3-5-2015

Organizational Boundary Spanning and Brokering as Business Innovation - An Empirical Analysis of a Software Development Company

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Abstract. Boundary-crossing individuals, either called “boundary spanners” or “brokers”, are important for facilitating knowledge sharing between internal organizational units and between companies and their external environment. While previous literature recommends strategizing and institutionalizing the use of such boundary-crossing individuals, it gives no specific recommendations or guidelines for how to do so. In this paper, we present findings from an extensive field study in a medium-sized software development company. We present the example of a dedicated organizational unit as a business innovation whose members act as both internal knowledge brokers between units and as boundary spanners between the dynamic, flexible environment and the non-flexible, more static world of the company. We analyze how and why this team became a success within the company, but we also show the downsides and problems related to this strategy and approach.

Keywords: Boundary Spanning, Brokering, Software Development.

1 Introduction

The dynamics at the knowledge boundaries between diverse occupational groups or communities of practice are an important area of current research [1]. This is especially true for the software industry. For example, it is now recognized that the development of software and information systems (IS) often has mixed outcomes in terms of success, which arises from a variety of technical, social, and political problems in working across knowledge boundaries [e.g., 2-4]. Since the pieces of knowledge that are required for the design of software and IS may reside with different stakeholders [5], knowledge sharing – the process through which knowledge is exchanged among stakeholders [1, 6] becomes a prerequisite for successful software and IS development.

However, the interplay of stakeholders, who work together, share knowledge, and interact across boundaries – activities that in the literature are called “boundary spanning” [7-9] or “brokering” [10, 11] – has not been investigated in much detail [1, 12].

12th International Conference on Wirtschaftsinformatik,
March 4-6 2015, Osnabrück, Germany

Rosenkranz, C.; Kautz, K. (2015): Organizational Boundary Spanning and Brokering as Business Innovation - An Empirical Analysis of a Software Development Company, in: Thomas. O.; Teuteberg, F. (Hrsg.): Proceedings der 12. Internationalen Tagung Wirtschaftsinformatik (WI 2015), Osnabrück, S. 1343-1359

We know from previous research on IS development projects that boundary-crossing individuals, either called "boundary spanners" [13, 14] or "brokers" [15] throughout the literature, pursue these activities and are important for facilitating knowledge sharing between departments and units of companies and between team members from different communities of practice. While previous literature recommends that managers should strategize the use of such boundary-crossing individuals, and institutionalize them in ongoing IS development projects, it gives no specific recommendations for this strategizing or for the appropriate choice and organizational structuring of these boundary-crossing individuals [16]. Moreover, teams in IS development projects often are only temporary, while organizations constantly change and evolve. This understanding gives rise to the question why we should only *temporarily* institutionalize boundary-crossing individuals (e.g., just for the duration of an IS development project). Could or should we not institutionalize them more permanently (e.g., as a "task force" or "competence center")? It is critical to better understand the effects, antecedents, and outcome effects of different approaches or strategies that try to leverage boundary-crossing individuals. If we can observe specific patterns, variations, drivers, or effects, this will have important implications for the design of effective approaches and strategies, and for the choice of adequate boundary-crossing individuals for ensuring the building of shared understanding and successful knowledge sharing. In this paper, we report from the results of an extensive field study. We explore the role of institutionalized boundary-crossing individuals within a medium-sized software development company for balancing between stability and flexibility. We present the example of a dedicated organizational unit as a business innovation (i.e., a novel structure and arrangement giving the company an increase in innovation capability and competitiveness) whose members act as both knowledge brokers and boundary spanners between the complex, flexible and agile environment (in the sense of "business agility") and the non-flexible, more static world of the company. We analyze how and why this team became a success within the company, but we also show the expenses and problems coming with this success, which may hinder other companies within a different context to replicate it. Our study has three contributions. First, we use the literature on boundary spanning and knowledge brokering to develop our own conceptual framework. Second, we develop an improved understanding of how boundary-crossing individuals can be institutionalized to provide a balancing mechanism between stability and flexibility. We thus investigate an integrated appearance of both boundary spanning and knowledge brokering, which has not been done to a large extent in the research community. Third, we show that the taken strategy comes at a cost in terms of increasing amounts of time spent for a variety of tasks, increasing the chance of workload overflow.

The remainder of the paper is structured as follows. The next section discusses the related work and theoretical background of our study. We introduce the concepts of boundary spanners and brokers, discuss their relationship to the challenges of software and IS development and frame our research with these concepts. We then present results from the exploratory study of a specialized unit within a software development company and develop an explanation of how this unit engages into boundary spanning and knowledge brokering, balancing flexibility and stability. We summarize and discuss our findings, and conclude with an indication of limitations and an outlook on further research.

2 Related Work and Theoretical Background

Increasingly, IS development and software development take place in dynamic and constantly changing situations and environments [17]. This underscores the demand of IS development and software development companies to also become more flexible and agile [18]. Enterprise or business agility is about the speed with which the organization can respond to customer requests, market dynamics, and emerging technology options, as well as being able to adapt to their environment [19]. Research on environmental turbulence has suggested that one important mechanism to cope with this complexity is boundary spanning, where companies establish boundary-spanning positions to manage interfaces between the organization and its environment [20-22].

2.1 Boundary Spanning and Boundary Spanners

The general topic of boundary spanning has a rich conceptual and empirical history within the organizational learning and social psychology domain [9, 22-25]. Seminal studies in organization theory on research and development projects [20-22] found that communication with the external environment under turbulent environmental conditions is not distributed evenly in teams, but takes place through a limited set of individuals. These boundary-spanning individuals link their subunits to external areas and serve to buffer their more locally oriented colleagues from environmental turbulence. The studies also show that high performing teams facing changing environments had significantly more boundary-spanning individuals than did high performing teams facing stable environments. These b*oundary spanners* are individuals that engage in boundary spanning activities towards other organizational entities than their own. Such individuals act as boundary spanners when they engage in boundary spanning activities [8, 9]. Boundary spanning activities include managing the coordination and knowledge transfer as well as the political maneuvering needed for the information sharing across the borders of an organization [25]. This involves specific *boundary-spanning activities* such as ambassadoring, coordinating, scouting, or guarding. These findings are confirmed by some studies in IS, which examine the role of boundary spanners in IS development projects [e.g., 14, 16].

2.2 Brokering and Brokers

In contrast to inter- and intra-organizational boundary spanning theories, theories of situated learning in communities of practice [26, 27] explain knowledge sharing within organizations using the term “brokering”. *Brokering* refers to activities of individuals that involve facilitating transactions and the sharing of knowledge between communities of practice across knowledge boundaries [15, 28, 29]. It “involves processes of translation, coordination, and alignment between perspectives” [27]. Brokering is especially needed at complex knowledge boundaries [30]. *Brokers* are defined as individuals, who participate in the work of multiple communities and facilitate knowledge sharing across the communities' boundaries by engaging into brokering [26]. In contrast to boundary spanners, who span the communities' borders from the inside of their communities, brokers may be weakly linked to several communities at once (and full members of none), strategically positioned to facilitate knowledge flow across communities [15, 28]. Brokers engage into specific *brokering practices* [15]. The investigation of brokers during IS development has led to the recognition of necessary skills that project participants need to possess to engage in brokering, and to the identification of role-specific brokering activities for IT professionals such as analysts or developers [e.g., 15].

3 Method and Research Design

Our strategy was to study a real case over a longer time period and in depth to develop an understanding and theoretical explanation of how boundary spanning and brokering enable business agility in the software industry, based on the empirical data collected. Single case studies are well-accepted in IS studies [31] because they allow researchers to develop a deep understanding of the phenomena related to the development of software and IS in their socially embedded and organizational contexts [32]. Our research design is exploratory in nature with the goal of investigating brokering and boundary spanning within IS development. Despite the problems inherent in the subjectivity of case studies, this approach is suitable for gaining new insights in under-researched areas by investigating IS in a real-life context [33]. As our intent was to develop a new understanding, we selected a *revelatory* case, that is, one that provided access to a phenomenon that was previously inaccessible to scientific investigation [31]. In conducting our single case study, we followed established guidelines for longitudinal case study research [33, 34]. As an appropriate case site, we sought an organization that had undergone a transformation towards a more flexible enterprise using agile software development methods. The chosen site was a new software development unit at a medium-sized German software solutions provider. For reasons of confidentiality, we name the firm *SoftCorp*. We consider the selected case site to be revelatory on at least two counts: First, the case organization was arguably successful in implementing more flexible business practices in a dynamic environment. Over the last three years, the number of sold licenses has increased by 80%, and the number of acquired big customers as well as customer satisfaction have steadily risen; the fiscal year 2012 was the most successful in the company history according to the annual report. Second, the transformation efforts from a start-up company to a more stable business span the whole company, that is, transformational decisions affected internal management as well as all operational processes.

The two main methods for data collection were interviews and observation. During a period of 9 months (October 2011 until June 2012), we visited the company three times for one to two days at each visit. During the visits, we conducted open interviews with selected key informants, group interviews, and field observations of activities. We conducted the interviews in German. All interviews, which lasted from 30 to 120 minutes, as well as those company meetings, which we observed, were audiorecorded and transcribed. (Note: all given quotes in the following sections have been translated by the authors.) In examining our data, we followed a two-stage process of inductive and deductive coding, building upon and adapting the recommendations by Miles and Huberman [34]. Inspired by previous work on boundary spanning [7, 24] and on brokering [15, 29], we searched for evidence of brokering practices and/or boundary spanning activities in relation to business agility. First, both authors scrutinized and coded the data independently of each other. We started with initial seed codes based on (a) boundary spanning activities (see [7, 24]) and (b) brokering practices (see [15, 29]). Each author also added new codes in exploring the data in more detail by coding events and activities that they found important (e.g., several new codes emerged related to "task variety" and "uncertainty/variability in processes"). Afterwards, both authors met in person or discussed their interpretation using e-mail and Skype.

4 Case Setting and Analysis

SoftCorp is a German software development company. The business was founded in 1999 and is now a subsidiary company of a larger, exchange-traded IT service provider. SoftCorp employs around 70 staff at its headquarters, with about 90 employees in total and sales offices in several European and US cities. The core product of SoftCorp is a specific software product: a content management system (CMS). The CMS differs from several competitive products in that one of its core features is the pre-generation of content – wherever possible, content is not created dynamically on the Web server at run time, but is instead pre-generated offline on the CMS server. This provides for several benefits as regards resources, scalability, or response time behavior under load. The CMS is used by many companies from many industries all across the world for managing their Internet presences as well as their intranet portals. Professionals from SoftCorp or selected partner companies provide consultancy and project services such as implementation, tailoring, or configuration of the CMS to end customers. The strategy of SoftCorp's managers as regards the CMS is product-driven and not market-driven:

> "It is my homework to care for our principles, […] that are such things such as […] the complete firm acts on the maxim or notion that we will not be driven by customer requests. We develop the product following our own vision […] in many areas, in many, many decisions, and for a long number of years, we simply didn't follow the trend on the market, which essentially is determined by Marketing or Sales, but we had our own thoughts about it." (Mike[1], member of the executive board)

As a result of this strategy, SoftCorp's employees focus on the development of a stable software core that is compatible between release versions. End customers have to run their own development projects, possibly supported by professionals from SoftCorp or partner companies, for customer-specific extensions of the CMS' core features. Such projects can range from simple extensions (so-called "modules") to complex web application projects. Most of the time, these customer-specific exten-

[1] All names have been anonymized for reasons of confidentiality.

sions are later not integrated into the core features of the CMS. Moreover, there are no customer-specific branches or code forks of the CMS:

> "[…] another [principle] is not to release customer-specific versions. This is something that customers care a great deal for, […] they have a bug, and then we deliver an upgrade or update that contains x bug fixes. However, what they would like to have is the version they currently run, 'dash'. With only this one bug fix. Naturally, I don't need to tell you this, with 170, 180 customers this frays out into a probably fractal tree. And this then is instantly not controllable […]." (Mike, member of the executive board)

Selected extensions are later incorporated into the CMS or accepted by SoftCop or partner companies as "official" modules that will be supported in future releases. For example, these modules allow the application of e-mail marketing, the display of website content on mobile devices, or the integration of the CMS with SAP NetWeaver, IBM WebSphere, or Microsoft SharePoint. Management's strategy as regards the CMS – long-term development of a stable core product – also impacts on the company strategy: consulting and project services provided by SoftCorp have been consciously reduced over the last years, aiming to be only provided by partner companies in the near future:

> "Yes, to be clear, we definitely are a product company. We aren't a service provider; there are many [companies] that build a content management system on their own and later want to sell their services. […]" (Charles, member of the PM team)

The executive board manages SoftCorp. The so-called *steering board* supports the executive board and is comprised of selected members from the different units and departments. The steering board discusses and caters to many tactical and strategic decisions as regards the products of the company.

4.1 "Stable & Sustainable" versus "Fast & Flexible" Development

The unit "Research & Development" (21 employees) is responsible for developing and maintaining the CMS as the core product. This is done exclusively by the so-called "core development team" at SoftCorp's headquarter (eight developers plus one manager). Consulting services and support for Internet and intranet projects of end customers are provided by consultants and project managers from the "Professional Services" unit (31 employees).

The core development team continuously develops and advances the CMS as the core asset of SoftCorp. In general, a release cycle takes several months, resulting in a gap between major releases of several years (e.g., version 3 in 2004 and version 4 in 2007). The development process follows a mixture of practices from traditional, plan-driven software engineering (e.g., variants of stage-gate models) and modern approaches (e.g., time boxing):

> "[…] we actually afford ourselves at the product side a small ivory tower, one can say that, an insular product development unit, many competitors work differently than that. And we actually make a point of doing so, that there exists this kind of wall, although we always adjust its height a little bit. Sometimes it is too high, sometimes it is too low, that is an ongoing process for us, but this wall is intentional and I find its existence a very good thing. […] After long discussions we have then said ok, we decelerate the development, we deliberately slow down in

> order to keep the quality higher, despite the small team, despite that competitors have 3-4 times higher numbers of developers […] This deceleration has meant that customer satisfaction has increased massively, […] the number of tickets has clearly decreased." (Tom, manager Professional Services)

The strategy to shield the core development team from outside pressure, developing the core product in a stable way, thus results in a kind of "wall" to the environment and to other departments. Since spring 2011, the "product management" subunit (in the following: *PM team*) of the professional services unit provides a second development team (six full-time employees and four apprentices). The PM team is responsible for developing modules for the CMS that address specific non-core features (e.g., video management). The creation of the PM team as a second development unit is explained with a felt need to accelerate the development of modules in order to be able to react faster to end customers' and partners' requests and to internal feature requests:

> "The module development team [the PM team] has been primarily brought into being in order to react quickly to requirements that come from the market because our development department simply cannot do that as they have firmly defined the work packages for the next one and a half years. Fundamentally, this is also the reason why we said that an agile approach is better [for us] than a traditional development process." (Charles, member of the PM team)

Thus, a specialization exists as regards software development. While the core development team develops the CMS as a stable core product in a sustainable pace, with a time horizon of years between releases, the PM team develops modules much faster, with a time horizon of months. Not all modules will be later incorporated into the core product; however, this specialization using two distinct development teams allows SoftCorp to react much more quickly to customer demands without having to jeopardize the stability of its core asset. The PM team also employs a more agile approach to software development than the core development team, using a variation of lean software development [35], following 'lean' principles such as "eliminate waste" and Kanban thinking for process management. A physical whiteboard is used as a Kanban board to track the flow of 'work units' belonging to the modules through different work phases. The work units correspond to different development features or tasks. The state of the Kanban board is mirrored within a time-logging and project management tool, with each task (or work unit) corresponding to a digital ticket.

4. 2 A "Jack of All Trades": Task Variety of the PM Team

However, the PM team is not only responsible for development tasks. In parallel, a variety of other tasks are situated with the team. The Kanban board and the digital tickets are used for tracking and managing these non-development tasks:

> "That means the people who develop modules do not do module development exclusively, but there are also other tasks that we have in product management, that also have to be done. So now we have no strict separation between module development team and the actual product management team." (Charles, member of the PM team)

So-called fixed time contingents govern how much time the PM team allocates to specific tasks. These contingents specify how much time is reserved for tasks that are not related to module development and that are performed on behalf of other units such as marketing. The actual times spent are more or less regularly entered manually within a time-logging and project management tool by the members of the PM team themselves, which is then used by the PM team's manager for controlling the allocated time for tasks with the actual time spent for tasks. Only one person – the manager of the PM team himself – regularly engages into tasks that are traditionally associated with product management (e.g., scouting the market and planning as well as defining new functionalities). Of course, the other members of the PM team also engage into different product management tasks (e.g., by developing new functionalities in the form of modules for the CMS in a self-organized way), but they also engage into a plethora of other tasks:

> "[…] internally, the product management team per se is an all-rounder and 'jack of all trades', and all sorts of people from all sorts of departments stop over all the time and want something to be done or made, have questions, and so forth." (Joe, apprentice in the PM team)

The PM team thus sometimes acts as an internal 'fire-fighter', or indeed a 'jack of all trades', engaging even in consulting activities with end-customer projects:

> "Or somebody such as Luke, who is something of a 'jack of all trades'. Who can do everything, somehow. And now when I need someone, someone with a strong personality … I don't need a developer, who sits there and looks at the code […] I need someone, who sits there and sometimes gives the developers a piece of one's mind … ." (Sean, consultant Professional Services)

4.3 The PM Team as Brokers and Spanners: "Chief Cook and Dish Washer"

Because of their diversified tasks, the employees of the PM team all also have detailed knowledge of the core product CMS and its software code. Due to their variety of tasks and their status of the all-rounder, we found that they are central for distributing and brokering diverse kind of knowledges between the different units (e.g., Professional Services consultants, marketing or sales people) as well as for spanning the boundary to partners and end customers in the external environment.

> "[…] product management in itself is relatively independent, yes, it is more an organizational thing, to what [other organizational units] it's attached to, but at our firm, product management is just the interface between all departments. Of course, this brings some influence on the roadmap of what will be developed, but the development unit is pretty strongly responsible as well." (Charles, member of the PM team)

Specifically, as regards *boundary spanning activities*, we found that the community work of the PM team presents a very interesting case of boundary spanning, with a mixture of 'coordinating', 'scouting', and 'guarding' activities on behalf of SoftCorp with regard to 'outsiders' such as external partners and end-customers. Meanwhile, the answering of questions that arise out of the community, including solutions to problems, in turn prompts these activities and feeds back to new knowledge for the members of the PM team (e.g., existing issues with the CMS or new ideas for novel functionalities).

> "The same applies for PM. Usually, you are not that close to the customer. Even the PM. Paul, who knows his stuff. The whole team. Luke, Charles both work, that means post quite intensively [within the community]. Which, of course, has led to an extreme level of compe-

tence in total. All [are posting], that is, practically all are carriers of core competency within the company. […]" (Mike, member of the executive board)

The PM team's development task (developing modules for the CMS) also involves frequent instances of 'coordinating' and 'scouting' activities. Similarly, other activities show some degree of direct or indirect boundary spanning (e.g., consulting support in form as stand-by men involves 'scouting'):

> "And then we have topics such as that you sometimes visit the partner and talk about the product or project decisions, and explore how you can improve the product so that developers and partners can work in a better way using it." (Luke, member of the PM team) …"Then we do classic product strategy. We integrate a lot. Then we do classic market observations, talk to potential partners […]."(Charles, member of the PM team)

As regards the existence of the role of brokers, exemplary evidence for *brokering practices* that we found within the PM team include 'crossing boundaries' as well as 'translating and interpreting'. During the tasks concerning internal product support and the development of 'show cases', the PM team brokers between the core development team and other departments due to the PM team members' extensive technical knowledge of the CMS; the PM team members also have direct access to members of the core development team, which members from other departments do not have quite so regularly; these tasks involve translating the technical knowledge related to the CMS to business people in marketing and sales.

> "[…] we are internally the contact for all departments that have questions regarding the product. So when our presales or our sales have questions in any pitch situations, "Can we do that? How is our position as regards …?" then product management is asked." (Charles, member of the PM team)

During the development of modules for the CMS, the PM team also engages into 'surfacing and challenging assumptions' practice. This includes both technical and organizational perspectives. For example, the PM team actively chose to develop and manage projects differently than the core development team, using lean software development as a new paradigm; during development of modules, they also continuously question the way things are done in the CMS and try to find new architectural solutions (e.g., challenging the 'pre-generation of content' paradigm of the CMS):

> "[These research and development activities] were born out of necessity. […] This was not planned. 'The innovator – born out of necessity' […]. In such a way, the best discoveries are made, you know. Ok, so from the outside this looks a bit crazy, because actually the core development also is a kind of research and development […]" (Paul, manager PM team)

Similarly, as regards the way of doing things, members of the PM team repeatedly stated that they try to communicate more with members from other departments because they themselves are not satisfied with the way knowledge is distributed within SoftCorp, clearly displaying characteristics of 'translating and interpreting' and 'crossing boundaries' activities:

> "For a new module, we always at the outset conduct a corresponding workshop, to which we invite people from sales, from presales, from professional services, to jointly define requirements, at least roughly, or at least the expectations for the module as regards functionality." (Charles, member of the PM team) … "[…] these review meetings, we also conduct them in order to exemplify to others a little bit. Because in reality, we wish us the same from these people. That's one of the reasons why we do this, among other things. […] So that's one reason,

> because we would like to actually establish this kind of openness and this including of others throughout the company. And we are now the only ones, who do it in this way." (Paul, manager of the PM team)

We did not identify any direct evidence in our data for the use of 'façading' practices by the PM team; however, we cannot rule out that these practices are also employed at times. When looking at how boundary spanning activities and brokering practices are distributed among *individuals* within the PM team, we found that not everybody in the PM team engages to the same degree into brokering practices or boundary spanning activities. For example, one employee with mostly technical knowledge often engages into development and technical tasks, although he still also executes other tasks such as catering to the community; a new employee almost solely is engaged into development tasks:

> "Nope, this [doing other tasks such as community support] is more like sporadically. So I do more implementation, sometimes it'll be a calculation part or so, then I attend to something that needs to be executed […] I really push things until they are released […]." (David, member of the PM team) … "[…] I'm really a special case because I just do module development. And I haven't, as I said yesterday, had this first CMS training, yet, that means I'm not doing community support. I don't do internal Intranet things. That said, I've only ever really have my module development stuff to do. […]" (Mark, member of the PM team)

Instead, we found that the other two members of the PM team (Luke and Charles) engage into all kind of tasks. We also label them 'leaders' because only they decide together with the manager what tasks have to be done during daily stand-up meetings, though not who does them, and they explicitly engage into all other tasks:

> "[…] And then we have a number of general tasks, which are primarily situated with Luke and me. So, overall product management tasks, communication with the core development, concept creation and blah, blah, blah. For those, we don't have fixed time quotas, fifty percent of our work is reserved for this. […] Luke and I do, so to speak, for fifty percent everything that is visible on the board [the Kanban board] […]" (Charles, member of the PM team) …"We decide what gets into the backlog, but the team itself […] of course, everybody decides for themselves when and what they take from the backlog and which task to select and process […]. "(Luke, member of the PM team)

We also found evidence that not everybody in the PM team engages into the same brokering practices or boundary spanning activities, or to the same degree; however the activities of the team as a whole map both the description of boundary spanners (external) and brokers (internal). Thus, we suggest to expand the understanding and conceptualization of brokers and boundary spanners to the unit level: the PM team as a unit shows all, but one, practices and activities usually associated with brokers and boundary spanners, although no single individual member of the team engages into all practices or activities.

We regard the role of the PM team as a unit that engages into both, (1) internal brokering practices towards other departments and (2) external boundary spanning activities towards partners and end-customers. The *core development team* is insular and intentionally shielded from outside and inside influences, it only has minimal contact to the environment and to other units, this allows for a stable development of the core product with a sustainable pace. As shown above, we found that the PM team is much more interactive, both with the outside environment and with other units. The team as a whole performs boundary spanning activities and brokering practices.

Moreover, both are conducted to external partners and customers as well as to other internal units. Thus the PM team is neither only conducting internal brokering nor external boundary spanning; it can best be described as an agglomerate of both, a “branner and spoker”.

The steering board is another institutionalized group. While the PM team acts predominantly on the operative level, we found that the steering board operates on a strategic level as regards the general product strategy of SoftCorp. It comprises representatives of all important product-related units, especially both development teams; the managers of Professional Services, the core development team, and the PM team are all members of the steering board. With our focus on the PM team however, we did not further consider the steering board’s role as brokers or boundary spanners. The PM team’s ability to act as such a bridging unit crucially depends on the different and complementary skills of its members. Reportedly, the PM team has been implemented bearing in mind the special skills of its members to fulfill this crucial position within the company:

“[...] When we founded product management, I thought about whom to take for staffing. […] So, then we thought about whom to take? The all-purpose weapons, I say now so somewhat militaristic, were exactly the right ones. […] [Charles] is used to this kind of work; he absolutely quickly familiarizes himself with new areas of knowledge. He absolutely is a carrier of know-how and a great asset who superbly fits into the team and into this area […] The same with Luke [...].“ (Tom, manager Professional Services)

4.4 Benefits and Costs of the “Branner and Spoker” Unit

The implementation of a “brannering and spokering” unit such as the PM team clearly has several positive effects for SoftCorp as a whole, besides the original reason for creating the unit to be able to react more quickly to changes in the environment). For example, having a team of dedicated carriers of broad amounts of know-how and knowledge clearly pays off for SoftCorp in terms of internal brokering:

“[…] now if new issues come in, then you quickly cannot stay on track anymore, and therefore it makes sense to have generalists […] this is more effective.” (Luke, member of the PM team)

This approach, having skilled employees with a variety of tasks and resulting broad knowledge as a dedicated unit, allows externally to improve customer satisfaction quality with boundary spanning and internally to broker knowledge to various other units:

“PM team and core development team do postings [in the community], with photos, or at least by name, yes. That was great with customers. The quality is great. […] If somebody from the core development team answers you, that something works or doesn’t work this way, then you have a definite answer. How cool is that for the customer? […]” (Mike, member of the executive board) … “We, I think, differ quite starkly now from how it is done in the core development team. […] As we notice how it works in projects, what we manufacture, and because we notice what issues arise, we have, I think, a very good, broad overview. And I think that’s important for the team and for the company. Previously, we didn’t have that department. And we had very big problems because, yes, because this knowledge was not focused at one single point, so to speak. […] This dichotomy, that we do both support issues and development issues,

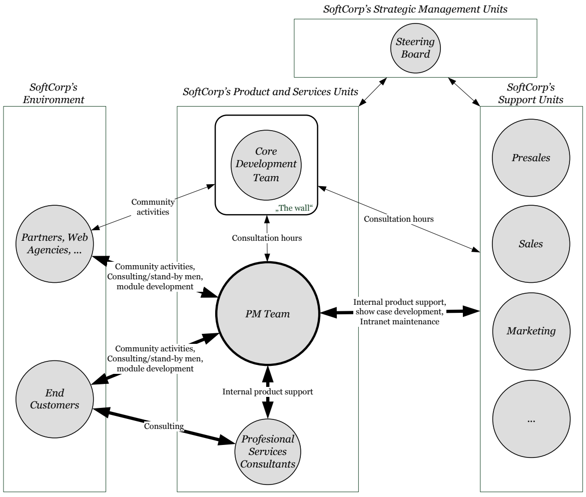
SoftCorp's Strategic Management Units
Steering Board
SoftCorp's Environment
SoftCorp's Product and Services Units
SoftCorp's Support Units
Core Development Team
„The wall"
Community activities
Consultation hours
Consultation hours
Partners, Web Agencies, ...
Community activities, Consulting/stand-by men, module development
PM Team
Internal product support, show case development, Intranet maintenance
Community activities, Consulting/stand-by men, module development
End Customers
Internal product support
Consulting
Profesional Services Consultants
Presales
Sales
Marketing
...

Fig. 1. The PM teams' role in SoftCorp

of course, has always pros and cons, like everything in life. I believe that this division contributes very strongly to the fact that we can develop a good, broad knowledge and a good view of the company and for the product itself and for the market as such, yes. If we would only have a development department, which really now just codes and does nothing else, then you always have the danger that the vision is lost a bit." (Paul, manager of the PM team)

However, these benefits come at a cost. While it helps to accumulate knowledge in diverse fields, the variety of different units that want to contact the PM team sometimes leads to overload as regards the capacity of the PM team to handle all tasks and requests. Thus, a fundamental problem for enhancing the efficiency of the PM team is the variety of the tasks that are executed by the team besides developing modules. Each task domain is a business process in itself, with separate input, output, and flow, which basically are completely different as regards their characteristics (e.g., developing modules is different from developing showcases or from catering to the community), and demand for each task is independent from demand for the other tasks.

"[…] The disadvantage is, of course, that all come running to us and always want to know something, yes, of course, this is the flip side of the coin. You somehow have to steer this into regulated channels or defend yourself in a sufficiently pushy way, as the case may be [laughs]." (Paul, manager of the PM team)

This task variety, with different goals, in turn also leads to more variability and uncertainty in the development process and in all other tasks respectively. This becomes apparent when looking at how the PM team organizes its work: using one global Kanban board with the same activities for all tasks, even if every task is in fact a separate process. For example, sometimes the prioritization of other tasks such as the building of show cases or the use of PM team members as stand-by men leads to bottlenecks and cases where the development of modules is on hold because developers are missing.

"[…] Yes, all right. And Luke was now, I would say; the last resort because he actually works in PM and actually has other tasks, but the other expert we wanted to have, first, he was on vacation and second, he also is a highly sought-after person with use here in the house." (Sean, consultant Professional Services) … "[…] So we have to cut somewhere, consequentially […] which can mean that before CeBIT, we hardly do any module development, so we can a little bit absorb this, internally, so almost no module development, but show cases, and accordingly vice versa, after CeBIT." (Charles, member of the PM team)

The role of the PM team is summarized in Fig. 1. The PM team as a unit engages into internal brokering practices towards other departments and external boundary spanning activities towards partners and end-customers. Table 1 summarizes the upsides and downsides of this approach taken by SoftCorp.

Table 1. Benefits and Costs of SoftCorp's Implementation of the PM Team

Pros & Cons	*Description*
Benefits	• Quick, agile development of modules using lean development (Kanban) coupled with stable development of core product with a long-term vision. • Create business agility and react fast to changes in the environment. • Acquire broad knowledge from a wide variety of tasks. • Broker knowledge between other internal units and core developers. • Span boundary towards external end-customers and partners.
Costs	• Variety of tasks leads to uncertainty and variability in the processes. • Uncertainty and variability in the processes lead to bottleneck and waste. • Variety of tasks clashes with lean management approach.

5 Discussion and Conclusion

The PM team incorporates aspects of both an external boundary spanner and an internal knowledge broker. The team's ability to act as a bridging unit depends on the different and complementary skills of its members that allow the unit as a whole to fulfill the variety of tasks and to act as a mediating and moderating unit. This is consistent with previous findings that link successful boundary spanning to team diversity [e.g., 36, 37]. In addition, we found that the same holds for the brokering practices of the PM team. More precisely, the diversity and variety of tasks processed by the PM team enable it to acquire a broad body of knowledge concerning all areas of the company. We found that this allows the members of the PM team to fulfill their crucial role of acting both as a boundary spanning and a brokering unit. On the one hand, this helps with keeping the core development team isolated in order to develop the CMS in a stable, slow-paced way. On the other hand, this allows SoftCorp to react quickly to changes in the environment. This dual strategy of "stable core product" vs. "fast modules" enables SoftCorp to implement business agility as a basis for their success. While the literature provides evidence for boundary spanning and brokering as two separate sets of activities, which are performed by individuals [e.g., 11, 14, 15, 38-40], we extent, based on our case, the common body of knowledge and establish that these activities beyond the individual level also take place in an integrated manner on the unit level.

Although the individuals are important, it is the *institutionalized unit as a whole,* which makes the difference in our case organization. As such, we provide the ground for a hybrid theory of institutionalized brokering and spanning. Having a dedicated unit, with members with complimentary skill sets and knowledge sets that can act as a “knowledge reservoir” in order to be able to span or broker is a promising strategy for other companies, which also want to balance stability and flexibility to achieve business agility. Our findings indicate that the antecedent conditions for this are to have (a) individuals with skills and competence necessary for brokering and boundary spanning and (b) a variety of tasks that are necessary to develop broad knowledge.

However, the institutionalized role of such a “brannering and spokering” unit is not for free and comes with a cost. This is mostly observable in terms of the high uncertainty and variability in the PM team’s business processes, which leads to bottlenecks and stand-stills in the software development process. It is also somewhat in conflict with the lean management approach taken for software development by the PM team, which usually has the ultimate goal of eliminating bottlenecks and eliminating waste [35].

Thus, we observe a trade-off: On the one hand, the wide diversity and variety of tasks allows the members of the team to acquire the skill set and the broad knowledge for both internal knowledge brokering and external boundary spanning; without the tasks, the team would not interface as frequent or as much with other units and with customers or partners. On the other hand, the same variety leads to amplified variability and a resulting increased chance for disruptions in the workflow of the PM team. The task variety leads to coordination problems, for example, visible in the necessity to assign time contingents to tasks or in the fact that it takes quite a while to develop a module for a team working in an agile way. Even though process variation may be related to performance gains or even to organizational survival in dynamic, competitive environments where flexibility is important [41], too much emphasis on too many tasks at once may lead to increases in variability and bottlenecks in the process flow [42], and thus, in turn, may compromise the intended strategy to use the team to be able to react more quickly and flexible to changes in the environment [41, 43].

Our findings may help other companies to decide whether having an institutionalized “brannering and spokering” unit is worthwhile in their situation or not in order to create business agility. However, we must also advise caution. We investigated one single case in depth and it may not be prudent to generalize beyond this individual case setting. Another limitation of our study is that we focused on boundary spanning and brokering from the start and did not employ other lenses for scrutinizing our data; neither did we investigate the role of “boundary objects” [e.g., 13, 44-46] such as the community tool, or the role of different “technology frames” [e.g., 47, 48] surrounding the various units, which surely have a role to play in this setting as well.

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