the globalisation process, and dramatic advances in the life, materials, and energy sciences. These developments have led to new industries and new services, as well as to the renewal of established ones (Aubert/Reiffers 2003: 9). Industry boundaries are easily crossed as value chains are being redefined (Amit/Zott 2001: 495). The knowledge economy develops high-tech industries, particularly in ICT and services (Ibid. 10). The development and diffusion of ICT is a prerequisite and facilitator of globalisation and the transformation into a knowledge-based economy. The most significant advancement in recent times is the emergence of the Internet and the subsequent evolution of electronic commerce (Melewar/Stead 2002: 29).

ICT have supported, facilitated, and often provided the impetus for global business development (Nelson/Clark, Jr. 1994: 19). ICT are both catalysts of globalisation and solution base from which to address international main challenges. IT can provide the strongest link in the business chain of partners, products, and suppliers, and is the basis for doing business around the clock and around the world (Deans/Kane 1992: 1). The network-centred phase we are in since the 1990s induces (1) an increase in the transparency of information on global markets and activities, (2) a decrease in the cost of information, facilitating global activities for an increasing number of firms, and (3) an increase in the speed and volume of communication, both internally and externally, making coordination of globally dispersed activities much easier (Samii 2004: 11). On balance, technological change has shifted the fundamental emphasis away from computing towards communication and co-ordination of activities (Sampler 1996: 19).

ICT reduce transaction and co-ordination costs in all forms of organisation, increase productivity and accelerate the dynamics of innovation (ifo 1999). ICT affect the cost and efficiency of the external marketplace (Blaine/Roche 2000: 4-6). ICT have the potential to dramatically reduce market imperfections and lowers transaction costs and coordination costs (Blaine/Bower 2000: 27). The combination of the evolution of cross-border networking and the increasing use of ICT also has far-reaching implications for the study of industry dynamics as the structures of value-added chains are changing and even boundaries between industries are blurring (Ernst/Kim 2002: 147). ICT increase boundary spanning (Dewett/Jones 2001: 323). The tremendous advances in ICT are leading to an entirely different type of industrial structure with mutually beneficial co-operations and networking (Roche 2000: 82). In most industries, supply chains become more elastic and flexible. The reconstitution and diffusion of the core activities across a number of global industries (e.g., automotive, financial services) are marked by ICT-induced dynamics. However, ICT will not eliminate the importance of distance and location, and in fact in some cases makes proximity and clustering even more important (De la Torre/Moxon 2001: 630).

Due to the globalisation of local markets and the emergence of the global electronic markets, worldwide acquisitions and cooperation strategies gain importance (Bicak 2005: 14).

Within organisations, electronic technologies are stimulating changes in productivity, management practices, and corporate culture. By enabling instantaneous communication, ICT allow firms to coordinate and control actions in distant locations, thus expanding the potential reach of the firm. They also lower transactions costs and facilitate networking. The Internet provides the possibility of distributed project teams, pooling of expertise worldwide and communicating electronically, rather than being bound to a single physical location (Gable 2006: iii). ICT increase the information-processing capacity and thus the decision-making capacity. ICT drive internal and external change by increasing the information-processing capacity and increase environmental complexity. In order to manage high levels of uncertainty, various sub-units are driven toward greater differentiation and specialisation. This in turn forces firms to develop strong integrative mechanisms. ICT supports both the standardisation of products and the coordination of business processes across border (Schober 1993: 213). ICT thus can improve efficiency of business processes (Blaine/Bower 2000: 37).

Externally, by linking intranets to the Internet, organisations are beginning to integrate their internal operations more closely with their vendors, partners, and customers (Bollier 1998: 2-3). ICT can support vertical quasi-integration, outsourcing, and quasi-diversification (all co-operative modes) (Clemons/Row 1992: 12). For example, “virtual consulting” can now often be provided from lower-cost countries. Auction style markets such as www.guru.com are developing in which individuals post their skills and are then bought by companies and consulting firms to complete a specific project (Gable 2006: iii). ICT allow much more cost-effective monitoring of cooperative arrangements. The value of the network even increases with network size (Clemons/Row 1992: 19).

Due to the described developments induced by ICT, De la Torre/Moxon (2001: 617-618) even state that ICT development leads to the “end of geography”. The “liquefaction” of the global economy leads to the formation of a global “domestic” economy, which is marked by a redefinition of corporate boundaries and the development of flexible network structures (Borghoff 2005). Within this global economic context, there is also an increasing emergence of “born globals” and global self-regulated markets (Melewar/Stead 2002: 35). This is most visible in the global financial markets where capital flows electronically (De la Torre/Moxon 2001: 617-618, 630). In general, there is a progressive transformation of business into relations of information exchange, leading to globalisation and network building. ICT has promoted transnational interactions and precipitated the growth of globally networked

organisations (McMahon 2002: 142). Increasing globalisation and the growth and spread of ICT will continue to dominate the world economic scene for many years and their importance will grow as they are driving each other (Samii/Karush 2004: 8).

In general, there is a significant gap in theoretical approaches that describe the emergence and development of global activity structures. Neither the development of typical network structures nor path-dependent "trajectories" in the development of global structures have been studied with a focus on their underlying dynamics. The same applies to the influence of ICT on these phenomena. The described theoretical approaches are lacking a focus on the emergence and development of global structures but they provide a rich fund of theoretical and methodological knowledge, which will be used in the project.

Although prior IB research has implicitly considered the impact of IT on the MNEs there has been relatively little explicit analysis of this topic (Blaine/Bower 2000: 21). From a global perspective, IT implementation and diffusion with emphasis in different cultures and countries has been analysed. The role played by the different national cultures on information systems management has been one of the most important topics in global IT (Del Águila et al. 2002: 18). During the 1990s, a revolution has occurred in computer and telecommunication technologies, which enables firms to structure and control their international operations in previously unimaginable ways (Blaine/Roche 2000: 3). The relative novelty of the global information technology management concept has meant that the research in this area is at an early stage. There has been a considerable amount since the early 1990s with three main components: (1) ICT that are global in scope, (2) IT products and services developed in one country and used in another, and (3) developing, using, and managing information systems and technologies in different cultures and countries (Del Águila et al. 2002: 19, Palvia 1998). Most evidence of IT in global business is anecdotal and the global competitive impact of IT has not been studied from a rigorous theory building or empirical perspective (Palvia 1997: 229).

According to an analysis by Straub/Loch (2006a: 39), the last five years of MISQ, ISR, and JMIS indicate quite clearly that articles that truly are expanding our knowledge of global issues in IT are not forthcoming. From the IT perspective, there is no doubt that the theory base in global IT is not as well developed as those in the mainstream (Straub/Loch 2006a: 39).

From an international management perspective, there is a paucity of directly relevant empirical research, which illuminates how MNEs develop and manage their IT capabilities in their different and complex circumstances (Roche 2000: 137). As editors of a Special Edition of JIBS on the role of ICT in IM, De la Torre/Moxon (2001: 628) identify a gap in research on how existing firms are being reconfigured

globally. In a similar vein, Del Águila et al. (2002: 19) state that despite the variety of work done in the IT organisational impact area and in the global IT area, there has been little effort of integration of these research fields. A further weakness is the restriction on a limited set of conceptual models such as those of Porter (1986) in strategic management or concepts from transaction cost theory (Ibid.). Del Águila et al. (2002: 34) comment that the divorce between the theoretical development of the global information technology and general management may be one of the main reasons that explains why global IT has been out of the research scope for other researchers in management. In addition, the impact of culture on IT is extremely interesting but underdeveloped. Studies indicate that IT is not "culture-neutral" but has a strong social and contextual dimension (Blaine/Bower 2000: 51). Adoption of ICT depends on cultural values. Those persons strongly committed to those values will have a predictable response to certain features of IT (Straub/Loch 2006: 5). In general, the diverse multicultural aspects and emerging organisational structures associated with global ISs are little understood (Nelson/Clark, Jr. 1994: 19).

Literature appears to have been more successful in explaining the time pattern of IT adoption and growth on a macro-level than in elucidating firm characteristics that drive IT investments. The few studies that relate IT investments to firm characteristics focus on firm size or growth in isolation and use specialised data sets based on a single firm or industry (Dewan et al. 1998: 220). According to Roche (1994: 553), '*at best, we have a series of case studies and story-tales of dramatic events within small portions of multinationals. No one has yet published a study of a complete global information system. We are lacking a coherent theoretical approach to examination of applications, we do not even know how many there are, or what their basic types are'*. A fundamental gap in the research on global ICT is the static character of concepts and empirical studies. Del Águila et al. (2002: 32) hence remark that it is necessary to introduce a greater dynamic component in the analysis of ICT in a global environment both by using dynamic theories and by applying techniques of longitudinal empirical research. *'Longitudinal methods may uncover new formulas of evolution in the management of global IT that may prove useful as much in the academic as in the professional world'* (Ibid.).

De la Torre/Moxon (2001: 631) identify longitudinal studies and the use of new sets of (web-based) data as two major avenues for the field to grow in the future. Reflecting on the gap in empirical research on globalisation processes, Schulte Jr. (2000: 107) remarks that cross-sectional research is the easiest to conduct, but that longitudinal designs offer the strongest evidence for a relationship between business value and ICT.

A significant gap exists in the research of the process dimension in the globalisation of firms. ICT have a large potential to facilitate the development of globalisation

capabilities. The influence of ICT on the development of new international activities, their global co-ordination, and the ongoing adaptation to global competitive processes has been explored only rudimentary and will thus be the main focus of this paper.

2 The influence of ICT on the globalisation of firms

There is a significant gap in the description and explanation of the emergence and development of firms on global scale. Internationalisation theories basically describe the build-up of international activities by SME but neglect the integration and co-ordination of these activities. Theories of MNEs, on the other hand, focus either on the explanation for the existence of MNEs (economic theories) or on the co-ordination perspective (management approaches) but fall short in describing the process perspective in the development of MNEs.

While internationalisation theories illuminate the development of firms from a national to an international level, they generally neglect the network building process, which is a central characteristic of globally operating firms and an evolutionary driver of this process. The internationalisation process is basically described as:

- a life cycle (Vernon 1966),
- an incremental, stage-based process (Helsinki School (e.g., Luostarinen 1980), Uppsala School (e.g., Johanson/Vahlne 1977), Innovation School (e.g., Cavusgil et al. 1979),
- a discontinuous process (Kutschker 1996, Macharzina/Engelhard 1991), and
- the emergence of “born globals” (Knight/Cavusgil 1996) or “international new ventures” (Oviatt/McDougall 1994).

Other approaches to explain the evolution of organisations in general as used in organisation theory (e.g., dialectical processes) or social evolutionary theories still have not been applied to the study of globally operating firms (Van de Ven/Poole 1996, Borghoff 2005).

Contrary to internationalisation theories, which focus on the development of new international activities, theories on MNEs target the co-ordination of global intraorganisational networks. In such complex firms as MNEs, co-ordination is based on a mix of different organisational modes such as market, hierarchy, and networks on formal and informal level. With the exception of a few studies (e.g., Malnight 1996, Mathews 2002) the process dimension in the evolution of MNEs remains to be explored. Processual perspectives were developed in the normative, stage-based development of formal (e.g., Newbould et al. 1978) und cognitive (Perlmutter 1969) organisations structures. The dominant “process school” (e.g., Bartlett/Ghoshal 1987, Doz 1980, Hedlund 1986) in International Management focuses on management

processes (co-ordination-, information-, communication-, leadership-, and decision-processes) but not on evolutionary processes or transformation processes in general.

The bulk of research into the role of IT in MNEs dates from the early and mid-1980s. with a considerable focus on centralisation vs. decentralisation in organisational issues, standardisation in architecture, and differentiation vs. integration, autonomy vs. control, and national vs. corporate boundaries for personnel (King/Sethi 1992: 230-232). From a global perspective, IT implementation and diffusion with emphasis in different cultures and countries has been analysed. The role played by the different national cultures on information systems management has been one of the most important topics in global IT (Del Águila et al. 2002: 18). During the 1990s, a revolution has occurred in computer and telecommunication technologies, which enables firms to structure and control their international operations in previously unimaginable ways (Blaine/Roche 2000: 3). Most evidence of IT in global business is anecdotal (Palvia 1997: 229).

In an analysis of the research articles published in the Journal of Information Systems Research (ISR) and the books published by the International Federation on Information Processing (IFIP) between 1990 and mid-2001, Sawyer/Chen (2003: 113-114) discovered five, mostly technical core areas in ICT research from a technological perspective. Despite the variety of work done in the IT organisational impact area and in the global IT area, there has been little effort of integration of these research fields (Del Águila et al. 2002: 19). On balance, there are four distinct research areas from the management perspective: (1) ICT as competitive advantage, (2) one- and multidimensional models explaining the influence of ICT on performance, (3) the fit of global strategy and global IS, and (4) the influence of ICT on organisation structure.

2.1.1 ICT as a source of competitive advantage

From a domestic perspective, strategic ICT have been studied as competitive tools. ICT can help to gain competitive advantage and to re-engineer business processes. Few researchers have attempted to move this research to a global context (Sakaguchi/Dibrell 1998: 380). There is a lack of a theoretical framework to understand the role of TNS in global competitive advantage. Several studies built on Porter's concepts (value chain, 5-forces model, 3 business strategies) (King/Sethi 1992: 233). A large number of studies have related the creation of value by means of IT with the gaining and maintenance of competitive advantage (Bharadwaj 2000, Powell/Dent-Micallef 1997). Several authors discuss the value of ICT as a strategic asset providing competitive advantages or even constituting a competitive advantage itself. The basic question is whether ICT provides a sustainable competitive advantage to a business or if it is a competitive necessity (Manheim 1990: 145). Examples of ICT as a competitive weapon are the computerised reservation system SABRE by

American Airlines and the computer-supported Cash Management Account introduced by Merrill-Lynch to gain a major position in the retailing of integrate financial products (Ibid.: 144). These examples show that the study of ICT as a competitive advantage was particularly popular in the beginning of the "information revolution". The options for further study in this area consist of the identification of new resources complementary to IT, and the description of the conditions under which ICT serve as a valuable resource. Del Águila et al. (2002: 30) propose that the resource-based view can serve as a basis from which to explain the competitive impact of IT over a period of time, an area with little empirical evidence so far. Increasingly, the perspective dominates that more important than ICT in itself is the link to other organisational resources. For example, Blaine/Bower (2000: 45) observe that complementary ICT and human resources may constitute competitive advantages. However, the very dynamic of ICT works against it being a source of unique, competitive advantage for any single company (Manheim 1990: 147). Any advantage gained from IT appears almost by definition unsustainable but ICT (1) can win market share, (2) can be good for the industry, (3) can provide first mover advantage, and (4) innovations can continue (Yves/Vitale 1996: 107).

In one of the few studies linking ICT to International Management from a theoretical perspective, Samii (2004: 11-12) reflects the eclectic paradigm and thus typical competitive advantages in international business on the basis of the advances in ICT. According to Samii (Ibid.),

- the ownership advantage has particularly been challenged by ICT as the information transparency and speed of information flow has resulted in globalisation of innovation and technological know how. Lifecycles of invention and innovation have become shorter and global process benchmarking and reverse engineering have become more prevalent in the age of ICT.
- ICT have created transparencies, which have reduced ownership advantages. However, advantage has shifted to web presence and design, It-trained work force, and the ability to leverage information for competitive advantage. ICT increase firms' ability to benefit from location advantages due to reduced cost and ease of communication. ICT also increase the ability to collect information on risk and regulatory environment. Communication technology facilitates the exploitation of location advantages through communication, e.g. offshore software development in India, call-centres in Ireland or outsourcing of services. ICT favour a greater geographic dispersion of business activities.
- ICT facilitate (1) a shorter duration of transactions, the simplification of procurement processes, (2) opportunities for an increase in trading, (3) a prospect for trade in services, and (4) the integration of activities of various affiliates. All these factors diminish internalisation advantages. In general, IT is lowering the advantage of internalisation. Transaction costs are reduced because of ICT,

making internalisation less expensive while at the same time increasing control. It also helps firms to benefit from strategic alliances due to network externalities.

2.1.2 Influence of ICT on efficiency

Until the early 1990s, most research on the subject of IT stopped short of looking at impact measures and was often limited to addressing the question of 'fit' (Jarvenpaa/Ives 1993). Then, a stream of research focused on the analysis of the correlation between economic performance/productivity and IT investment (Brynjolfsson/Hitt 1996). There were already mixed or negative results in the 1970s and 1980s regarding the effect of IT expenditures on firm performance. Since the 1990s, studies show a positive impact. However, there are no studies in international comparison (Blaine/Bower 2000: 50).

Interdependencies between ICT and other organisational variables are difficult to prove due to problems in their identification, causal relations, and complexity. Case studies are often the only method to discover interdependencies between technical and organisational developments (ifo 1999: 52, Klein 1996: 137). Hence, there are no definite empirical results indicating the influence of ICT on the efficiency of organisations. Empirical studies provided evidence for positive, negative, and even neutral relations between the intensity of the use of ICT and increases in the efficiency of firms (Brynjolffsson/ Hitt 1996, Cohen 1995, Lichtenberg 1995, Loveman 1994, Morrison/Berndt 1990). The missing positive influence of ICT on productivity is called the "productivity paradox of information technology".

Studies on the influence of IT expenditures on the profitability of firms generally find a small correlation between both (Ahituv/Giladi 1993, Dos Santos et al. 1993, Strassmann 1985, 1990). Reasons for this are according to Brynjolfsson/Hitt (1996):

- Causal delays due to learning and adaptation effects
- Redistribution of profits between firms
- Management mistakes and insufficient exploitation of the technological potentials.

Piller (1998: 258) also points to negative effects of the increasing amount of information to be processed ("information overload") and organisational interdependencies (boundary-spanning problems). Furthermore, ICT has become a strategic necessity rather than a source of competitive advantage (Clemons/Row 1992). ICT may serve as a basis for the development of strategic success factors by enhancing product utility or organisational innovation und efficiency but does not constitute a competitive advantage per se. IT can generate a large macroeconomic utility but also increases competition and lower entry barriers. Indeed, Brynjolfsson/Hitt (1996) provided evidence that the productivity paradox did not exist any more in the mid-1990s due to learning effects in the use of ICT in practice and the

solution of measuring influences of ICT expenses on the efficiency in empirical studies. Since then, quantities research on this phenomenon became sparse.

Barua et al. (1995: 6) further argue that primary economic impacts or contributions (to performance) of IT can be measured at lower operational levels in an enterprise, at or near the site where the technology is implemented. Measurements should capture first-order effects. What is needed is a process-oriented model of the enterprise (incorporating exogenous competitive influences) to understand the creation of IT impacts, and a scientific approach to measuring the economic consequences of IT investments (Ibid. 5).

- **Multidimensional models of ICT and efficiency**

To adequately measure the impact of a global IT application it is more adequate to look at more than its one-dimensional impact on financial performance. Mahmood/Soon (1991), Sethi/King (1994), Palvia (1997) and Whitworth et al. (2005) developed models for the measurement of the global strategic influence of ICT and showed that it should be modelled as a multidimensional construct. The authors promote the idea that the effect of global ICT is not fully reflected by the financial results.

Palvia (1997) developed a model that can be used to identify specific strategic factors for a company and a contingency analysis to determine the importance of various factors based on organisational characteristics. The research is exploratory and new in international IS. The primary purpose is to identify the global organisational variable for the successful application of information technology (Ibid. 233). Palvia builds the "Global IT Strategic (GLITS) model" on the basis of variables identified by Mahmood/Soon (1991). For their underlying model, domestic SIS literature provides variables on organisational level (new entrants, entry barriers, customers, competitors, suppliers, etc., and on industrial level (products and services, economies of scale, pricing). Palvia (1997) adds five additional variables: economies of scope, business risk reduction, downsizing and outsourcing, learning curve and knowledge transfer, and flexible operations. Variables from global IT literature include worldwide physical resources, government requirements, country requirements, human resources, alliances, and time zones (Ibid. 232). A third source contains technology variables: coordination, integration, responsiveness, and information systems.

Building on prior work of Palvia (1997), Mahmood/Soon (1991), and Sethi/King (1994), Whitworth et al. (2005) develop a multi-factor global IT impact measurement model. The data of the "Global Information Technology Impact (GITI)" study (Whitworth et al. 2005) show that enterprise expansion and globalisation, global supply chain management effectiveness, and global resource coordination and cost management contribute more significantly to global IT impact than the firm's

financial performance. The study by Whitworth et al. (2005) provided evidence that ICT particularly facilitate the development of global activity structures.

The measurement models of the strategic impact of IT developed by Palvia (1997), Mahmood/Soon (1991), and Sethi/King (1994) showed that the strategic impact of IT is a multidimensional, latent construct. With the exception of these studies, little quantitative research has been done on the subject of global IT strategic impact on a macro level but only on individual components (Whitworth et al. 2005: 282). The global competitive impact of IT has not been studied from a rigorous theory building or empirical perspective (Palvia 1997: 229).

☞ **Phenomenon of increasing returns**

Although ICT triggered dramatic restructuring in existing industries, they also facilitated the emergence of new industries marked by the phenomenon of increasing returns. These are based on mechanisms of positive feedback in markets, businesses, and industries by reinforcing the effect of influencing factors. From an economic perspective, increasing returns create instability instead of equilibrium (Arthur 1996: 100). They primarily exist in knowledge-based industries while the typical manufacturing industries are characterised by decreasing returns. Examples for increasing returns are markets that are network-based, such as operating systems like DOS or application systems like MSOffice. Both the benefit for every user (customer perspective) and the marginal return of each additionally sold unit (firm perspective) increase with every additional user of then product. Industries based on increasing returns are subject to different rules in competition. Adaptation and change instead of optimisation are the driving forces (Ibid. 105). Reasons for positive feedback are 1) high fixed costs with low variable costs, 2) network effects, and 3) high switching costs (Nachum 2003).

An empirical study by Nachum (2003) shows, that the size and the degree of multinationality have the greatest influence on the success of firms in industries with increasing returns. ICT facilitate the instant build-up of global activities based on E-commerce and co-operations so that the globalisation process of many firms is accelerated significantly (Berchthold 1997: 13). "*Building an information infrastructure to facilitate the enterprise's transformation into a global competitor is perhaps the most critical challenge*" (I/S Analyzer 1991: 13).

2.1.3 Fit of ICT and strategy

ICT are essential ingredients for business expansion, providing strategic competitive advantage in worldwide markets (Ives/Jarvenpaa 1993) and facilitating globalisation (Palvia 1997). They also serve as magnifiers of business competitive strategy and as vehicles for building new strategies and new businesses. ICT support a competitive strategy and creates new strategic options (Earl 1996: 49). ICT can dramatically

compress time and distance, facilitate the coordination and movement of worldwide goods and services, allow for the sharing of human expertise and other resources, and provide the infrastructure necessary for operating new services that generate real competitive advantage (Whitworth et al. 2005: 282). There is little systematic examination of the link between firm's international business strategy and the IT strategy (Alavi/Young 1992: 497).

Several studies link the design of ICT-systems to the strategic orientation of a firm. In the tradition of contingency theory, ICT-strategy then should reflect and sustain the general strategic orientation of a firm. In one of the first studies, Selig (1982) compared the IS planning of 25 US MNCs and discovered differences were attributable to contingency factors like product and industry diversity and corporate roles. In 1989, both Reck and Thompson et al. developed typologies to categorise the ICT-approach of MNEs. Thompson et al. (1989) propose two factors – degree of market integration and degree of home country rule – to be used to categorise firms into one of four globalisation stages: domestic, empire, UN, and war games. In a similar vein, Reck (1989) relates three operating strategies for MNEs defining IS issues such as technology architecture, data architecture, and communication architecture: “imperialistic”, “multidomestic”, and “global”.

Later, many authors built on the strategic models of Porter (value chain, business strategies) and Bartlett/Ghoshal’s (1987) typology of multinational corporations, particularly focusing on the normative transnational type. Scholars writing about global ICT management have particularly embraced the Global Integration/Local Responsiveness model to help explain the impact of ICT decisions on a firm's competitive advantage (Schulte Jr. 2000: 102). Strategic focus, firm configuration, and IT configuration are often described by using the strategic orientations of Bartlett/Ghoshal (1987) (Bakis/Roche 2000: 158). For example, Jarvenpaa/Ives (1993: 552) use these orientations to study the degree of business-IT fit. Broadbent/Butler (2000: 174) describe business pressures and IT management responses based on integration/responsiveness portfolio. Karimi/Konsynski (2003: 103) ascribe a distinct IS strategy and structure to each of the four business orientations developed by Bartlett/Ghoshal (1987). In the tradition of contingency theory, all these approaches assume that the ICT-strategy has to reflect the general strategic orientation of a firm and that it has to help implement it.

Given that IT can delimit the firm strategy, the global strategy of the firm can also be shaped by IT issues – contrary to the linear causality underlying the contingency logic. The means of introduction and expansion in new markets or the defence strategies against external competitive pressures can be interrelated to IT utilisation and development choices (Del Águila et al. 2002: 22). On balance, more research is needed to fully understand the relationship between IT utilisation and competitive

advantage using knowledge management practices by the same firm in different parts of the world. Particularly Internet technology provides better opportunities for companies to establish distinctive strategic positioning in global competition than did previous generations of information technology (Porter 2003: 377). Strategic positioning becomes all the more important (Ibid. 389). Blaine/Roche (2000: 15) remark that '*rather than conforming to the firm's strategic direction, the information infrastructure of many MNEs … is one of the primary determinants of the firm's strategic "possibility set"*'. ICT have long been recognised as a management mechanism integral to a firm's shift from a national to a global strategy but the focus of concern has been sporadic, uneven, and eclectic (Broadbent/Butler 2000: 156). Though alignment among strategic and structural dimensions is supposed to enhance performance, there has been little research on the dynamics of alignment. Research was primarily focused on cross-sectional views, focusing two on dimensions, such as business and IS strategies or structures and usually had a normative outlook (Sabherwal et al. 2003: 312).

2.1.4 Influence of ICT on organisation

Traditionally, improving the efficiency and effectiveness of organisations is the domain of the ICT function (Bakos/Treacy 1986: 109). In both the information processing and the TAC schools of organisational theory, bounded rationality plays a pivotal role. To explain the role of ICT in improving internal strategy, systems are characterised in terms relevant to bounded rationality, e.g., processing capacity (Ibid. 110). This perspective was particularly apparent in the information processing approach in organisation theory (Galbraith 1977, Egelhoff 1985). The focus is here on how to increase the information processing capacity of an organisation.

From an institutional perspective, ICT are viewed as organisational tools, grounded in institutional circumstances and thereby resembling an internal environmental factor (Montealegre 1998: 238). Yates/Benjamin (1991) observed that IT has repeatedly played a role in the evolution of organisational structures and assert that innovations in IT have made new organisational forms possible, and vice versa.

From a contingency perspective, Del Águila et al. (2002: 24) identify seven structural consequences of ICT: (1) reduction in the number of hierarchical levels, (2) disappearance of routine jobs, (3) integration of departments, (4) formation of workgroups, (5) change in flow of information throughout the organisation, (6) possible implantation of telecommuting, (7) relationship between IT architecture and organisational structure.

In general, the relationship between ICT and organisation structure is not as static as contingency theory suggests but changes over time. There are effects of ICT on work practices, skill sets, authority relationships and vice versa on an on-going basis

(Sampler 1996: 18). Rindova/Kotha (2001) even term this on-going strategic and organisational change "continuous morphing". ICT use is also an evolving reality over time. The dynamics of electronic communication in a firm maybe different in the long run than the short run because new groups of users with somewhat different social realities are likely to emerge (Dewett/Jones 2001: 339).

Little international ICT research has addressed issues at the application and functional subsystem levels. Literature that integrates the international business function and IS/IT is sparse (Deans/Karwan 1994: 27-28). De la Torre/Moxon (2001: 630) notice a dearth of research dealing with the organisational impacts of ICT and particularly those examining how functional management is being changed within MNEs. Similarly, they observe that we know little about the impact of ICT on the management of customer relationships and human resources.

3. The influence of ICT on globalisation capabilities

There is a large variety of definitions of the term "globalisation". In international management, globalisation is generally conceived as a process of global integration and standardisation. Here, globalisation is defined as a "*historical process in which the emergence and reproduction of social systems expands from heretofore dispersed, unconnected local contexts to a globally differentiated social context*" (Borghoff 2005). Globalisation is a historical process, which leads to the development of a new layer of social systems on global level and to a potential interdependence of globally dispersed social systems. The basic mechanism of social evolution is the differentiation and integration of social systems (e.g., societies, organisations). Through globalisation, social systems worldwide become interdependent and even new social systems with global extension may emerge. Globalisation is the process of differentiation and integration of social systems across national and cultural boundaries. Globalisation processes are constituted by three subprocesses:

1. Internationalisation: changes in the level and dispersion of activities in different national markets;
2. Global networking: development of internal and external network structures in the global context;
3. Evolutionary dynamics: drive differentiation and integration of social systems on global scale. Firms are in a co-evolutionary process with their environment.

Firms develop respective characteristics and capabilities in their globalisation, which reflect these subprocesses of globalisation and thus increase their chances for successful globalisation. These capabilities are termed (1) Internationalisation capability, (2) global network capability, and (3) global evolutionary capability (Borghoff 2005). ICT have a significant influence on the development and application of the three globalisation capabilities.

3.1 Influence of ICT on the internationalisation capability

Internationalisation of a social system can be conceived as changes in its geographical or cultural extension. Both changes in the extension of the meaning and the action system may induce internationalisation. Global media have provided the basis for a general internationalisation of meaning systems. More important, however, is the internationalisation of system-specific meaning. In a strict sense, internationalisation only takes place, when also the activity system is subject to changes in the geographical and/or cultural extension. Studies by Schulte (2002) and Borghoff/Schulte (2003) show that internationalising firms often do not have a symmetrical behaviour in this regard. The studies indicate that firms often build activity structures abroad without sufficient adaptation of the meaning structure or vice versa. Internationalisation literally induces changes in the system's boundaries and its relationship with its environment. In the case of expansion, environmental complexity increases, inducing an increase of the system's internal complexity and requisite variety as well.

Jarvenpaa/Ives (1993: 547) observed that ICT can drive global business. ICT is an essential ingredient for business expansion, providing strategic competitive advantage in worldwide markets (Ives/Jarvenpaa 1993) and facilitating globalisation (Palvia 1995). It also serves as a magnifier of business competitive strategy and a s a vehicle for building new strategies and new businesses. ICT can dramatically compress time and distance, facilitate the coordination and movement of worldwide goods and services, allow for the sharing of human expertise and other resources, and provide the infrastructure necessary for operating new services that generate real competitive advantage (Whitworth et al. 2005: 282). ICT thus also facilitate the development and implementation of global strategy as these require obtaining and processing of data about overseas markets that are related to company resources (Melewar/Stead 2002: 29). The use of ITC has enabled many companies to expand their international presence and international trading capabilities (Collins 2004: 67).

Internationalisation leads to larger scope of international activities. Quality, scope, and variety of information increase (Blaine/Roche 2000: 11). De la Torre/Moxon (2001: 619) state that any export, licensing or foreign direct investment decision involves acquiring information about distant markets, assessing consumer needs in different cultural settings, evaluating the relative efficacy of alternative entry strategies, and coordinating activities across all elements of the value chain and across markets. All of these acts are severely affected by the monumental changes in the availability and cost of information that characterised the last decade. Global strategy requires obtaining and processing of data about overseas markets that are related to company resources, particular finance, marketing, and production (Melewar/Stead 2002: 29). The networking capability of ICT therefore enhances the international

orientation of firms significantly (Lal 1996: 271). Given that ICT can delimit the firm strategy, ICT issues can also shape the global strategy of the firm. The means of introduction and expansion in new markets or the defence strategies against external competitive pressures can be interrelated to IT utilisation and development choices (Del Águila et al. 2002: 22).

The use of Internet tends to expand the geographic market, bringing many more companies into competition with one another (Porter 2003: 381). The Internet enables potential customers and organisations to enter virtually different parts of the world. Customers can shop electronically and place orders for items they would normally be able to purchase in their own neighbourhood. An organisation can use the Internet as an inexpensive tool for advertising, booking orders, promoting their philosophies, and communicating with their customers all over the world (Bicak 2005: 12). The Internet has dramatically reduced the costs of "point to multi-point" communication, making it far easier for brokers and other information providers to supply information to their customers (Globerman et al. 2001: 759). In addition, it provides real time immediacy of information Melewar/Stead (2002: 30).

The Internet holds the potential of reducing the uncertainty that adheres to doing business in foreign markets and thus accelerates the internationalisation process. The Internet may even reverse the role of knowledge as a limiting factor to that of a catalyst. On the other hand there is the danger of information overload and over-confidence (Petersen et al. 2003: 48). International connectivity and linkage between incubators provide network externalities and increase the business activities of small firms internationally (Samii 2004: 18).

The collection of information on the international business environment, the development of international contacts, and overseas travel are costly and difficult to undertake. Lack of knowledge in itself is a factor of deterrence for entering into the global market. ICT have facilitated these activities by reducing the costs and making information available. Traditionally, the main sources of initial contact for many firms were costly trade shows, now they establish contacts via web pages and search engines (Samii 2004: 17). ICT seem to be an especially important source for international market information and a tool in overcoming communication barriers (Aspelund/Moen 2004: 87). The amount and availability of information can increase the likelihood that management will consider internationalisation a promising strategy for firm growth. Information from the Internet also allows for the cross-validation of market information and thereby reduces the risks involved with market entry when the firm does not possess experiential market knowledge (Ibid.: 88, Yeoh 2000).

The Internet enables firms to identify new market opportunities leading to business expansion. Specifically, it allows SMEs to gain deeper knowledge of target markets,

to select suppliers and to establish direct contact with clients using a low cost medium. The Internet makes it easier for firms to expand internationally (Nieto/Fernández 2006: 254). Due to access to information about markets, a firm finds itself in a better position to meet the segment needs of specific clients and to tailor its products and services to conform those needs. Similarly, the Internet reduces the entry barriers to international markets, which in turn encourages the firm's international expansion and minimises the importance of the local market (Ibid.: 252).

Previous research has identified recent advances in ICT as a trend that presumably facilitates the process of introducing new products to international markets but little empirical work has been conducted to establish the dynamics behind this relationship (Aspelund/Moen 2004: 85). ICT-intensive firms internationalise faster and more extensively than less ICT-intensive firms (Ibid. 96). There is a widespread assumption that internationalisation processes now are much faster than in 1970, but there is no empirical proof for that (Petersen et al. 2003: 50). Due to decreasing transport and communication costs, the international distribution of value-added activities increasingly matches the relative comparative advantage of each geographic location (Ibid.). ICT brings extended connectivity with speed and will expand boundaries of firms and networks (Samii 2004: 15). ICT facilitate the immediate development of global activities by using e-commerce and co-operations so that the globalisation path of many firms will be accelerated (Berchthold 1997: 13).

The Internet increases international exposure dramatically. It may be good for market skimming (e.g., unsolicited orders) but not necessarily to further penetrate the markets (Petersen et al. 2003: 49). For example, a study of 22 New Zealand firms by Chetty/Campbell-Hunt (2002) provided evidence that born globals follow a “sow and reap” approach to marketing with extensive use of ICT. The latter finding is the key difference as compared to regional or globally acting traditional firms. E-commerce is a vital tool for helping firms globalise. The Web provides a new sales channel, gives companies global reach and is far less expensive the alternative modes. Successful multinationals are using ICT to build the capability to quickly assemble forces at a needed location in order to overwhelm the competition (Roche 2000: 81). IT needs vary with the nature of the business and the entry modes (Deans/Kane 1992: 42).

ICT can also be used to make rapid market penetration. The role of ICT in international business becomes one of assisting in getting rapid market penetration. This could mean anything from helping in the rollout of a national network to providing support for a new chain of stores. The important competitive advantage of the IT side is the ability to respond quickly to emerging businesses conditions (Roche 2000: 81). Thus, it would be useful to gather examples of cases in which IT has been used as the primary way to penetrate a foreign market (Ibid.: 82).

IT is also increasingly used as a competitive weapon to create market entry barriers, to extend rather than augment product offerings, to differentiate firm services, and to create switching costs (Deans/Kane 1992: 153). Another critical role for ICT is to allow projecting competitive advantage into foreign markets (Roche 2000: 82). However, there are no studies indicating the long-term effect of ICT on the internationalisation process.

The Internet provides several advantages for the internationalisation of firms. Internet strategies are relatively inexpensive, especially when compared to direct exports and e-commerce transactions allow firms to have a bigger market control with respect to indirect exports (Giustiniano/Fratocci 2002:232). ICT will facilitate strategies that target cross-national consumer segments (De la Torre/Moxon 2001: 630). Web marketing thus has to some extent evened out the playing field between large and small companies (Samii 2004: 18). IT also reduces large firms' advantages of centralised purchasing and in-house suppliers. Technological changes have resulted in smaller production runs, increasing the feasibility of product changes and allowing small, specialised firms to exploit fragmented product markets on the basis of their flexible response (Chen 2002: 259).

Despite a comprehensive literature in the area of internationalisation there is a gap in research in the development of global structures which are characterised by the worldwide networking and differentiated allocation of activities, knowledge, competencies, and resources across dispersed organisational units. This applies particularly to the influence of ICT on this process. The described influences of ICT on the internationalisation of firms lead to the following hypotheses:

H1: The use of ICT facilitates the earlier of internationalisation of firms
H2: The use of ICT increases the speed of internationalisation
H3: The use of ICT increases the international dispersion of business activities

3.2 Influence of ICT on the global network capability

ICT reduce trade barriers and facilitate the co-ordination of worldwide activities (ifo 1999: 46). Particularly the development of network technologies lift communication barriers between geographically dispersed organisational units. The World Wide Web (WWW) itself is regarded as the most powerful instrument in this regard and provides the fundamental infrastructure for e-commerce (Dzbor et al. 2004: 342, Bicak 2005: 7). "Data warehouses" supplement these communication structures by integrating globally dispersed data, which can be used for analyses and forecasts by staff from all over the world. Abramowicz et al (2001: 810) thus consider the data warehouse as the best way to organise transactional data. With the development of a web-based interface to data, "data mining" is also able to analyse and determine the preferences and activities of customers who go online and access company websites (Elliott 2004:

199). MNEs thus become “listening corporations”, able to “sense” changing developments in the environment (Blaine/Roche 2000: 9). ICT facilitate

- round-the-clock service across time zones,
- management of customer knowledge by data mining, analyses, anticipation instead of “lock-in”, and
- global knowledge management (Ibid.: 10).

Consequently, Kefalas (1992: 609) regards MNEs as the world’s best scanners with global ICT as their most important weapon. MNEs in their present form could not exist without ICT. Complementary ICT and human resources may also serve to create competitive advantages (Blaine/Bower 2000: 41-42).

Network formation is a process, which reflects both changes in the relations between subsystems and thus the system’s autopoietic organisation, and changes in the amount and extension of structural coupling with other systems. The formation and reproduction of relations and social acts between internal subsystems and with external systems becomes much more complex when these are located in different cultural environments. Symbolic codes (e.g. language) and interpretational schemes in communication may be different, i.e. the interpenetration of systems and the development and reproduction of consensual domains may be very difficult. The same applies to the activity level, where path-dependent developments and endowments may produce incompatible structures and processes of production and interaction between systems of different contexts.

IT brings extended connectivity with speed and will expand boundaries of firms and networks (Samii 2004: 15). Emphasis on connectivity is nowhere as evident as in TNCs (King/Sethi 1992: 231). ICT foster external alliances through interorganisational information systems for information partnerships (Earl/Feeny 1996: 79). The Internet can be used to enhance information flow and collection, as well as co-ordination among firms, which may lead to the establishment of agreements, a necessary tool for international expansions. Co-operations provide useful information and reduce the perceived risk of internationalisation significantly (Nieto/Fernández 2006: 254).

IT is more than a transaction facilitator and is promoted as an enabling technology for collaborative commerce amongst firms, involving not only interorganisational coordination of the supply chain but also cooperation in product definition, design, and R&D (Chen 2002: 253). ICT also increase the innovativeness of firms (Blaine/Roche 2000: 8). Therefore, Zaheer/Manrahakhan (2001) assume that the importance of co-ordination skills is a defining competitive competence for the Internet age. Success will largely depend on how well firms manage the resulting portfolio of lead market locations where physical presence remains essential, together

with a broad network of outsourced activities where it is not. De la Torre/Moxon (2001: 630), however, assume that ICT will not eliminate the importance of distance and location, and in fact in some cases makes proximity and clustering even more important.

A fundamental purpose of ICT is to improve coordination among business units, and facilitate integration (Palvia 1997: 232). Networks represent a challenge to hierarchies because they redistribute information horizontally. ICT challenges basic logic of centralised corporate control (McMahon 2002: 10). ICT provide the backbone for co-ordination and the learning of organisational processes (Kanjas 2000: 223). The potential opportunities for cross-border learning within MNEs have been enhanced by an increased take-up of ICT. Firms get access to network structures where they can specialise and increase their innovation capacity. The Internet could play a crucial role in this process to ensure network coordination and transparency (Nieto/Fernández 2006: 252).

There is a progressive transformation of business into relations of information exchange, leading to globalisation and network building (McMahon 2002: 142). ICT can reduce communication barriers that often occur for geographically dispersed organisations. Communication is cheaper and often more convenient with ICT. Advanced ICT also allow communication of richer information than traditional telecommunication systems. These two features, the convenience and richness of communication, facilitate the internationalisation and global network building of firms (Aspelund/Moen 2004: 88).

A cornerstone in the management of a geographically complex international network lies in a firm's specialisation in ICT. The opportunities created for the fusion of formerly unrelated types of technology through ICT has made feasible new combinations of activities, at best centres of expertise for which may be geographically distant from one another. The enhanced expertise in ICT seems to provide a company with greater flexibility in the management of its geographically dispersed network (Cantwell 2002: 238).

A key requirement for global efficiency is the collection of comparative performance information from locations around the world to support decisions on resource allocation and sourcing. It is facilitated by building a global data network, collecting and providing access to information, which conforms to some globally applied data standards. Standard application systems worldwide ensure data integrity. They facilitate transfer of information and scale economies in systems development (Earl/Feeny 1996: 78). ICT has made knowledge-based strategies much more feasible. Databases and networks supported by decision support tools are crucial enabling requirements (Ibid.: 50).

ICT facilitates real-time information flows and functional coordination across organisational and national boundaries (Chen 2002: 249). ICT facilitate the transfer of learning along functional dimensions, providing knowledge bases and systems (Earl/Feeny 1996: 79). The programmability, interactivity, and networking capabilities of IT also leads to a number of advantages in the production and export of goods and services and thereby contributing to an improvement in the performance of firms (Lal 1996: 270). Little empirical work has been done that studies the influence of ICT on the structural variables of the network. If ICT has an effect on these variables it will affect learning capability of company members of the network, and also the blocking and unblocking of new alliances (Del Águila et al. 2002: 32). Even less research in this area has adopted a dynamic perspective. The described influences of ICT on global network formation lead to the following hypotheses:

H4: The use of ICT facilitates the development of global intraorganisational networks
H5: The use of ICT facilitates the development of global interorganisational networks
H6: The use of ICT facilitates the co-ordination of global networks

3.3 Influence of ICT on the global evolutionary capability

ICT facilitate the co-ordination among loosely federated components, overcomes the spatial and temporal barriers that characterise conventional organisational structures, and promotes flexibility. ICT have the capability to enable dramatic organisational transformation (Boudreau et al. 1998: 123). Typically, advanced ICT play a central role in virtual/learning/temporary organisations because technology permits organisational designs to overcome the spatial and temporal dispersion that accompanies increased global reach (Ibid.: 120). The geographically dispersed work force of the virtual organisation may be moulded into temporary teams to seize new business opportunities when they arise (Ibid.: 123).

Managers in MNEs increasingly must rely on ICT to provide them with enterprise wide information in support of their business activities. They need in-depth knowledge of how their firms operate in various global markets, need to learn more about their customers' needs and preferences, to more precisely gauge their firm's performance relative to competitors, and assess the quality of the products and services they produce and sell around the world (Karush 2004: 112). Internationalisation of a firm implies the exploration of new contexts, which reduces the efficiency of existing decision-making structures. ICT can provide a cost-effective backbone for enabling timely decision-making and rapid communication of those decisions in a globally competing firm (Jarvenpaa/Ives 1993: 553). Designing effective transnational organisations thus depends on the effective deployment of advanced information technology (Boudreau et al 1998: 120).

ICT enhance the ability to combine distant learning processes in formerly separate activities. Subsidiary networks are increasingly used to source new technology. Global learning has become an important mechanism for corporate technological renewal within MNEs (Cantwell 2002: 238). MNEs have recently shifted to a closely integrated network of subsidiaries designed to facilitate complementary paths of innovation and new competence creation (Ibid. 244, Cantwell/Piscitello 2000). ICT facilitate real-time information flows and functional coordination across organisational and national boundaries (Chen 2002: 249). ICT enhance not only information exchange but also the sharing, creation, and utilisation of knowledge. Global networking and ICT gradually reduce constraints to international knowledge diffusion (Ernst/Kim 2002: 147). ICT can enhance scope for knowledge sharing among multiple network participants at distant locations in a long-term, iterative process. Digitisation of knowledge has fostered the specialisation of knowledge creation, giving rise to modularisation. While much of this is still at an early stage of "trial-and-error", international business now faces a huge potential for extending knowledge exchange across organizational and national boundaries (Ernst/Kim 2002: 148).

ICT can enhance scope for knowledge sharing among multiple network participants at distant locations in a long-term, iterative process. Chaudhry/Ng (2001: 742) analysed knowledge-sharing practices in the Singapore subsidiary of a European information technology MNE. The results suggest that ICT facilitates knowledge sharing but that more could be done to enhance capturing and sharing of knowledge across the various functions (Ibid. 743). '*While much of this is still at an early stage of "trial-and-error", international business now faces a huge potential for extending knowledge exchange across organizational and national boundaries'* (Ernst/Kim 2002: 148).

ICT can assist in the creation and international transfer of proprietary knowledge (Blaine/Bower 2000: 26). ICT are a vital means in the coordination and learning of organisational processes. ICT give powerful tools for the identification, development, and support of competencies in general and plays a central role in the identification, generation, selection, and diffusion particularly of core competencies in MNEs (Kanjas 2000: 233). ICT advances enhance the decision-maker's opportunities for retrieving and transmitting "objective knowledge". ICT also lower costs of transforming tacit into explicit knowledge. They tend to increase benefits of codification as they expand opportunities for large-range distribution of codified knowledge. Digitisation of knowledge has fostered the specialisation of knowledge creation, giving rise to modularisation (Petersen et al. 2003: 46).

ICT provide information on demand, build\ banks of shared knowledge and enable real-time, structured learning events to transcend boundaries of time and space,

becoming a tool for building solutions. It can also be used as a tool for understanding other cultures and tapping into their creative synergy (Korac-Kakabadse/Kouzmin 1999: 294). ICT facilitate the coordination of management control and operational decision-making by providing a standardised interface through a web browser. Employees are able to access multiple systems throughout the corporation and even combine data elements from different systems together on the same display screen (Blaine/Roche 2000: 8). Effective capture and re-use of tacit, contextual knowledge may be achieved utilising a well-structured "common and shared vocabulary", known as common ontology (Dzbor et al. 2000: 342).

ICT strengthen the evolutionary mechanisms in social systems und thus their capability to change and transform (Van de Ven/Poole 1995, Borghoff 2005). Research and literature in the area of management focus on the directly observable mechanisms that can be influenced, such as life cycles, decision-making, and learning. Mechanisms such as dialectical processes between internal and/or external actors or emergent processes of variation and selective retention are often not intended and not subject to research. However, all evolutionary processes and mechanisms are influenced by ICT and should be subject to research. The described influences of ICT on global evolutionary dynamics lead to the following hypotheses:

H7: ICT increase the capability of global evolutionary dynamics
H8: ICT accelerate evolutionary mechanisms and dynamics
H9: ICT allow for faster adaptation to environmental changes.

Conclusions

There is a clear gap in the research of ICT in the globalisation of firms. A rich fund of literature exists on the technical side of ICT and information systems in firms. From a management perspective, there is almost no explicit research on the influence of ICT on the globalisation of firms. This influence is only implicitly included in terms of a better information processing capacity, time zone economies, or the contribution to innovation and knowledge management. There are assumptions that ICT facilitate a faster internationalisation and the emergence of "born globals". However, an explicit observation and explanation of ICT influences on globalisation processes is still missing. Future research could provide some transparency in this field. In a first step, qualitative research could provide the basis for theory building while quantitative studies could generate transparency with regard to general patterns in the use and development of ICT in globalisation processes. Longitudinal and quantitative studies could further provide evidence of influences on speed and intensity of globalisation processes.

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