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## **How do Start-ups Recognize the Value of External Knowledge and Acquire it? A Study on Absorptive Capacity in B2B Start-ups**

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### **Abstract**

In today's market-driven world entrepreneurs have to learn from external knowledge to improve their responsiveness to the market. The importance of external knowledge in the context of start-ups remains underexplored. For start-ups the use of external knowledge is crucial due to their liabilities of smallness and newness. The objective of this paper is to understand how start-ups learn from external knowledge sources. This requires the investigation of different absorptive capacity dimensions in various organizational stages.

Therefore, this study focuses on and unravels the black box of the early core components of absorptive capacity allowing practical insights on how start-ups deal with and learn from external knowledge. Finally, suggest adding the dimension "access/connection to external knowledge" to the framework by Todorova & Durisin (2007).

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**1. Introduction**

Start-ups not only have to overcome certain entrepreneurial challenges such as extreme uncertainty, the lack of resources, the initial creation of customer value as well as the lack of paying customers during early phases of product development (Blank, 2013), they also have to effectively learn, integrate and apply external knowledge from the market as well as from relevant technologies (Presutti, Boari, & Majocchi, 2011). Moreover, these challenges are deeply rooted in two characteristics: start-ups' liability to newness and smallness (Aldrich & Auster, 1986). As a result, start-ups face several barriers when dealing with external knowledge (Brettel, Faaß, & Heinemann, 2007) as they frequently cannot pay for strong protection mechanisms on their own and thus risk knowledge spillovers. Furthermore, especially early start-ups lack extensive internal knowledge and have difficulties gaining access to external knowledge (Brettel et al., 2007). In addition, the early start-up phase requires a certain capability to deal with a high amount of new internal and external knowledge. Accordingly, this paper provides a differentiated investigation of start-ups and how they deal with external knowledge and develop absorptive capacity. Previous studies have intensively analyzed the concept of absorptive capacity in the context of effective learning from external knowledge. Absorptive capacity – often described as a dynamic capability (Zahra & George, 2002) – has initially been defined as the ability of a firm to “recognize the value of new information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990, p.128). Absorptive capacity (AC) aims at improving innovation and performance outcomes. While absorptive capacity is a concept addressing the firm-level, it is deeply rooted in the individual member(s) of the firm and their cognitions, motivations, actions and interactions (Volberda et al., 2010). Although the roots of absorptive capacity

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originated from research in large R&D intensive firms (Spithoven, Clarysse, & Knockaert, 2011) with own R&D departments, research on small- and medium-sized firms and especially start-ups is relatively scarce.

Following Flatten, Engelen, Zahra, & Brettel (2011), the investigation of the important absorptive capacity dimensions at different organizational stages requires more attention from researchers, particularly in the context of start-ups. The refined model of Todorova and Durisin (2007) illustrates the core aspects of absorptive capacity. Firstly, these consist of knowledge sources, prior knowledge and the recognition of the value (Cohen & Levinthal, 1990; Todorova & Durisin, 2007). Recognizing the value addresses the cognitive ability of individuals and organizations to recognize and value external information new to the firm. This is followed by the acquisition of external knowledge, which deals with the intensity, speed, direction and effort to acquire new knowledge (Todorova & Durisin, 2007; Zahra & George, 2002). Volberda, Foss, & Lyles (2010) argue that the core elements of absorptive capacity, especially in the early phase of integrating external knowledge, have not been broken down or measured separately. Furthermore, the different existing concepts (Cohen & Levinthal, 1990; Todorova & Durisin, 2007; Zahra & George, 2002) of absorptive capacity show that there are extremely limited definitions and insights about what happens in the black-box of its core dimensions.

More specifically, this research uses the theoretical framework of absorptive capacity by Todorova and Durisin to investigate the early core components of the concept and how start-ups learn from external knowledge in the early phases: “recognizing the value of external knowledge” and “acquiring external knowledge”. For the purpose of this paper, we define “recognizing the value” as the cognitive ability of individuals and organizations to recognize and value external information new to the firm (Todorova & Durisin, 2007) and acquisition “refers to a firm's capability to identify and acquire externally generated knowledge that is *critical to its operations*” (Zahra & George, 2002, p.189). These early phases of external

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knowledge sourcing act as an essential foundation for start-ups in learning to deal with and make use of external knowledge. Furthermore, it is important to understand how entrepreneurs act and which processes they use in the early stages of entrepreneurial activity to better understand how they sustain in the long run. That means that the black-box of both of these components of absorptive capacity are analyzed in detail allowing insights on a practical level of how start-ups deal with and learn from external knowledge. The central research questions for this paper are:

1. How do B2B start-ups recognize the value from external knowledge?
2. How do B2B start-ups acquire external knowledge?

Hence, the objective of this paper is to understand how start-up companies are learning from the insights of external knowledge sources. This research is based on semi-structured interviews with 16 start-up entrepreneurs in the early stage of their company allowing deep insights into the early phases to better understand how start-ups “recognize the value of external information” and how they “acquire external knowledge”.

## **2. Literature Review**

### **2.1 Absorptive capacity as a capability to make use of external knowledge**

In today’s world, which is largely driven by knowledge and technology-intensive businesses, the importance of learning from external knowledge grows. Cohen & Levinthal (1990) developed the concept of absorptive capacity to address the capability to learn from external knowledge that is new to the firm. The concept strongly builds on prior related knowledge (Cohen & Levinthal, 1990), which is formed by the organizational history and industry relevance in terms of complementarity and diversity (Cohen & Levinthal, 1990). Furthermore, Lane, Koka, & Pathak's (2006, p.856) present a definition, that allows an even deeper understanding of absorptive capacity:

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“Absorptive capacity is a firm's ability to utilize externally held knowledge through three sequential processes: (1) recognizing and understanding potentially valuable new knowledge out-side the firm through exploratory learning, (2) assimilating valuable new knowledge through transformative learning, and (3) using the assimilated knowledge to create new knowledge and commercial outputs through exploitative learning”.

Research and development (R&D) departments of large or established are an important driver of the development of absorptive capacity and the absorption of external knowledge (Argote, 2013). This capacity can build on tacit or implicit knowledge, which is “personal, experiential, context-specific and hard to formalize and communicate” (Bessant & Tidd, 2007, p.188). External knowledge can occur in different domains “such as technology, product, processes, strategies, and markets” (Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011, p.1336). Most previous studies argue absorptive capacity to be a capability that aims at knowledge creation and usage (Zahra & George, 2002) to achieve and sustain a competitive advantage in terms of flexibility, innovation and performance. Frequently used measures of absorptive capacity comprise “compensation policies, dominant logic, knowledge sharing routines, motivation, and competencies” (Lane et al., 2006, p.844). Thus, there no consistent measure, yet.

Todorova & Durisin's (2007) model builds on Cohen and Levinthal's model of absorptive capacity and further extends Zahra and George's model (Figure 1).

### **[FIGURE 1 ABOUT HERE]**

The refined model of Todorova and Durisin illustrates the core aspects of absorptive capacity. Firstly, these consist of knowledge sources, prior knowledge and the recognition of the value (Cohen & Levinthal, 1990; Todorova & Durisin, 2007). Recognizing the value of external knowledge addresses the cognitive ability of individuals and organisations to recognize and value external information new to the firm. This is followed by acquisition of external

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knowledge, which deals with the intensity, speed, direction and effort to acquire knowledge (Todorova & Durisin, 2007; Zahra & George, 2002).

### **[FIGURE 2 ABOUT HERE]**

Figure 2 shows the core components of the absorptive capacity concept: recognize the value of, acquire, assimilate, transform and exploit external knowledge. In addition, the figure emphasizes knowledge source and prior knowledge as important input factors following Todorova & Durisin (2007). Figure 2 visually illustrates the focus of this research in grey.

The next step covers the integration of the knowledge in the firm and splits into either assimilation or transformation of the knowledge. To distinguish both aspects, assimilation addresses knowledge that is consistent with the current cognitive structures and is compatible with the prior knowledge (Todorova & Durisin, 2007). That means the firm is capable of implementing the new external knowledge in a way that is compatible with the existing values of the company. On the other hand, transformation addresses new external knowledge that is at the beginning incompatible with the firm and its cognitive structures, therefore requiring efforts to transform the organisation (Todorova & Durisin, 2007). Finally, the exploitation of knowledge refers to *“a firm’s ability to harvest and incorporate knowledge into its operations”* (Zahra & George, 2002, p.190). This exploitation results in the continuous development of new products, processes, structures, knowledge or organizational structures.

Besides these core aspects, the contextual factors of absorptive capacity also require an introduction. First, absorptive capacity is moderated by the contextual factor of activation triggers, which are events that motivate a firm to react to internal or external impulses (Zahra & George, 2002). Second, social integration mechanisms strengthen the sharing and potential exploitation of knowledge (Zahra & George, 2002) creating connectedness and shared meanings (Todorova & Durisin, 2007). Todorova & Durisin (2007) further add established power relationships as a contextual factor that addresses powerful internal or external

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organizational stakeholders influencing certain knowledge creation or sourcing processes to achieve their preferred outcome.

### **2.2 Recognize the value of external knowledge**

Todorova & Durisin (2007) and Cohen & Levinthal (1990) emphasize the importance of the ability to recognize the value of new external knowledge for firm survival in turbulent environments which is the first core component of absorptive capacity (see Figure 2). “*Not being able to motivate these efforts by not ‘seeing’ or ‘understanding’ the potential of new external knowledge may be overlooked*” (Todorova & Durisin, 2007, p.777).

While a clear definition of recognizing the value is still lacking, Cohen & Levinthal (1990) argue that the recognition of external knowledge is based heavily on the prior existing knowledge of the organization and the individuals within the organization, as well as the knowledge source that enables the absorption of knowledge (Cohen & Levinthal, 1990). Following the conceptualization of Todorova & Durisin (2007), recognizing the value is biased due to cognitive and structural embeddedness and it needs to be fostered in order to enable the absorption of external knowledge to begin.

Previous research on recognizing opportunities states three central factors that influence opportunity recognition: an active search for opportunities, alertness to new opportunities, and opportunity relevant prior knowledge. Pattern recognition through connecting the dots and recognizing links between apparently unrelated insights plays an important role in recognizing opportunities (Baron, 2006).

Cognitive, organizational, social, institutional and geographic proximity may further influence the recognition of external knowledge’s value (Boschma, 2005). Furthermore, Boschma (2005, p.71) argues that “too much and too little proximity are both detrimental to learning and innovation”. Additionally, there are different aspects that can negatively influence the

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recognition of external knowledge such a firm's embedded knowledge base, rigid capabilities, history, culture and path-dependent managerial cognition (Henderson & Clark, 1990)

Usually, firms use different sources to identify valuable new knowledge. Previously investigated sources range from a focus on individual stakeholders, for example on customers (Piller & Ihl, 2009), to a more heterogeneous set of sources of external knowledge such as suppliers, universities, research institutes, consultants, and competitors (Katila & Ahuja, 2002; Laursen & Salter, 2006, 2014).

Furthermore, companies use routines and methods to foster the identification and recognition of the value of external knowledge. Amongst others they comprise gatekeepers, forecasting, trend scouting, probing, mining patent literature, industry trade magazines, market research, end user surveys or informal interactions with industry actors (Lewin, Massini, & Peeters, 2011).

### **2.6 Acquire external knowledge**

The second core component of this research addresses how external knowledge is acquired. Zahra & George (2002, p.189) state that acquisition “refers to a firm's capability to identify and acquire externally generated knowledge that is critical to its operations”. Huber (1991, p.90) adds that knowledge acquisition is “the process by which knowledge is obtained”. Furthermore, Zahra & George (2002) argue that effort in knowledge acquisition routines has different influential aspects: intensity, speed, direction, prior knowledge and prior investment. While speed and intensity are said to be a driver of quality, direction can influence the path in which the organisation goes, and accordingly where it will acquire external knowledge from (Zahra & George, 2002).

Acquiring knowledge can take place in different forms: congenital, experimental, vicarious learning, grafting and searching (Huber, 1991). While congenital learning is present at



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inception through individuals and their prior knowledge, experimental learning refers to the experience of the firm and vicarious learning to benchmarking with other firms (Huber, 1991). Moreover, searching occurs as scanning, focused search or performance monitoring. Grafting is a form of acquiring an organization or developing a joint venture (Huber, 1991).

In terms of acquiring external knowledge, different sources can be distinguished. For example, Schmidt (2010) distinguishes three clusters of sources: inter-industry, intra-industry and scientific knowledge. Frequent knowledge types include new technologies, scientific information, research and development, professional information and intelligence, skills or expertise and market or competitor intelligence (Huggins et al., 2010).

In the start-up context, customer interviews are frequently stated as a source with which to acquire external knowledge. Blank & Dorf (2012) promote the idea of “get[ting] out of the building” in order to push entrepreneurs to get feedback, learn from the market and understand real customer problems. In start-ups, knowledge acquisition often represents iterative learning in combination with the use of prototypes to communicate to-be-built features and products (Ries, 2011). A side benefit is that such external knowledge sourcing contributes to an entrepreneurial network. Lead users can be attracted and be used for the co-development of the start-up’s product with customer interviews as a means of acquiring external knowledge (Ries, 2011).

Furthermore, Grimpe & Kaiser (2010) argue for the consideration of internal, external, collaborative R&D, firm acquisitions and the in-licencing of technology as knowledge acquisition methods. In terms of accessing sources, Grimpe & Kaiser (2010) add that offshore locations give access to more diverse knowledge, which in turn can improve the resources of a company. Lewin et al. (2011) identify lead users, suppliers, R&D alliances, co-creation relationships, networking with research partners and initiatives in standard setting as important knowledge acquisition mechanisms. In terms of the acquisition of resources that

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start-ups do not possess internally, start-up firms are required to develop social networks in order to stay competitive (Huggins et al., 2010). These path dependent social networks, which start-ups are typically exploiting when they emerge, develop with the growth of a start-up, as it moves towards calculative networks that consider costs and benefits of maintaining a network (Hite & Hesterly, 2001). Furthermore, Yli-Renko, Autio, & Sapienza (2001, p.607) add that “social interaction and network ties are positively related to knowledge acquisition, but that relationship quality is negatively related to knowledge acquisition”.

Finally, there are different influencing factors for the capability to acquire external knowledge for start-ups. The prior knowledge (Zahra & George, 2002) of the founders and the start-up team is of a crucial role. Mechanisms that facilitate the acquisition of external knowledge in start-ups are e.g. mobility, geographic co-location and alliances.

The literature review shows that the core components of early absorptive capacity in start-ups are underexplored. In addition, according to Volberda et al. (2010, p.937) who refer to the initial absorptive capacity model of Cohen and Levinthal, just “few studies have broken AC down into its components and measured elements of recognition, assimilation, and utilization separately”. Huggins et al. (2010) argues that smaller firms tend to have a disadvantage in terms of knowledge sourcing due to the smaller size and age of a start-up. Additionally small firms “might not have the same means and opportunities to exploit external knowledge, simply because they cannot risk betting on the wrong horse” (Schmidt, 2010, p.6). Building upon this prior research, many questions remain unsolved, especially how start-ups decide about the effort of external knowledge acquisition, the accessed sources and the forms of knowledge. Furthermore, there is the question of how prior knowledge and prior relationships, the cognitive mindset, as well as triggers and routines, influence the acquisition of external knowledge.

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In sum, prior research does not directly elaborate on or measure the black box of the two above introduced core components of absorptive capacity, namely recognizing the value and acquisition of external knowledge, in start-ups. More specifically, we contribute to extant research by shedding light on these early absorptive capacity dimensions as well as by investigating the triggers to recognize the value and acquire external knowledge, the directing efforts, routines, and other factors that might influence the cognitive mindset as well as the evaluation of recognizing the value/ acquiring external knowledge. Thus, in what follows, we qualitatively investigate early absorptive capacity aspects based on findings from the literature (Figure 3).

**[FIGURE 3 ABOUT HERE]**

### **3. Methodology**

#### **Sample**

Our sampling procedure was theory-driven. Given our interest in start-ups' early absorptive capacity, we selected distinct cases which have similar characteristics and requirements. We applied the following selection criteria on which we identified relevant start-ups. Brettel, Faaß, Heinemann (2007) distinguish start-ups from other companies based on these characteristics: the liability of newness, of smallness, of growth, of dependence on founders and of innovativeness. Therefore, all the interviewed start-ups had to be recently founded businesses (max 5 years) with a team size of less than 50 people aiming at growth (scalable offers, no consulting and no agencies), with at least one year in the for-profit business and with an innovative product. The start-up had to be run by at least one of its founders at the point in time of start-up selection (June-July 2014). Besides the age of the enterprises, they also had to be an independent organization that makes most decisions on its own. As such, spin-offs are excluded from this study. We further conducted a random sampling approach based on all relevant B2B start-ups in the high-tech ICT sector in Berlin, Germany. We

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decided to focus on this particular industry because Berlin is a known ICT cluster. Moreover, Berlin is the second largest hub of high-tech start-ups in Europe. Additionally, we further realized that there are large differences between B2B and B2C business models which also determine a more complicated access to valuable external knowledge for B2B start-ups as fewer people have relevant domain knowledge.

Thus, we decided to lay our focus on B2B start-ups only. In order to systematically identify the start-ups, we used the most complete lists of Berlin-based start-ups (Thomas, 2014) and analyzed them against the aforementioned criteria. This resulted in a sample of 89 out of 855 Berlin-based start-ups in total. A random sample of 50% of the 89 relevant start-ups was invited to participate resulting in 16 confirmed and conducted interviews. It is necessary to point out that all the interviewees were male which can be explained by a dominance of male founders among start-ups in the ICT sector.

### **Data collection**

This study has a qualitative character, answering mainly how-questions using a semi-structured interview guide. We conducted semi-structured interviews to allow for flexibility during the interviews. This flexible data collection permitted an iterative process adjusting the questionnaire when data saturation was reached. At the same time, this allows unprejudiced insights into the black-box of the early phases of absorptive capacity, so that we can draw additional understanding from as well as compare the results of the interviews to the existing framework by Todorova & Durisin (2007). The guideline was first pretested (Atteslander, 2003) with two theoretical experts in June, and then, with two entrepreneurs that did not fit to the criteria mentioned above in July. Insights from these four tests have been used iteratively to clarify the interview guide, change different questions, adapt the order, reduce questions and raise awareness of challenges in using the absorptive capacity concept for start-ups. Fieldwork was carried out between July and September 2014. We conducted 16 interviews of which 14 were conducted in a personal meeting with the founders and 2 were conducted via

telephone. The final sample consists of 11 CEOs, 2 CMOs, and 3 CTOs who are all co-founders of their respective companies. Moreover, we interviewed 9 first time founders and 7 serial entrepreneurs. The interviews lasted from 38 to 85 minutes (average duration 59 minutes) and were triangulated with personal memos taken during and after the interviews as well as secondary sources such as notes from the founders, company documents, firm websites, product descriptions and strategy documents. This approach greatly benefited the objectivity and integrity of the results and enabled us to get a comprehensive view of the two early phase AC dimensions and other related aspects. The homogeneous characteristics of the selected start-ups allowed us to do cross-case comparisons while controlling for heterogeneity.

### **Research setting**

In this study, we use a multiple holistic case study design (Yin, 2009) as we include one key informant on one level for each of our different case companies. All the participating start-ups belong to the ICT industry, besides that they are also affiliated with one of the following industries: Data analytics, E-Business, Education, Entertainment, Fashion, Finance, Health, Journalism, Market research, Psychology, Retail, Tourism. Additionally, eight start-ups addressed purely B2B markets, while eight start-ups acted in B2B and B2C markets.

## **4. Empirical analyses**

In preparation for the data analysis, the recorded interviews were transcribed in their original language and coded in English, using Atlas.ti 7 (Atteslander, 2003). During transcription, the interviews were anonymized, and pseudonyms were used for the interviewees reducing researcher bias during the further analysis.

For the data analysis, the 16 interview transcripts were searched and compared for patterns and relationships. Based on this analysis and theoretical sensitivity, a coding structure in the context of this research question was developed by the author (Boeije, 2010; Strauss, 1987;

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Glaser & Strauss, 1967). We applied a pre-defined coding scheme in the first cycle as well as an axial coding scheme in the second cycle of coding. We grouped codes to categories and then further abstracted them to concepts in a stepwise approach. Nascent themes from the data were constantly discussed with experts and members of the research group. We also split the interviews and coding work between two different researchers to avoid potential biases and influence on the research based on the interviewer. The analysis is based on grounded theory and is code-based, which means it is oriented towards the occurring themes and categories. To process the data resulting from the interviews we first conducted a within-case data analysis for each separate case before searching for patterns across them (Eisenhardt, 1989). Cross-case pattern searching consists of searching for similarities, differences or patterns across the different cases.

### **5. Results**

The findings section summarizes and presents how entrepreneurs in a B2B and ICT market in Berlin recognize the value and acquire external knowledge and the other important aspects emphasized in the interviews.

#### **[FIGURE 4 ABOUT HERE]**

Figure 4 provides a model of early AC based on the findings from the coding process.

#### **5.1 External knowledge sources**

First of all, interviewees expressed their thoughts on a wide range of sources used, and secondly, talked about different types of sources used. The questionnaire asks interviewees for a set of pre-determined sources based on findings from the literature. On the other hand, the entrepreneurs came up with additional sources they use.

The following sources have been stated repeatedly (in declining order, while \*indicates not explicitly asked for): customers, personal network, events, market\*, regulation, inter-industry,

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intra-industry, vicarious learning, suppliers, competitors, market research, scientific knowledge, employee grafting, advisors, internet, investors, databases, grafting, similar entrepreneurs\*, previously used sources\*, acquisition grafting and similar companies\*. This list illustrates the wide range of (partly overlapping) sources of external knowledge used by start-ups. This overlap is especially prevalent around market-related sources, entrepreneurial experience and the founder's personal network.

*“Most parts start with socializing with partners, contacts. You are meeting up with contacts, with people on events, specifically with those in the region. This is the first step, I think. Or if someone mentioned it, someone said hey you should get in contact with this person, this may be interesting for you, and after that we investigate the possible external knowledge that we can gain from this partner or this person.”* – Interviewee 12

Furthermore, the entrepreneurs highlighted that they recombine external knowledge with their own knowledge and use multiple and different sources to address different purposes and make better decisions. They especially emphasized that using multiple contexts of sources is required for solving different problems.

*“Always use all contexts, you need personal feedback, from friends, from competitors, from customers, from everybody, you need implicit or tacit or codified feedback, you have to do all. Success is something that comes not by luck, it's about giving all options a chance and the learning from the chances and having lots of opportunities and choosing the right opportunity and not just going one way *that would be stupid.*”* – Interviewee 4

Our study shows that start-ups use and learn most from external knowledge sources from the market and customers as a source of knowledge. This can provide direct feedback on a new product or feature, making sure the start-up develops in the right direction that is demanded by customers.

*“There is, for example, the conceptualization phase of a new product or a new feature. We are trying to draw from external knowledge, in this case customers as early as possible. As I said it lies at the heart of entrepreneurialism so it has to be in there.”* – Interviewee 1

In general, a higher number and heterogeneous sources are stated as better, as such sources allow one to deal with different external knowledge. Furthermore, finding the right external sources was stated as a central aspect in this discussion. And, the start-up should focus on a

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limited number of sources. One interviewee even stated that there is a danger of overloading the start-up with external knowledge:

*“It's got to be a balance, if you are just drawing too heavily on many different sources, you will see that they are probably contradict sometimes and I guess there is also some danger of overloading yourself with fresh and new knowledge. And at some point I guess it's better to stop acquiring knowledge and start building and then maybe going back again.”* – Interviewee 1

Despite the different sources, the entrepreneurs also talked about categories or types of sources that they access to learn from external knowledge. The most frequently stated form of how start-ups learn is on demand, when a problem or a need occurs.

These three pairs of external knowledge types were addressed and sorted by importance: problem based and general knowledge, codified and tacit knowledge and thirdly, formal and informal knowledge exchange.

*“Problem-oriented knowledge is more actionable, it's like, it's important in the right situation to know what you do. But general knowledge is also important, probably if you have the right knowledge you don't have to solve, you don't have the problem anymore.”* – Interviewee 3

Informal knowledge is described as a core source drawn upon by the entrepreneurs. They preferably use informal sources to access tacit and difficult to access knowledge. It is quickly and easily accessible, and often within the personal network. On the other hand, interviewees use formal sources of external knowledge, like associations or partners, for access to knowledge and long-term cooperation.

### **5.2 The influencing factors**

The analysis showed two relevant influencing factors that, as of now, have only been partly included in the concept of absorptive capacity, yet they are important for the way B2B start-ups learn. First of all, the entrepreneur's prior knowledge, formed through experience and education, was mentioned as an important factor that has already been included in the absorptive capacity concept. Interviewees further highlighted that critical reflection and a



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cognitive mindset are necessary requirements for successfully absorbing external knowledge and hence serve as influencing factors of the early dimensions of AC.

*“So of course I also try to question the person or the source as far as this is possible. And there, I would say, this is for sure coined by my prior education, that I don’t believe everybody and everything without questioning.” – Interviewee 2*

Additionally, the entrepreneurs explained that prior experience included internships, market development with their start-up or a previous experience as employee often in the same industry.

*“Once you do have experience, it's much easier for you to put a value on this source of external knowledge and thus being able to negotiate a price for it. In the beginning when you are completely new to a certain topic and you acquire external knowledge, you are willing to pay almost anything, just because you don't know better.” – Interviewee 17*

The analysis of the transcripts also uncovered that the entrepreneur’s own cognitive mindset emerges as an important pattern from the data. Moreover, they emphasize the importance of reflecting their own situation and their mindset towards external knowledge critically.

Interviewees provide a strong case for maintaining an open mindset towards – especially new – external knowledge, and stated that start-ups typically have a more open mindset compared to other companies.

### **5.3 Access to external knowledge**

The personal network forms one of the most fundamental sources of access to external knowledge. Besides the direct access to one’s personal network, this personal network enables one to get feedback in form of recommendations from one’s personal network and to get access to the contacts of the contacts in one’s network. That shows that the personal network increases the access to external knowledge significantly.

*“If you need human capital, if you are looking for new employees, if you are looking for partners, you can always use your social network to get first feedback on the trustworthiness or get a recommendation.” – Interviewee 14*

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Moreover, entrepreneurs distinguished between weak and strong ties within their personal network and stating both forms of ties to be important. In contrast to the personal network of entrepreneurs and the partner network, filters can act in the opposite way when trying to access external knowledge. This means that instead of increasing access to external knowledge, they act like a barrier or filter. The interviewees talked extensively about the following aspects as filters in declining order: geographic proximity, alliances, geographical market, path dependency, clusters, prior knowledge, social proximity, cognitive awareness, prior experience, organisational proximity and institutional proximity. Another point that some interviewees stated relates to reusing formerly successful sources. The reliance on established sources can be a threat to the start-up, particularly if the start-up does not screen alternatives, but uses the previously used sources as a standardized process.

*“Every time that you already know where you should go when you try to get your knowledge that kind of prevents you from maybe taking a step back and maybe assessing new sources. Practical example would be I have a problem with HR and I’m definitely going to call one of the other entrepreneurs that are within that circle of start-up friends instead of maybe trying to see there is a good workshop or there is some expert out there that I could talk to. If you have certain processes in drawing from external knowledge and these processes are kind of fixed than this kind of prevents you on taking a step back.”* – Interviewee 1

### **5.4 Triggers, direction and evaluation of external knowledge**

In order to describe the data we identified sub-dimensions of the core components of early AC: triggers, the direction of sourcing and the evaluation of the knowledge. These three sub-dimensions influence how firms recognize the value of external knowledge and acquire it. Triggers or signals refer to certain catalysts to recognize the value of external knowledge and to acquire external knowledge. The direction indicates the path or pattern in which a start-up is looking for external knowledge (search strategy). Different interviewees stated that direction, intensity and speed of sourcing external knowledge are highly correlated and often aligned towards the problems the start-up currently faces. Evaluation refers to the analysis of the data on how entrepreneurs assess the value of certain external knowledge and its sources.

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Table 1 summarizes the major findings for each of the sub-dimensions as mentioned in the interviews. Particularly, interviewees mentioned that they had problems differentiating between recognition of the value and acquisition of external knowledge for the sub-dimension trigger.

### [TABLE 1 ABOUT HERE]

An important trigger that was identified is when entrepreneurs realize that they are lacking knowledge in a certain area that is, or could become, important for them. Finally, an interesting trigger mentioned refers to the potential to increase value towards the customer:

*“If you say, ok we have developed this kind of tool and it would perfectly fit together with your tool, this could be an improvement for your customers and for our customers and then it's definitely a trigger, to say it's valuable knowledge and we should get in contact and speak about it.”* – Interviewee 12

Besides active triggers, the entrepreneurs also discussed passive triggers, where they passively came into contact with external knowledge and recognized the value of it. Trust was stated as an important trigger, especially when a source gets passively in contact with an entrepreneur. One interviewee stated that customers and business partners, as a source, trigger him to listen thoroughly:

*“Trigger is somebody of our customers gives us a hint, what we can improve in our product. That's quite of value, the customer speech, how to say, customer's voice. That's very important for us, or if a business partner gives us a recommendation.”* – Interviewee 10

For the acquisition of external knowledge, the data also provides different repeatedly stated active triggers. First of all, a large share stated that they focus their acquisition of external knowledge on actual problems the start-up is currently facing. Typically that means that start-ups are lacking internal resources to tackle the problem. So, facing such a problem in a B2B start-up will trigger an active acquisition of external knowledge. A frequently highlighted form of trigger for active acquisition is learning by doing, also known as experimental

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learning. In a way, this form describes a cognitive attitude of the interviewed entrepreneurs, to give new ideas a chance and test them if they can be successfully applied in their own situation. Entrepreneurs stated that systematic learning is the opposite pole, and that it is just rarely used. During and after the testing of these ideas, start-ups learn quickly and this form of learning allows them to evaluate from first-hand experience.

When setting the direction, the B2B ICT entrepreneurs were aiming to achieve validation for their product, find a fit with the market and assess the relevance to the current business.

One of the aspects that entrepreneurs mentioned in the interviews was that they set direction to recognize value in order to validate their business model and product proposition. Such a direction allows them to quickly improve their product, iterate on it and improve it to match customers' needs. At the beginning of a start-up's life under extreme uncertainty, one can only work with assumptions that require validation from the market.

*"You start with a certain assumption with a preposition and you think let's see if I can validate this and the first thing is to go out as early as possible and then draw from this external knowledge in order to iterate."* – Interviewee 1

An entrepreneur explained that his decisions are directed by frequency and size of the customer demand. On the other hand, others highlighted that only external knowledge from their target market in terms of geography and industry is relevant. And because of this relevance, a corresponding direction is chosen.

*"I think it's pretty dependent from the market in which you are operating, the direction. I don't know. I think if you are operating in the German market, it's pretty clear that you are focusing on German sources and if you are operating in B2B it's pretty clear that you have to focus on B2B as well"*. – Interviewee 11

The most important factor impacting the acquisition direction is the entrepreneurial problem-based approach. Even more interviewees stated that, when there is a current problem that the start-up is facing, this problem determines the direction.

Evaluation is of major importance in order to assess the potential and applicability of external knowledge (sources) and thus is a particularly difficult job for entrepreneurs. Entrepreneurs

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face the challenge of how to deal with certain external knowledge: whether to amplify or block out certain ideas and whether to stick to one's own ideas or to adapt to the external feedback.

Relatedness and relevance form the core of the evaluation criteria. In addition, prior success and experience, trust and recommendation, as well as tie strength are evaluation criteria that occur in the data. Tie strength plays a significant role in the evaluation of the value of external knowledge. Another repeating pattern in the interview data addresses trust and personal recommendation as a factor influencing the evaluation of the value of external knowledge. So knowledge that is recommended from somebody else, like a personal contact or an expert is evaluated better. Prior success addresses how successful the source has been in the past doing their business and sometimes just the perception of success is enough to more positively evaluate certain external knowledge from the source. According to the interviewees, the knowledge becomes more valuable the closer and the more relevant it is. Interviewee 14 gave an example of such a particularly valuable piece of external knowledge:

*“If it would be somebody who is in the exact same area that we are. Then any type of information, that this company has, or any type of business knowledge obviously is very close to our business as well. Therefore very valuable.”* – Interviewee 14

The following evaluation criteria for acquisition were found in the data analysis, ordered by an increasing frequency: validation, knowledge quality and reliability, acquisition efficiency and outcome orientation. First of all, such validation addresses the internal decisions a start-up has made, and in order to reduce market uncertainty the team tries to achieve validation. On the other hand, validation can be valuable for insights from an external source. Evaluation of the acquisition of external knowledge is better feasible depending on knowledge quality and reliability which in turn are mainly dependent on the attributes of the source. The efficiency of external knowledge acquisition plays an important role in two dimensions: the ease of the process of acquiring the knowledge and the efficiency of the final outcome for the start-up.

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Extending the previous argument of efficiency, the entrepreneurs frequently identified an outcome-orientation in evaluating their external knowledge acquisition. This orientation overlaps with the most important direction stated frequently by the interviewees, the problem-based direction, which aims at a solution for a specific problem. At the same time the most important acquisition trigger is learning by doing. That means the evaluation of acquired external knowledge can be best done at the end, when the outcome is achieved. For entrepreneurs whether the outcome is achieved or not forms a substantial decision criterion for evaluation.

*“You can’t evaluate the value in that moment, you get a feeling, if that’s good or bad, what you get as information there. Then you use that knowledge and apply it and you come to a conclusion. And just then you can actually qualify whether this knowledge has been good or bad. So there is no signal, you just have to do it.”* – Interviewee 15

### **6. Discussion and conclusions**

In today’s turbulent environment, start-ups face several barriers and challenges in effectively learning, integrating and adapting external knowledge. In this paper, we investigated the question how B2B start-ups recognize the value from external knowledge and eventually acquire it. Hence, we provide a more fine-grained understanding of the concept of early absorptive capacity in start-ups and suggest an extension to the framework by Todorova & Durisin (2007). Start-ups use different sources, forms and routines to acquire external knowledge compared to prior research on larger companies (Lewin et al., 2011). In larger companies AC often is strategically built up and the learning frequently takes place in formalized routines and with formalized sources which in B2B start-ups typically happens informally and is based on tacit problem-based knowledge exchanges. In contrast to the existing absorptive capacity model by Todorova & Durisin, we propose a new central dimension of absorptive capacity in the context of B2B start-ups, namely the access or connection to external knowledge. This dimension acts as a connecting tie between the (source of) external knowledge and the recognition of the value of external knowledge.

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Absorptive capacity is a firm-level construct that is deeply rooted in the individual member of the firm – this paper shows that based on the special requirements of B2B start-ups more research is needed on the individual-level since entrepreneurs' mindsets and capabilities might be of higher importance for the overall absorptive capacity than suggested by previous literature (Cohen & Levinthal, 1990; Zahra & George, 2002; Todorova & Durisin, 2007). This leaves room for further research by investigating whether “recognize” and “acquire” are necessarily part of a sequential process or whether they can both happen simultaneously. Future research should provide a process that adapts the concept of AC to the specific needs of start-ups and include a better working definition of “recognize the value”.

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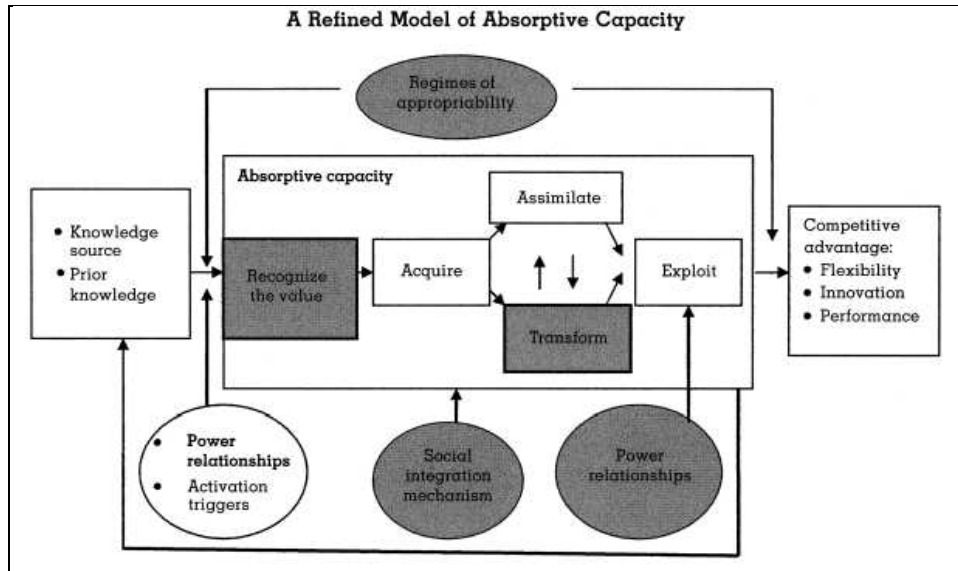
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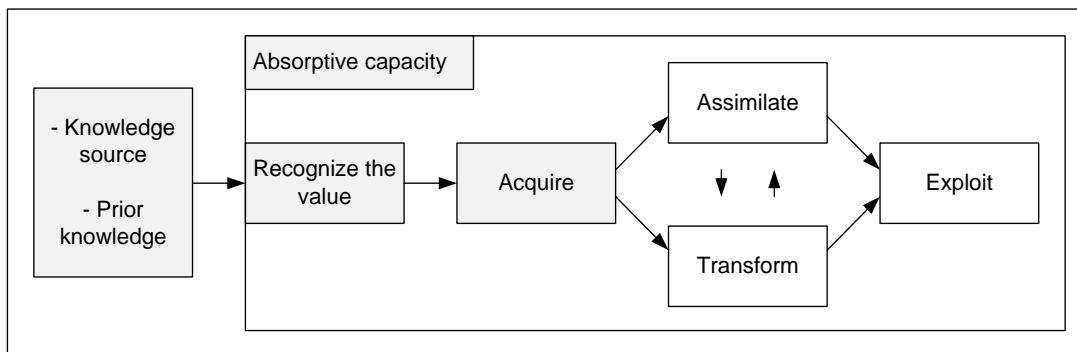
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**FIGURES AND TABLES**

**Figure 1: Refined model of absorptive capacity (taken from Todorova & Durisin, 2007)**



**Figure 2: Core components of the used absorptive capacity concept and the research focus of this thesis highlighted in grey (adapted from Todorova & Durisin, 2007)**

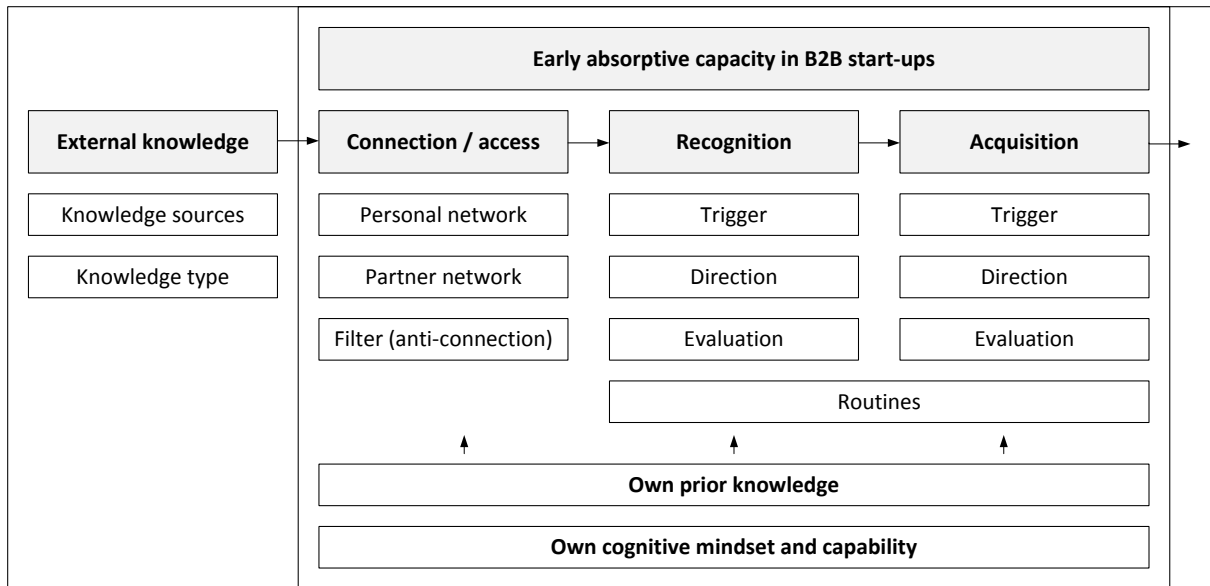


**Figure 3: Investigated aspects of early absorptive capacity dimensions**

Context: Early absorptive capacity in B2B Startups (IT-based in Berlin)	
Recognize the value of external knowledge	Acquisition of external knowledge
Investigated aspects: cognitive mindset, evaluation criteria, information filter, prior knowledge, proximity, routines, trigger, valuation.	Investigated aspects: channels, cognitive mindset, direction, intensity, prior investment, Prior knowledge, prior relationships, routines, sources, speed, trigger.

**Figure 4: Recurring patterns of early absorptive capacity stated by interviewees**

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**Table 1: Summary of major findings regarding two core dimensions of early AC**

	<b>Recognition of the value of external knowledge</b>	<b>Acquisition of external knowledge</b>
<b>Trigger</b>	<ul style="list-style-type: none"> <li>• Active: active sourcing, learning by doing</li> </ul>	
	<ul style="list-style-type: none"> <li>• Reactive: learning by doing, problem-based acting, trust</li> </ul>	
<b>Direction</b>	<ul style="list-style-type: none"> <li>• Product/Business model validation</li> </ul>	<ul style="list-style-type: none"> <li>• Business priority and a problem-based approach</li> </ul>
	<ul style="list-style-type: none"> <li>• Market fit</li> </ul>	<ul style="list-style-type: none"> <li>• Entrepreneur’s prior experience with acquisition of ext. knowledge</li> </ul>
	<ul style="list-style-type: none"> <li>• Business potential and market size</li> </ul>	<ul style="list-style-type: none"> <li>• Problem determines direction (relevance, urgency)</li> </ul>
	<ul style="list-style-type: none"> <li>• Relevance at a certain point in time</li> </ul>	
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Tie strength</li> </ul>	<ul style="list-style-type: none"> <li>• Validation</li> </ul>
	<ul style="list-style-type: none"> <li>• Trust and personal recommendation</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge quality and reliability</li> </ul>
	<ul style="list-style-type: none"> <li>• Relatedness and relevance</li> </ul>	<ul style="list-style-type: none"> <li>• Acquisition efficiency and outcome orientation</li> </ul>
		<ul style="list-style-type: none"> <li>• Learning by doing, gut feeling</li> </ul>