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**B2C - BUBBLE TO CLUSTER? THE DOT.COM BOOM AND SOFTWARE
ENTREPRENEURSHIP IN AN EAST GERMAN REGION***

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Abstract. From a regional perspective, the dot.com boom may not have had as unequivocally adverse effects as one would conclude from an investor's standpoint. As a case study, we discuss the regional effects of a German dot.com firm: Intershop. We show that at least 30 spinoffs emerged giving rise to a small but growing software industry. The Intershop case exhibits some striking similarities to earlier spinoff-based accounts of cluster formation. We also explore other dimensions in which Intershop has lasting impacts on regional development: effects on software-related human capital and the provision of a role model for potential entrepreneurs are considered.

Keywords. Entrepreneurship, spinoffs, regional development, cluster formation

JEL - code(s). M13, R11, O18

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1. Introduction

The assessment of the dot.com boom of the late 1990s has shifted between extremes. When the stock markets collapsed, widespread enthusiasm and the willingness to accept that in the Internet age, basic economic principles are no longer valid rapidly gave way to a new conventional wisdom holding that the “new economy” was little more than an unfortunate coincidence of greed, hubris and naïveté, producing little that was of lasting substance. From the investor’s perspective, the latter assessment is straightforward, as the stock of many Internet and other “new economy” start-ups have lost most of their value after 2000, and a substantial share of these firms has folded altogether.

This article argues that the post-2000 reassessment of the dot.com boom may have been too extreme, and that the boom may have had substantial, lasting effects that are not reflected in the investors’ portfolios. Not all money spent by the Internet start-ups was wasted, and even when firms were failing in the long run, they may nonetheless have had a positive impact on their employees and their environment. In particular, we adopt a regional perspective and ask how (temporarily) successful dot.com start-ups affected the development of their home region. We take our motivation for this study from recent empirical studies indicating that individual firms can trigger regional development and the formation of local industrial clusters by providing a seedbed of succeeding spinoffs or by shaping the regional conditions for entrepreneurial activities in their environment (think of, e.g. Fairchild Semiconductors in Silicon Valley (Moore and Davis, 2004), the telecommunication cluster in North Jutland (Dahl et al., 2003), and B.F. Goodrich’s role in the emergence of the tire industry cluster in Akron, Ohio (Buenstorf and Klepper, 2005)). Could it be that similar processes occurred in regions with dot.com firms?

Previous research on spinoff-based cluster emergence has highlighted the learning processes inside the parent firm that favor opportunity perception and the formation of spinoffs (Klepper, 2002; Agarwal et al., 2004; Klepper and Sleeper, 2005). This literature focuses on the direct effects this has regional development through the formation of spinoffs. This article adds a complementary perspective by also considering further effects that the individual firm may have on its (regional) environment. Successful firms provide positive entrepreneurial role models (Fornahl, 2003) and enhance the conditions for successful (non-spinoff) entrepreneurship in various ways (see, e.g., Bresnahan et al., 2001; Feldman, 2001; Feldman et al., 2005; Menzel and Fornahl, 2005), thus further adding to regional dynamics and cluster formation.

In this article, we begin to pursue these issues based on a case study. We trace the regional legacy of one of Germany's most prominent (former) dot.com stars: Intershop Communications, a Jena-based maker of e-commerce software. Intershop has recently been singled out as the biggest annihilator of investor money by the German association of private investors (Deutsche Schutzvereinigung für Wertpapierbesitz, 2006). According to estimates made by the association, stock valued Euro 10,000 at the end of 2000 would have a value of Euro 27 at the end of 2005. Like with other fallen dot.com stars, conventional wisdom has it that Intershop was a giant failure. At the same time, Intershop's East German hometown, Jena, is among the few East German cities that appear to have succeeded in the transition from socialism to a market economy after 1990. It has just been hailed as a positive exemplar of Germany's potential future by the Economist (Economist Online, 9. February 2006). As will emerge below, in spite of its recent drastic downsizing, Intershop may have contributed to the positive development.

Our main conclusion is to suggest that as regards its longer-run effects on the local economy, the Intershop case – and possibly the dot.com boom more generally – may have to be reassessed once more. Not only did the rise of Intershop come with a variety of direct positive regional effects, both tangible and intangible in nature. In addition, its subsequent fall was accompanied by new entrepreneurial activities, both from the original founders of the firm and from employees leaving the firm. Largely without public policy intervention, Intershop has turned into an incubator for new software firms. To be sure, the founding activities related to Intershop are modest in scale, and it is too early to tell whether any of the new firms will grow into substantial businesses in the long run. However, the basic dynamics that can presently be observed in the Jena software industry – existing at best in an infant state before the rise of Intershop – are similar to the early phases of the prominent industrial clusters mentioned above.

The remainder of the article is organized as follows. Section 2 provides the theoretical background of the following analysis by summarizing prior theoretical and empirical work on spinoff formation as well as indirect effects that successful new firms may have on cluster development. Section 3 presents our narrative on the growth and subsequent decline of Intershop. Section 4 turns to entrepreneurial activities by Intershop's employees (including the original founding team) that accompanied the firm's recent downsizing. The section also discusses how a local support structure for nascent software entrepreneurs developed with Intershop's support. Section 5 identifies the firm's economic effects on the local economy and discusses Intershop as a regional role model affecting attitudes toward entrepreneurship. Section 6 concludes

2. Theoretical Background

This section discusses two different strands of literature are presented that help explain how firms affect the emergence and development of local clusters emerge and develop over time. Through triggering the formation of spinoffs by employees, existing firms affect their regional environment “from within” the firm organization. In contrast, firms in a region may also influence agents that are not members of the firm organization. We discuss two kinds of such “external” effects: the provision of entrepreneurial role models by successful start-ups and the interaction between start-ups and cluster development.

Spinoff-based cluster formation

Empirical research on spinoffs has identified a number of regularities in the spinoff process as well as in the characteristics of spinoffs. Studies of different industries (e.g., Klepper, 2002; Agarwal et al., 2004; Klepper and Sleeper, 2005; Buenstorf and Klepper, 2005) found that on average, spinoffs performed better than other kinds of entrants. This suggests that spinoff founders bestow capabilities on their ventures in ways that other founders cannot. Prior knowledge gathered by spinoff founders while working for the parent firm affects whether a business opportunity is discovered and how it is framed (Shane, 2000). Klepper and Sleeper (2005) show for the U.S. laser industry that spinoffs tended to enter into markets that are closely related to those served by their parent firms. These authors also find that spinoffs drew on specific knowledge their founders accumulated on their prior job rather than a more general business experience. Buenstorf (2005) finds similar patterns in the German laser industry.

While on-the-job-learning enables employees to organize spinoff companies, the empirical evidence suggests that actual spinoff formation is frequently triggered by events in the parent firm such as changes in leadership and mergers or acquisitions (Klepper and Sleeper, 2005). Such events often induce strategy conflicts and lead to disruptions in the individual employee’s working environment, rendering the current job situation less attractive to the employee. They thus give rise to negative displacement effects (Shapiro, 1975).

Research linking characteristics of parent firms and spinoffs lends further support to the conjecture that knowledge is transferred in the spinoff process. First, the performance of spinoffs is positively related to that of their parents, i.e. success breeds success in the spinoff process. Second, better-performing incumbent firms are generally more “fertile” as breeding grounds of spinoffs. The latter result has been further refined by Agarwal et al. (2004) who distinguish

between the potential and the actual number of spinoffs. They suggest that while the number of potential spinoffs a firm has increased with its capabilities (and thus the scope for employee learning), the actual number of spinoffs is greatest when the parent firm generates potential new business opportunities without actually exploiting them itself (which need not be a pathological behavior, but may make sense for the parent firm to maintain its strategic coherence or to prevent cannibalization of existing activities, cf. Chesbrough, 2003; Klepper and Sleeper, 2005).

Finally, in terms of geography, recent empirical work has found that spinoffs play a crucial role in the formation of industry clusters. Spinoffs predominantly enter at or close to the location of their parent firm. Thus, new entrants into the cluster develop endogenously within the region, and their capabilities derive from those of the parent firm(s). Based on self-reinforcing spinoff processes, historical singularities like the change event of bringing one or a few successful early entrants to a specific region can result in a differential long-term regional development. Furthermore, the accumulation of industry-specific human capital and infrastructure and the biased opportunity perception due to prior knowledge can cause the emergence of local industrial clusters based on the co-location of firms based on similar business models (Sørensen and Sorenson, 2003; Brenner, 2004). In this account, no traditional agglomeration economies need therefore be assumed to explain the emergence of clusters. Moore and Davis (2004) emphasize the impact of spinoffs in the evolution of Silicon Valley. In a historical context, Klepper (2004) shows that spinoffs were central to the emergence of Detroit as the center of the U.S. automobile industry. Buenstorf and Klepper (2005) likewise find that a large number of entrants in the tire industry cluster in Akron, Ohio, were spinoffs. In both autos and tires, observable performance effects of being located at the center of the industry were limited to the spinoffs, whereas other *de novo* entrants did not perform better at the centers than at other locations.

Successful entrepreneurship and cluster formation

The work on spinoff-based cluster formation indicates that successful firms favor the development of clusters through their spinoffs. However, potential effects of firms in a region are not restricted to the internal dynamics affecting mainly its founders and employees. Recent work has examined a variety of additional effects of successful firm formation in an industry cluster. Successful (new) firms add to the local visibility of the industry, which enhances its ability to organize collective action and to shape the local support infrastructure through lobbying efforts

(Kenney and von Burg, 1999). In addition, locally successful industries may induce local institutions of research and education to re-orient their activities in directions favourable to the local cluster.

The strongest effect a new firm has on the regional knowledge base is by attracting qualified employees from outside the region and by enabling employees to accumulate knowledge on their jobs. In addition to increasing the pool of potential (spinoff) entrepreneurs, successful firms thus add to the pool of (qualified) employees (Fornahl, 2005). These activities are beneficial for other firms in the cluster, as qualified employees may switch jobs within the region. Furthermore, in the case of firms laying off workers or closing down completely, other firms can draw on the existing pool of workers.¹

Finally, successful firms may affect regional attitudes toward firm formation. Fornahl (2003) has outlined a conceptual framework to account for such role model effects. His point of departure is the bounded rationality of agents. Because their cognitive capacities are limited, agents' attention to and processing of environmental stimuli is necessarily selective. Individual cognitive representations are consequently imperfect and biased by the agent's earlier experience. Within interacting and communicating groups, shared cognitive representations or "mental models" are likely to emerge (Denzau and North, 1994; Witt, 1996). In such groups, particular facts, issues and attitudes are more frequently discussed than others, and agents are moreover able to learn from other group members, both by verbally communicating with them and by directly observing their behavior and its consequences (Bandura, 1986). Shared mental models tend to be persistent in the group, as they are reinforced by the ongoing communication and behavioral patterns. They can be changed by strong external shocks, and also by new information, attitudes or behavior introduced by group members. However, changing the shared mental models of groups requires that their persistence can be overcome. This is more likely to be the case when several agents simultaneously introduce the same new mental model, or when an individual agent of change is highly visible and accepted as a role model in the group.

¹ Prior work also examined the impact of new firms on the possibilities for regional co-operation, regional customer-supplier relations, and thus the formation or strengthening of regional value chains (Audretsch and Feldman, 1996; Gray, Golob and Markusen, 1996; Lundvall, 1988). Such regional buyer-supplier linkages were not very strong in the Intershop case: Intershop neither realized a large share of its turnover nor bought many supplies locally and, thus, we do not analyze this aspect in the following sections. This does not imply that the local linkages were not important since it might be the case that very specific core supplies were bought locally without resulting in a high overall share. This low level of connectivity might be the reason that other local firms were not affected heavily by the decline of Intershop.

Fornahl (2003) refers to these cognitive processes to explain regional differences in entrepreneurial activities. He argues that successful entrepreneurial activities can affect other agents' attitudes toward entrepreneurship, their abilities to perceive entrepreneurial opportunities (i.e., their Kirznerian alertness) as well as their willingness to start a firm themselves. Successful entrepreneurs thus act as role models for others. Their role model effect is likely to increase with geographical proximity for several reasons. Proximity increases their visibility and the likelihood of direct communication and observation of behavior. In addition, the willingness to accept other agents as role models is enhanced by similarities in background and constraints, which tend to be larger within a regional setting. By this impact of role models on the whole regional population, the overall likelihood to start a firm increases which triggers start-up dynamics (Fornahl, 2005).

3. The Rise and Fall of Intershop

Intershop Communications AG was a poster child of Germany's „New Economy“. Founded in 1992 by Stephan Schambach, Karsten Schneider and Wilfried Beeck under the name NetConsult Communications GmbH in the formerly socialist East, the maker of e-commerce software appeared to be an impressive success story. Initially the firm primarily sold computer hardware and networks, but it also engaged in some software development. Schambach had grown up in East Germany. Dropping out of his studies at the University of Jena, he had started to sell home-assembled computers even before Germany was reunited (Virtel, 2001). Schneider likewise was an East German native. After the end of socialism, the graduate of electrical engineering had left the local Zeiss company to sell cars. The third founder, Wilfried Beeck, was a West German computer scientist who had substantial entrepreneurial experience before he co-founded Intershop. He had started his first software firm in 1983 and was distributing Steve Job's NeXT Computers when he joined forces with Schambach and Schneider to start Intershop.

Intershop's development into an e-commerce software producer began in 1994 when, based on an idea by Schambach, the firm integrated its internal order processing system into the Internet (Berberich, 1999). The firm subsequently specialized on web-related software development. In 1995 it introduced Intershop Online, the first standard software for e-commerce applications. One year later, Intershop was the first German software firm to attract VC funding (ibid.). It was thus able to grow rapidly. Intershop subsequently tried to attain global market leadership in e-commerce software, a strategy that at the time convinced many growth-oriented

analysts and investors. To be closer to the crucial U.S. market, it relocated its corporate headquarter to San Francisco.

In 1998, the Intershop went public on the German *Neuer Markt*² and subsequently also on NASDAQ. Intershop's stock price skyrocketed (cf. Figure 1). At the all-time high of the Intershop stock (March 10, 2000), the firm had a stock market value of more than Euro 11.1 billion. Its revenues increased from Euro 0.54 million in 1996 to nearly Euro 123 million in 2000, while its worldwide employment rose from 43 to 1,218 in the same period (cf. Table 1). In the company's hometown, Intershop's success was visualized when the firm moved its headquarters to Jena's tallest building, a 150-meter glass tower that had originally been constructed as a socialist prestige project. At night, the huge *Intershop* sign on top of the tower was (and still is) visible from large parts of town. Next to it, the visual presence of Jena's traditional optical and precision mechanics industries, most notably the renowned Carl Zeiss and Schott firms, paled.

In February 2000, U.S. magazine "Business Week" ran a story on Intershop titled "Germany's Hot Star", which likened the Jena startup to Hewlett-Packard in its young years (Echikson, 2000). Intershop co-founder Stephan Schambach acquired celebrity status in Germany. Finally, here was a young entrepreneur who had come from nowhere to demonstrate that successful high-tech firms could be started in Germany, which was beginning to recognize how much it was lacking behind the Anglo-Saxon world in terms of entrepreneurship. And not only was Schambach German – he even came from the German East, where post-reunification euphoria had long been replaced by the sobering realization that billions of Marks spent on industrial restructuring had done little to replace the manufacturing jobs lost in the giant trusts from socialist days.

During the surge of its stock price and until the stock collapsed early in 2001, Intershop was widely regarded as a bluechip among the German "New Economy" firms. A crucial ingredient of its standing among analysts and investors was that as opposed to other German startups, Intershop had early on emphasized the need to be present in the U.S. During that time, the company claimed global leadership in the e-commerce market. Schambach and other Intershop executives were sought after experts to comment on policy discussions covering issues like entrepreneurship, the Internet and even immigration policy.

² The *Neuer Markt* was a growth- and technology-oriented segment of the German Stock Exchange started in 1997 and closed down in 2003. Intershop was the first East German startup to make it to the *Neuer Markt*.

In 2001 newspaper coverage of Intershop and Schambach had changed drastically. After the firm had lost 70 per cent of its stock market value on a single day early in 2001, not only the judgment skills of its management were questioned. It was alleged that the firm had withheld bad news from its investors. Lawsuits and criminal prosecution ensued.

In the following years, all three founders resigned from the firm's active management. Beeck left in 2002, taking with him the first-generation Intershop e-commerce software that was tailored to smaller-scale applications. Schneider likewise quit in 2003. In the same year, Schambach resigned as Intershop's CEO. The position was taken over by Intershop's CFO Jürgen Schöttler, an economics PhD and experienced "Old Economy" executive who had come from Messer Griesheim, a prominent German maker of industrial gases (Klawitter, 2003). Subsequently, Schambach left Intershop's management altogether and, like his former co-founders, started new entrepreneurial activities (see section 4 below). He still holds a substantial ownership share in Intershop, however (*Frankfurter Allgemeine Zeitung*, February 21, 2005).

An often-found assessment is that Intershop's software products were of high quality, while the firm's major weakness was the marketing of the products. Moreover, in retrospect Intershop's strategic orientation toward the high-end segment of the e-commerce software market has been criticized. Intershop's flagship product "Enfinity" may have been too complex for most potential customers' IT infrastructure (von Bredow and Jung, 2001).

For the past five years, Intershop has been on the decline. And while the firm has survived to date, it had to downsize its operations drastically. Revenues, R&D investments, employment and stock price have all fallen tremendously (cf. Table 1). To save money, branches outside Europe and the U.S were shut down, and Intershop's corporate headquarter was moved back from San Francisco to Jena in 2002. A large number of employees were laid off or left the firm on their own initiative. Intershop presently has 222 employees and annual revenues of roughly Euro 15 million.

While shrinking the firm to a sustainable size, the new management tries to safeguard Intershop's future prospects by bringing in fresh capital as well as strengthening the firm's marketing and sales divisions. Its major problem is seen in a widespread reluctance vis-à-vis major IT investments. Intershop's license revenues based on existing customer accounts, which include names such as Hewlett Packard, Deutsche Telekom and Otto, are still substantial. In the final quarter of 2005, the firm announced a quarterly profit for the first time since going public. The firm acknowledges, however, that it was unable to attract major new customers in recent

years (Ostthueringer Zeitung, October 28, 2005). At the moment, the survival chances of Intershop are unclear.

4. Intershop as a breeder of software firms: spinoff activities

In the years since 2001, the decline of Intershop has been accompanied by a wave of new entrepreneurial activities by Intershop's founding team and other ex-employees. Through its policies vis-à-vis entrepreneurially inclined employees, Intershop helped enable the emergence of spinoffs. In this section, we present the empirical evidence on Intershop spinoffs and relate it to the prior theoretical and empirical work.

Phoenixes from the ashes? Intershop's founders as serial entrepreneurs

In section 3 it was indicated that all three members of Intershop's founding team had acquired prior entrepreneurial experience when they started Intershop. It was also noted above that all three have left the firm's management during the recent decline of the firm. Since then, they all have engaged in renewed entrepreneurial activities. This section has a closer look on their new firms and how they relate to Intershop.

Wilfried Beeck's departure from Intershop in 2002 involved a fissioning of the firm. Beeck took with him the smaller-scale software Intershop 4 for SMEs and hosting providers, whereas the parent firm retained the rights in the higher-end Enfinity software. He transferred the rights in Intershop 4, as well as the existing customer accounts, to a firm named ePages. In spite of continuing Intershop's original e-commerce software, ePages is the legal successor of Beeck's earlier firm started back in the 1980s. The firm attracted a number of former Intershop employees, and in addition to the founder, the entire top management team of ePages consists of former Intershop managers.

Beeck's departure from Intershop is indicative of a strategy conflict. His assessment of the market potential of Intershop 4 differed from that of the other managers who had focused on the Enfinity software (Toparkus, 2004). Its focus on smaller-sized customer firms notwithstanding, the new firm continues to upgrade its product, for example by enabling its integration into Internet marketplaces such as eBay. In 2004, it introduced ePages 5, which is characterized as an entirely new development (cf. ePages corporate website).

Bilderservice Pixaco was started by Karsten Schneider, Ronald Tscherepanow, Steffen Schuchardt and Ines Kneißl in 2003. The firm is based on the Web portal Bilderservice.de, which was first started in 1999 by Creative Online Systems (later renamed into Vimago). This firm was an Intershop partner firm located in nearby Weimar, and the Bilderservice.de portal was built on the basis of Intershop's e-commerce software (Ostthueringer Zeitung, October 11, 2001). Bilderservice Pixaco's business model is to provide a web portal allowing customers to upload their digital image files for professional printing. Already before Pixaco was started, the digital photo processing facilities associated with Bilderservice.de were relocated to facilities in the tower building in Jena where Intershop's operations are located (more on this in section 5 below). Given its heavy data traffic, the sophisticated IT infrastructure available in the tower is a major asset for the Bilderservice Pixaco (Querengaesser, 2004).

In addition to its acquisition of the Bilderservice.de portal in 2003, Pixaco started a second portal specifically focused on the mass market. Except for Schneider, who became CEO of the new firm, all co-founders worked for Vimago before. The founding team includes Vimago's former software architect. In December 2005, Bilderservice Pixaco was acquired by Hewlett-Packard in a trade sale. The acquisition was characterized as part of Hewlett-Packard's strategy to globalize its online photo services. At the time, Bilderservice Pixaco was operating in 12 European countries. The acquisition was expected to enable further growth in its Jena operations (Querengaesser, 2005)

Finally, Stephan Schambach also started a new firm, but in contrast to the two other Intershop founders, he did so outside Jena and Germany. In 2004, Schambach organized a company named Demandware located in the Boston region (Frankfurter Allgemeine Zeitung, February 21, 2005). With Demandware, Schambach intends to combine e-commerce software with the on-demand software concept. With on-demand software, customers do not install the program on their own computers, but rent computing time on the provider's computers. License fees are based on actual use rather than flat rates. Demandware is VC backed and employs a number of former Intershop employees. Most notably, Demandware hired Intershop's former chief software architect, Ulrike Mueller, who was in charge of the concept and design of the Enfinity software. Even though it located far away, Demandware has cooperations with recent Intershop spinoffs located in Jena (see next section) as well as long-term Intershop partners such as Deutsche Telekom. In February 2006, Demandware secured second-round VC funding of \$ 12 million (Demandware, 2006).

All three new ventures of the Intershop founders are strongly influenced by their earlier experiences at Intershop. Both Beeck and Schambach (who both still hold major ownership shares in Intershop) remained active in Intershop's core market – software development for e-commerce applications – with their new ventures. Even though both new firms focus on market segments and approaches somewhat different than Intershop's, they represent a competitive challenge to at least some of the parents firm's business. The strategic differences between the two new firms are pronounced. EPages basically tries to build on Intershop's early success and to keep its software simple and affordable for smaller-scale customers. The firm stresses its prospects to break even rather than its growth potential. It appears more conservative than Demandware, which, similar to Intershop in its early days, strives to be a pioneer in a new software market (on-demand software). With Demandware, Schambach moreover repeats Intershop's strategy of locating close to the U.S. market.

Bilderservice Pixaco differs from the other firms in that it is not (primarily) a software developer but a provider of a web-based service (digital image printing). The Intershop impact on this firm is nonetheless discernible. Pixaco's web portal, originally developed by an Intershop partner firm, was from the beginning based on Intershop software. It is questionable whether it would have been created without Intershop's regional presence. Moreover, Schneider's ability to perceive the opportunity presented by Bilderservice.de and to use the portal as the cornerstone of a new firm likely reflects his Intershop experience.

Intershop as incubator: spinoffs and a self-organized technology park

The new ventures started by the three Intershop founders are not the only entrepreneurial activities that have emerged from Intershop. The firm's recent downsizing induced a number of the firm's employees to start their own businesses. No complete listing of Intershop spinoffs exists. However, based on various online resources, local information and personal communication a total number of at least 27 new firms started by former Intershop employees (in addition to the 3 firms discussed in the previous section) could be identified (cf. Table 2 for details).³ Most of these firms were started after the parent firm's decline had begun. 14 of them are spinoffs in the more narrow sense of having entered the software industry rather than other activities. Of these, only a single one (Ageto/Truition) entered in the same industry segment (i.e.,

³ This number does not include a handful of ex-Intershop employees who now work as free-lance programmers or self-employed consultants.

e-commerce software) that Intershop, as well as two of the founders' new firms (Demandware and EPages), are active in. Not surprisingly given the low barriers to entry in that industry, more than a third (10) of the new firms entered into consulting.

There are some striking examples among the spinoffs suggesting that employees were able to exploit knowledge and experience gained at Intershop in their new firms. Xceptance, co-founded by Intershop's former head of quality control and its legal advisor, markets quality tests and automation techniques for software quality control. The founder of Mokkafish, which focuses on developing user interfaces, was in charge of interface design at Intershop. Similarly, J-media, which has developed standardized software supporting marketing and PR activities, was started by a former member of Intershop's communication department. A direct connection between the jobs they held at Intershop and the focus of their new ventures can also be drawn for some of the employees that started consulting firms. For example, Cresco Services, started by Intershop's former CFO, does financial consulting, whereas TowerConsult, the firm organized by the former VP for Human Resources, offers recruiting services. Likewise, one co-founder of Clienthouse, which concentrates on customer relation management consulting, was responsible for customer and partner services at Intershop.

Another aspect of the spinoffs that emerged from Intershop is the leveraging of contacts and the apparent ability of Intershop employees to perceive business opportunities related to software development and online services. Both Ageto/Truition and EPages are working to integrate e-commerce and online marketplaces. Alea, a new venture co-founded by Intershop's first-round employee and chief software architect, Frank Gessner, develops business software for mail-order firms. Its product is based on programs developed in an earlier firm of Gessner's co-founder. Alea is thus similar to Pixaco in adopting and further developing a business model that has some relation to Intershop's activities but has previously been developed outside the firm. Altogether, it appears that those members of Intershop that were most central to its strategic management developed the business models that are most closely related to that of the parent firm. In particular, it is striking that two of the three firms started by Intershop's founders, but only a single employee spinoff, are developing e-commerce software that is at least in part competing with Intershop's product.

Intershop played a substantial role in enabling and fostering the entrepreneurial activities by its former employees. When it began to lay off employees at a large scale, the firm utilized a German law allowing for publicly subsidized transfer firms. Under that law, the laid-off

employees received a publicly funded transfer income (roughly corresponding to unemployment benefits), while Intershop had to cover both social insurance payments and re-training costs for the employees. This institutional arrangement was more costly to Intershop than the alternative of just laying off the respective employees, including the litigation and settlement costs that the firm expected to arise in the latter case. Part of Intershop's motivation to incur these costs (at the expense of its shareholders, to be sure) was to try and retain software competences in the region. Since there was not much of a software industry in Jena, most of the dismissed employees could be expected to leave the region to find new employment, mostly in West Germany. From the beginning, own entrepreneurial activities of the employees shifted to the transfer firm were seen as one avenue for them to find new employment (Hoffmann, personal communication).

The transfer firm was the nucleus of TowerByte eG, a cooperative of small start-up firms whose activities are related to software development. TowerByte was founded late in 2003. At present, the cooperative has 16 member firms with an aggregate employment of 90. 12 of them are Intershop spinoffs. The individual firms focus on different submarkets and services. Accordingly, the other firms in the cooperative are no direct competitors.

TowerByte provides a number of services to its member firms. First, the cooperative rents office space in the Intershop Tower, which is occupied by the member firms. The firms are thus able to benefit from the building's IT and service infrastructure as well as from the proximity to Intershop, EPages, Bilderservice Pixaco (which are all located in the Tower) and the other member firms. Second, the Tower is also home to a specialized provider of systems and network administration services (IKS). As a consequence of the available technological infrastructure and services, new firms can start small and quickly. Third, since the member firms differ in their competences, they are able to help each other by providing specific expertise, access to customers, and if necessary also small-scale loans (Kalla, 2005). Finally, the cooperative argues that the presence of other software firms makes it easier for member firms to hire new employees, since the presence of potential alternative employers significantly reduces the risk of joining a small startup (Hoffmann, personal communication).

As emerges from the previous paragraph, the TowerByte cooperative is in many aspects similar to a well-functioning, software-specific technology park. Indeed, one local software firm – originally founded as a spinoff from the local university – has recently moved from Jena's publicly funded but not software-specific technology park to the cooperative. What is special about TowerByte, however, is that it is based on private initiative rather than by deliberate public

policy. To be sure, the cooperative to some degree depends on outside funding. Initially, all of TowerByte's premises were sublet from Intershop and paid by the parent firm. And even though the cooperative has outgrown the office space taken over from Intershop, it still rents most of its offices at a discount rate from the parent firm. In addition, the cooperation is supported by public funds in that three of the member firms get a state subsidy to their rent.

Intershop and its spinoffs – an evaluation

How well does the observed emergence of spinoffs from Intershop square with the prior work on spinoffs? On the one hand, in line with the prior work, the business models of the Intershop spinoffs strongly suggest that their founders try to make use of the specific experiences and knowledge accumulated while working at Intershop. An additional aspect supporting this interpretation is that founders who were closer to Intershop's general management (particularly, the serial entrepreneurs) started the firms whose activities are closest to the parent firm's markets. On the other hand, the "success breeds success" character of the spinoff process – better incumbents tend to have more and better spinoffs – is hard to square with the Intershop history with its prolonged struggle for survival and drastic downsizing after 2000.

There are several ways, however, to reconcile the large number of spinoffs out of Intershop with the parent firm's weak performance. First, the decline of Intershop not only led to changes in the firm's leadership, but clearly was a crisis situation that may have induced employees to form spinoffs who would not have considered this option under more favorable conditions. As was related in section 2, such triggering events and negative displacement effects have indeed been suggested as crucial ingredients into the spinoff process. Second, Intershop was an early entrant into e-commerce software, and its products are highly regarded for their quality. The firm thus seems to accord to the account for actual spinoff generation given by Agarwal et al. (2004). Technological capabilities were developed in the firm, but given its fragile situation Intershop was unable to exploit them, thus creating the potential for employees to start spinoffs. Since it was downsizing and had little prospect of broadening the range of its activities, these spinoffs – except when entering into the e-commerce market itself – did not threaten to become competitors of the parent firm. Intershop could therefore "afford" to support their emergence, as is indicated by its sponsoring of the TowerByte cooperation. Finally, specific characteristics of the software industry, both in terms of its life cycle and in terms of product design, may have played a role in the Intershop case. Because of the abrupt end of the dot.com boom, with

Intershop a young firm was downsizing that belonged to the technological vanguard in a young industry still allowing for new entry. This contrasts with the frequent pattern that the decline or exit of industry incumbents is part of a more general industry shakeout. In the latter situation, there are much less opportunities for starting successful spinoffs. In addition, software is a prime example of heterogeneous and modular product designs. Specialization along heterogeneous submarkets has been found to favor spinoff entry over all of the industry's previous history (Klepper and Sleeper, 2005; Buenstorf, 2005), and the same pattern would appear plausible also in the software industry. Product modularity is likewise favorable to the formation of spinoffs, as it allows for entry by horizontal disintegration, i.e. specialization on some specific aspect of the software (note, e.g., Ageto/Truition's strategy of focusing on integration of e-commerce and web marketplaces). Moreover, the firm's emphasis on modularity in software design was a significant aspect of the alleged quality of Intershop's products.

What regional impact did the entrepreneurial activities of Intershop's founders and employees have? With EPages and Bilderservice Pixaco, two of the serials start-ups by the Intershop founders follow the oft-observed pattern that entrepreneurs stay in their home region when starting a new firm (Cooper and Folta, 2000; Fornahl and Graf, 2003). Both firms are moreover based on regional capabilities that can be traced back to Intershop. Thus, whatever economic effects the two firms may have in the future (at present, they each employ less than 50 employees, cf. Table 2) can in part be attributed to Intershop's legacy. The same holds, at least to a large extent, for the employee spinoffs. In terms of location, most new ventures entered at the location where their founders were active before. As Intershop had established various regional branches, this is not in all cases Jena. Nonetheless, roughly half of the new firms (17) located in Jena, and 3 additional firms entered within a 100-kilometer range (Weimar, Leipzig). Between them, the local entrants created at least 180 jobs in Jena, with an increasing trend in spite of the recent economic downturn in Germany. A substantial fraction of the software-related human capital brought to Jena and/or bred at Intershop was thus retained in the region in spite of no longer being needed in the parent firm itself. When the remaining 220 jobs at Intershop are taken into account, it can be seen that of Intershop's peak local employment of about 700, more than half has been retained in the region to date. Put differently, new jobs at the spinoffs and serial entrepreneurship ventures have compensated for about one third of the jobs lost at the parent firm.

In contrast to most other Intershop-related start-ups, Demandware's direct effects are, if anything, detrimental to the Jena region, because they potentially threaten Intershop's (as well as EPages') future sales. At the same time, the cooperations with Intershop spinoffs based on existing personal networks may give rise to some positive indirect effects on the region.

5. Beyond spinoffs: Intershop as a promoter of regional conditions

Money from Nothing: Direct Regional Effects of Intershop

What direct effects did the rise of Intershop have on the economy of its hometown? Is there any evidence that these effects facilitated entrepreneurial activities and the development of software firms in Jena? And to what extent have these effects survived the drastic downsizing of the firm? In the absence of detailed empirical work on these questions, it is difficult to provide more than informed guesses. In this section, we will – guided by the literature on the emergence of industrial clusters – discuss three potentially relevant dimensions: human capital, infrastructure and purchasing power.

Arguably the most important direct effect of Intershop was to attract human capital to Jena.⁴ At the climax of its growth, Intershop had some 700 employees in Jena, with the remaining employment largely being divided between San Francisco and Hamburg, where the financial operations were concentrated. Jena has always been the center of Intershop's product development, and accordingly its local employment was biased toward programmers and software developers. More than two thirds of them had roots in the broader region (consisting, essentially, of Thuringia and Saxony). University graduates in computer science were predominantly hired from the surrounding Technical Universities in Leipzig, Ilmenau, Chemnitz and Dresden. Because of its profile, the local university was less important as a provider of human capital. In addition to university graduates, the firm hired – particularly during its most rapid growth phase – a number of employees with more remotely related professional backgrounds, university dropouts etc. Notably, also among employees attracted from outside East Germany, many had local roots. Intershop deliberately attempted to lure back Easterners who because of the dismal East German job market had before migrated to West Germany.

⁴ This and the following two paragraphs are based on information provided by Intershop's former head of human relations, Reinhard Hoffmann.

The effect of Intershop's recruitment on the regional human capital base has to be evaluated against the backdrop of substantial out-migration from East Germany at the time. It helped to retain skilled individuals who would otherwise have had difficulties to find suitable jobs in East Germany, and also to bring back some who had already left before. However, as noted above, many of these employees did not come from Jena itself, but from the broader region. Locally, the firm's hiring therefore added to the human capital base in a substantial way.

Even more important than Intershop's recruitment may have been the capabilities that employees acquired on their jobs at Intershop. The firm being a pioneer of e-commerce software development, few of its employees brought the specific skills needed for their job or even had a specific background based on prior job experience. Instead, they acquired much of their know how on the job. In this context, the high quality of Intershop's software development was crucial, as it helped improve the skills of programmers and software developers. Intershop may thus have operated as a "breeder of e-commerce competences" (Hoffmann, personal communication).

There is another way in which Intershop might have affected the regional knowledge base. When the firm's stock price peaked in 2000, the founders and a group of early employees organized the Intershop Foundation dedicated to the support of local scientific, cultural and educational projects. One of the foundation's first projects was to endow a chair for electronic commerce at the local university, which was meant to form the nucleus of a new program in economics and computer science (Uni-Journal Jena, June 2000). Initial plans for the foundation had been highly ambitious, yet relatively little of them materialized. While state authorities were still processing the registration process for the foundation, the *Neuer Markt* crashed, forcing the initiators of the foundation to radically downsize its scale (Hoffmann, personal communication). The planned university chair was moreover plagued by complications in appointing a suitable professor and was cancelled in 2001. Instead, the foundation gave smaller-scale financial support to the university's computer science department, and it helped initiate a program in internet business economics at the University of Applied Sciences. The latter was discontinued in 2004. Given the largely diminished form in which it materialized, the Intershop Foundation can only finance a handful of small-scale projects. Thus, it is unlikely to have a substantial effect on local development in general and on human capital accumulation – as had been planned through the support of higher education – in particular.

A crucial issue is to what extent the human capital attracted and generated by Intershop remained locally available after the firm's rapid downsizing by almost 500 employees locally.

Many of the individuals leaving Intershop moved outside the region, particularly those who had no regional roots but were native West Germans or foreigners. In contrast, many of the employees coming from the region attempted to stay. These employees form a pool of employees a new entrepreneur can pick from. Altogether, some estimated 200 ex-Intershop employees found new IT-related employment locally (including the employees of the Intershop spinoffs discussed above).

Besides its role in human capital accumulation, Intershop had an effect on local infrastructure and purchasing power. In 2000 Intershop rented the upper half of Jena's landmark building, the former tower of the University of Jena that had been built in the 1970s and was vacant after German reunification. Upon the rental agreement with Intershop, the tower's private owner initiated a thorough reconstruction effort that turned the tower into a state of the art office building custom-made for the needs of IT firms. It features fast and redundant Internet access, air-conditioned server facilities as well as security features such as uninterrupted power supply and contact-free access control. Today, given Intershop's substantially smaller needs for office space, the facilities are in part used by its spinoffs, the TowerByte cooperative and also other software and IT firms.

Intershop's effects on local purchasing power were twofold – based on both regular salaries and wealth from stocks and options. The quantitative significance of these effects is hard to evaluate. An estimate made in 2000 (Bott, 2000) suggests that their ownership share in Intershop turned at least 70 employees into temporary (nominal) millionaires. According to sources close to the firm, few if any of the employees became extremely rich by cashing in on their stock options before the stock price collapsed. Moreover, to be sure, some of the money lost by Intershop's investors came from local investors. However, there is at least anecdotal evidence that the earnings from selling Intershop stock added substantially to local purchasing power, particularly in the local housing market. For a variety of reasons, Jena is among the most expensive housing markets in all of East Germany (N.N., 2005). The extent to which the Intershop money added to this development cannot be quantified. In any case, no decline in real estate prices was observed after the decline of Intershop began.

Local Heroes: Intershop as a Regional Role Model for Entrepreneurship

In addition to the direct, tangible effects of Intershop sketched in the previous sub-section, there is some evidence suggesting that the firm also influenced local attitudes toward entrepreneurship

and the ensuing willingness to start firms, as it provided a positive role model for potential entrepreneurs.

Existing empirical evidence of a role model effect of Intershop (or more precisely its founders) on entrepreneurial activities in Jena is mixed (Fornahl, 2005). In a series of expert interviews on entrepreneurship in Jena, 14 out of 24 experts mentioned Stephan Schambach as an individual who affected local entrepreneurial activities (ibid.). No other firm founder was mentioned as frequently.⁵ The experts either explicitly characterized Schambach as a role model or described his role in a way that is consistent with such a characterization (“Mr. Schambach was important because he has shown to other agents how an agent can start a firm and achieve something”; “Agents observed that Mr. Schambach was one of the first who worked his way up, managed to start and develop a firm”; Fornahl, 2005, pp. 212-3). Evidence supporting the notion that the regional entrepreneurial climate affects firm formation moreover emerges from a survey of 93 founders or managers of local startups organized between 1990 and 2001 (ibid., pp. 195-211). Two-thirds of the respondents stated that a positive entrepreneurial climate had been a relevant factor in their founding decision. In addition, one-third of the firm representatives answered that earlier regional founders had positively influenced their own decision to start a firm.⁶

In contrast to the self-reports, however, a quantifiable effect of Intershop’s example on subsequent firm formation in Jena was not found in the survey. Neither positive founding decisions nor the actual formation of startups were correlated with the respondents’ ex-post assessment of the regional entrepreneurial climate at the respective time (ibid.).⁷

⁵ The only tie was with Lothar Späth, a well-known West German politician who had moved to Jena to restructure the local Jenoptik company.

⁶ In contrast, no respondent indicated a negative impact of earlier firm formation. As is acknowledged by Fornahl (2005), this asymmetry may indicate a sample bias due to the restriction to actually started firms.

⁷ There exists, however, a rather illustrative piece of anecdotal evidence for Intershop’s effect as a regional role model. A short-lived software firm named Exquisit Technologies was started in Jena in 2000. It focused on software for language recognition. The firm founders acknowledged Intershop as a role model (Financial Times Deutschland, October 17, 2000). In addition, the firm’s name itself indicates the Intershop influence. To see this, one needs to know that the name Intershop not only alludes to “internet” and “shopping”. Intershop also was the name of the chain of state-run shops that sold Western merchandise (for Western currency) during socialist times in East Germany. Likewise, Exquisit was the name of the chain of shops that sold the highest-quality goods available for Eastern currency.

6. Conclusions: A Giant Failure or a Software Cluster in the Making?

From an investor's point of view, Intershop, like many other dot.com firms, was a bad long-term investment. Our objective in the present article was to question the investor-centered assessment of the dot.com boom by adopting a different perspective, tracing Intershop's regional legacy five years after the end of the dot.com boom. We found key elements of the spinoff-based account of cluster formation in the Intershop case. Intershop was an early entrant into e-commerce software, and there were no systematic reasons other than the founders' biographical backgrounds why it emerged in Jena and not somewhere else. Firm formation by Intershop employees spawned a substantial number of additional entrants, and characteristics of the new firms suggest that founders were able to transfer some of the knowledge they acquired at Intershop. Intershop even actively enabled new entry by spinoffs. Additionally, Intershop positively affected regional conditions for successful entrepreneurship by attracting human capital to the region and inducing investments in software-related infrastructure. Finally, its founders may have served as role models for other potential entrepreneurs. Intershop thus appears to have helped create and shape some of the conditions and interactions that are often argued to be crucial for the performance of firms and the emergence of industry clusters. Even if Intershop itself should go bankrupt soon, it may have been the nucleus of a software cluster developing on the basis of an endogenous, entrepreneurial spinoff process and the impact it had on the regional environment. Beginnings of a clustering of software firms are discernible in the region.

It is too early to tell whether or not the Intershop spinoffs perform sufficiently well to give rise to a stable and further growing software cluster. Thus, as regards Intershop's long-run regional impact, the jury is out. Nonetheless, in assessing the Intershop case, the regional perspective clearly differs substantially from that of the firm's investors.⁸ The case shows how a former dot.com firm may have had a lasting beneficial effect on regional development – one that potentially will survive the original firm. If this finding can be generalized to other regions that were home to dot.com firms, it may justify another re-evaluation of the dot.com boom – to be sure, only from an *ex post* perspective and definitely without the slightest plea for creating new bubbles.

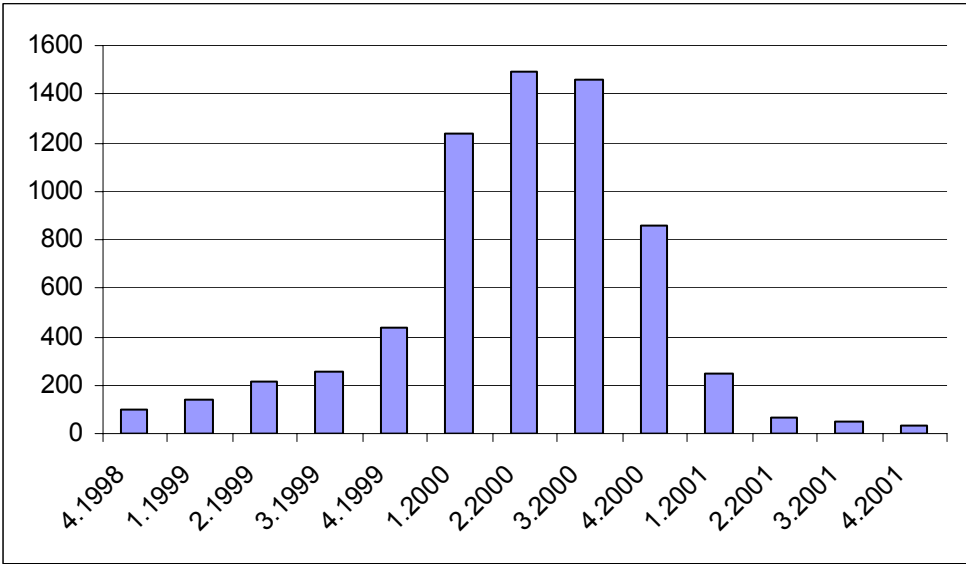
⁸ To be sure, from an investor's perspective some of the firm's policies that appear useful from a regional perspective, such as its support for the transfer firm and subsequently the TowerByte cooperative, seem more problematic. It is difficult to assess whether potential benefits to Intershop resulting from the presence of other software firms outweigh the direct pecuniary cost of that support.

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Figure 1: Development of the Intershop Communications AG stock price (source: www.onvista.com)



* The bars represent the average stock prices in that quarter of the year based on the stock prices on the first day of the three respective months.

Table 1: Intershop financial and employment data, 1996-2004 (source: Intershop Communications AG, annual reports 1997-2004)

| Year | Revenue (€million) | Profit / Loss (€million) | R&D investment (€million) | Total Employment |
|------|-----------------------|-----------------------------|------------------------------|---------------------|
| 1996 | 0.538 | -2.656 | 0.341 | 43 |
| 1997 | 5.036 | -7.956 | 1.000 | 179 |
| 1998 | 17.872 | -17.308 | 4.377 | 353 |
| 1999 | 46.300 | -18.400 | 7.115 | 544 |
| 2000 | 122.994 | -38.900 | 10.191 | 1,218 |
| 2001 | 68.654 | -131.798 | 15.179 | 733 |
| 2002 | 45.097 | -27.555 | 7.225 | 479 |
| 2003 | 23.159 | -18.640 | 6.260 | 371 |
| 2004 | 17.568 | -8.776 | 4.149 | 260 |
| 2005 | 17.792 | -3.312 | 2.765 | 222 |

Table 2: Firms started by Intershop employees, their activities and their founder's position at the parent firm (as of February 2006; various sources)

| | Firm name | Location | Jobs (ca.) | Industry | Business model / field of activity | Intershop position of (co-)founder(s) |
|----|---|----------------------|------------|-----------------------|---|--|
| 1 | Ageto (2005 acquired by Truition) | Jena | 17 | E-commerce software | Integration e-commerce and internet marketplaces | (1) Director, Component Consulting (2) Director, Product Management |
| 2 | Alea | Jena | 17 | Software | Business software for mail-order companies | Vice President Software Engineering |
| 3 | Avorium | Weimar | Unknown | Consulting | Software engineering consulting | Vice President R&D |
| 4 | Bilderservice Pixaco (2005 acquired by Hewlett-Packard) | Jena | 40 | Web-related services | Web portal for digital photography printing | Founder |
| 5 | Callan Consulting | U.S.A. | Unknown | Consulting | Strategic marketing consulting | Vice President Global Marketing |
| 6 | Clienthouse | Jena | 6 | Consulting | Customer relation management consulting | (1) VP Services (2) Customer and Partner Services |
| 7 | Cresco Group | Hamburg | Unknown | Consulting | Financial consulting services | CFO |
| 8 | Demandware | U.S.A. | 22 | E-commerce software | E-commerce on demand | Founder |
| 9 | Designkorridor | Jena | 5 | Advertising | Web and graphic design | (1) Media designer (2) Web designer |
| 10 | DotSource | Jena | 2 | Consulting | Consulting, software development and sales | Intern, Graduate of Internet Business Engineering Program |
| 11 | Eastsidestory | Leipzig | unknown | PR agency | | Head of Marketing |
| 12 | Ensights Corporation | U.S.A. | unknown | Consulting | Management and technology consulting for energy market firms | Vice President |
| 13 | EPages Software | Jena | 40 | E-commerce software | Further development of Intershop 4 | Founder |
| 14 | Facultas | London | Unknown | Software distribution | Distributor for e-mail marketing software; human resource consulting (recruiting) | Practice Leader |
| 15 | IQ-One | Hallbergm. (Bavaria) | Unknown | Consulting | IT consulting and services | Systems administration / technical support |
| 16 | Jmedia | Jena | 2 | Software | Standard software for marketing / PR | Press relations |
| 17 | Lydecker Fine Art | U.S.A. | Unknown | Art trade | | National sales manager |
| 18 | Mgksolutions | U.S.A. | Unknown | Consulting | IT consulting | Systems administration |
| 19 | Mobizcorp | Berlin and U.S.A. | Unknown | Consulting | E-commerce consulting (partner of ePages, Intershop, demandware) | Senior software architect |
| 20 | Mokkafish | Jena / Taiwan | 3 | Software | Interface design, e-learning | User interface design |
| 21 | Occasio | Leipzig and U.S.A. | Unknown | Software | Specialized content management systems | Manager Strategic Alliances / Sales Engineer |
| 22 | OMWave | Paris | Unknown | Consumer electronics | Home entertainment centers integrating computers and consumer electronics | Director Business Development |

| | | | | | | |
|----|--------------|------|---------|-------------------------|--|---|
| 23 | Pixundeins | Jena | 1 | PR agency | Web and graphic design | Graphical user interface design / storyboards |
| 24 | SEWAK | Jena | 5 | Software | | Procurement, web design |
| 25 | Synchronity | Jena | 18 | Software | Bank software | Unknown (indirect spinoff – was IT manager of bank after Intershop) |
| 26 | TimeSpin | Jena | 8 | Webdesign and software | Webdesign, advertising, content management systems | |
| 27 | Tourevo | Jena | 4 | Software | Online software for travel agencies | Customer relation management |
| 28 | TowerConsult | Jena | 10 | Software and consulting | Human resource consulting (recruiting); software development | VP Human resources |
| 29 | Tower PR | Jena | 1 | PR agency | | Company spokesman |
| 30 | Xceptance | Jena | unknown | Software | Quality management for software development | (1) Quality control (2) Legal counseling |