

2 The Conceptual Principles

With regard to the conceptual principles of absorptive capacity, section 2.1.1 first points out how absorptive capacity serves as an important performance-enhancing layer for SMEs. Next, section 2.1.2 explains what role the knowledge source and complementarity and experience as the key antecedents of absorptive capacity play for the two subsets of absorptive capacity, namely ‘potential absorptive capacity’ and ‘realized absorptive capacity’, which are described in section 2.1.3. In the end, section 2.1.4 explains in more detail that these two subsets consist of the four capabilities — acquisition, assimilation, transformation and exploitation — of the model of absorptive capacity, based on *Zahra & George* (2002), before discussing the conceptual principles of organizational culture.

According *Schein’s* (1984 & 1990) definition, organizational culture manifests itself at three levels: observable artifacts, values and basic underlying assumptions. Section 2.2.1 explains these three levels of organizational culture. Next, section 2.2.2 explains approaches to organizational culture. Section 2.2.3 explains one special approach, a knowledge-friendly organizational culture approach of organizational culture, as the designated approach of this thesis.

2.1 The Conceptual Principles of Absorptive Capacity

Although *Kedia & Bhagat* (1988) first coined the term ‘absorptive capacity’ in their study of the cultural constraints on transfer of technology across nations, the contribution by *Cohen & Levinthal* (1990) is generally accepted as the founding paper on absorptive capacity (cf. Volberda et al. 2010, p. 932). *Cohen & Levinthal* (1989 & 1990) link a firms’ R&D availability to its learning and innovative capabilities and therefore established a concept that is accepted as “a

key concept for the literature on knowledge and innovation management of the past two decades” (Flatten, Greve & Brettel 2011b, p. 137)¹⁹.

Cohen & Levinthal (1990) define absorptive capacity as “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal 1990, p. 128). This definition highlights three steps of absorptive capacity, namely, knowledge recognition, knowledge assimilation and knowledge exploitation to commercial ends. Several re-conceptualizations of this original absorptive capacity construct by *Cohen & Levinthal* (1990) have appeared in the literature since 1990 (e.g., Lane et al. 2006, Todorova & Durisin 2007, Zahra & George 2002). For example, *Mowery & Oxley* (1995) propose that absorptive capacity “includes a broad array of skills, reflecting the need to deal with the tacit components of the transferred technology, as well as the frequent need to modify a foreign-sourced technology for domestic applications” (Mowery & Oxley 1995, S 81). *Zahra & George* (2002) analyze this and further definitions of absorptive capacity and concluded by referencing *Cohen & Levinthal* (1990), *Kim* (1998) and *Mowery & Oxley* (1995) for the proposition that absorptive capacity is “a multidimensional construct involving the ability to value, assimilate, and apply knowledge [...] or is a combination of effort and knowledge bases” (Zahra & George 2002, p. 186). They highlight absorptive capacity “as a dynamic capability pertaining to knowledge creation and utilization that enhances a firm’s ability to gain and sustain competitive advantage” (Zahra & George 2002, p. 185).

After reviewing the work on absorptive capacity in the past, *Zahra & George* (2002) reconceptualize original work by *Cohen & Levinthal* (1990) in developing their model of absorptive capacity (cf. Figure 3). They define absorptive capacity as “the set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic capability” (Zahra & George 2002, p. 186). Their definition and model of

¹⁹ The terms ‘construct’ and ‘concept’ are used synonymously throughout this thesis.

absorptive capacity is characterized by three changes in the key antecedents, moderators and outcomes of the construct, its components and its capabilities, which are described in sections 2.1.2 through 2.1.4.

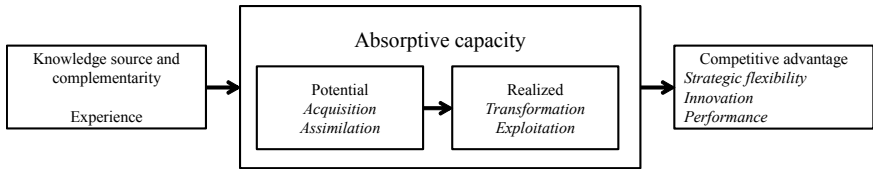


Figure 3 A Model of Absorptive Capacity²⁰

The model of absorptive capacity by *Zahra & George (2002)* is used as the basis model for this thesis. Before the model is explained in more detail, the relationship among the capabilities of absorptive capacity, competitive advantage and firm performance in SMEs is discussed in the following section 2.1.1 because it has already been addressed several times that absorptive capacity serves as an important performance-enhancing lever for SMEs.

2.1.1 The Relationship between Absorptive Capacity and Firm Performance

Organizational resources and capabilities that lead to competitive advantage are both valuable and unlikely to be available from others. This statement has been supported by *Barney (1991)*: “A firm is said to have a *sustained competitive advantage* when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors *and* when these other

²⁰ Author’s own figure, referencing *Zahra & George (2002, p. 192)*; the moderators of absorptive capacity (activation triggers, social integration mechanisms and regimes of appropriability) are not depicted because they are not the focus of this thesis. They are described in detail in *Zahra & George (2002, p. 192 f.)*.

firms are unable to duplicate the benefits of this strategy” (Barney 1991, p. 102). Absorptive capacity is a bundle of knowledge-based capabilities and can be a source of a firm’s competitive advantage because differences in firms’ utilization of organizational resources and capabilities impact performance (cf. Zahra & George 2002, p. 195).

According to the model of absorptive capacity by *Zahra & George* (2002), firms can achieve competitive advantage through innovation and strategic flexibility, and therefore, realized absorptive capacity influences a firm’s performance through product and process innovation (cf. *Zahra & George* 2002, p. 195). Transformation capabilities help firms to develop new perceptual schema or changes to existing processes²¹. Exploitation capabilities help firms to convert knowledge into new products and services²².

SMEs often have to deal with a lack of resources and capabilities that are required to complete those processes that generate long-term competitive advantages. As an example of external knowledge sources, strategic alliances present a good opportunity to overcome this deficiency through sharing costs and risks²³. Due to their lack of resources and capabilities, SMEs typically cannot heavily invest in R&D activities, but engagement in strategic alliances is a way to develop and expand an SME’s knowledge base without making a large investment (cf. *Flatten et al.* 2011, p. 139). *Flatten et al.* (2011b) find some multifaceted relationships between strategic alliances, absorptive capacity and firm performance: “Strategic alliances have a strong effect on firm performance, while ACAP influences both firm performance and success of strategic alliances” (*Flatten et al.* 2011b, p. 146)²⁴. To provide further detail, their findings imply that firms with a barely developed absorptive capacity cannot handle external knowledge as successfully as firms with a highly developed absorptive ca-

²¹ Transformation capabilities are explained in detail in section 3.2.1.3.

²² Exploitation capabilities are explained in detail in section 3.2.1.4.

²³ External knowledge sources are explained in detail in section 2.1.2.

²⁴ ‘ACAP’ is an abbreviation of ‘absorptive capacity’.

capacity and therefore, they differ with regard to their ability to enhance their performance by engaging in strategic alliances: “SMEs with a well-developed ACAP can additionally use it as an instrument to improve the effectiveness of strategic alliances, and thus enhance firm performance” (Flatten et al. 2011b, p. 147).

To summarize, absorptive capacity serves as an important performance-enhancing lever for SMEs, which typically have a lack of internal resources and therefore tend to depend heavily on absorptive capacity because external knowledge absorption is a critical factor for competitiveness.

The following sections explain the model of absorptive capacity by *Zahra & George* (2002). In their model, external sources of knowledge and experience are the key antecedents of absorptive capacity. Both antecedents are explained in the following section 2.1.2.

2.1.2 Antecedents of Absorptive Capacity

A firm’s attempt to acquire knowledge from external sources is based on an idea the firm has for an application for a new product or service, but about which the firm lacks relevant knowledge (cf. Lichtenthaler & Lichtenthaler 2012, p. 161). External knowledge sources include acquisitions (e.g., Chaudhuri & Tabrizi 1999), communications (e.g., Levine, Higgins & Choi 2000, Stasser, Vaughan & Stewart 2000, Warkentin & Beranek 1999), interactions with suppliers and customers (e.g., von Hippel 1988), interorganizational relationships, including R&D consortia, strategic alliances and joint ventures (e.g., Baum & Ingram 1998, Darr, Argote & Epple 1995, Das & Teng 1998, Ding, et al. 2009, Lane & Lubatkin 1998, Larsson, Bengtsson, Henriksson & Sparks 1998, McEvily & Zaheer 1999, Powell et al. 1996, Simonin 1999, Vermeulen & Barkema 2001), observations (e.g., Nonaka, Umemoto & Senoo 1996), patents (e.g., Appleyard 1996), purchasing through licensing and contractual agreements (e.g., Granstrand & Sjölander 1990), staff transfers (e.g., Almeida & Kogout 1999,

Gruenfeld, Martorana & Elliott 2000) and training measures (e.g., Moreland & Myaskovsky 2000, Thompson et al. 2000). *Maurer & Tiwana* (2012) highlight that the efficient integration of knowledge from multiple sources results in greater performance than relying solely on internal knowledge (cf. Maurer & Tiwana 2012, p. 4). These multiple sources are summarized in Table 1.

Table 1 External Knowledge Sources²⁵

Source	Author
Acquisitions	e.g., <i>Chaudhuri & Tabrizi</i> (1999)
Communications	e.g., <i>Levine et al.</i> (2000), <i>Stasser, Vaughan & Stewart</i> (2000), <i>Warkentin & Beranek</i> (1999)
Interactions with suppliers and customers	e.g., von Hippel (1988)
Interorganizational relationships	e.g., <i>Baum & Ingram</i> (1998), <i>Darr et al.</i> (1995), <i>Das & Teng</i> (1998), <i>Ding et al.</i> (2009), <i>Lane & Lubatkin</i> (1998), <i>Larsson et al.</i> (1998), <i>McEvily & Zaheer</i> (1999), <i>Powell et al.</i> (1996), <i>Simonin</i> (1999), <i>Vermeulen & Barkema</i> (2001)
Observations	e.g., <i>Nonaka et al.</i> (1996)
Patents	e.g., <i>Appleyard</i> (1996)
Purchasing through licensing and contractual agreements	e.g., <i>Granstrand & Sjölander</i> (1990)
Staff transfers	e.g., <i>Almeida & Kogout</i> (1999), <i>Gruenfeld et al.</i> (2000)
Training measures	e.g., <i>Moreland & Myaskovsky</i> (2000), <i>Thompson et al.</i> (2000)

Firms can acquire knowledge from different external knowledge sources, and the diversity of these sources significantly influences the acquisition and assimilation capabilities and therefore, a firm's potential absorptive capacity (cf. Zahra & George 2002, p. 191 f.).

²⁵ Author's own table.

To absorb external knowledge that will enhance a firm's stock of knowledge to achieve competitive advantage, a firm needs absorptive capacity. The ability to absorb knowledge depends on a firm's experience because this ability is largely a function of the level of prior related knowledge (cf. Cohen & Levinthal 1990, p. 129). *Rosenkopf & Nerkar* (2001) point out that a firm's assimilation capability is strongly associated with its past R&D activity (cf. *Rosenkopf & Nerkar* 2001, p. 287). It is important that a firm's local search is affected by past experience because its R&D activities are closely related to previous R&D activities (cf. *Rosenkopf & Nerkar* 2001, p. 287). Directing areas of a local knowledge search to past experience in which the firm has had past success influences the development of future acquisition capabilities (cf. *Zahra & George* 2002, p. 193).

In addition to experience, a further key for the absorption of knowledge is path dependency (cf. Cohen & Levinthal 1990, p. 135). *Zahra & George* (2002) highlight the role of the path dependency of absorptive capacity because relevant prior knowledge forms the content of a firm's absorptive capacity (cf. *Zahra & George* 2002, p. 191). In the literature, the path dependency of absorptive capacity is widely acknowledged by researchers such as *Cohen & Levinthal* (1990) and *Lane et al.* (2006), as *Lichtenthaler & Lichtenthaler* (2012) highlight because prior knowledge in a particular field determines a firm's ability to profit from external knowledge in that field (cf. *Lichtenthaler & Lichtenthaler* 2012, p. 162). Prior knowledge permits the absorption of new knowledge (cf. Cohen & Levinthal 1990, p. 135 f.). Therefore, it is important that some prior knowledge be very closely related to the new knowledge to facilitate the absorption of external knowledge. This can be explained as follows: "Accumulating absorptive capacity in one period will permit its more efficient accumulation in the next. By having already developed some absorptive capacity in a particular area, a firm may more readily accumulate what additional knowledge it needs in the subsequent periods in order to exploit any critical external knowledge that may become available" (Cohen & Levinthal 1990, p. 135 f.).

In summary, a firm's prior knowledge enables it to add value to incoming factors of production, namely external knowledge, in a unique manner that allows the firm to gain competitive advantage (cf. Spender 1996, p. 45). *Spender* (1996) points this out as follows: "So long as we assume markets are reasonably efficient and that competitive advantage is not wholly the consequence of asymmetric information about those markets or the stupidity of others, these rent-yielding capabilities must originate within the firm if they are to be of value. Since the origin of all tangible resources lies outside the firm, it follows that competitive advantage is more likely to arise from the intangible firm-specific knowledge which enables it to add value to the incoming factors of production in a relatively unique manner" (Spender 1996, p. 45).

In section 2.1.3, the components of absorptive capacity, which are essential to developing and increasing the knowledge base of a firm, are explained.

2.1.3 Components of Absorptive Capacity

Zahra & George (2002) ascertain that absorptive capacity consists of two components: potential absorptive capacity and realized absorptive capacity (cf. *Zahra & George* 2002, p. 190). These two components of absorptive capacity have different value-creating potentials: Potential capacity centers on the acquisition and assimilation capability of knowledge and realized capacity centers on the transformation and exploitation capability of knowledge (cf. *Zahra & George* 2002, p. 185). Furthermore, potential absorptive capacity and realized absorptive capacity have different but complementary roles by coexisting at all times and fulfilling a necessary but insufficient condition to improve a firm's competitive advantage (cf. *Zahra & George* 2002, p. 190). *Zahra & George* (2002) give the example that on the one hand, firms cannot possibly exploit knowledge without first acquiring it, but on the other hand, the capability to transform and exploit knowledge for profit generation might be missing after successful

knowledge acquisition and assimilation, so that high potential absorptive capacity does not necessarily imply enhanced performance (cf. Zahra & George 2002, p. 190).

The theoretical distinction between potential and realized absorptive capacity is important for three reasons related to the evaluation of the contributions for a firm's competitive advantage²⁶:

1. It can be explained through inefficiency in leveraging potential absorptive capacity and therefore, missing performance improvements, why certain firms are more efficient than others in using absorptive capacity. Therefore, it is possible to compare the different contributions of the potential and realized absorptive capacity to building the firm's competitive advantage.
2. Different managerial roles that are necessary to nurture and harvest the two components of absorptive capacity can be examined.
3. The distinction between potential and realized absorptive capacity provides a basis for observing and examining the fluid and nonlinear paths that organizations may follow in developing their core competencies, and it is possible to study why some firms fail because of changes in their external environments.

Section 2.1.4 explains the several capabilities of potential and realized absorptive capacity.

2.1.4 Capabilities of Absorptive Capacity

In comparison to *Cohen & Levinthal* (1989), who define absorptive capacity as an ability that facilitates the accumulation and subsequent use of knowledge, *Zahra & George* (2002) broaden the concept of absorptive capacity, because the exploitation of externally acquired knowledge usually requires the conversion of

²⁶ Cf. *Zahra & George* (2002, p. 190), extends to the listing.

its content into a usable form (cf. Flatten et al. 2011a, p. 98). They broaden this concept from the original three capabilities of *Cohen & Levinthal* (1989), namely identification, assimilation, and exploitation, to four capabilities, namely acquisition and assimilation, both building the potential absorptive capacity, and transformation and exploitation, both building the potential realized capacity (cf. Figure 4).

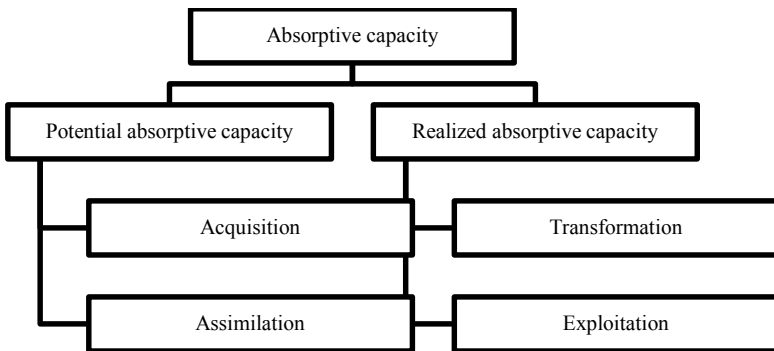


Figure 4 Capabilities of Absorptive Capacity²⁷

The four capabilities can be described as follows²⁸:

- The **acquisition capability** refers to a firm's capability to identify and acquire knowledge relevant to a company's operations from external knowledge sources (cf. Flatten et al. 2011a, p. 100, cf. Flatten et al. 2011b, p. 138, cf. Zahra & George 2002, p. 189). Prior knowledge is considered as a prerequisite in this process that positively influences

²⁷ Author's own figure.

²⁸ A detailed description of the four capabilities of absorptive capacity follows in section 3.2.1, which describes the parameters of the model. Cf. the description of the capabilities of absorptive capacity in *Ivens, Zerwas & Schaarschmidt* (2014).

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