SUPPLY CHAIN INTEGRATION
IN THE HR-SERVICE INDUSTRY

Thomas Graf

IE Business School
Strategy Department
María de Molina 12, 4º-D
28006 Madrid

tgraf.phd2012@alumno.ie.edu

Summary

Can the concept of supply chain (SC) integration be transferred from manufacturing to service industries? An action research design at a major German HR-service company was applied in order to explore SC integration in the context of the HR-service supply chains. It is found that the company acts as a mediating supply chain member between graduates (downstream), who look for jobs, and employers (upstream), who look for employees, and that it provides a multitude of integration mechanisms. After contrasting the results of the action research study with SC integration constructs in manufacturing industries derived from an intense literature review, a model of SC integration in the HR-service industry was developed. The model suggests that concepts of SC integration can indeed be transferred from manufacturing to service industries and offers testable propositions to path the way towards more generalizability. If the model receives empirical support this would have serious implications for managers who are assumed to face an increasing lack of qualified resources within the next decade.

Introduction

In 1998, the consulting firm McKinsey & Company published a widely-noticed survey about the value of talent as competitive weapon and the increasing challenges for HR-departments to recruit talent (Chambers, Foulon, Handfield-Jones, Hankin, & Michaels III, 1998). In 2010, McKinsey published a similar study warning against a potential lack of 2 million qualified employees until 2020 in Germany (McKinsey & Company, 2010). One means for organizations to manage these challenges of effective HR-recruitment especially in times of workforce scarcity is to work with professional HR-service firms, who are specialized in promoting positions or positioning employer brands within networks of potential job candidates (e.g., online-job-platforms, head-hunters, career fair agencies). What determines the effectiveness of such HR-service firms?

This study draws on the literature of supply chain integration in manufacturing industries and uses an action research approach to explore to what extent constructs from there can be transferred to supply chains in the HR-service industry. Theoretical studies on the service sector are still underexplored within the field of operations management (Gupta, Verma, & Victorino, 2006). Both leading academic publications on operations, Operations Management (POM) and the Journal of Operations Management, show only about 15 publications on supply chains in service industries at all, and as far as the author knows no study ever touched the field of HR-service firms.

Given this gap in the literature, this study provides important contributions. First, it is the first study that develops a model of supply chain integration for the HR-service industry. It thus provides with a better understanding of the SC processes in this type of industry in general and the effectiveness of supply chains in particular. Second, following an action research approach (Lewin, 1946) this study provides a first notion to what extent constructs developed within the context of manufacturing industries may have value also in service industries. The study thus contributes to the literature on supply chain integration and the literature on service industries in general as well as specifically on the literature on HR-services. In addition, it has serious implications for managers who may increasingly need guidance in deciding about the most effective means for meeting the challenges of future talent recruitment.

The remainder is organized as follows: First, I provide a literature review on supply chain integration and identify two dimensions of external supply chain integration that could be transferred to and applied within the context of service industries. Second, I describe the results of an action research approach using the German HR-service firm E-FELLOWS.NET that offers a bunch of integration tools for up- and downstream supply chain members. Third, I develop a supply chain integration model as a conceptual solution for future challenges of the HR-industry based on the literature review and my action research. Fourth, I discuss potential future steps for testing the model and implications for managers.

Theoretical Background

Although the concept of supply chain integration received strong recognition from researchers in the context of manufacturing industries, research on SC integration within service industries remains underdeveloped (Gupta, Verma, & Victorino, 2006). Conducting a broad keyword search on "supply chain" and "service industries" in the abstracts of the Production and

Operations Management (POM) online database from 2005 to 2010 led to only 13 academic articles, compared to 293 articles over all published in that period. A keyword search in the Journal of Operations Management found no article directly mentioning "supply chain" and "service industries" within the abstracts whereby about 15 articles can be attributed to these areas after a deeper look on the content. As to my knowledge, no study was done on SC integration in the HR-service industry where employers offer their HR-products to job candidates and intermediary career firms, and where job candidates search for HR-products by directly contacting employers or indirectly by contacting career firms.

Before exploring SC processes in service industries, however, it makes sense to clear what we already know about SC integration even though research so far primarily drew on manufacturing industries. Having a closer look on the operations literature, it becomes obvious that the SC integration constructs used in research on manufacturing industries are far from being homogenous. Though many researchers argued that supply chain integration (SCI) positively affects the system and eventually financial performance of organizations and some perceive them even as competitive weapons (e.g, Johnson, 1999; Frohlich & Westbrook, 2001; Vickery, Jayaram, Droge, & Calantone, 2003), there is neither a commonly accepted definition nor a common measure of SCI (Pagell, 2004). This is surprising given that so many studies explore "this" issue and raises the question whether everyone talks about the same thing[1].

In an overview of the several definitions used in the literature from 1990 to 2002, Pagell (2004) showed that "cooperation", "coordination", and "collaborations" are common keywords used for conceptualizing integration. Integration, for example, is described as "*coordination* of activities throughout the networks of buyer sand suppliers" (Handfield & Nichols, 1999; italics by the author), as "*cooperative relations* between suppliers and customer organizations to solve joint problems, implying reduction of supplier and customer complexity through the establishment of cooperative relationships" (Flynn & Flynn, 1999; italics by the author), and as "*collaboration* between supplier and buyer in areas such as inventory planning, demand forecasting, order scheduling, and customer relationship management" (Feeny, 2001; italics by the author).

Cooperation, coordination, and collaboration, however, are vague constructs and may refer to different content. A closer look on the literature seems to reveal that authors partly refer to the exchange of explicit information and the conditions for this (e.g., the alignment of IT-systems) and partly to collaboration in the sense of developing trust (De Jong & Elfring, 2010), tacit knowledge (Polanyi, 1966), and routines (Nelson & Winter, 1982).

Frohlich & Westbrook (2001), for example, use eight dimensions two measure their "arcs of integration"-construct, all of which refer to technical issues of supply chain member process alignment: access to planning systems, sharing production plans, joint EDI access/networks, knowledge of inventory mix/levels, packaging customization, delivery frequencies, common logistical equipment/containers, and common use of third-party logistics. On the other extreme, Rosenzweig et al. (2003) introduced supply chain integration intensity as a proxy for Frohlich & Westbrook's (2001) "arcs of integration". SC integration intensity is described as reflecting the linkages among supply chain entities within and outside the organization including the network of direct suppliers and their suppliers and direct customers and their customers. The development of integration intensity is said to rely on infrastructure, history, and collective experience of a specific organization or set of organizations. In contrast to Frohlich & Westbrook's primarily

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[1] As the focus of this study is on external integration as a Cultural status among several organizations within a supply chain, I ignore studies on internal integration in my review.

technical integration construct, Rosenzweig et al. (2003) thus refer to something more tacit that may be associated with Nelson & Winter's (1982) organizational routines.

Other authors use a mixture of both extremes. Vachon (2003), for example, distinguishes between logistical and technological integration. Logistical integration refers to tactical activities and explicit knowledge exchanged – for example through IT systems – aimed to improve logistical management. Technological integration, in contrast, refers to more strategic activities such as product development, process reengineering and technical training, and tacit knowledge creation between exchange partners – for example through close and intense cooperation.

Vickery et al. (2003) identify two major components of an integrated supply chain strategy: integrative information technologies and supply chain integration, with the former being modelled as antecedent to integration. This construct of information technology integration comes close to Frohlich & Westbrook's (2001) approach and was measured by integrated electronic data interchange, integrated information systems, and computerized production systems. Integration on the other side captures the "practices" that foster vertical linkages among members in the supply chain and horizontal linkages among entities within the firm, for instance by supplier partnering (described as "bringing all of the participants in the product life cycle into the process early on so even suppliers and customers can provide input to each others' processes", p. 536), closer customer relationships, and cross-functional teams. This construct, thus, comes closer to the more relational construct of integration.

Sanders (2005) uses a similar mixed approach and distinguishes between technology and integration with the former as an antecedent of the latter. Buyer-supplier IT alignment is measured by alignment of applications used in transaction processing, alignment of applications used in operations, and alignment of applications used for communication. Buyer-supplier integration is described as coordinating activities throughout the network of buyers and suppliers and was measured by partnering with buyer, cross-functional teams with buyer, and collaborative planning with buyer.

Li, Rao, Ragu-Nathan, & Ragu-Nathan (2005) conceptualized six dimensions of "SCM practices" that are important for effectively managing a supply chain: strategic supplier partnership, customer relationship, information sharing, information quality, internal lean practices, and postponement, measured by 25 items. A closer look on the items, however, reveals again that some items refer more to the technical exchange of explicit information ("We and our trading partners exchange information that helps establishment of business planning") while others imply a more tacit dimension ("We include our key suppliers in our planning and goal-setting activities").

A similar phenomenon can be found at Lee, Kwon, & Severance (2007), for instance "Our company shares product information with customers electronically" and "Our company involves suppliers during the design stage for our new products", and Flynn, Huo, & Zhao (2009) with "Our major customer shares demand forecast with us" and "The frequency of period contacts with our major customer."

Summary and development of constructs

Heterogeneous as the literature on supply chain integration is, two dimensions of integration seem to be emerging common to most of the extant studies: The first dimension refers to the

integration of systems and infrastructures of supply chain members in order to allow mutual sharing of explicit information. This type of integration allows for better decision making based on better information and efficiency-optimized processes based on aligned information flows and may be called *systems integration*.

The second dimension of integration refers to the integration of collaborative processes, human interaction, and relations in order to develop tacit knowledge, routines, and trust. This type of integration may allow for developing competitive advantage by a valuable and hard-to-imitate (Barney, 1991) culture and for an aligned strategy management and may be achieved for instance through common planning, strategic interaction, mutual training and shared thinking. It may be called *relational* or *cultural integration[2]* and occur through the frequency, depth, and strategic level of interaction. Frequent interaction between supply chain members (or their respective teams) allows for the development of mutual trust and knowledge. A similar effect can be expected if two supply chain members share in depth knowledge such as knowledge created when both sides are involved in product development processes. Finally, cooperation on a higher hierarchical process and organizational levels can also be expected to nurture the development of trust, for instance the involvement of supply chain members in strategic decision making processes. Table 1 provides an overview of the literature explored and the respective supply chain integration constructs.

TABLE 1: EXTERNAL INTEGRATION CONSTRUCTS IN LITERATURE

Reference	Systems integration	Cultural integration
Handfield & Nichols (1999)	coordination of activities throughout the networks of buyers and suppliers	
Flynn & Flynn (1999)	information-processing model	
Feeny (2001)	inventory planning, demand forecasting, order scheduling	customer relationship management
Frolich and Westbrook (2001)	**Supplier and customer side** • access to planning systems, • sharing production plans, • joint EDI access/networks, • knowledge of inventory mix/levels, • packaging customization, • delivery frequencies, • common logistical equipment/containers, • common use of third-party logistics	
Vachon (2003)	**Logistical integration** tactical activities and explicit knowledge exchanged	**Technological integration** • more strategic activities • tacit knowledge creation between exchange partners
Rosenzweig et al. (2003)		**Integration intensity** • How integrated is your business unit's supply chain? • integrated closely with your own organization

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[2] Cultural integration may be seen as an extreme case of relational integration when the collaborative character of dyadic relationships between human beings is extended to the organization as a whole.

		• integrated closely with raw material suppliers • integrated closely with distributors/retailers • integrated closely with customers
Vickery et al. (2003)	**Integrative information technologies** • Integrated electronic data interchange • Integrated information systems • Computerized production systems	**Supply chain integration** • Supplier partnering • Closer customer relationships • Cross-functional teams

Reference	Systems integration	Cultural integration
Sanders (2005)	**Buyer-supplier IT alignment** • alignment of applications used in transaction processing, • alignment of applications used in operations, • alignment of applications used for communication.	**Buyer-supplier integration** • Partnering with buyer • Cross-functional teams with buyer • Collaborative planning with buyer
Li, Rao, Ragu-Nathan, & Ragu-Nathan (2005)	**Customer relationship (CR)** • CR1* We frequently evaluate the formal and informal complaints of our customers • CR3* We have frequent follow-up with our customers for quality/service feedback • CR4 We frequently measure and evaluate customer satisfaction • CR5 We frequently determine future customer expectations • CR6 We facilitate customers' ability to seek assistance from us • CR8 We periodically evaluate the importance of our relationship with our customers **Information sharing (IS)** • IS6 We and our trading partners exchange information that helps establishment of business planning **Information quality (IQ)** • IQ1 Information exchange between our trading partners and us is timely • IQ2 Information exchange between our trading partners and us is accurate • IQ3 Information exchange between our trading partners and us is complete • IQ4 Information exchange between our trading partners and us is adequate • IQ5 Information exchange between our trading partners and us is reliable	**Strategic supplier partnership (SSP)** • SSP1* We rely on a few dependable suppliers • SSP2* We rely on a few high quality suppliers • SSP3 We consider quality as our number one criterion in selecting suppliers • SSP4* We strive to establish long-term relationship with our suppliers • SSP5 We regularly solve problems jointly with our suppliers • SSP6 We have helped our suppliers to improve their product quality • SSP7 We have continuous improvement programs that include our key suppliers • SSP8 We include our key suppliers in our planning and goal-setting activities • SSP9 We actively involve our key suppliers in new product development processes • SSP10* We certify our suppliers for quality **Customer relationship (CR)** • CR2 We frequently interact with customers to set reliability, responsiveness, and other

Internal lean practices (ILP) • ILP1 Our firm reduces set-up time • ILP2 Our firm has continuous quality improvement program • ILP3 Our firm uses a ''Pull'' production system • ILP4 Our firm pushes suppliers for shorter lead-times • ILP5 Our firm streamlines ordering, receiving and other paperwork from suppliers	standards for us • CR7* We share a sense of fair play with our customers

Reference	Systems integration	Cultural integration
Li, Rao, Ragu-Nathan, & Ragu-Nathan (2005) continued	**Postponement (POS)** • POS1 Our products are designed for modular assembly • POS2* Our production process modules can be re-arranged so that customization can be carried out later at distribution centers • POS3 We delay final product assembly activities until customer orders have actually been received • POS4 We delay final product assembly activities until the last possible position (or nearest to customers) in the supply chain POS5* Our goods are stored at appropriate distribution points close to the customers in the supply chain	**Information sharing (IS)** • IS1* We share our business units' proprietary information with trading partners • IS2 We inform trading partners in advance of changing needs • IS3 Our trading partners share proprietary information with us • IS4 Our trading partners keep us fully informed about issues that affect our business • IS5 Our trading partners share business knowledge of core business processes with us • IS7 We and our trading partners keep each other informed about events or changes that may affect the other partners
Lee, Kwon, & Severance (2007)	**Customer linkage variable (CUL)** • C1: Our company shares product information with • customers electronically. • C2: Our company accepts customer orders electronically. • C4: Our company has an order placing system that is fast • and easy to access. • C5: Our company shares order status with customers • during order scheduling. • C6: Our company shares order status with customers • during product manufacturing. • C7: Our company shares order status with customers	**Customer linkage variable (CUL)** • C3: Our company interacts with customers to forecast demand. **Supplier linkage variable (SUL)** • S1: Our company has strategic linkages with suppliers in • our supply chain. • S2: Our company involves suppliers during the design • stage for our new products. • S3: Our company involves suppliers in production planning and inventory management.

• during product delivery **Supplier linkage variable (SUL)** • S4: Our company has a rapid response ordering processing • system with our suppliers. • S5: Our company has a supplier network that assures • reliable delivery. • S6: Our company uses information technology well to • exchange information with suppliers.	

Reference	Systems integration	Cultural integration
Flynn, Huo, & Zhao (2009)	**Customer** • The level of linkage with our major customer through information networks. • The level of computerization for our major customer's ordering. • The level of sharing of market information from our major customer. • The establishment of quick ordering systems with our major customer. • Our major customer shares Point of Sales (POS) information with us. • Our major customer shares demand forecast with us. • We share our available inventory with our major customer. • Follow-up with our major customer for feedback. **Supplier** • The level of information exchange with our major supplier through information networks. • The establishment of quick ordering systems with our major supplier.	**Customer** • The frequency of period contacts with our major customer. • The level of communication with our major customer. **Supplier** • The level of strategic partnership with our major supplier. • The participation level of our major supplier in the process of procurement and production. • The participation level of our major supplier in the design stage. • We help our major supplier to improve its process to better meet our needs.

	- Stable procurement through network with our major supplier. - Our major supplier shares their production schedule with us. - Our major supplier shares their production capacity with us. - Our major supplier shares available inventory with us. - We share our production plans with our major supplier. - We share our demand forecasts with our major supplier. - We share our inventory levels with our major supplier.	

Research Approach

Even though a two-dimensional construct of SC integration within the research on manufacturing industries could be extracted, it is by far uncertain to what extent this construct could be applied within service industries or to what extent service industries follow their own rules of integration. Given the newness of our research topic, an explanatory qualitative research methodological design in the form of action research (Checkland and Howell, 1998; Eden and Huxham 1996; Lewin, 1946) was employed. The action context developed in this paper involves 10 years of business experience within the German career service company E-FELLOWS.NET and with partner companies that use E-FELLOWS.NET as a platform for employer branding and for the recruiting of graduates as well as with students who use E-FELLOWS.NET as an information and contact platform.

E-FELLOWS.NET provides career information to registered students through a career website, mailings, publications and events, and acts as an intermediary platform between the students and the partner companies. The students join the network in order to receive information and network advantages through a mentoring program with partner companies, invitations to career events, or the participation in a social community similar to Facebook where they can interact with each other, E-FELLOWS.NET and the partner companies.

The partner companies have several tools to access their target groups through E-FELLOWS.NET even beyond the publication of a specific position. For example, they may engage in online expert panel discussions, mentoring services, or career events. Most importantly, however, they interact with a key account manager at E-FELLOWS.NET who channels the specific HR-needs of the company such that ideally the respective target groups receive the appropriate information from the partner company.

More details about E-FELLOWS.NET are provided below. The important point is that E-FELLOWS.NET offers many integration-providing tools both to employers and to career-interested students and job-seeking graduates. E-FELLOWS.NET, thus, is very useful as social context for an action research design.

Data collection

Data was collected from the knowledge of the author of this paper who worked for E-FELLOWS.NET for more than 10 years, as well as from archival data of E-FELLOWS.NET such as surveys conducted with students about their satisfaction with E-FELLOWS.NET. As a next step for refining the paper, interviews with E-FELLOWS.NET employees (especially from key account managers who closely work together with clients,), clients (that is companies who use E-FELLOWS.NET to staff their positions or workshops), and students (who are registered on the E-FELLOWS.NET website and use the company's career services, for example newsletters, mentoring programs, or direct invitations for workshops), are planned.

Data Analysis

A key feature of E-FELLOWS.NET is the way it collects and administers explicit information about the students. Students not only register with their basic data (name, email, semester, academic area, university, age) but also have the opportunity to apply for a specific talent program exclusively provided from E-FELLOWS.NET for high calibre students who belong to the best 10% of their academic cohort. Once selected for the talent program, the students not only have a record for their CV but also receive a bunch of benefits such as free newspapers, free access to databases, and specific career information such as employer events exclusively designed for them.

In order to become selected for the talent program, the students apply by going through a double-step process: First, they provide their detailed resume through an online-mask to E-FELLOWS.NET and, second, they send their documents and certificates for approval of the online-data to the network once they are accepted. This process is repeated every year such that every talent student needs to update his or her online-CV every 12 months and verify the CV changes by handing in the approving documents.

E-FELLOWS.NET, thus, administers more than 20,000 highly updated and credible resumes of top-10% students and of course disposes of several tools such as statistical or data managing software to pre-select a specific sub-group of the overall pool and access this subgroup through emails. Because a key feature of systems integration, as developed in the previous part of this study, is the provision of accurateness of data, this process signals a **status of high downstream systems integration** between E-FELLOWS.NET and the students.

E-FELLOWS.NET does not only collect explicit information from the students but also a tacit understanding on their information, career, and communication preferences. This has to do with a two-way interaction. On the one side, E-FELLOWS.NET communicates to the students through the website, newsletters, mailings, or at events. On the other side, also the students communicate to E-FELLOWS.NET by interacting with its employees on the phone or through emails for requests on any kind of issues such as the students' member status, their CVs, or the benefits included in the talent program.

The most important tool for E-FELLOWS.NET to collect information about the students beyond the explicit online-CV, however, is feedback tools and surveys. Any product, whether it is a career book sent to the students for free, a career event such as discussion panels with companies, or other benefits offered to the students within the talent program, is evaluated by the students by online-feedback provision. In addition, E-FELLOWS.NET implements several detailed surveys per year, for example about the satisfaction with E-FELLOWS.NET, information preferences, and employer reputation. By this continuous interaction, E-FELLOWS.NET gathers an understanding of the students' information needs, career preferences, and communication style that goes beyond the pure explicit information gathered through online tools and may be characterized as tacit knowledge. The two-way process includes also that E-FELLOWS.NET adjusts its communication and career or service offers continuously according to the students' preferences so that the relationship between E-FELLOWS.NET and the students also reflects a **high level of downstream (relational or) cultural integration**.

Upstream clients of E-FELLOWS.NET are the partner organization, primarily global players from several industries such as professional services (consulting, accounting, finance, and law), telecommunication, media, pharmaceuticals, travel and manufacturing industries. The companies engage financially in E-FELLOWS.NET for employer branding and the purpose of recruiting high potential students for internships, trainee programs, and jobs.

E-FELLOWS.NET serves the partner companies in two directions. First, it transfers the explicit information of the partners' offers to the students. And, second, it provides the partners with incoming applications from the students for the offers. For example, a partner company transfers a job description to E-FELLOWS.NET, which after a period of promoting this job offer in the students' pool transfers the applications for this job to the partner company. Sometimes it also pre-selects the best applications according to the partner company's criteria and forwards only those applications with the greatest match.

The partner companies have the opportunity to align their IT-infrastructure with that of E-FELLOWS.NET such that jobs published on the partner's website automatically are published on E-FELLOWS.NET's website and in its "look & feel". Not every company uses this service, but the opportunity exists. If they do not use the platform, they transfer the information via email to the key account manager of E-FELLOWS.NET, who makes sure that the respective position is processed further, for example publishing it on E-FELLOWS.NET's website or promoting it through the weekly job-newsletter or by a direct-mailing to a selected group of students. In addition, E-FELLOWS.NET collects and manages incoming applications from candidates such that it checks the resumes for completeness or transfers only the most promising applications to the partner.

By this double-way process – explicit information from the partners to E-FELLOWS.NET and vice versa - E-FELLOWS.NET makes sure that the explicit information of each partner company is published most accurately and that the partner company receives the necessary information from E-FELLOWS.NET most accurately. Moreover, E-FELLOWS.NET provides the partner companies with information about the students beyond applications, for example survey results about career and employer preferences of the students or feedbacks from the students about partner events. Hence, we may characterize the relationship by a **high degree of upstream systems integration**.

Relational or cultural supply chain integration was found in the extant literature as referring to the degree of tacit knowledge exchanged and mutually developed by supply chain members. In our study, upstream cultural integration can be proxied by the degree of E-FELLOWS.NET's understanding of the partner companies' HR preferences and the degree of tacit information about the students' career preferences communicated to the partner companies by E-FELLOWS.NET.

To achieve a high level of integration, each partner organization has a key account manager at E-FELLOWS.NET and has one person within the HR department who is responsible for the cooperation with E-FELLOWS.NET. This one-to-one contact is the basis for a continuous every day cooperation as it involves an intense interactions via email or by phone, mutual trust, and common problem solving throughout the year. The topics of this interaction includes, for example, which positions should be promoted through E-FELLOWS.NET, could further employees of the partner involved in the mentoring program of E-FELLOWS.NET, which managers of the partner should be involved in interviews or testimonials, what kind of

workshops of the partner with students could be designed and when and where should they be organized?

At the beginning of every year, these two people also prepare the yearly strategy workshop. The workshop is a one day workshop between E-FELLOWS.NET and the partner company where the communication strategy of E-FELLOWS.NET towards the students with is developed - for example, how many career workshops between the partner and selected students are organized; is the focus of the partner more on employer branding or on recruiting; should E-FELLOWS.NET highlight a specific division of the partner, which needs a bit more promotion in order to incur applications?

In addition to the ongoing close interaction and the yearly strategy workshop, other exchanges are made, for example irregular meetings or mutual visits with representatives from both sides to get to know each other better or discuss short-term issues for the next months. Once a year, all partner companies are also invited to a network meeting organized by E-FELLOWS.NET at one of the partner's offices where lecture about new trends in the HR market are held and everybody can exchange with each other. Overall, a lot of effort is invested by E-FELLOWS.NET to better understand the specific culture, needs, and strategies of the partner companies, to serve the partners with the best possible information about the students even beyond explicit resume knowledge, and to build trust and a reputation as reliable and professional partner. Hence, we can describe the relationship by a **high degree of upstream cultural integration**.

By providing the students relevant explicit information from the partner companies and by providing the partner companies with explicit information from the students, E-FELLOWS.NET establishes a high level of systems integration over the whole supply chain. Moreover, by close interaction with both supply chain members beyond the exchange of explicit information, E-FELLOWS.NET established also a high level of cultural integration over the supply chain. By this, E-FELLOWS.NET always served as a mediating service provider between upstream and downstream members.

Additionally, E-FELLOWS.NET's social community and the mentoring program also offer a platform for directly bringing students and partner companies into contact without the interaction of the carer network. The social community is an online-platform similar to Facebook or Linkedin, where only students form the talent pool and partner representatives have access and can interact with each other. Sometimes E-FELLOWS.NET supports both sides to get into contact, for example by online discussions to specific career topics in the community, but both sides can get interact also independently with each other.

Furthermore, E-FELLOWS.NET offers partner employees the opportunity to become mentors in the network and support pre-selected students during their studies. The contact is established online but can lead into phone interaction or face-to-face meetings. Once the connection between the mentor and his or her mentee is established, the information exchange and ongoing interaction is totally up to them and not influenced by E-FELLOWS.NET.

Both, the community and the mentoring system allows the two parties to get a broader base for exchanging explicit and tacit information – and eventually whether both sides find together within an working environment or not. By this, hence, E-FELLOWS.NET directly increases the **systems** and **cultural integration** between candidates and employers and hence **over the whole supply chain**.

The Model

My research question is to which extent the concept of supply chain integration and particularly the two dimensions of systems and cultural integration can be transferred from the manufacturing industries to the HR-service industry. In order to attract high potential future employers such as university graduates, organizations often cooperate with professional HR-service providers (in the following: HR-firms) such as job-platforms (e.g., Monster or Stepstone), career event organizations, or head-hunters. Employers communicate information about HR-products such as jobs, trainee-programs or internships downstream to an HR-firm, who transfer this information further downstream to potential future employees. The HR-firm may also transfer information from the potential candidates, collected for example through market surveys, upstream to the employer. Figure 1 shows the supply chain and the respective flows. And of course there may also be direct information flows between job candidates and employers without the intermediary HR-service firm.

Figure 1

Downstream information flow

Employer ⟷ HR-service firm ⟷ Job candidates

Upstream information flow
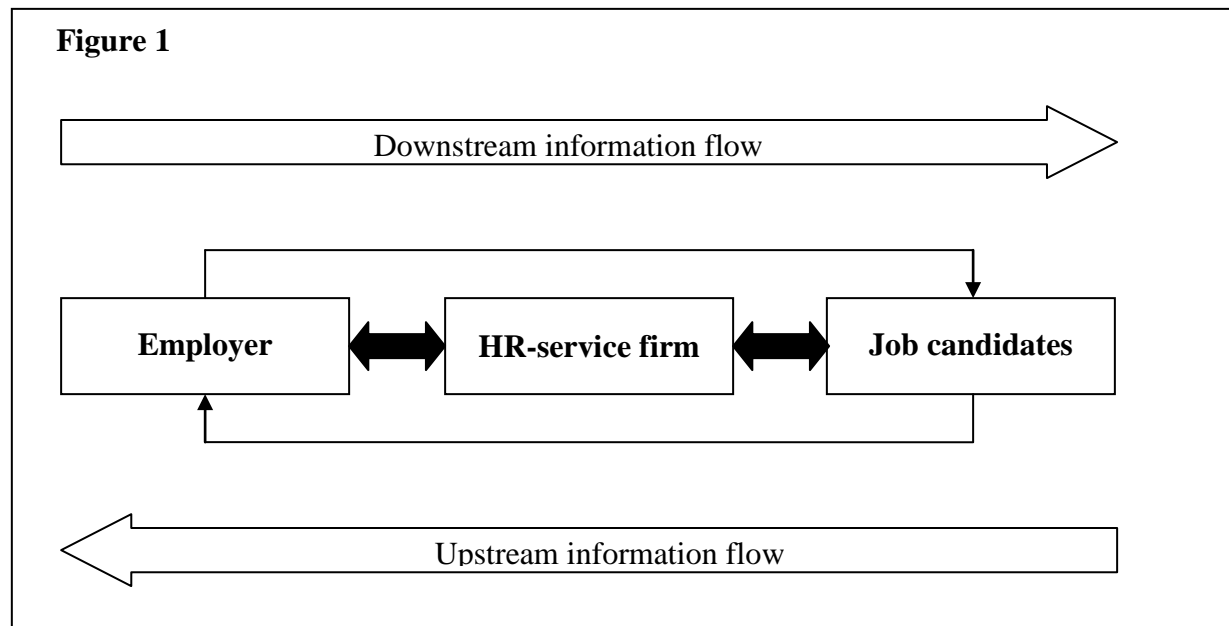
Employers, especially in knowledge-oriented and dynamic industries, are continually scanning the labor market for potential future employees (candidates) applying two kinds of HR-strategies. Whereas *recruiting* includes the attraction and recruitment of candidates for specific positions, *employer branding* refers to general promotion activities of an organization as attractive employer (e.g., Berthon, Ewing, & Hah, 2005; Moroko & Uncles, 2008). Effective employer branding by creating a positive image of an organization as great place to work can support the recruitment process. HR-strategies including recruiting and employer branding activities can be explored along the supply chain.

In this study an action research approach was applied at a major German HR-service firm that acts as an intermediary between employers and job candidates. Within my inductive approach I found support for the notion that SC integration constructs developed within research on manufacturing industries may also be applied in the HR-service industry. In this section, I develop a model for members of SC in the HR-service industry as a first step in understanding

SC processes in service industries in general and with the purpose to provide a conceptual solution for the HR challenges employers face during the next decade.

1. Employer-candidate integration

In HR-service industry SC, the employer has not only a specific position or a specific workplace to offer. He also searches for a specific people profile in the labor market that matches the requirements of the job offered. The employer, for example, may want to promote his HR-products only to a specific group of engineering graduates with top-10% grades. On the other side, also the potential candidates have an interest in receiving explicit information about potential employers, for example the job description or about the number of employees, career development, or internationality. Hence, before signing the contract both parties have a need to receive explicit information about each other. Following the terminology of integration in manufacturing industries, I call efforts of providing mutual and accurate representation of explicit information **systems integration**.

Systems integration between potentials candidates and employers can be assumed to lead to a higher quality of the applications compared to a situation when companies communicate their HR-products to people who do not fulfil their requirements and to potential candidates who look for different employers.

> *Proposition 1a: Systems integration between the employer and the potential candidates before working together is positively correlated with the quality of the applications (e.g., the fit of the candidate's profile and the offered position quality of the applications).*
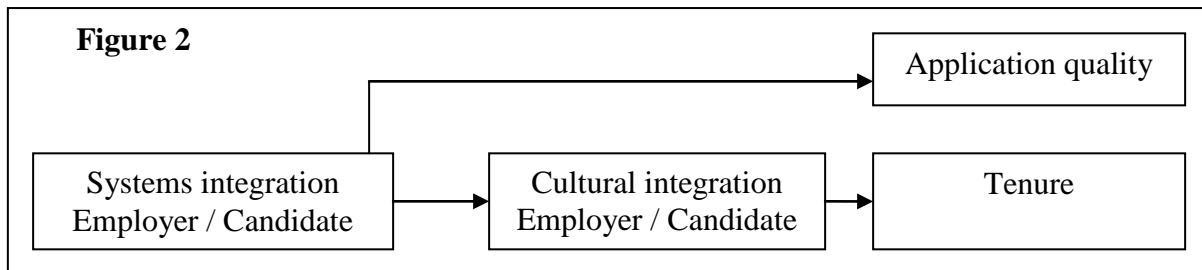
Moreover, employers may have more interests than only knowing the explicit information about the candidates. Assessment centers, for example, reflect the desire of organizations to understand better whether the person has specific skills or capabilities not reflected in the CV. Several job-talks with people from different departments refer to the employer's interest in getting to know whether the candidate fits, for example to the organizational culture.

On the other side, also the candidate may have has specific needs and preferences in terms of his or her job and employer expectations. For example, he or she may be interested in how the potential work environment looks like, cultural issues, or interest in potential future employees. I call efforts of aligning mutual tacit preferences and the creation of mutual understanding between employer and job candidates activities of **cultural integration**. More cultural integration before signing the contract may lead to a better fit between both side's tacit preferences and therefore to more satisfaction with each other once the candidate is in the job.

> *Proposition 1b: Cultural integration between the employer and the potential candidates before working together is positively correlated with the tenure of the candidate later in the organization.*

Furthermore, systems integration may be seen as an antecedent of cultural integration as without explicit information about each other it will be difficult, for example, to better understand each other's strategies. Hence:

Proposition 1c: Cultural integration mediates the relationship between systems integration and tenure.

Figure 2

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                                                    ┌─────────────────────┐
                                           ┌───────→│ Application quality │
                                           │        └─────────────────────┘
┌─────────────────────┐       ┌─────────────────────┐       ┌─────────────────────┐
│ Systems integration │──────→│ Cultural integration│──────→│       Tenure        │
│ Employer / Candidate│       │ Employer / Candidate│       │                     │
└─────────────────────┘       └─────────────────────┘       └─────────────────────┘
```

2. Employer-HR-firm integration

Very often employers use the service of external HR-service firms (in the following: HR firms). A career fair, for example, may be visited to meet candidates personally or a job-platform in the internet may be used to make job descriptions accessible. Even the advertisement service of newspapers may be considered as an HR-service since it is used to communicate and promote a specific position or create a specific employer image among the readers. Similar, TV channels may be used to position an organization as attractive employer.

Once a HR-firm is included as an intermediary in the employer-candidate-relationship, however, part of the match success described in the previous paragraph depends on precisely this third party. The more explicit information about the HR-product (e.g., job) the HR-firm has and the more accurate this information is (e.g., how up-to-date the information is), the higher the likelihood that the service firm transfers this information accurately to the candidate. In other words, the higher the **systems integration** between the HR-firm and the employer, the higher the overall systems integration between the employer and the candidate.

Proposition 2a: Systems integration between a HR-firm and the employer is positively correlated with the system integration between the employer and a candidate.

Moreover, the employer may not only have the interest to provide accurate information through the HR-firm to the candidate but also to access those candidates that match the target criteria of the employee. Communicating an engineering trainee position to thousands of humanities graduates, for example, may both waste resources such as fees for the HR-firm and may bother this workforce by sending them information not valuable for them. Because these people, however, may also be potential product customers with buying power a continuous communication of the wrong information to these people may not be in the interest of the employer.

If the HR-firm, however, is able to tailor its communication of the respective position to the accurate target group then the likelihood of a match between the employer's and the candidate's interests increases. Furthermore, it can be assumed that the better the HR-firm understands the HR-strategy of the employer the better she will be able to create this match. For example, if a newspaper only receives a job advertisement and publishes it, it may be less

effective than a job-platform that not only matches a job profile with the CVs of candidates but also knows more about the HR-preferences of that employer and actively searches for adequate people by using keywords beyond the pure job description. We may call this employer-HR-firm alignment of strategic understanding beyond the explicit knowledge **cultural integration**. Hence, we can assume that the higher the cultural integration between an employer and an HR-firm, the higher the cultural integration between the employer and the candidates.

> *Proposition 2b: Cultural integration between a HR-firm and the employer is positively correlated with cultural integration between the employer and a candidate.*

Furthermore, systems integration of the HR-firm and the employer may be seen as an antecedent of cultural integration as without explicit information about each other it will be difficult, for example, to better understand of each other's strategies. Hence:

> *Proposition 2c: Cultural integration of the HR-firm and the employer mediates the relationship between systems integration of the HR-firm and the employer on the one side and cultural integration of the employer and the candidate on the other.*

Figure 3
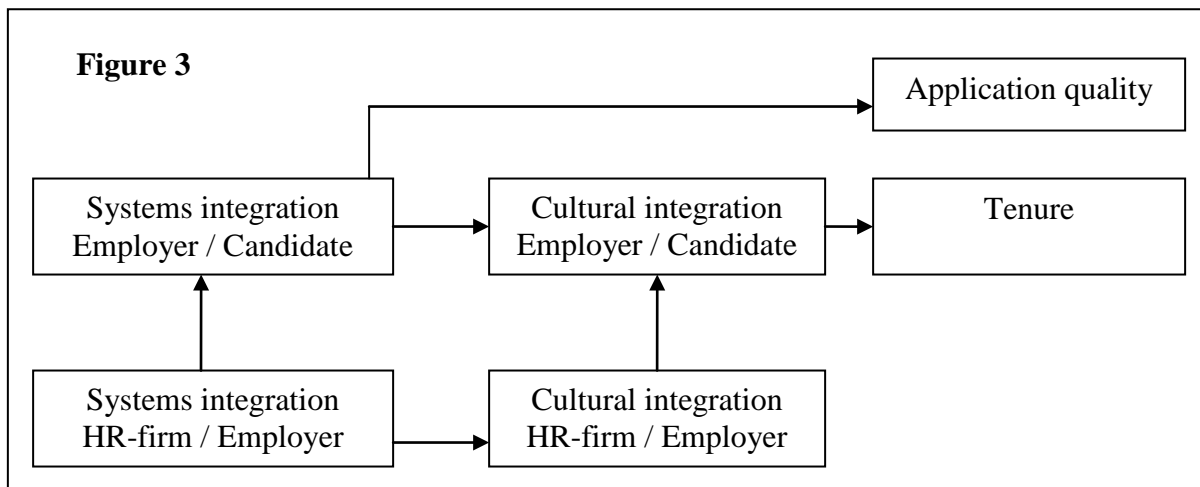
3. HR-firm– candidate integration level

We have hypothesized that strong system and cultural integration between an employer and a HR-firm may contribute to higher system and Cultural integration between the employer and the candidate. However, this will only be the case if the HR-firm manages to develop high system and cultural integration levels with the candidate as well.

If the HR-firm, for example, is systems-integrated with the employer such that she receives up-to-date, clear, and comprehensive explicit information about a specific position but fails to deliver this information in time or fully to the candidates the overall integration between the employer and the candidate will suffer. Hence:

> *Proposition 3a: Systems integration between a HR-firm and the candidate is positively correlated with systems integration between the employer and a candidate.*

However, communicating the explicit information adequately to candidates does not mean automatically that this information reaches the target audience of the employer as we described already using the example of the humanities graduates. In contrast, if a job-platform matches the position profile with the candidate resumes, when a newspaper publishes the advertisement in a special edition with engineering content only (to stay in our example from above), or when the organizer of a job fair pre-selects the participants or pre-matches them with the employer, then the overall match between the candidate and the employer's product will be achieved. Therefore, high cultural integration between the HR-firm and the candidate may lead to high cultural integration between the employer and the candidate.

> *Proposition 3b: Cultural integration between a HR-firm and the candidate is positively correlated with cultural integration between the employer and a candidate.*

Furthermore, systems integration between the HR-firm and the candidate may be seen as an antecedent of cultural integration as without explicit information about each other it will be difficult, for example, to better understand each other's tacit information such as the career preferences of the candidate or the level of credibility HR-firm. Hence:

> *Proposition 3c: Cultural integration of the HR-firm and the candidate mediates the relationship between system integration of the HR-firm and the candidate on the one side and cultural integration of the employer and the candidate on the other.*

Finally, some HR-firms may also offer services that directly bring candidates and employers together and allow them to interact within the interface of the HR-firm. For example, a firm that organizes career events brings the two sides together at the stand or within a firm presentation or interview. An HR-firm that organizes workshops such as consulting or accounting workshops with students and employers establishes an interaction between the two sides in the context of the career firm. An HR-firm may also bring them together within an online interface such as a social network. This interaction before an actual job talk contributes to the mutual exchange of both explicit information, for example mutually presenting each other, and tacit information, for example by working together within a workshop, this interaction provision within the infrastructure of the HR-firm can be assumed to directly enhance system and cultural integration
.

> *Proposition 4: A platform infrastructure of the HR-firm for direct interaction of candidates and employers is positively correlated with systems and cultural integration between the employer and a candidate.*

Figure 4: Final model
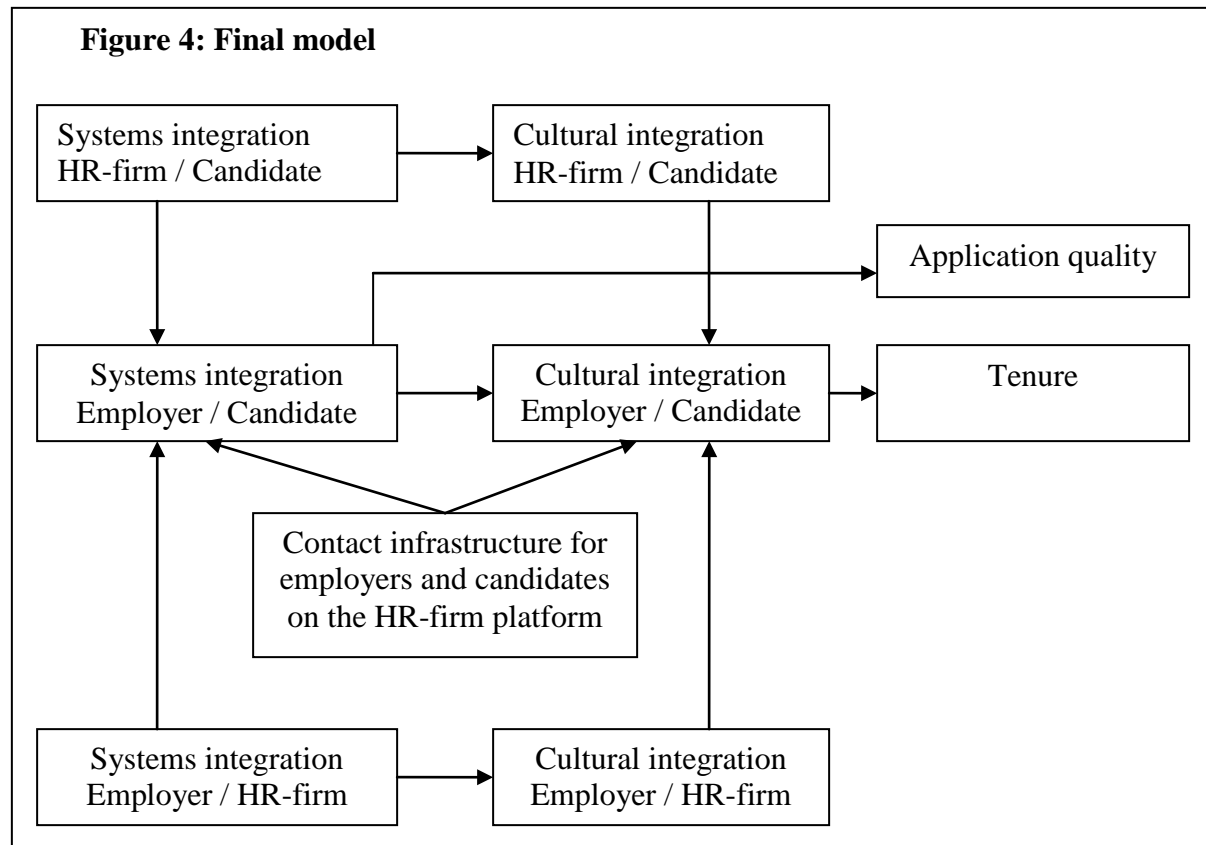
Summary and Future Research

In this study I have developed a model for SC integration in the HR-service industry. It includes two dimensions of SC integration that are also found in research on manufacturing SC and suggests that systems and cultural integration may be used both to structure the SC in HR-service industries and to analyze performance heterogeneity among firms.

However, a model developed within an inductive approach lacks external validity and needs to be tested among a greater sample, for example among several HR-service firms with different profiles of integration. The model would find proof, for instance, if we find that clients of HR-service firms with high levels of systems and cultural integration achieve better performance results than clients with lower integration levels.

The two dimensions of the integration, for example, could be assed by a survey among HR-departments who work together with HR-service companies. For the construct "systems integration" (which may be defined by the degree to which explicit information is exchanged), items for measuring may need to include questions such as "To what extent do you receive explicit information about the students from the HR-service company?" or "How often do you provide the HR-service company with explicit information about jobs or your company?". On the other hand, "cultural integration" (which may be defined by the extent of tacit information exchanged) may be measured by items such as "How much did the HR-service company help you in understanding the students' career preferences?" or "To what degree do you perceive the HR-service company to understand your company' HR-strategy as well as the company's culture?". A survey should also be done among students (e.g., "How much explicit information

about employers do you have received from the HR-service company?") and employees of the HR-service company. To triangulate the results also archival data such as employer branding surveys conducted within the network about the reputation of partner firms should be included. By the testing the model, future research could contribute to the external validity of the model and further deepen our understanding of SC in the HR-service industry.

Implications

Overall, this research contributes to the field of supply chain management research in that it offers new insights in the underexplored topic if service supply chains. Given the expected challenge for organizations in developed countries to recruit qualified employees, as already forecasted for Germany, until 2020 (McKinsey, 2010) the model developed in this study may have serious implications also for practitioners, especially HR-managers, and the HR-strategy of firms. If future studies provide empirical support for our model, the dimensions of systems and cultural integration among all members of the supply chain (employer-candidates, employer-HR-service firm, and HR-service firm-candidates) may offer a valuable tool of HR-managers to evaluate and finally adjust their relationships to HR-service firms and candidates so that an optimal performance is achieved. The results than may be of similar importance for HR-service firms whose success depends on the success of their clients in recruiting apt candidates.

In addition, the appliance of this model of SC integration may also be extended from the HR-service industry to other service industries. For example, it may be possible that banks as intermediaries between companies who sell shares and clients who buy shares perform better the more integrated upstream (companies) and downstream (clients) supply chain members are along the systems and the cultural dimension. Similarly, it may be interesting to explore whether travel agencies perform better the more integrated their processes upstream towards hotels and downstream towards clients are. With my inductive study, I hope to set the first step towards this new direction for future research.

Literature

Barney, J. (1991). FIRM RESOURCES AND SUSTAINED COMPETITIVE ADVANTAGE. *Journal of Management*, 17(1): 99-120.

Berthon, P., Ewing, M., and Hah, L. L. (2005). Captivating company: dimensions of attractiveness in employer branding. *International Journal of Advertising*, 24(2): 151-172.

Chambers, E.G., Foulon, F., Handfield-Jones, H., Hankin, S.H., and Michaels III, E.G. (1998). The War for Talent, *The McKinsey Quarterly*, Number 3: 44-57.

Checkland, P. and Howell, S. (1998). Action Research: Its Nature and Validity. *Systemic Practice and Action Research*, 11(1): 9-21.

DE JONG, B., and ELFRING, T. (2010). HOW DOES TRUST AFFECT THE PERFORMANCE OF ONGOING TEAMS? THE MEDIATING ROLE OF REFLEXIVITY, MONITORING, AND EFFORT. *Academy of Management Journal*, *53*(3): 535-549.

Eden, C. and Huxham, C. (1996). Action Research for Management Research. *British Journal of Management*, 7: 75-86.

Feeny, D. (2001). Making business sense of the e-opportunity. *MIT Sloan Management Review*, 42(2): 41-51.

Flynn B. and Flynn J. (1999). Information-processing alternatives for coping with manufacturing environment complexity. *Decision Sciences* 17 (3): 249-169.

Flynn, B. B., Huo, B. F., and Zhao, X. D. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28(1): 58-71.

Frohlich, M. T. and Westbrook, R. (2001). Arcs of integration: an international study of supply chain strategies. *Journal of Operations Management*, 19(2): 185-200.

Gupta, S., Verma, R., and Victorino, L. (2006). Empirical Research Published in Production and Operations Management (1992-2005): Trends and Future Research Directions, *Production and Operations Management*, 15 (3): 432-448.

Handfield R.B., and Nichols, E.L. 1999. *Introduction to Supply Chain Management*, Prentice-Hall, Upper Saddle River, NJ.

Johnson, J. L. (1999). Cultural integration in industrial distribution channels: Managing the interfirm relationship as a strategic asset. *Journal of the Academy of Marketing Science*, 27(1): 4-18.

Lee, C. W., Kwon, I. W. G., and Severance, D. (2007). Relationship between supply chain performance and degree of linkage among supplier, internal integration, and customer. *Supply Chain Management-an International Journal*, 12(6): 444-452.

Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues*, 2(4): 34-46.

Li, S. H., Rao, S. S., Ragu-Nathan, T. S., and Ragu-Nathan, B. (2005). Development and validation of a measurement instrument for studying supply chain management practices. *Journal of Operations Management*, 23(6): 618-641.

McKinsey & Company. 2010. Willkommen in der volatilen Welt, www.mckinsey.de/html/kompetenz/special_initiatives/volatile_welt/volatile_welt.asp

Moroko, L. & Uncles, M. D. 2008. Characteristics of successful employer brands. *Journal of Brand Management*, 16(3): 160-175.

Nelson, R. R. & Winter, S. 1982, *An Evolutionary Theory of Economic Change*, The Belknap Press of Harvard University, London.

Pagell, M. (2004). Understanding the factors that enable and inhibit the integration of operations, purchasing and logistics. *Journal of Operations Management*, 22(5): 459-487.

Polanyi, M. 1(966). The Tacit Dimension. Reprinted Peter Smith, Gloucester, Mass, 1983.

Rosenzweig, E. D., Roth, A. V., & Dean, J. W. 2003. The influence of an integration strategy on competitive capabilities and business performance: An exploratory study of consumer products manufacturers. *Journal of Operations Management*, 21(4): 437-456.

Sanders N.R. (2005). IT Alignment in Supply Chain Relationships: A Study of Supplier Benefits, *Journal of Supply Chain Management*, 41 (2): 4-13.

Stevens G.C. (1989). Integrating the supply chain. *International Journal of Physical Distribution and Materials Managament*, 19 (8): 3-8.

Vachon R. D., and Klassen S. (2001). Linking Supply Chain Environmental Management to System Performance: The Role of Complexity, *WORKING PAPER SERIES No. 2001-01. Richard Ivey School of Business*, The University of Western Ontario, London, Ontario.

Vickery, S. K., Jayaram, J., Droge, C., and Calantone, R. (2003). The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. *Journal of Operations Management*, 21(5): 523-5