Absorptive capacity in startups: A systematic literature review

Ximena Alejandra Flechas Chaparro1, Ricardo Kozesinski2, and Alceu Salles Camargo Júnior3

Abstract

Purpose: Several scholars have pointed out that absorptive capacity (AC) is critical for the innovation process in large firms. However, many other authors consider startups as key drivers for innovation in the current global economy. Therefore, this article aims to identify how the concept of AC has been addressed in the new venture context.

Methodology: A systematic literature review analyzing 220 papers published between 2001 and 2018.

Findings: The systematic literature review identifies three clusters of research addressing AC in startups: Knowledge, Innovation, and Performance, along with the central authors of the discussion, the main contributions, theoretical references, and their future research agenda guidelines.

Implications for theory and practice: This study contributes to the innovation and entrepreneurship literature by connecting the importance of AC and new venture creation, and providing a better understanding of how entrepreneurs could enhance their innovative processes.

Originality and value: Based on the analysis of the literature review, a framework that differentiates knowledge acquisition strategies for new ventures was created. The framework categorizes the strategies according to the knowledge source (i.e., internal or external) and the degree of intentionality (i.e., formal or informal).

Keywords: innovation, absorptive capacity, startups, new ventures, entrepreneurship

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Received 10 September 2019; Revised 12 February 2020, 25 March 2020, 29 May 2020, 8 December 2020; Accepted 15 December 2020.

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Journal of Entrepreneurship, Management and Innovation
Volume 17, Issue 1, 2021: 57-95
INTRODUCTION

Absorptive capacity (AC) is defined by Cohen and Levinthal (1990) as the ability to recognize, identify, assimilate and exploit new external information, and is considered to be critical for the innovation process. Zahra and George (2002, p. 186) defined AC as a “set of organizational routines and processes” including acquisition (to identify and obtain external knowledge), assimilation (to interpret and understand the information obtained), transformation (to integrate and combine existent knowledge with the newly acquired), and exploitation (the application of new knowledge for commercial ends). This ability involves renewing routines, practices, technological paths (March, 1991; McGrath, 2001), but in particular, it involves a learning process (Lane, Koka, & Pathak, 2006).

Previous works have addressed extensively how organizations might benefit from AC. For instance, Patterson and Ambrosini (2015) explored how AC could be configured to support research activities in biopharmaceutical firms, Engelen and colleagues (2014) identified how AC contributes to the strengthening of the entrepreneurial orientation and a firm’s performance relationship, and Lis and Sudolska (2015) studied what role AC plays in organizational growth and competitive advantage. The large number of theoretical and empirical publications addressing the AC construct over the past 30 years has also led to a number of literature reviews with different aims, such as revalidating and reconceptualizing the construct (e.g., Lane et al., 2006; Zahra & George, 2002), identifying major discrepancies among AC’s theoretical perspectives (e.g., Volberda, Foss, & Lyles, 2010), and analyzing the multifaceted dimensions of AC literature (e.g., Apriliyanti & Alon, 2017).

However, unlike these past reviews, in the present study, we propose to analyze AC in the context of new ventures, mainly due to two factors. First, because several authors have argued that startups are better suited to develop radical innovation (Bower & Christensen, 1995; Edison, Smørsågård, Wang, & Abrahamsson, 2018; Spencer & Kirchhoff, 2006). According to Giardino et al. (2014, p. 28), startups are entities “exploring new business opportunities, working to solve a problem where the solution is not well known and the market is highly volatile.” These organizations are characterized by a lack of resources, rapid evolution, small teams, little working experience, third-party dependency, and work under several uncertainties (Giardino et al., 2014). Despite the shortcomings associated with the scarcity of resources and experience (Ambos & Birkinshaw, 2010), these firms are able to launch innovative products and become a ‘game-changer’ in traditional industries, putting incumbent firms under pressure (Edison et al., 2018; Sirén, Hakala, Wincent, & Grichnik, 2017). Second, because, despite being game-changers,
Startups operating in technology-intensive industries suffer the permanent threat of premature obsolescence since—and considering the high level of uncertainty—these companies often bet on ‘failed technologies’ (i.e., those technologies that result not to be the ones adopted by the market (Eggers, 2012) and to survive, they must revamp their knowledge to adjust their solutions for which the AC may be crucial. Therefore, we identified a necessity to analyze AC literature within the context of new ventures in order to better understand which topics have been studied in this regard, and try to identify which aspects can be extracted from the main findings to contribute to some extent to the improvement of entrepreneurs’ processes of knowledge renewal and innovation.

The aim of our research is to determine how the concept of AC has been addressed in the new venture context by identifying the clusters of research, the main authors, and findings. To this end, we proceeded to conduct a systematic literature review analyzing 220 papers published between 2001 and 2018. Three clusters of research regarding the importance of AC in the new venture context were identified: Knowledge, Innovation, and Performance. In addition, the central authors of the discussion were reviewed, including their main contributions, theoretical references, and future research agenda.

The text is structured as follows: section 2 reviews the concepts and discussions about dynamic capabilities and new ventures, followed by the methodology in section 3. Our results are presented in section 4, including the bibliometric and content analyses. In section 5, we discuss the findings, and the last section contains the conclusions and suggestions for future research.

**LITERATURE BACKGROUND**

Authors such as Zahra and George (2002) and Engelen et al. (2014) have recognized AC as a dynamic capability. Dynamic capabilities (DC) enable the firm to evolve and positively influence its competitive advantage (Zahra & George, 2002, p. 185). Given that the present study seeks to connect concepts from the strategic management (i.e., AC and DC) and entrepreneurship fields, it is important to discuss in which way this interaction could be addressed considering the still ongoing debate about these concerns (Arend, 2014). Teece, Pisano, and Shuen (1997, p. 516) defined DC as “the firm’s ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments.” DC is tied to the resource-based theory, in which firms’ differences, such as resources, skills or endowments, are key aspects that help companies to create a sustainable competitive advantage (Barney, 1991). However, DC complements the resource-based theory by
providing the abilities for controlling, configuring, and reconfiguring the resources for long-term survival.

According to Teece et al. (1997), resources and assets are arranged in integrated groups of individuals that perform the firms’ activities or routines. In other words, through functions, routines, and competences, firms take advantage of their resources. However, differently from incumbent firms, new ventures lack functions and routines, so they need to rely broadly on team members’ and entrepreneurs’ idiosyncratic knowledge to operate (Bergh, Thorgren, & Wincent, 2011). In this regard, literature offers some examples of how DC has been addressed focused on individuals. For instance, Teece (2012) points out that there is a group of DC that is based on the individual “skills and knowledge of one or a few executives rather than on organizational routines” (Teece, 2012, p.1). According to the author, capabilities are built jointly by individual skills and collective learning originating from employees working together. In addition, the author notes that entrepreneurial management, besides being concerned about the improvement of existent routines, is more about creating new ones and figuring out new opportunities. Finally, Teece mentioned that the dependency on individual skills usually fades over time after five or ten years.

The individual approach in DC is associated with the concept of micro-foundations, which are one of the aspects that undergird the capabilities. According to Teece (2007, p. 1319), micro-foundations are the mechanisms through which sensing, seizing, and reconfiguring capacities operate; these include “the distinct skills, processes, procedures, organizational structures, decision rules, and disciplines.” Certainly, all these mechanisms widely depend on individual cognition (Helfat & Peteraf, 2015) and individuals’ extant knowledge (Teece, 2007). Helfat and Peteraf (2015) suggest that individual cognitive capabilities may mediate the relationship between changes in the organizational environment and strategic changes, and, therefore, individuals (by the effect of their own capacities) can reshape their organizations.

Several scholars have also discussed DC from the entrepreneurship perspective (for instance, Arend, 2014; Arthurs & Busenitz, 2006; Boccardelli & Magnusson, 2006; Newbert, 2005; Zahra, Sapienza, & Davidsson, 2006). These works offer different alternatives to connect both of the research strands (i.e., DC and entrepreneurship). For instance, Newbert (2005) proposes the new firm formation process as a dynamic capability, based on a random sample of 817 entrepreneurs; he concludes that there is evidence to support that new firm creation meets the DC conditions placed by Eisenhardt and Martin (2000) (i.e., identifiable, unique, deals with market dynamism, and is affected by learning). Arthurs and Busenitz (2006) set out that after the opportunity identification, when entrepreneurial leadership starts to transition to a more
formal type of management, new ventures need to develop new skills— as mentioned by Teece (2012)— through the usage of DC. Furthermore, Arend (2014) found out that most entrepreneurial ventures have been created based on DC from the beginning, and mainly on an individual level.

RESEARCH METHODS

With the aim of determining how the concept of AC has been addressed in the startups’ context, we conducted a systematic literature review (SLR). This methodology is a rigorous and well-defined approach that enables the identification of the current knowledge and what is known about a given topic (Boell & Cecez-Kecmanovic, 2015). Following Denyer and Neely (2004), we endeavored to develop an accurate process considering the planning, the use of explicit and reproducible selection criteria, and an analysis procedure. Figure 1 summarizes our systematic review process.

Figure 1. Summary of the systematic review process

Planning the SLR

During the planning phase, we determined the purposes of the research and its most important aspects. Our main goal was to identify how past research employed AC in an entrepreneurship and startups context. We did not limit the research to any specific time frame and only peer-reviewed articles were included. We conducted a search in September 2018 on the Web of Science (WOS, Clarivate Analytics) database since it is one of the most complete peer-
review journal repositories on social sciences (Crossan & Apaydin, 2010). We defined two subject areas, “Management” and “Business,” and searched in all the indexes provided on WOS (SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, and ESCI). Given the wide diversity of terms and morphological variety to refer to a “recently created innovative company”, we applied the following Boolean search keywords: “((absorptive capacity) AND (“startup” OR “start-up” OR “start up” OR “new firm*” OR “NTBF” OR “new venture” OR “entrepreneur*”))” in the Topic (title, keywords or abstract) category.

Sampling process

The search returned 358 papers. An exclusion filter was applied to select only documents that address AC in the context of entrepreneurship, on the basis of a thorough reading of titles and abstracts. In order to minimize bias in this filter parameter, the documents were reviewed in two rounds by the researchers. The final search process yielded 220 documents published between 2001 and 2018.

Data analysis

We performed bibliometric and statistical analyses to provide an overview of the literature, including the publications per year and the main journals. We also carried out a network analysis employing the VOSviewer 1.6.9 Software. The data was extracted directly from WOS, including all the information items (e.g., title, abstract, keywords, publication year, cited references, etc.). Then, we manually removed the non-related documents using Microsoft Excel. These data were exported to a text file (*.txt) and imported to VOSviewer to create the co-occurrence and co-citation networks in order to identify the main theoretical references and central discussions. We used the default settings of the program, as presented in Table 1.

Table 1. Default settings of VOSviewer

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counting method</td>
<td>Full counting</td>
</tr>
<tr>
<td>Method of normalization</td>
<td>Association strength</td>
</tr>
<tr>
<td>Layout of attraction repulsion</td>
<td>2</td>
</tr>
<tr>
<td>Layout of repulsion</td>
<td>0</td>
</tr>
<tr>
<td>Clustering resolution</td>
<td>1.00</td>
</tr>
<tr>
<td>Minimum size of clusters</td>
<td>1</td>
</tr>
<tr>
<td>Merging small clusters</td>
<td>Switched on</td>
</tr>
</tbody>
</table>

Exploring the Link Between Entrepreneurial Capabilities, Cognition, and Behaviors
Marta Gancarczyk & Anna Ujwary-Gil (Eds.)
Based on the all keywords co-occurrence network, we identified three clusters of lines of research: knowledge, innovation, and performance. Afterward, we proceeded to classify all the papers of our database into these three clusters using Microsoft Excel. After reading the documents, we selected the most relevant articles that matched the research goal and the clustering parameter as well. A total of 50 papers satisfied these parameters and are discussed in the content analysis. The documents were manually coded using the Mendeley Desktop 1.19 software and Microsoft Excel, considering the following aspects: 1) Authors, 2) Year of publication, 3) Journal, 4) Type of article, 5) Aim of research, 6) Relevance of absorptive capacity, 7) Methodology, sample, and variables, 8) Findings, and 9) Future research agenda. We provide a detailed explanation of the coding process in Appendix A (Knowledge cluster; Innovation cluster; Performance cluster.)

RESULTS

Bibliometric and descriptive analyses

Figure 2 shows the evolution of publications over time. It is observed that the earliest paper in the sample was published in 2001; from 2009, there is an increase in the number of publications, reaching a peak in 2015 with 26 publications. The 220 articles are distributed over 77 journals. Table 2 shows the most representative journals accounting for about 60 percent of the sample.

![Figure 2. Number of papers published on AC and Startups over time](image-url)
Table 2. Most common outlet journals

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Title</th>
<th>Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>JBV</td>
<td>JOURNAL OF BUSINESS VENTURING</td>
<td>16</td>
</tr>
<tr>
<td>SEJ</td>
<td>STRATEGIC ENTREPRENEURSHIP JOURNAL</td>
<td>12</td>
</tr>
<tr>
<td>ET&amp;P</td>
<td>ENTREPRENEURSHIP THEORY AND PRACTICE</td>
<td>11</td>
</tr>
<tr>
<td>JSBM</td>
<td>JOURNAL OF SMALL BUSINESS MANAGEMENT</td>
<td>11</td>
</tr>
<tr>
<td>IBR</td>
<td>INTERNATIONAL BUSINESS REVIEW</td>
<td>10</td>
</tr>
<tr>
<td>RP</td>
<td>RESEARCH POLICY</td>
<td>10</td>
</tr>
<tr>
<td>SBE</td>
<td>SMALL BUSINESS ECONOMICS</td>
<td>9</td>
</tr>
<tr>
<td>ERD</td>
<td>ENTREPRENEURSHIP AND REGIONAL DEVELOPMENT</td>
<td>7</td>
</tr>
<tr>
<td>JWB</td>
<td>JOURNAL OF WORLD BUSINESS</td>
<td>7</td>
</tr>
<tr>
<td>JTT</td>
<td>JOURNAL OF TECHNOLOGY TRANSFER</td>
<td>6</td>
</tr>
<tr>
<td>R&amp;DMANAGE</td>
<td>R &amp; D MANAGEMENT</td>
<td>6</td>
</tr>
<tr>
<td>SMJ</td>
<td>STRATEGIC MANAGEMENT JOURNAL</td>
<td>6</td>
</tr>
<tr>
<td>IJTM</td>
<td>INTERNATIONAL JOURNAL OF TECHNOLOGY MANAGEMENT</td>
<td>5</td>
</tr>
<tr>
<td>JMS</td>
<td>JOURNAL OF MANAGEMENT STUDIES</td>
<td>5</td>
</tr>
<tr>
<td>EMJ</td>
<td>EUROPEAN MANAGEMENT JOURNAL</td>
<td>4</td>
</tr>
<tr>
<td>IMM</td>
<td>INDUSTRIAL MARKETING MANAGEMENT</td>
<td>4</td>
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<tr>
<td>ISBJ</td>
<td>INTERNATIONAL SMALL BUSINESS JOURNAL</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>Total:</strong></td>
<td><strong>133</strong></td>
</tr>
</tbody>
</table>

In order to identify the central authors, we performed a co-citation analysis based on cited authors. This analysis builds a network based on the citation link (where one item cites the other). We set this parameter to a minimum of “40 citations of an author,” resulting in 41 central authors, as seen in Figure 3.

The map shows the number of citation links (represented by the number of lines) and the link strength (represented by the distance between items), which refers to a similarity measure normalized by the association strength (van Eck & Waltman, 2010). Zahra S. is the author with the most citation links (412) and total link strength (6082) followed by Cohen W. with 233 and 3067, respectively. The number of links and total link strength of the central authors is displayed in Table 3.
Figure 3. Co-citation author network

Table 3. Citation link and link strength of the co-citation author network

<table>
<thead>
<tr>
<th>Author</th>
<th>Citation link</th>
<th>Link strength</th>
<th>Author</th>
<th>Citation link</th>
<th>Link strength</th>
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<td>Knight G.</td>
<td>47</td>
<td>914</td>
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</table>
Top 10 Co-citation references network

We also built another co-citation network but based on the analysis of cited references to find commonalities in the theoretical background. The resultant network, exhibited in Figure 4, contains the top ten cited references. We present a brief description of these publications below.

Figure 4. Top 10 Co-citation references network

Cohen and Levinthal (1990, p. 128) introduced the term AC to refer to the “ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends.” The authors argue that AC is critical to the firms’ innovative capabilities, and it requires prior related knowledge to evaluate and utilize the outside new knowledge. Similarly, March (1991, p. 83) suggested that knowledge “makes performance more reliable,” and learning and technological changes might improve competitive advantage. In this study, March popularized the idea that firms must enhance their technological explorative and exploitative abilities and look for a balance between them in order to ensure survival and achieve better performance. In this regard, Barney (1991), aiming for a more comprehensive understanding of sustained competitive advantage, proposed that some resources and characteristics (such as heterogeneity, valuable, rareness, or inimitableness) are crucial for a firm’s competitiveness, and they may vary over time.
To Kogut and Zander (1992), one central aspect of the competitive dimension is the ability to transfer knowledge within the firm. The authors drew on the perspective that organizations are repositories of tacit and explicit knowledge, skills, and social networks, which enable companies to learn new abilities by recombining their existent resources and capabilities. In this same vein, Grant (1996) explores how to integrate the specialized knowledge of individuals into firms. Drawing on the resource-based theory, Grant (1996, p. 110) conceptualizes the knowledge-based view as a new perspective to understand a company, placing knowledge as “the most strategically important of the firm’s resources.” Additionally, he identified the key characteristics of knowledge in order to create value: transferability (the capacity of transference across individuals), capacity of aggregation (the potential to add new knowledge to the existing one), and appropriability (the ability of the owner of a resource to receive a return).

Alternatively, Lumpkin and Dess (1996) explore the relationship between entrepreneurial orientation (EO) and firm performance. The authors defined EO as the practices, processes, and decision-making activities that lead the firm to enter new or existing markets, and is characterized by the “propensity to act autonomously, a willingness to innovate and take risks, and a tendency to be aggressive toward competitors and proactive relative to marketplace opportunities” (Lumpkin & Dess, 1996, p. 137).

In order to address the question of how firms achieve sustained competitive advantage, Teece et al. (1997) proposed the dynamic capabilities concept. As discussed in section 2, this perspective “emphasizes the development of management capabilities, and difficult-to-imitate combinations of organizational, functional and technological skills” (Teece et al., 1997, p. 510). Similarly, from the basis that not all firms have equal chances to acquire knowledge, Lane and Lubatkin (1998) reconceptualized the construct of AC as a dyad-level construct and established some conditions for this interaction to occur: the specific type of knowledge, similarities in practices, logic and organizational structure, and familiarities between the firms. Zahra and George (2002) also reconceptualized AC as a dynamic capability related to knowledge creation and exploitation in order to gain sustained competitive advantage. Additionally, they proposed that AC is built upon two capacities: potential capacity (knowledge acquisition) and realized capacity (knowledge transformation and exploitation). Ending this top ten references network, Podsakoff et al. (2003) present an important methodological review about biases in behavioral research methods that are often employed and cited by AC researchers. The authors summarized the most common sources of method biases, their effects, and techniques to control them.
Content analysis

Finally, we created the co-occurrence map using all keywords as the unit of analysis, as presented in Figure 5. We used the default parameter of a minimum of 10 occurrences of a keyword (Eck & Waltman, 2018). According to Gomes et al. (2016), keywords maps are widely used by researchers and help to establish a general idea on a certain subject. From this map, three clusters of lines of research addressing AC in startups were identified: knowledge (26 articles), innovation (11 articles), and performance (13 articles). Based on these clusters, we performed our data analysis and identified the following codes: 1) Authors, 2) Year of publication, 3) Journal, 4) Type of article, 5) Aim of research, 6) Relevance of absorptive capacity, 7) Methodology, sample, and variables, 8) Findings, and 9) Future research agenda.

![Co-occurrence map using all keywords](image)

**Figure 5.** Co-occurrence map using all keywords
Knowledge cluster

New knowledge is an essential input factor for innovation and new firm’s progress (Mueller, 2006; Prashantham & Young, 2011; Sullivan & Marvel, 2011; McKelvie, Wiklund, & Brattström, 2018; Bingham & Davis, 2012) by offering the possibility of renewing existent skills, technological paths, and developing innovative capabilities to improve competitive advantage and stimulate growth (Zahra, Filatotchev, & Wright, 2009; Agarwal, Audretsch, & Sarkar, 2010). Several authors recognize R&D as a major vehicle to acquire new knowledge (Acs, Braunerhjelm, Audretsch, & Carlsson, 2009; Mueller, 2006). However, very often, new and small firms do not have the resources to structure an R&D department; thus, partnerships with institutions such as universities or research laboratories are crucial to develop new knowledge (Hayton & Zahra, 2005; Hayter, 2013; Carayannis, Provance, & Grigoroudis, 2016; Dai, Goodale, Byun, & Ding, 2018). Sullivan and Marvel (2011) emphasize that technology and market knowledge is highly important to achieve positive results and enhance the innovative process. In any case, direct inter-personal contacts and proximity to the environment are useful to access knowledge (including tacit knowledge) faster and more successfully (Mueller, 2007, p. 356).

Based on Huber (1991), De Clercq et al. (2012) categorized knowledge acquisition (KA) into five types: experiential learning (learning from experience), vicarious learning (learning by observing others), searching (learning by searching for specific information), grafting (learning by incorporating entities that possess knowledge), and congenital learning (drawing on intrinsic knowledge gained from founders or personal experience). Differently, Carayannis, Provance, and Givens (2011) proposed to classify KA into two groups regarding the form of acquisition: (1) formal KA and arbitrage (referring to the intended ability to manage and apply knowledge for a specific purpose), and (2) informal KA and serendipity (referring to the unintended rewards of enabling knowledge from different sources).

Friesl (2012) identified four knowledge acquisition strategies: “low key” in which there are low levels of collaborative and internal learning and low performance as well; “mid-range,” where the emphasis is on collaborative and market-based learning but low levels of internal learning; “focus,” where the firms’ efforts concentrate on both collaborative and internal learning; and “explorer,” in which firms have high mean values for all knowledge acquisition categories (i.e., collaborative, internal, and market-based learning). In this latter group, firms have a particular interest in renewing their knowledge base in order to achieve the highest level of performance.

We identified three recurrent research topics in the present cluster: entrepreneurial internationalization (EI), spin-offs, and identification of
opportunities. The first topic, EI, explores how new firms go about looking to expanding their activities into foreign markets (De Clercq et al., 2012; Bruneel, Yli-Renko, & Clarysse, 2010; Yu, Gilbert, & Oviatt, 2011). Considering that entering foreign markets might entail the obsolescence of existing knowledge and capabilities, to acquire new knowledge becomes crucial to successful internationalization (De Clercq et al., 2012; Prashantham & Young, 2011; Bruneel et al., 2010; Fernhaber, McDougall-Covin, & Shepherd, 2009; Tolstoy, 2009). Therefore, AC emerges as a cornerstone for new venture survival and a critical factor for growth (Mueller, 2007; Qian & Acs, 2013; Moon, 2011). Some studies point out that networks and alliances may enable and accelerate initial commercial activities in new markets (Bruneel et al., 2010; Yu et al., 2011; Sullivan & Marvel, 2011; Perez, Whitelock, & Florin, 2013), and support the absence of in-house translators of new knowledge as suggested in AC theory (Cohen & Levinthal, 1990).

The second topic of research studies is the creation of spin-offs as a vehicle to commercialize new knowledge developed in public research institutes, in large incumbent firms, or in universities (Knockaert, Ucbasaran, Wright, & Clarysse, 2011; Qian & Acs, 2013; Hayter, 2013; Patton, 2014). Qian and Acs (2013, p. 191) argued that the level of knowledge spillover entrepreneurship depends not only on the speed or level of knowledge creation, but also on entrepreneurial absorptive capacity (EAC), defined as the “ability of an entrepreneur to understand new knowledge, recognize its value, and subsequently commercialize it by creating a firm.” Different from Cohen and Levinthal’s AC concept, EAC focuses on the entrepreneur’s abilities—not on the firm’s abilities—and involves the capacity to build a new business.

The third and last topic considers AC as a means to identify opportunities and enhance the firm’s performance (McKelvie et al., 2018; Saemundsson & Candi, 2017). Due to the fact that existing knowledge base might become obsolete within a short period of time, new ventures must intensively promote the search for novel knowledge, primarily in market and customer knowledge (McKelvie et al., 2018). Regarding the principles of AC set by Cohen and Levinthal (1990), to absorb new knowledge requires certain existent abilities. This is probably a challenge for startups because, in many cases, they are building new markets and customers have not been identified at all. In this respect, McKelvie et al. (2018) suggest that new ventures may not over-rely on external knowledge acquisition, especially when the firm works in a highly dynamic sector. Furthermore, Saemundsson and Candi (2017, p. 43) proposed to divide potential AC into “problem absorptive capacity, i.e. the ability to identify and acquire knowledge of the goals, aspirations and needs of current and potential customers, and solution absorptive capacity, i.e. the ability to identify and acquire external knowledge of solutions to fulfill
them.” The authors found out that changes in problem absorptive capacity are a stronger trigger for identification of new opportunities than changes in solution absorptive capacity.

**Innovation cluster**

According to Dushnitsky and Lenox (2005a, 2005b), Corporate Venture Capital (CVC) carry a potential innovative benefit. The authors suggest that the greater the firm’s AC, the greater the firm’s investment in entrepreneurial new ventures and, therefore, the firm’s innovation rate (Dushnitsky & Lenox, 2005b, 2005a). Nevertheless, the role of AC is not restricted to an enabler of innovation. In fact, access to new information provided by CVC can improve the AC of the firms (Wadhwa & Hall, 2005), although this strategy may limit the knowledge created. Similarly, Lee, Kim, and Jang (2015) argue that the firm’s knowledge diversity enables corporate investors to acquire and maximize useful knowledge.

On the other hand, Winkelbach and Walter (2015) found out that prior knowledge held by the firms has a non-significant effect on value creation. Knowledge creation and knowledge-related learning capabilities (which are moderated by AC) enable firms to deal with dynamic environments to create value and develop innovation. Scholars approach the pursuit of new knowledge by firms to promote innovation in different ways. For instance, human mobility across national borders may foster knowledge creation (Liu, Wright, Filatotchev, Dai, & Lu, 2010). The new knowledge may come from scientists and engineers that return from abroad to start up a new venture in their native countries (Liu et al., 2010). Regarding the type of source of new knowledge (i.e., internal or external), Kamuriwo, Baden-Fuller, and Zhang (2017) point out that external knowledge development is more associated with breakthrough innovations and with a faster time-to-market.

Nevertheless, existing literature suggests that there are some setbacks related to knowledge acquisition and innovation. Marvel (2012) pointed out that sometimes knowing less is better to create innovation. His findings suggest that acquiring the knowledge of ways to serve markets is “negatively associated with innovation radicalness” (Marvel, 2012, p. 464). Therefore, the less knowledge about existing offerings in the market and how they work, the greater the chances for developing breakthrough innovations.

Knowledge acquisition can also stem from universities in the form of academic entrepreneurship, technology transfer, and research commercialization. Using the AC perspective, two multiple case studies explored the Proof of Concept (PoC) process within a University Science Park Incubator (UK) and provided evidence that AC plays a crucial role in obtaining
commercial outcomes (McAdam, McAdam, Galbraith, & Miller, 2010; McAdam, McAdam, & Brown, 2009).

Finally, network market orientation is found to make a significant contribution to the development of AC in international new ventures. Monferrer, Blesa, and Ripollés (2015) showed that network market orientation facilitates the development of dynamic adaptive and absorptive capabilities, which influence their capacity to develop innovative, dynamic capabilities.

**Performance cluster**

AC might also moderate the firm’s performance (Nielsen, 2015; Zahra & Hayton, 2008). In our review, we found two perspectives of performance: addressed as a capability to innovate and as a financial output. Typically, firms engage in activities such as acquisitions, alliances and CVC when pursuing growth and profitability. Yet, it is not completely clear how these activities may influence the firm’s performance. To that end, Zahra and Hayton (2008) suggest that AC moderates this relationship. According to their findings, after studying 217 global manufacturing firms, the investments made for building AC positively influence the firm’s performance benefits derived from international venturing. Conversely, Benson and Ziedonis (2009, p. 330) argue that “internal technological capabilities remain a critical determinant of success in innovation-driven acquisitions.” A limit on CVC investment is imposed by the acquirer’s total R&D expenditures, and beyond this limit, the firm’s performance starts to improve at a diminishing rate. Wales, Parida, and Patel (2013) posit that the relationship between AC and financial performance is mediated by Entrepreneurial Orientation (EO) referred to as the “strategy-making practices, management philosophies, and firm-level behaviors that are entrepreneurial in nature” (Anderson, Covin, & Slevin, 2009, p. 220).

Based on an individual perspective of AC, Nielsen (2015) proposes that individuals with higher levels of education have also higher absorptive and learning capacities that leverage the likelihood of firms’ survival and growth. Additionally, some authors (for instance, Rhee, 2008; Witt, 2004) claim that, in general, the social network represents the theoretical lenses used to investigate performance and startup success. Surprisingly, Rhee (2008) found that social networks of the startup’s team members do not help their ventures to reap superior performance. By comparing university and corporate spin-offs, Clarysse, Wright, and Van de Velde (2011) revealed that different characteristics in the technological knowledge base (e.g., specificity, newness, or tacitness) influence the spin-off’s performance and growth. According to Simsek and Heavey (2011), corporate entrepreneurship impacts positively the knowledge-
based human, social, and organizational capital and is also positively associated with the firm’s performance (i.e., profitability and growth).

Considering international sales performance, Javalgi, Hall, and Cavusgil (2014) argue that AC has a positive relation with customer-oriented selling and performance in international B2B settings. Furthermore, Un and Montoro-Sanchez (2011) define performance as the development of new technological capabilities through investments in R&D. Their research uncovered that the prior capabilities enable the firm to develop new technological ones. In another approach, Zheng, Liu, and George (2010) suggest that a key performance indicator is the valuation or market value, which is influenced by the innovative capability and the network heterogeneity of the firms.

Dynamic and operating capabilities must interact to enable entrepreneurship (Newey & Zahra, 2009). AC may be a key knowledge-based mechanism, which connects learning at both product development and portfolio planning levels. Finally, Deeds (2001) suggests that there is a positive relationship between a high technology venture’s R&D intensity, technical capabilities, and AC and the amount of entrepreneurial wealth created by the venture.

**DISCUSSION**

On the basis of the issues raised in the previous section, we observed a relationship between the three clusters: firms employ and develop their AC in order to identify and transform new knowledge into innovation projects, which in turn leads to performance improvement and growth (see figure 6). This relationship is confirmed by authors such as Mueller (2006), who emphasizes the contribution of new knowledge and knowledge exploitation as valuable inputs for economic regional growth. Moreover, Zahra et al. (2009) reinforce the idea that for a startup to grow, it is necessary to revamp its skills, replace its dated capabilities, and build up new ones. In this regard, AC plays an important role as an enabler for integrating knowledge from different sources. Another approach that supports the relationship presented in Figure 6 is the innovation capability because this construct integrates the creation or appropriation of new knowledge, the transformation of that knowledge into new or improved products, and the firm’s progress or performance enhancement (Aas & Breunig, 2017).
We identify that there are open discussions about different aspects. The first is the favorability of certain types of knowledge sources (i.e., internal or external) for developing innovations. McKelvie et al. (2018) argue that in highly dynamic environments, the payoff attributed to investments in externally acquired knowledge is not significant. In this same vein, Marvel (2012) found out that knowing less is better to create innovation; the less knowledge about existing offerings in the market, the greater the chances for developing breakthrough innovations. Conversely, Kamuriwo et al. (2017) claim that external knowledge development is more associated with breakthrough innovations and with a faster time-to-market. The second aspect is the role of prior knowledge. On the one hand, Winkelbach and Walter (2015) identify the sole reliance on prior knowledge may foster traps and hinder the ability to foresee opportunities. On the other hand, Un and Montoro-Sanchez (2011) argue that prior stock of knowledge and capabilities enable the development of new ones and thus ensure value creation. Finally, there are some mismatches related to the volume of new knowledge required for developing breakthrough innovations; in the discussion set out by Marvel (2012) it is not clear whether large amounts of knowledge are favorable or not in the development of radical innovation products.

There are three major reasons for companies to engage in knowledge renewal: to address the evolving character of environmental conditions and customer’s preferences for enabling growth (Marvel, 2012; Perez et al., 2013; Zahra et al., 2009), to enter into foreign markets (i.e., internationalization) (Prashantham & Young, 2011; Rhee, 2008; Tolstoy, 2009), and to identify entrepreneurial opportunities (McKelvie et al., 2018; Saemundsson & Candi, 2017). Regarding the types of strategies for knowledge acquisition, we identified two of the former: formal and informal (Carayannis et al., 2011), and two of the latter: internal and external (Friesl, 2012) (see Figure 7).
Types of strategies for acquiring knowledge

<table>
<thead>
<tr>
<th>Types of Knowledge Acquisition</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
</table>
| **Formal**                    | • Experiential  
• Vicarious  
• Searching  
• Congenital | • Grafting  
• Human mobility  
• Partnerships with universities and institutions | |
| **Informal**                  | Serendipity (unintended process) | Serendipity (unintended process) |

Figure 7. Types and strategies of knowledge acquisition

Internal–formal strategies comprise four categories: experiential learning (learning from experience), vicarious learning (learning by observing others, for instance, customers or competitors), searching (learning by searching for specific information), and congenital learning (drawing on intrinsic knowledge gained from founders or personal experience) (De Clercq et al., 2012). On the other hand, external–formal strategies include grafting (learning by incorporating entities that possess knowledge) (De Clercq et al., 2012), human mobility (i.e., knowledge transfer from the exchange of experience as a result of human mobility across national borders) (Liu et al., 2010), partnerships with universities and technology institutions (Clarysse et al., 2011; Mueller, 2006), social networks (Newey & Zahra, 2009; Witt, 2004), and acquisitions and alliances (Dai et al., 2018; Yu et al., 2011; Zahra & Hayton, 2008). Both internal–informal and external–informal are based on the serendipity approach, which refers to the unintended rewards of enabling knowledge from different sources (Carayannis et al., 2011).

From the review, we highlight three recommendations for startups concerning absorptive capacity. First, considering the resource limitations of startups, developing partnerships with institutions such as universities or research laboratories could enhance the capacity for identifying and gathering new knowledge (Hayton & Zahra, 2005; Hayter, 2013). Second, networking, direct inter-personal contacts, and proximity to the environment are useful to access knowledge and become crucial to successful internationalization (De Clercq et al., 2012; Mueller, 2007). Finally, in order to improve the opportunities recognition, new firms should emphasize the problem
absorptive capacity, in other words, in identifying and acquiring knowledge related to the aspirations and needs of current and potential customers, instead of on existent solutions (Saemundsson and Candi, 2017)

Additionally, some common issues among researchers were identified. First, there is wide adoption of the definition of AC proposed by Cohen and Levinthal (1990) as the mechanism through which firms identify, acquire, and exploit new knowledge in order to achieve more sustainable levels of growth. Second, internal capabilities enable the firm to transform new knowledge into value. Third, intellectual property rights may inhibit the openness to acquire external knowledge and limit the offers to receive venture capital.

CONCLUSION AND FUTURE RESEARCH AGENDA

The purpose of this paper was to identify how the concept of AC has been addressed in the new venture context. We selected 220 documents and applied a systematic literature review method that evidenced three clusters of research: knowledge, innovation, and performance. We concluded that the AC construct first conceived by Cohen and Levinthal in 1990 still stands as an important theoretical lens. Several scholars used the concept in its original context, but others extended it to other research fields, such as the role of AC in universities and research institute spin-offs, corporate venture capital, entrepreneurs’ networks, and as a crucial factor to new venture performance.

Bibliometric analyses showed an increasing interest in AC in the context of new firms. In spite of the earliest paper being published in 2001, the main concepts (which currently prevail) were proposed during the decades of the 1990s (Cohen & Levinthal, 1990; Grant, 1996; Kogut & Zander, 1992; Lumpkin & Dess, 1996) and the early 2000s (Zahra & George, 2002). We identify three inter-related clusters of research regarding the importance of AC in the new venture context: knowledge, innovation, and performance. The relationship between the clusters reflects how firms employ and develop their AC in order to identify and transform new knowledge into innovation projects, which in turn leads to performance improvement and growth.

Content analysis revealed three main concerns related to knowledge obsolescence: growth and dynamic environment and markets, entrepreneurial opportunities, and internationalization. Firms can apply several strategies, internal or external, in order to acquire knowledge, and also might follow both formal and informal processes to address the strategies.

Regarding future research, we identify three avenues exhibit in Table 4. The first avenue contemplates AC from the individual perspective to follow the multilevel approach set by some management areas, which started with
the firm level, business unity, project, and ended on an individual level (e.g., uncertainty management; Gomes et al., 2019). The second avenue centers on bibliometric analysis and literature reviews aiming to identify pivotal studies, which have changed or incorporated content into the AC literature. Finally, the third avenue is related to the strategies for knowledge acquisition in order to clarify the conflicting aspects identified in our content analysis.

Table 4. New avenues for future research

<table>
<thead>
<tr>
<th>Avenues for future research</th>
<th>Potential research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The individual perspective</td>
<td>• Which are the micro-foundations and individual cognitive aspects associated with AC and knowledge renewal?</td>
</tr>
<tr>
<td></td>
<td>• Which mechanisms can contribute to the enhancement of AC? For instance:</td>
</tr>
<tr>
<td></td>
<td>• Exposure to new experiences</td>
</tr>
<tr>
<td></td>
<td>• Involvement with different areas of knowledge</td>
</tr>
<tr>
<td></td>
<td>• Access to education and training programs</td>
</tr>
<tr>
<td>Bibliometric analysis and literature review</td>
<td>• How has the AC concept evolved, and which are the pivotal studies that have changed or incorporated content to the AC literature?</td>
</tr>
<tr>
<td>Strategies for KA</td>
<td>• Which are the barriers and constraints for KA during the different stages of the startup formation?</td>
</tr>
<tr>
<td></td>
<td>• What is the effect of the type of strategy for KA (internal or external) on the degree of radicalness of the innovations of the startups?</td>
</tr>
<tr>
<td></td>
<td>• What is the relationship between the type of strategy for KA and the appropriateness for determining the problem (customer concerns) or the solution (product concerns)?</td>
</tr>
</tbody>
</table>

In addition, we identify some suggestions from the literature: empirical research for validating models or propositions, considering larger samples, longitudinal analysis, different sectors, cultures, and regions. Furthermore, the authors propose to conduct further studies analyzing the types of networks, the interdependencies between the innovation strategies, public policy on innovation, and incorporating different measures of AC.

We contribute to the innovation and entrepreneurship literature in different ways. First, we have connected the importance of AC and new venture creation, to provide a better understanding of how entrepreneurs could enhance their innovative processes. Second, we have established an overview of the existing literature on AC in startups, highlighting the main authors and drivers. Third, we have clustered the pertinent literature with distinct research themes regarding the entrepreneurial AC found in our systematic review and have also proposed a framework that differentiates
knowledge acquisition strategies for new ventures. Finally, we have suggested future research opportunities on entrepreneurship and absorptive capacity.

The results also allow us to identify some practical implications. The analyzed literature suggests that there are certain strategies that entrepreneurs may adopt in order to acquire and absorb new knowledge. We categorize these strategies according to the knowledge source (i.e., internal or external) and the degree of intentionality (i.e., formal or informal). This effort is aimed at persuading entrepreneurs and practitioners to bear in mind a wide range of strategies that mediate between acquiring knowledge and achieving growth objectives and expansion into new markets.

Finally, some limitations must be considered regarding the systematic literature review method. First, concerning the sampling procedures, the keyword selection, which includes only articles published in English and databases from one specific scientific citation indexing service, can limit the resulting sample. In addition, there is some subjectivity involved in the selection of articles for analysis; this is mainly because it relies on the authors’ interpretations from reading titles and abstracts. Furthermore, the concept of startups is not very precise. We noticed that it still remains ambiguous and unclear since it is defined differently among the authors. Therefore, it can be difficult to filter the sample in order to restrict the analyses to one specific type of firm.

Acknowledgment

This work was supported in part by Coordination for the Improvement of Higher Education Personnel (CAPES) Foundation (a Brazilian research agency) under scholarship grants.

References


Appendix A. Coding process of the three clusters of research guidelines

Knowledge cluster

<table>
<thead>
<tr>
<th>AUTHORS</th>
<th>YEAR</th>
<th>JOURNAL</th>
<th>TYPE</th>
<th>AIM OF RESEARCH</th>
<th>RELEVANCE OF AC</th>
<th>METHODOLOGY</th>
<th>SAMPLE</th>
<th>VARIABLES</th>
<th>FINDINGS</th>
<th>FUTURE RESEARCH AGENDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zohra et al.</td>
<td>2006</td>
<td>JOURNAL OF BUSINESS VENTURING</td>
<td>Conceptual</td>
<td>To provide an integrative review of the role of learning in the internationalization of new ventures</td>
<td>To capture new knowledge</td>
<td>Systematic literature review</td>
<td>–</td>
<td>–</td>
<td>To develop AC theories and models for new venture internationalization</td>
<td>Further studies examining the role of learning in new venture internationalization.</td>
</tr>
<tr>
<td>Acs et al.</td>
<td>2008</td>
<td>SMALL BUSINESS ECONOMICS</td>
<td>Empirical</td>
<td>To develop a knowledge pillbox theory of entrepreneurship to improve the pre-entry internationalization of young firms</td>
<td>To capture new information</td>
<td>Longitudinal panel data, cross-sectional data, multiple linear regression, F-tests, t-tests, and significance analysis</td>
<td>Start-ups from 1994 to 2010 in the US</td>
<td>Entrepreneurial activity does not involve only the creation of new knowledge but also the exploitation of new and pre-existing knowledge.</td>
<td>Empirical research in order to validate the propositions and suggest differentiator factors for new venture internationalization.</td>
<td></td>
</tr>
<tr>
<td>Brushett et al.</td>
<td>2010</td>
<td>STRATEGIC ENTREPRENEURSHIP JOURNAL</td>
<td>Empirical</td>
<td>To address how AC can influence the context and skills required for successful internationalization and how young firms may compensate for their lack of firm-specific knowledge</td>
<td>AC allows new ventures to develop new ventures</td>
<td>Longitudinal panel data, cross-sectional data, multiple linear regression, and sensitivity analysis</td>
<td>Start-ups from 1994 to 2010 in the US</td>
<td>The firm’s internationalization is a complex process involving new knowledge development and skills attained by key partners.</td>
<td>Empirical research in order to validate the propositions and suggest differentiator factors for new venture internationalization.</td>
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</tbody>
</table>


Exploring the Link Between Entrepreneurial Capabilities, Cognition, and Behaviors

Marta Gancarczyk & Anna Ujwary-Gil (Eds.)
Tacit knowledge is a crucial aspect of the process of knowledge spillovers and economic growth. To identify and capture new knowledge, entrepreneurs and firms need to engage in various learning processes, such as trial-and-error learning, vicarious learning, experimental learning, and improvisational learning. These learning processes help organizations to develop new ideas and value new ideas, which is essential for entrepreneurship and innovation.

The ability to identify and exploit new knowledge is crucial for the success of new ventures. To identify, capture, and exploit new knowledge, entrepreneurs and firms need to rely more on external sources of knowledge, such as marketing alliances with foreign firms, as opposed to internal sources of knowledge, such as marketing alliances with domestically experienced domestic firms. This relationship can enhance the ability of the internationalization of new ventures.

To conduct other studies considering other high-tech industries, countries, or characteristics, a broader sample should be considered. The understanding of the role of networks in new venture anticipation is very important to understand the evolution of networks and the potential AC gains.
### Absorptive capacity in startups: A systematic literature review

<table>
<thead>
<tr>
<th>AUTHORS</th>
<th>YEAR</th>
<th>JOURNAL</th>
<th>TYPE</th>
<th>AIM OF RESEARCH</th>
<th>VARIABLES</th>
<th>FINDINGS</th>
<th>FUTURE RESEARCH AGENDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qiao and Acs</td>
<td>2013</td>
<td>SMALL BUSINESS ECONOMICS</td>
<td>Conceptual article with empirical evidence</td>
<td>To propose a better understanding of how entrepreneurial activity builds knowledge.</td>
<td>To identify, acquire, and exploit new knowledge.</td>
<td>Surveys, structural equation modeling, linear structural equations (LISREL), random sample of 683 international statistics business registers.</td>
<td>Further investigation regarding the processes involving knowledge contribution and knowledge creation in foreign market networks for both international and domestic entrepreneurs, and the impact of creating knowledge in external networks rather than in a firm’s internal network.</td>
</tr>
<tr>
<td>T祐y</td>
<td>2006</td>
<td>JOURNAL OF SMALL BUSINESS MANAGEMENT</td>
<td>Empirical article</td>
<td>To investigate the interaction between absorptive capacity and knowledge creation in small business firms’ knowledge creation.</td>
<td>The interaction between absorptive capacity and knowledge creation in small business firms.</td>
<td>Contract-based approach over two to three years.</td>
<td>Additional empirical work using an individual unit of analysis (firms) with entrepreneurs.</td>
</tr>
<tr>
<td>Hayton and Zabrek</td>
<td>2005</td>
<td>INTERNATIONAL JOURNAL OF TECHNOLOGY MANAGEMENT</td>
<td>Empirical article</td>
<td>To examine the extent to which absorptive capacity is influenced by the human capital characteristics of the top management teams (TMT).</td>
<td>The ability to identify, acquire, and exploit new knowledge.</td>
<td>Surveys, longitudinal regressions, and correlations.</td>
<td>To consider the role of the human capital of top management teams (TMT) characteristics in organizational learning from venturing activities.</td>
</tr>
<tr>
<td>Copson et al.</td>
<td>2013</td>
<td>SMALL BUSINESS ECONOMICS</td>
<td>Conceptual article</td>
<td>To examine the role of knowledge acquisition and transformation in regional sustainability of new venture formation.</td>
<td>The means by which new ventures funders incorporate new knowledge into their organizations.</td>
<td>Agent-based simulation, 30 runs of the simulation in six configurations, 22 strategies.</td>
<td>To develop more empirical research relating to knowledge-governance and entrepreneurship.</td>
</tr>
<tr>
<td>Patton</td>
<td>2014</td>
<td>INTERNATIONAL JOURNAL OF SMALL BUSINESS JOURNAL</td>
<td>Empirical article</td>
<td>To analyze the incubation process through the lens of AC in order to evaluate how it might strengthen the business model of high-technology firms.</td>
<td>AC enables knowledge development and critically, facilitating the transformation of knowledge into a resource which supports business development and sustainability.</td>
<td>Case study of 27 new firms at two university incubations in Boston and Bristol between 2009 and 2011.</td>
<td>Future research needs to investigate how the incubation process creates a context which encourages entrepreneurs to engage with those who can assist the accumulation of the knowledge base and a commercial business model.</td>
</tr>
<tr>
<td>Ross et al.</td>
<td>2013</td>
<td>EUROPEAN JOURNAL OF MARKETING</td>
<td>Conceptual article</td>
<td>To gain a better understanding of how small technology start-ups learn about new customers in the context of B2B relationships, and to propose a model of interfirm learning with customers.</td>
<td>The ability of an SFB to recognize new products or technologies between a small technology firm and a large, well-established customer.</td>
<td>Three-case study of advances to new products or technologies between a small technology firm and a large, well-established customer.</td>
<td>Further research using large-scale longitudinal studies and considering the effect of other firm-market orientation on performance and innovation.</td>
</tr>
</tbody>
</table>

Exploring the Link Between Entrepreneurial Capabilities, Cognition, and Behaviors
Marta Gancarczyk & Anna Ujwary-Gil (Eds.)
To examine the factors that influence absorptive capacity in new ventures, this study investigated how new ventures acquire and use knowledge from different external sources to facilitate their knowledge acquisition activities. The ability of a firm to acquire new knowledge is a crucial factor in its growth and success. The study employed a longitudinal design and collected data from 364 new ventures in the Västra Götalandsregion in Sweden.

Dependent: New venture's characteristics. Independent: General market knowledge, internal knowledge generation, market dynamism and technological dynamism. The new ventures' ability to acquire knowledge from the external environment, the more likely they are to continue their entrepreneurial activities and develop new knowledge. New studies using longitudinal and panel approaches could be used to capture temporal differences in the length of time. Future research should focus on the interplay of knowledge sources and other factors that influence the development of knowledge.

To investigate relationships between knowledge and opportunities in new ventures, the identification of opportunities is related to the identification of potential knowledge-based firms (KBF). The study collected data from 246 high-tech ventures in the Dalian, China. New studies using additional factors such as market dynamics and internal knowledge generation could provide a more comprehensive understanding of the knowledge-sharing process.

The study investigated the relationship between knowledge and opportunities in new ventures, with a focus on the identification of potential knowledge-based firms (KBF). The study collected data from 246 high-tech ventures in the Dalian, China. New studies using additional factors such as market dynamics and internal knowledge generation could provide a more comprehensive understanding of the knowledge-sharing process.
Exploring the Link Between Entrepreneurial Capabilities, Cognition, and Behaviors
Marta Gancarczyk & Anna Ujwary-Gil (Eds.)
<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Journal</th>
<th>Type</th>
<th>Aim of Research</th>
<th>Relevance of AC</th>
<th>Methodology</th>
<th>Sample</th>
<th>Variables</th>
<th>Findings</th>
<th>Future Research Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weickhardt, A; Weber, A</td>
<td>2015</td>
<td>INDUSTRIAL MARKETING MANAGEMENT</td>
<td>Empirical</td>
<td>What is the interplay between AC, prior knowledge, and value creation?</td>
<td>AC moderates the intensity between cognitive knowledge and value creation. ACAP = prior technological knowledge.</td>
<td>Survey, Hierarchical regression</td>
<td>Database of 127 science-to-industry R&amp;D projects in technology-based markets.</td>
<td>DV: transfer value to innovation, prior knowledge, absorptive capabilities, absorptive learning, structural characteristics.</td>
<td>Prior knowledge has no significant impact on value creation per se. Instead, the impact of prior knowledge on value creation is enhanced at high levels of absorptive capabilities.</td>
<td>Future studies can replicate our research using longitudinal designs, which could eliminate several biases including a potential Hawthorne bias. Additionally, future studies should consider the dyadic perspective on technology transfer projects. Finally, it will be worthwhile to analyze our framework in other national contexts because cultural and context-related aspects can increase the influence of specific factors.</td>
</tr>
<tr>
<td>Woltering, K; Mcaldern, M; Brown, V</td>
<td>2009</td>
<td>R &amp; D MANAGEMENT</td>
<td>Empirical</td>
<td>To explore the Proof of Concept (PoC) process within a University Science Park located as a means for promoting the commercialization of University technology transfer using an AN.</td>
<td>Importance of Absorptive Capacity on PoC outcomes.</td>
<td>Multiple case analysis, interpretive research, semi-structured interviews</td>
<td>16 PoC projects;</td>
<td>-</td>
<td>AC influencing factors such as levels of R&amp;D investment, prior knowledge base, and integration of stakeholders and technology planning will impact the PoC outcomes.</td>
<td>Future studies are encouraged to explore the multidimensional nature of knowledge and learning in explaining opportunity discovery, exploitation, and survival outcomes.</td>
</tr>
<tr>
<td>Marcel, M</td>
<td>2012</td>
<td>JOURNAL OF SMALL BUSINESS MANAGEMENT</td>
<td>Empirical</td>
<td>Explore knowledge acquisition mechanisms in early venture development and how they relate to radical innovation creation.</td>
<td>AC as an essential mechanism of prior knowledge and experience may refer to AC and the development of radical offerings.</td>
<td>Survey</td>
<td>166 founders of new technology ventures at university incubators</td>
<td>IV: Knowledge Acquisition, DV: Innovation Radicals, Control Variables: nature of the venture's offering, extent of formal education, experience breadth, and physical science engineering education</td>
<td>Assumptions on knowledge acquisition during early venture development are untested. Innovations are often radical and associated with acquiring knowledge of customer problems and markets. The knowledge of ways to serve these markets was negatively associated with innovation radiculizations. The fewer technology entrepreneurs know about comparable offerings in the market and how to develop them, the greater the chance of creating breakthrough innovations.</td>
<td>Future studies will need to replicate our research using longitudinal designs, which could eliminate several biases including a potential Hawthorne bias. Additionally, future studies should consider the dyadic perspective on technology transfer projects. Finally, it will be worthwhile to analyze our framework in other national contexts because cultural and context-related aspects can increase the influence of specific factors.</td>
</tr>
<tr>
<td>Menzinger, M; Bierlein, A; Rayport, M</td>
<td>2015</td>
<td>EUROPEAN JOURNAL OF INTERNATIONAL MANAGEMENT</td>
<td>Empirical</td>
<td>How market-oriented networks contribute to the development of adaptive, absorptive, and innovative knowledge-based dynamic capabilities in international new ventures (INVs).</td>
<td>The participation of MNEs in market-oriented networks encourages their AC. A network-oriented orientation makes a significant contribution to the development of AC in INVs.</td>
<td>Survey, Structural equation modeling</td>
<td>360 firms founded after 2005 with international activity</td>
<td>Variables: market orientation, network characteristics, absorptive &amp; dynamic capabilities of the firms.</td>
<td>The study shows the role of the network market orientation in the development of dynamic capabilities, which are derived from the firm's market-oriented networks, help the firm to create new and innovative capabilities and sustainably in their international markets.</td>
<td>Future studies are encouraged to explore the multidimensional nature of knowledge and learning in explaining opportunity discovery, exploitation, and survival outcomes.</td>
</tr>
<tr>
<td>Ximena Alejandra Flechas Chaparro, Ricardo Kozesinski, Alceu Salles Camargo Júnior /</td>
<td>2017</td>
<td>JOURNAL OF PRODUCTION INNOVATION MANAGEMENT</td>
<td>Empirical</td>
<td>What are the characteristics mechanisms, models, and approaches that are used by entrepreneurs of producing breakthrough innovations?</td>
<td>Search capabilities and AC of partners can be used when early-mature technological knowledge has specific applications.</td>
<td>Longitudinal panel study</td>
<td>68 UK firms, technology firms over 15 years</td>
<td>DV: number of the firm's patents that turned out to be a breakthrough is associated with product development success.</td>
<td>Absorptive knowledge development mode is associated with innovation outcomes and a faster movement of innovations to market.</td>
<td>Future studies will need to consider the firms' choice of knowledge development strategies to understand the antecedents to the knowledge development.</td>
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Performance cluster

**Exploring the Link Between Entrepreneurial Capabilities, Cognition, and Behaviors**

Marta Gancarczyk & Anna Ujwary-Gil (Eds.)
Newey, J, Zahn, S, 2009 BRITISH JOURNAL OF MANAGEMENT Empirical article How collaborating on AC processes at different levels affects firms' innovative capability. The authors found that the knowledge-based approach to learning leads to product development and portfolio planning. A case study interview with 12 key informants 2 biotech companies 8 At the operating level, high-impact firms build AC in value networks through increased learning and know-how. The authors suggest that the complementary effect on innovative capability and AC as a dynamic capability in the following circumstances of the existence-based shocks. Correlation between value networks, AC, and operational capability, and the role of strategic management in the context of innovative capability. Future research could consider how the correlation between strategic management and innovative capability is mediated by the existence of exogenous shocks. Further studies examining the role of strategic management in the innovation process are also recommended.

Chyran, G, Wight, M, Yoo de Valdés, D, 2011 JOURNAL OF MANAGEMENT STUDIES Empirical article How does the innovative capability of the technological network associated with start-ups influence performance? The authors identified that the innovative capability of the technological network is a key factor in determining firm performance. Longitudinal panel study 85 corporate and 25 university spin-offs, comprising the population of spin-offs in Sweden during 2006-2011 DV: start-up capital, firm age, firm size, supply of resources (human, financial, and technological), technological distance (industry) Corporate spin-offs grow and perform better when they have a specific niche in the market. The novelty of technical knowledge in the area of spin-off, the corporate spin-offs, and the parent organization. How different institutional settings influence the role of knowledge-based mechanisms in the development of innovative capability? Expanding the research to other geographical regions, incorporating different institutional contexts, conducting a longitudinal design of the phenomena, and refining the scope of research. Other studies examining the role of institutional mechanisms in the innovation process are also recommended.

Wihko, W, Pedinos, V, Parel, P, 2013 STRATEGIC MANAGEMENT JOURNAL Empirical article What is the nature of the relationship between ACAP and firm financial and performance? The authors found that there is a strong evidence association between ACAP and firm financial and performance. Survey, one-factor analysis 385 small-to-medium-sized enterprises DV: growth IV: ACAP, EO CV: age, size, opportunity, knowledge-based mechanisms, geographical focus, market sector There is a strong evidence association between ACAP and firm financial and performance. Expanding the research to other geographical regions, incorporating different institutional contexts, conducting a longitudinal design of the phenomena, and refining the scope of research. Other studies examining the role of institutional mechanisms in the innovation process are also recommended.

Gensler, J, Heray, C, 2013 STRATEGIC ENTERPRISE JOURNAL Empirical article How does corporate entrepreneurship (CE) contribute to expanding the firm’s knowledge-based capital and its performance? The authors found that CE enables a firm to leverage the firm’s knowledge-based capital and improve its performance. Cross-sectional design of 125 firms DV: performance IV: CE CV: opportunity, networking, and resources effectiveness, intellectual capital (human capital), and organizational capital. The pursuit of CE enhances the firm’s knowledge-based capital and improves its performance. Expanding the research to other geographical regions, incorporating different institutional contexts, conducting a longitudinal design of the phenomena, and refining the scope of research. Other studies examining the role of institutional mechanisms in the innovation process are also recommended.

Zhang, Y, Liu, L, Georges, G, 2010 JOURNAL OF BUSINESS VENTURING Empirical article How do the effects of innovative capability and inter-firm networks affect firm performance? The authors identified that innovative capability and inter-firm networks have a positive impact on firm performance. Longitudinal panel study 170 biotechnology startups DV: firm performance IV: innovation capability CV: market opportunity, knowledge-based capital, technological field, public company, total alliances, equity alliances The relative value of innovative capability in networks varies according to the firm’s stage, the role of external information, and the network's ability to absorb external information. The authors suggest that this finding has implications for future research on the role of networks in firm performance. Expanding the research to other geographical regions, incorporating different institutional contexts, conducting a longitudinal design of the phenomena, and refining the scope of research. Other studies examining the role of institutional mechanisms in the innovation process are also recommended.

Journal of Entrepreneurship, Management and Innovation Volume 17, Issue 1, 2021: 57-95
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<tr>
<th>Authors</th>
<th>Year</th>
<th>Journal</th>
<th>Type</th>
<th>Aim of Research</th>
<th>Methodology</th>
<th>Sample</th>
<th>Findings</th>
<th>Future Research Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhee, Jr.</td>
<td>2009</td>
<td>ASIAN BUSINESS &amp; MANAGEMENT</td>
<td>Empirical article</td>
<td>What are the determinants of entry mode choice and internationalization performance of new ventures?</td>
<td>Survey</td>
<td>95 Korean venture firms that had international operations</td>
<td>Dr. Entry mode choice is not as important as the social network of start-up team members in determining entry mode in international expansion. Social network of start-up team members do not help their ventures enjoy superior performance.</td>
<td>Further theoretical perspectives need to be applied to better understand the internationalization of new ventures.</td>
</tr>
<tr>
<td>Maione, A.</td>
<td>2015</td>
<td>JOURNAL OF TECHNOLOGY MANAGEMENT</td>
<td>Empirical article</td>
<td>What is the importance of human capital for industry choice and subsequent performance of first-time entrepreneurs?</td>
<td>Survey, OLS regressions, ordered logit model (OLM)</td>
<td>1,151 individuals starting new ventures in 133 different industries</td>
<td>Dr. New venture performance is better in profitable and uncertain industries, better only in profitable industries. Both types of academics are more successful in uncertain industries.</td>
<td>Further research might explore the reasons for the differences in performance between technical and non-technical academics in uncertain industry environments.</td>
</tr>
<tr>
<td>Javali, RG; Hall, KD; Javalgi, RG</td>
<td>2016</td>
<td>INTERNATIONAL BUSINESS REVIEW</td>
<td>Conceptual article</td>
<td>How sales representatives can contribute to or even replace a traditional research function?</td>
<td>Literature Review, Conceptual model</td>
<td>–</td>
<td>The authors propose that international sales performance for firms practicing fast lane entrepreneurship will be enhanced when salespeople practice customer-oriented salesmanship and absorptive capacity is stronger.</td>
<td>Empirical testing of the conceptual sales model. Additional opportunities are in the investigation of the incentive and control structures that would best support a low-to-high absorptive capacity or high-to-low absorptive capacity in determining entry mode in international entrepreneurship.</td>
</tr>
<tr>
<td>Li, CA</td>
<td>2011</td>
<td>INTERNATIONAL JOURNAL OF TECHNOLOGY MANAGEMENT</td>
<td>Empirical article</td>
<td>How existing capabilities influence new entrepreneurial technological capabilities, and in what way the existing capabilities affect new entrepreneurial technological capabilities.</td>
<td>Survey</td>
<td>1,215 manufacturing firms operating in Spain</td>
<td>Dr. development of new technological capabilities through investments in R&amp;D depends on firm's capability to invest and the capability to absorb. CV from size, experience in business, and industry</td>
<td>Prior capabilities to invest and to absorb enable the firm to develop new technological capabilities. The capability to absorb affects both types of absorptive capacity, whereas the capability to invest only affects external investments in R&amp;D.</td>
</tr>
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**Absrakt**

**Cel:** Kilku uczonych wskazało, że zdolność absorpcyjna (AC) ma kluczowe znaczenie dla procesu innowacji w dużych firmach. Jednak wielu innych autorów uważa star-tupy za kluczowe czynniki napędzające innowacje w obecnej gospodarce światowej. Dlatego niniejszy artykuł ma na celu określenie, w jaki sposób koncepcja AC została potraktowana w kontekście nowego przedsięwzięcia. **Metodyka:** Systematyczny przegląd literatury analizujący 220 artykułów opublikowanych w latach 2001–2018. **Wyniki:** Systematyczny przegląd literatury identyfikuje trzy grupy badań dotyczących AC w start-upach: wiedza, innowacje i wyniki wraz z głównymi autorami dyskusji, głównymi wkładami, odniesienia teoretyczne i wytyczne dotyczące ich przyszłego programu badawczego. **Implikacje dla teorii i praktyki:** Niniejsze badanie wnosi wkład do literatury dotyczącej innowacji i przedsiębiorczości łącząc znaczenie AC i tworzenia nowych przedsięwzięć oraz zapewniając lepsze zrozumienie, w jaki sposób przedsiębiorcy mogą usprawnić swoje procesy innowacyjne. **Oryginalność i wartość:** Na podstawie analizy przeglądu literatury stworzono ramy różnicujące strategie pozyskiwania wiedzy dla nowych przedsięwzięć. Ramy kategoryzują strategie według

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źródła wiedzy (tj. wewnętrznego lub zewnętrznego) oraz stopnia intencjonalności (tj. formalnej lub nieformalnej).

Słowa kluczowe: innowacje, chłonność, startupy, nowe przedsięwzięcia, przedsiębiorczość.

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Conflicts of interest

The authors declare no conflict of interest.

Citation (APA Style)