

## **A review of international entrepreneurship as part of broader opportunity research:**

### **Topic modeling approach**

**Abstract** Although international entrepreneurship reviews have made a significant contribution to the subject's knowledge, researchers have not unleashed its full potential. This review provides an understanding of the deeper development processes and structures in international entrepreneurship, focusing on international entrepreneurship's role in broader opportunity research. We begin by elaborating on a topic modeling approach to look at latent structures of scientific discussion. We then review the contents, influence, and impact of international entrepreneurship in opportunity research. Finally, we present issues that future research could take into account both theoretically and methodologically.

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### **Introduction**

International Entrepreneurship (IE) research plays a vital role in understanding the internationalization of new, fast-growing, and born global companies (Oviatt & McDougall, 2005; Reuber, Knight, Liesch & Zhou, 2018). IE also plays an essential role in research on entrepreneurs and entrepreneurship in a globalizing, multicultural, and technological world (Dana, 1999, 2001; Mainela et al., 2018), and especially in the exploration of entrepreneurial opportunities (Peiris et al., 2012; Mainela, Puhakka & Servais, 2014). Jones, Coviello & Tang (2011) pointed out in their IE review that a significant part of research examines entrepreneurial internationalization focusing on the type of venture (e.g., Madsen & Servais, 1997; Oviatt & McDougall, 1994), the process of internationalization (e.g., Autio, Sapienza & Almeida, 2000; Nummela, Saarenketo & Puumalainen, 2004), networks and social capital (e.g., Coviello & Munro, 1995; Presutti, Boari & Fratocchi, 2007), as well as knowledge and capabilities (e.g., Weerawardena, Mort, Liesch & Knight, 2007; Zahra, Korri & Yu, 2005). According to Jones et al. (2011), the previous research has also focused on cross-country and cross-cultural comparisons of entrepreneurship (e.g., Anderson, Dana & Dana, 2006; Baker,

Gedajlovic & Lubatkin, 2005; Thomas & Mueller, 2000). The least attention they consider has been given to research that draws directly from opportunity theories of entrepreneurship and examines how to discover or create international opportunities.

This study aims to complete the picture of earlier IE reviews by examining IE's influence and impact on broader entrepreneurial opportunity research. The research corpus utilized in this study is 1,326 published journal articles on opportunities in time between 1958 and 2016. We are not looking at dedicated IE articles as such but rather broadly opportunity articles where IE is one of the key themes. Opportunity research is being considered because it has been the main research area for entrepreneurship for the last 20 years (see seminal papers by Dana, 1995; Gaglio & Katz, 2001; Shane & Venkataraman, 2000). Also, in IE's influential articles, opportunity is a crucial concept (Dana, 1994; McDougall & Oviatt, 2003; Oviatt & McDougall, 1994). This study applies topic modeling (Blei & Lafferty, 2006; Blei, Ng & Jordan, 2003) in the analysis. Topic modeling is an unstructured, algorithm-based analysis of sizeable naturalistic text data, which looks at the use of words with their context. It can bring out the below-the-surface embedded deep structures of a great mass of text and display. For example, how science is organized differently is usually seen as structuring.

This study contributes in two ways. First, the study aims to show how science is polyphonic. The diversity of topics reveals how IE's construction is a dynamic, contingent, and always unfinished area of human activity. The research involves and is connected with various discourses, perspectives, and ideologies at the same time. Second, the study aims to open up a path for computer-aided, algorithm-based analysis of large text masses. This study highlights a way to analyze a large mass of articles as a polyphonic discussion, immersed in a wide variety of even contradictory topics, without polyphony or contradiction being seen as a problem but as a natural part of science. The study reveals how language produces the reality that we see as research on opportunities and IE within it.

The rest of the study is structured as follows. We start by explaining the topic modeling approach, the article corpus, and examining it. Then we analyze and determine what influence and impact IE has on the broader opportunity research. We then suggest how the IE theme can evolve as part of broader opportunity research. We finally conclude with a discussion of implications for IE research regarding the use of the topic modeling approach. In the following, topic and theme are used interchangeably.

## **Methodology**

### ***Topic modeling approach***

Topic modeling is about mining texts to find a probabilistic model arranging a corpus of documents. We define a topic as "*a distribution over a fixed vocabulary*" (Blei, 2012, p. 3), that is, how likely particular words coexist in a text. Probabilistic topic modeling is a set of algorithms whose task is to find thematic structures immersed in a text data corpus (Steyvers & Griffiths, 2007). Probabilistic topic modeling focuses on the whole corpus, not individual texts. Topic model algorithms statistically analyze words in the documents under consideration to find topics that produce the documents' text, the links between the topics, and the change of topics over time (Blei et al., 2003).

The main idea is that the human use of words is not random, but the words are used in specific contexts (for example, scientific research), which constitute the broader topics. The benefit of topic modeling is that it does not require any prior classification or code trees or qualitative coding of the data, and the algorithms can handle masses of information quickly and efficiently (Newman, Noh, Talley, Karimi & Baldwin, 2010). The algorithms produce the latent topics emerging from the original documents based on the use of words.

This study uses the LDA (latent Dirichlet allocation) topic model approach, a

probabilistic model of texts (Blei, 2012; Blei et al., 2003). The LDA is based on the idea that each document consists of many topical themes (Blei et al., 2003). Thus, articles are blends of many topics. The LDA is an unsupervised statistical method that takes advantage of this thinking and tries to find what kind of latent topics there are and how documents blend the various topics. It aims to reveal the below-the-surface embedded generating process that produces the observed text corpus (Blei, 2012). Therefore, it is not based on the idea that there are ex-ante categories in which texts or parts of texts should be placed. Instead, it is looking—by the words and about their use to each other—for the classification through which texts are produced as a blend of various topics (Blei & Lafferty, 2007).

Thus, the approach regards texts as naturalistic and unstructured. Naturalistic linguistic data is data sampled from a natural context, as it is without manipulation and so that the researcher has not affected its production. In the LDA, the algorithms go through the text space to find possible topics and weights for documents to present the data's best possible representation (Blei et al., 2003). For this to be possible, the topic model requires that only a few words are likely to be part of the topic and that each document is attached as little as possible to topics. Through these rules, the LDA double-checks the texts and sets the optimal structure of topics. The LDA, therefore, inversely looks for the generative process that produces the detected text corpus (Blei, 2012). In sum, the topics consist of a network of words in which the words appear together more often than would happen randomly.

### ***Identification of the relevant literature***

Articles were selected for analysis via a three-step process. Keyword searches carried out the first stage. The search used the ABI/INFORM Complete database. The criteria used were peer-reviewed scientific publications written in English and published in scholarly journals. The specific date range, quality requirements from the journals (e.g., impact factor), and

thematic scoping (e.g., business and management) were not set because the aim was to bring the opportunity research as widely and comprehensively as possible.

The keywords for searches were "opportunity" and its different versions in the title or abstract and "entrepreneurship," "small business," "SME," or "new venture" and their various forms at any point in the publication. These following keywords were included in closing out the kind of research that uses the word "opportunity" in any sense other than linking it to entrepreneurship and its various forms. To make sure that these constraints did not rule out relevant articles, manual analysis was done on a thousand articles that did mention the word "opportunity" but not the word "entrepreneurship," "small business," "SME," or "new venture." The investigation showed that the procedure did not rule out entrepreneurship's opportunity articles, which this study is particularly interested in.

In the second stage, we moved our attention to how the articles use the opportunity concept. The articles included standard scientific articles, commentaries, editorials, and essays. All paragraphs with the word "opportunity" were searched for in these articles. At this stage, opportunity was broadly defined to be about value creation in order for the different ways to see an upcoming opportunity were included in the analysis. The aim was to find those articles that explicitly use the opportunity concept as part of the research problem, the constitution of theoretical arguments, a variable or theme in data collection, or the context of the conceptual modeling based on empirical data. Those articles that used the opportunity word as a general expression or in a single sentence were excluded from the analysis. Excluded articles were reviewed for the second time, and it was confirmed that only those articles in which the opportunity was not an essential concept were excluded.

The third phase confirmed that it is not lost articles that should be covered by the analysis. This stage was deliberately broad and open. Confirmation was done by analyzing manually back and forth the references of the found articles, doing searches using Google

Scholar, studying the number of journals in core entrepreneurship, management and organization, marketing, and international business journals, as well as by examining the articles citing the seminal Dana (1994), Oviatt & McDougall (1994), and Shane & Venkataraman (2000) articles. The search revealed very few articles that corresponded to the required criteria. This stage confirmed that the phases one and two procedure functions—and that for the analysis—could form a reliable and comprehensive corpus of the entrepreneurship's opportunity research.

As a result, we identified 1,326 articles. The defined article corpus is from the years 1958–2016. The corpus contains 790 articles from the 2010s, 594 articles from the 2000s, 75 articles from the 1990s, 13 articles from the 1980s, one article from the 1970s, two articles from the 1960s, and four articles from the 1950s. The use of the opportunity word in the articles ranged from 1 time to 603 times. On average, the opportunity word was mentioned 52 times in the examined articles. All in all, the opportunity word was used 73,013 times.

### ***Analyzing scientific impact***

The articles' LDA exploration was carried out by utilizing the Topic Modeling Tool (TMT) (see <https://code.google.com/archive/p/topic-modeling-tool/>). The TMT topic modeling tool applies MALLET, which is a full, Java-based program family "*for statistical natural language processing, document classification, clustering, topic modeling, information extraction, and other machine learning applications to text*" (<http://mallet.cs.umass.edu/>) in a graphical user interface. Andrew McCallum has written the MALLET. The toolkit is Open Source Software released under the Common Public License (see <http://mallet.cs.umass.edu/index.php>).

The exploration was done in the following three steps: In the first stage, the full-text corpus was fed in its entirety into the TMT program. Each article was one document. It set

boundaries so that the program searched for ten main topics and removed from the analysis the most common stop words, it did not preserve the case, and it made 300 training cycles to find the most suitable model. The number of topics was tested with different options, but the ten best distinguish between various topics. The first phase yielded output.csv and output.html folders for the ten central topics. These folders have both CSV- and HTML -formatted documents of (1) the main research topics and the articles the topics appear in, (2) a numbered listing of topics, and (3) the listing of the documents (the articles) and the topics appearing in each document. This step aims to find which specific topics the research area consists of and what articles and their parts belong to these particular topics.

The second step was to take a closer look at the topics and give titles describing their content. The program does not directly provide meaningful headers to the topics, but they are displayed as a list of keywords that the algorithm thinks to belong to best describe the topics. It is the task of the researcher to interpret and decide what their common denominator is. This was done by reading each topic and examining their key themes, concepts, keywords, and methods, and cross-analyzing the articles to unite and distinguish them. By delving into the articles in each of the topics, looking for common denominators within the topic, considering the program's word list in the title of the topic, and comparing the topics to each other, we could give each of the ten topics a meaningful heading.

The third step was to move into a more in-depth analysis of the IE topic as part of the broader opportunity research. The first was to examine the influence of various opportunity research topics and, in particular, the IE theme throughout the whole scientific discussion. Topic modeling enables this by generating an influence figure on each article's topic, which tells you how much of the article's text belongs to each topic. Each topic's influence, including IE, was calculated as follows: The sum of the influence figures in each topic of the articles in the period, multiplied by the number of articles for that particular topic in the period, then

divided by the number of all articles in the period. This calculation method considers both the volume and the number of articles in a given topic concerning all articles. Second, the impact of articles with citations where IE was a central topic was examined. The goal was to find the most cited and least cited articles and what topics and blends they contain. Also, the topics and journals around which the most influential articles and researchers intertwine were analyzed. Third, we analyzed the typical combinations of different topics in the articles and, in particular, with which topics IE appears. The top 20% of the topics in the article in question were chosen as the article's main topics. Thus, typically, an article has two to five topics that are the focus of its discussion. The size of each of the main topic's support topics shows from what perspective the main topic can be published and which other topics remain marginal despite their importance. The analysis seeks to reveal a broader, embedded structure. The productive structure of the phenomenon is essential, not the individual paper per se.

Topic modeling analysis and standard qualitative analysis—in which the researcher's observations and interpretation play a significant role, and where theory and data analysis are continuously discussed—have clear points of convergence (Hannigan et al., 2019). Topic modeling analysis often proceeds through the following process: searching for data by criteria, converting data to .txt format, running topic modeling, and manually transferring topics in the doc to Excel while simultaneously writing memos. These will then be followed by a more detailed qualitative analysis and reflection on what is relevant and interesting. One way or another, this is how most social scientists use topic modeling analysis. It is not a mechanical analysis, but the researcher's theoretical knowledge and understanding of the phenomenon and the material play a key role. The key is to be able to ask the right questions and find the answers through the analysis.

## **Findings**



The findings below are observations of the immersed structure of the entire scientific discussion. This generative structure cannot be detected by reading the articles alone, but it leads to a debate that we as researchers see as opportunity research. The following will first introduce the topics of all opportunity research. Secondly, we analyze the most influential topics, the place of IE, and how the topics emerge relative to one another. Thirdly, we look at the impact of topics and articles that focus on IE and identify the scientific journals that have had an impact on the IE theme. Fourthly, we explore the themes with IE that have made the most impact. Fifthly, we examine the combinations of IE with other themes and whether they deal with a particular theme or are combinations of different topics and in what respect.

### ***Topics on broader opportunity research***

Opportunity research, as a whole, appears to be utterly polyphonic. Polyphony emerges in the diversity of topics and fragmentation of discussion. The key is to understand that topic modeling analysis does not categorize articles by topics but instead reveals that articles blend many topics within them. Table 1 below highlights various topics, ranging from internationalization to cognition and again from finance to culture. In polyphonic opportunity research, the research topics are related to each other more or less equally, in which case, there is no single prevailing perspective in the research. Opportunity research typically addresses issues related to the phenomenon's nature, emergence processes, actors and characteristics, contexts and influential external factors, and the final outputs. In this case, the emergence of topics as diverse in the research is also central to its future development. However, voices with a requirement for consistency in the topic's content can also be located in the research.

However, the abundance of topics speaks to the vivid research area and its centrality as a research concept. The concept of opportunity has been applied in many ways. The topic

modeling analysis brought up the following topics (in alphabetical order): (1) cognition and learning, (2) external determinants, (3) growth and capital, (4) individual qualities, (5) international entrepreneurship, (6) knowledge and information, (7) local and cultural embeddedness, (8) process and practice perspective, (9) social and institutional context, and (10) technology entrepreneurship. These were subjected to topic modeling analysis within them. Table 1 illustrates all the opportunity topics and sub-topics. These topics represent a diversity of voices, different ways of thinking about the central feature of opportunity, ideologies, and interpretive frameworks. However, this is not a weakness of the research area but rather a resource. It can be argued that opportunity research has varied and diverse approaches. This is the way science evolves.

Therefore, opportunity research is not clear in its definitions or methods. The topic modeling analysis of opportunity research highlights the reason why there is an active debate in entrepreneurship about whether the concept of opportunity works and is sufficiently exact as a starting point for research. Based on our analysis, voices representing external determinants, growth, and capital—or knowledge and information—require standard definitions and methods. On the other hand, more permissive and flexible approaches include international entrepreneurship, local and cultural embeddedness, process and practice perspective, and approaches with a social and institutional context. However, this is why our analysis emphasizes that the use of the opportunity in research is inevitably ambiguous, complex, and multidimensional.

For this reason, it is also natural that it is vague, abundant, and inconsistent. On the other hand, the concept must be criticized and questioned. In this way, the topics that make the phenomenon understandable and produce the scientific dialogue phenomenon evolve and change. From this study's perspective, it is essential to observe that the use of the concept of opportunity is naturally polyphonic. Through this, researchers can view entrepreneurship in

many ways. It helps scientists talk about the phenomenon, not limit it. International entrepreneurship is part of this diverse and vibrant debate on entrepreneurship, contributing to a cross-border and cross-cultural perspective.



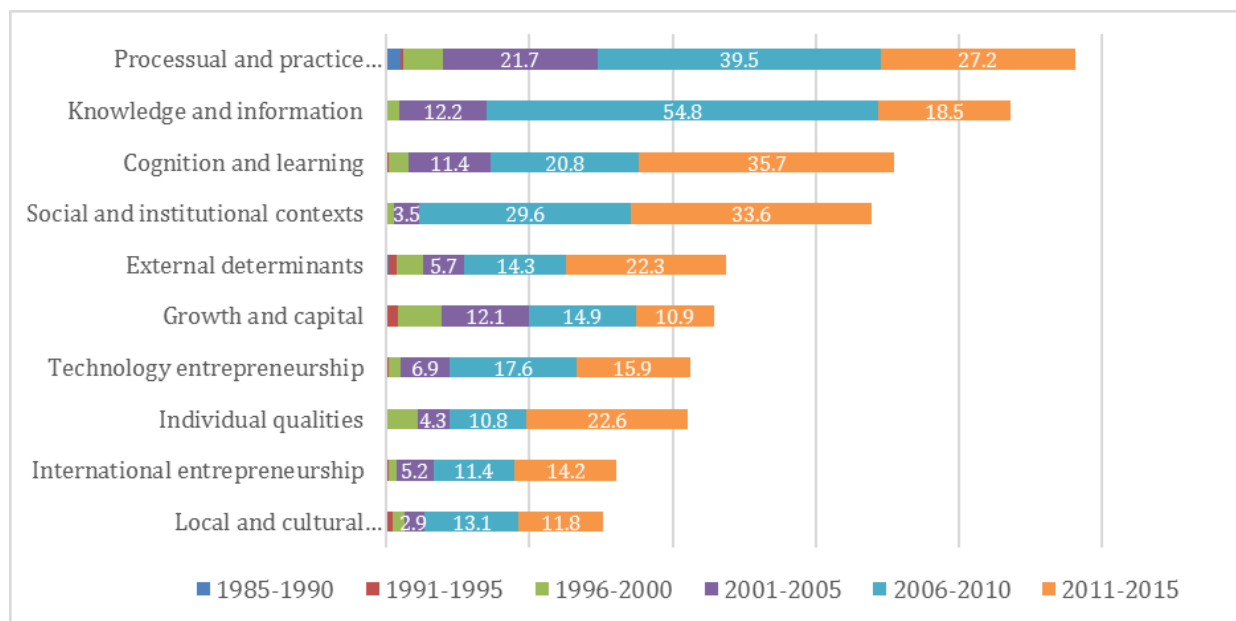
The analysis shows that opportunity research is overall diverse and meaningful. The research of the subject interweaves diverse views on the nature of the opportunity. IE is available as one of the focal points for productive discussions on opportunity research. IE has an extensive influence on opportunity research, and its tip is very sharp in terms of influence and impact. On the other hand, IE also appears as relatively traditional IB research within opportunity research: its main research areas are internationalization processes, internationalization of SMEs, and international market opportunities. These themes are essential, but IE could bring the meaning of globalization and crossing borders—socially, physically, mentally, and culturally—more broadly and deeply into the research as part of its contribution to opportunity research.

***Most influential topics in opportunity research and relationships between them***

Second, opportunity research was considered in its entirety and IE's place in it. Topic modeling analysis highlighted the above ten topics through which opportunity research was formed. These topics can be found in articles in different proportions. These topics, in order of influence, are processual and practice perspective, knowledge and information, cognition and learning, social and institutional context, external determinants, growth and capital, technology entrepreneurship, individual qualities, international entrepreneurship, and local and cultural embeddedness. The articles combine the themes and are most often combinations of three to five topics. However, some of these topics are more influential than others, and influence changes over time. These are shown in Figure 1.

Overall, the most influential topics have been processual and practice perspective, knowledge and information, and cognition and learning. The least influential topics have been individual qualities, international entrepreneurship, and local and cultural embeddedness. This is

not to say that themes are not necessary per se, the issue is how strongly they come to the fore in articles on the subject. This finding is in line with the development of entrepreneurship research, where the concept of entrepreneurship and its processual nature have been central. On the other hand, especially in the early 2000s, knowledge and information and cognition and learning were popular explanatory models in all social sciences. However, it is particularly interesting that their role and influence is weakening. Alongside them, and even beyond their influence, is the theme of social and institutional context.



**Fig 1.** The most influential topics in opportunity research.

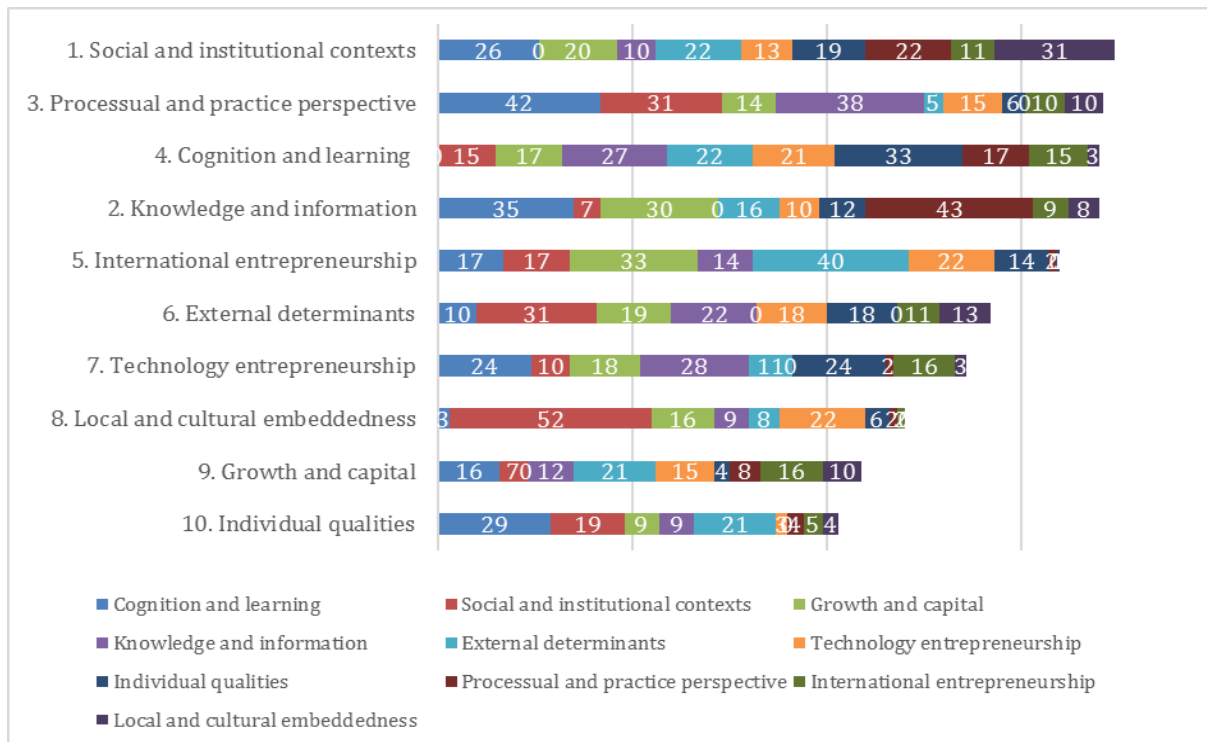
The role of IE has also increased significantly in the 2010s. Especially in the 2010s, international entrepreneurship has established itself as an essential theme in opportunity research (see Figure 1). This suggests that the explanatory models for opportunity research have started to move towards more contingent, contextual, and learning-based models. Indeed, processuality and cognition are still influential, but knowledge and information, in particular, is rapidly dripping

from the place of the most influential topics and is in the most recent period of analysis only slightly more influential than the IE theme. IE is part of this new trend and provides a theoretical and methodological basis for understanding the entrepreneurial opportunity phenomenon as a global, multicultural, and cross-border activity.

Figure 2 below further illustrates how the topics emerge relative to one another. The longer the bar, the more diverse the central theme is. The social and institutional context attaches itself most strongly to different themes. This may explain its growing influence. When looking at topics relative to one another, the furthest apart is the processual and practice perspective and the external determinants; they do not readily coexist. Correspondingly, the highest amount of support is sought from cognition and learning and growth and capital. The least support is found from international entrepreneurship and local and cultural embeddedness. It is a challenge for IE to get broader opportunity research to take advantage of IE. However, this also illustrates the research orientation. Processuality, cognition, growth, and knowledge—together and separately—dominate the discussion. Processuality is a major central theme but less significant as a supportive topic. Anything related to social, community, or people-to-people issues has little consideration in the discussion, although their role in a globalizing and complex world is continually rising.

Furthermore, the size of each central theme's support themes is an indication of the angle at which the central theme is published. However, those with little conversation, such as cognition and locality, should be allowed to interact with each other, as these places could be important for contributions. Strong connections, such as knowledge and information and cognition and learning, on the other hand, could be drawn from elsewhere, and representatives of these angles could also accept and open up other perspectives to the phenomenon. IE mostly uses external

explanatory factors as a support theme, and all the more so IE could use a broader theoretical basis. Locality and social institutionalism are strongly intertwined. Conversely, like IE, the role of communities and technology are also potent drivers of economies and entrepreneurship, and therefore their role in research should be highlighted in the future. Their rich tradition of theory and methodology is still underused.



**Fig 2.** The emergence of topics relative to each other.

In sum, for the IE theme to gain influence in the opportunity research, it should make itself applicable to other themes and broadly link itself to different themes. Isolation as an independent branch of research with independent definitions or scientific journals does not alone promote IE as a research field. For example, IE could learn from the social and institutional context theme, as its importance has snowballed. It has strongly influenced the theorizing of



entrepreneurship during the last years while at the same time engaging with other themes. To increase its influence, IE could combine many themes, open up more broadly how IE benefits entrepreneurship research, seek to develop entrepreneurship theory (and not just international entrepreneurship theory), and publish in the most respected entrepreneurship journals.

Furthermore, the above shows opportunity research as rather one-sided in its orientation. As a researcher, if one wanted to publish, he or she may want to base a study on processuality, knowledge, or cognition and publish it in the four most dominant journals. Still, contextualism, cultures, internationality, or technology have not earned the attention they deserve from researchers (and here, this refers precisely to how much of the themes are addressed in those articles where opportunity is a key concept). However, the analysis of the influence above suggests that a change may be happening. The influence of themes is already changing, which is likely to affect the future in the form of impact. This is also a good trend for IE, as it enables its theoretical and methodological heritage to be more strongly incorporated into entrepreneurship research. IE is generally seen too much as an external variable or a new business abroad in opportunity research. Instead, IE can bring a wealth of heritage and expertise to the understanding of the birth of a multicultural, cross-border, cross-cultural, evolving, and transformational new business.

The attention that processuality receives in opportunity research is focused on the challenges of defining the opportunity phenomenon. This is understandable, and the work has been valuable. However, it may be suggested that now is the time to take inspiration from other themes, such as IE, since the opportunity phenomenon is partly stuck with definition debates and because the global economy is changing radically with artificial intelligence, globalization, climate issues, and people's unbound interactions. The phenomenon can no longer be understood

simply by analyzing the individual or the company as an opportunity producer but rather in context. However, what makes it challenging is that the most cited articles and topics that researchers have pressure to refer to are explicitly based on the theorizing or empirical analysis of individuals or firms, not cultures, processes, or collectives, in the most influential journals.

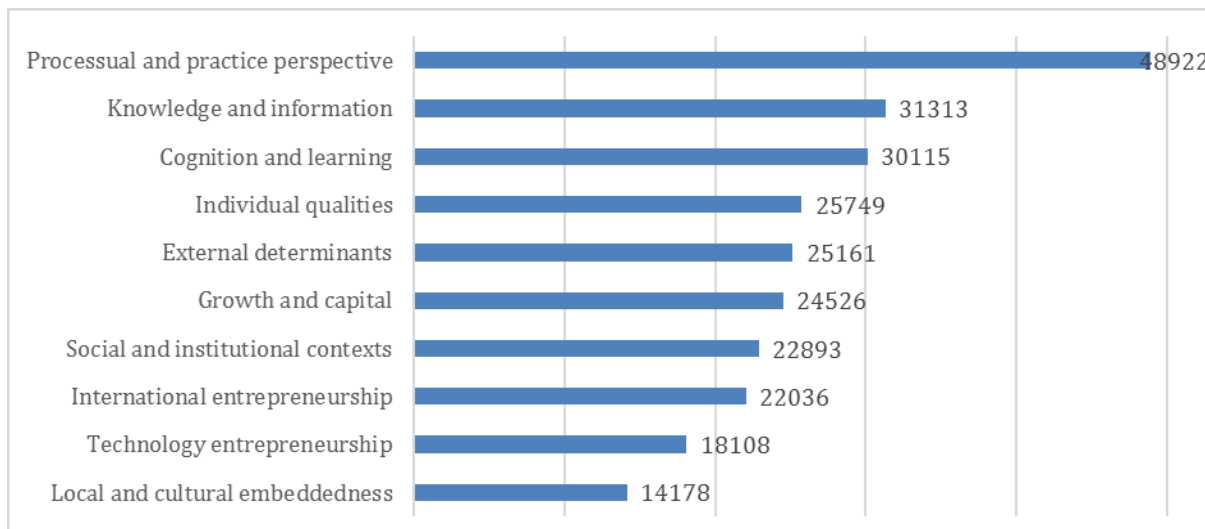
### ***Impact of IE theme as part of opportunity research***

Third, the impact of the topics, particularly the effects of IE, was analyzed. The implication here refers to the impact that the topic has had on the conceptualization, theory, methodology, and understanding of the whole phenomenon of opportunity research. Impact analysis began by examining the impact of all topics on opportunity research. The citation counts of the articles based on Google Scholar were used to calculate the impact (all 1,326 articles citation counts were searched). In total, these articles have received 311,152 citations.

Each topic's impact was calculated as follows: the sum of the articles' citations with that theme, multiplied by the number of articles' text shares in the theme, and divided by the number of these articles. This brings up the theme's proportion of the impact. In this way, it was found that the processual and practice perspective has had the most significant impact on opportunity research (see Figure 3). Knowledge and information and cognition and learning have also played a vital role in the research. International entrepreneurship, technology entrepreneurship, and local and cultural embeddedness have been the least affecting.

Moreover, if we look at the impacts of the above topics relative to one another, on average, each topic produces one-tenth of the total effect. Above this average are the processual and practice perspective (18.6% by the impact), knowledge and information (11.9% by the impact), and cognition and learning (11.5% by the impact). This means that the opportunity articles that

deal with these three themes have created almost half of the total impact. Also, the mere consideration of the opportunity phenomenon's processual nature and the type of practice it involves has received nearly a quarter of all attention. Below average, nonetheless, a significant impact has been created by individual qualities (9.8% by the impact), external qualities (9.6% by the impact), growth and capital (9.3% by the impact), and social and institutional context (8.7% by the impact). The articles with the least impact were articles on international entrepreneurship (8.4% by the impact), technology entrepreneurship (6.9% by the impact), and local and cultural embeddedness (5.4% by the impact).



**Fig 3.** Citation impact of the topics.

The impact analysis was followed by a review of the journals where opportunity articles with IE were published and the number of citations these articles received in each journal (see Figure 4; journals with at least 100 citations). In total, the articles with the IE theme have received 80,620 citations. Based on the analysis, the Journal of Business Venturing is the essential journal to make an impact. The articles published in this journal have received nearly 20,000 citations,

which is almost a quarter of all IE citations. The next most relevant journals have been Journal of International Business Studies (7,889 citations), Journal of Management (6,517 citations), and Entrepreneurship Theory and Practice (5,067 citations). These four journals are about half as likely to be referenced. This tells how focused the impact building is.



**Fig 4.** The number of citations received by articles featuring an IE theme in each journal.

Other relevant journals for IE impact-building as part of opportunity research have been

International Business Review (3,519 citations), Journal of Management Studies (3,226 citations), Journal of Business Research (2,771 citations), Journal of World Business (2,261 citations), Strategic Entrepreneurship Journal (2,337 citations), and Small Business Economics (2,113 citations). The dedicated journal of IE, Journal of International Entrepreneurship, has also produced a fair impact (1,361 citations). All in all, IE has been involved as a theme in producing about a quarter of all citations in opportunity research. This is more than IE's more general influence or impact.

***The impact of IE theme with other topics***

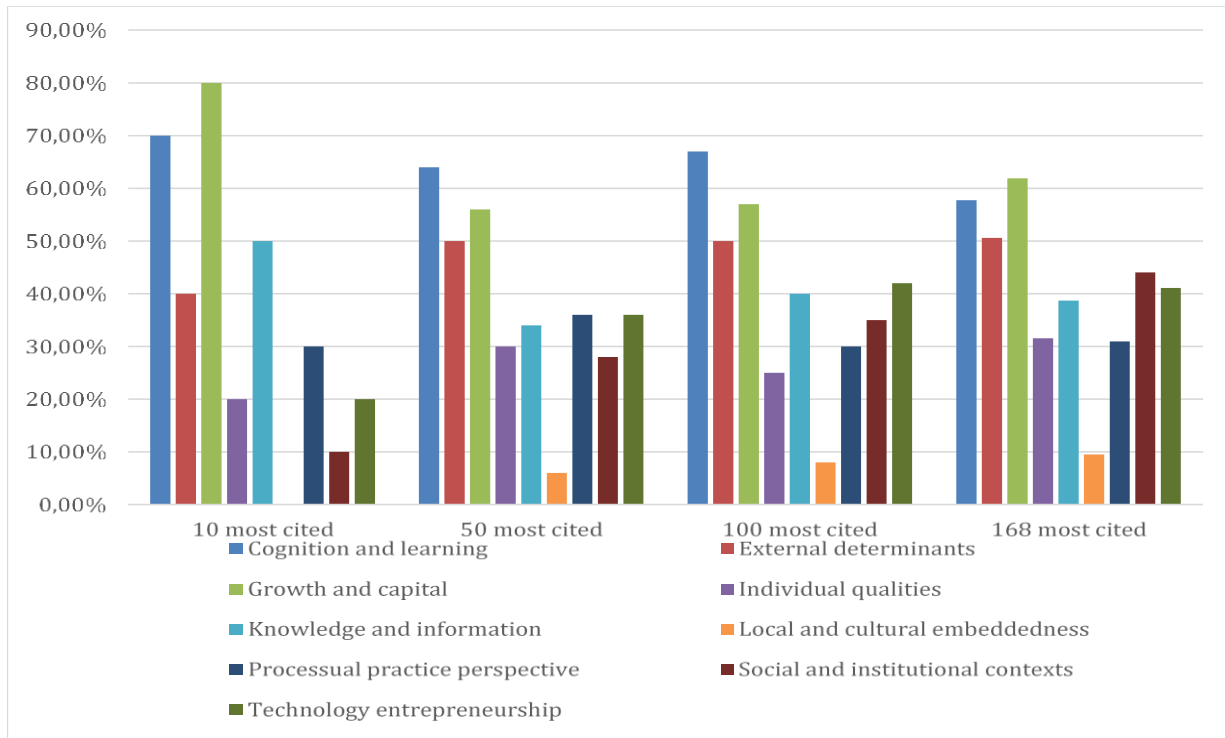
Fourth, the impact was examined in more detail, and specifically from the perspective of IE. First, we looked at how many citations come from the articles, with IE being one of the eight essential topics in the article. Table 2 below shows that the articles in which IE is one of the eight most essential themes have generated 79,176 citations. There is a total of 424 IE articles, with an average of 138 citations. The 10% most cited articles have 23,783 citations, and the average citation for these most cited articles is 559 citations. Of these 424 articles, IE articles as the central theme have returned 40,172 citations (50.7%). There is a total of 168 of these articles. Citations are even more concentrated when we find that 10% of the most cited articles with IE as the main topic have generated over 20,000 citations (26.2%). Therefore, in practice, less than 20 articles have produced a large part of IE's impact on opportunity research. This confirms that IE is a reasonably self-determining topic within the opportunity research having a narrow theme with a sharp tip.

**Table 2.** The importance of IE in opportunity articles.

<b>How important is IE in an opportunity article?</b>	<b>The number of articles</b>	<b>Citations in total</b>	<b>Citations per article on average</b>	<b>Citations of 10% most cited</b>	<b>Citations per article on average of 10% most cited</b>
Main theme	168	40,172	239	20,671	1,216
Second most important	53	7,372	139	3,444	574
Third most important	60	10,824	180	6,312	1,052
Fourth most important	72	9,780	136	5,848	731
Fifth most important	44	9,063	206	6,091	1,218
Sixth most important	22	2,099	95	1,758	586
Seventh most important	4	400	100	303	303
Eighth most important	1	6	6	6	6
Sum/Average	424	79,716	138	23,783	559

This also indicates that the IE theme within opportunity research is divided into two groups in terms of impact. On the one hand, the IE theme is the central theme in a relatively small number of articles as a whole, but their impact is high. These articles are groundbreaking articles that have theorized international entrepreneurship as a phenomenon from an opportunity perspective. They have also added value to a broader focus on entrepreneurship. The second group is articles where IE is a theme but does not play a central role. These articles have not created as much impact on the research as IE's central theme. This indicates that IE is still a relatively unknown theme in opportunity research, thus its rich research tradition has not been utilized. Only a small number of top articles create a significant impact, probably more in IE and IB research than in entrepreneurship. This is one of the significant challenges of IE research: how to have an impact so that a wide range of entrepreneurship and IB research can take advantage of IE research tradition, theory, and findings.

The following looks at the most- and least-cited topics with IE and what mixes are in the articles. This tells us what topics the most remarkable IE articles wrap around. The results especially indicate that the ten most cited articles are different from all others. Figure 5 first reveals that the ten most cited IE articles (IE is the central theme ) within opportunity research are intertwined with growth and capital, cognition and learning, and knowledge and information. Very little attention is given to the social and institutional context and local and cultural embeddedness, which is not discussed in the most cited articles. The more articles are included, the more topics other than the above will be covered. It is noteworthy that the role of growth and capital is diminishing, and that the importance of the social and institutional context is increasing as we move from the most cited articles to a broader range of articles. Cognition and learning continuously play an important role despite the citation category.



**Fig 5.** The volume IE combines with other topics in different citation categories.

Taken together, the results suggest that opportunity studies somewhat safely combine familiar and powerful themes. This is the best way to get attention by referring. If, on the other hand, research is at the interface of more than one theme or combines newer themes, research will not quickly receive attention in the form of citations, even though the development of the phenomenon as a subject of study would need it. However, articles often combine so many different themes that purity is almost impossible. Nevertheless, research artificially simplifies the phenomenon in publications. This is important because future research always builds on previous research. It is tempting for researchers to build on research that receives much attention. In this case, a paper may also receive citations.

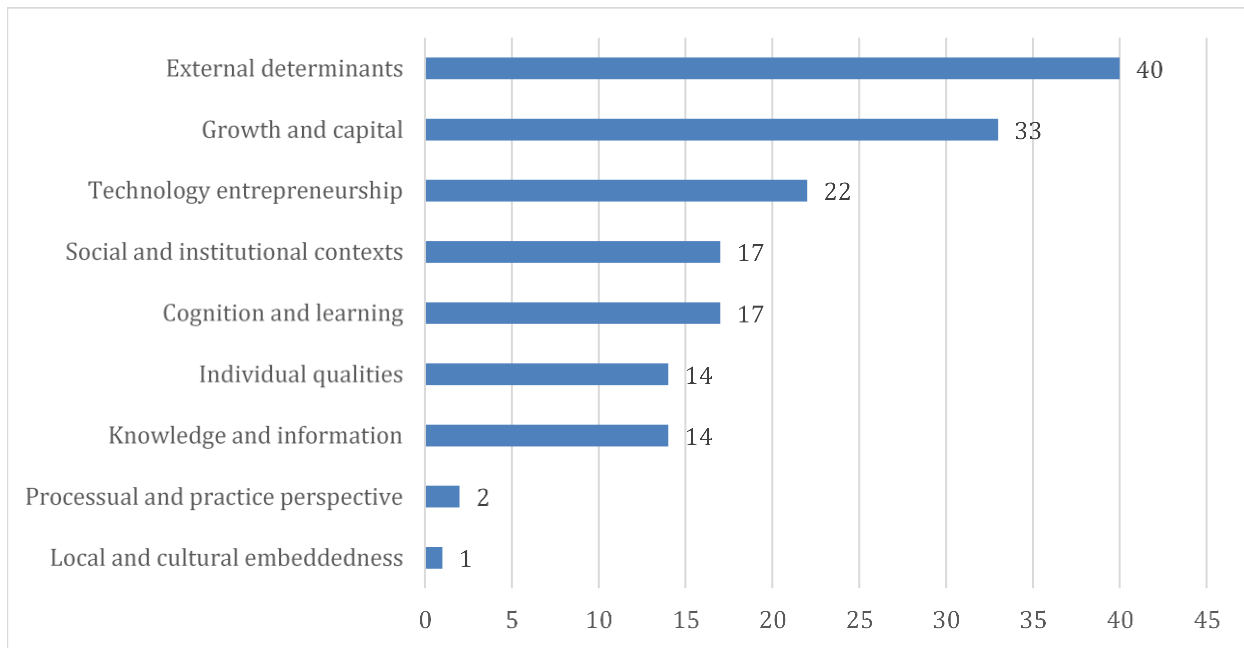
Nonetheless, this does not advance science. Science should also have other types of impact measures because, according to this analysis, research seems to be one-sided if one looks at the most influential articles for citations and does not value versatility, new perspectives, and the combination of different discourses. The IE theme is quite one-sided and needs a broader theme if you look at IE's impact with citation categories.

### ***The development of topics in articles with IE as the main topic***

Last, the following is a look at the combinations of themes with IE's central theme. In Figure 6, the bar length indicates the number of articles where IE is the central theme; this second theme is included. Overall, IE was the central theme in 160 articles out of 1,326 opportunity articles, which is 12%. The IE theme is typically intertwined with external determinants (40 articles) and growth and capital (33 articles). Technology entrepreneurship and IE also often coexist (22 articles). The least IE theme seeks support from the processual and practice perspective (two articles) and local and cultural



embeddedness (one article). In general, it seems that IE is more intertwined with hard variables than with soft human and social issues. The result is quite surprising because IE is often related to things like context, networks, or ethnicity.



**Fig 6.** The combinations of themes of the IE primary topic.

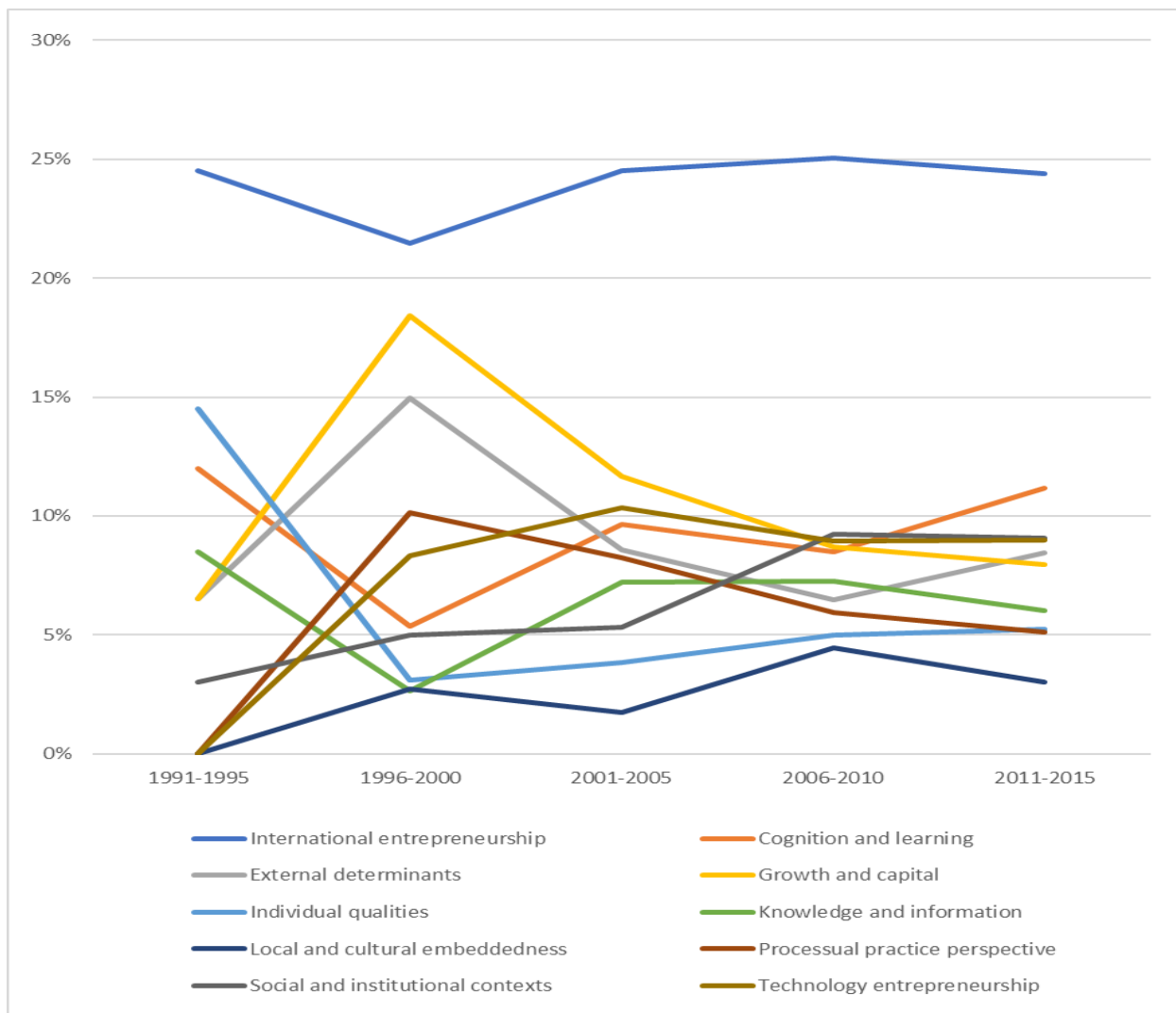
This suggests that opportunity research uses IE as a background variable or technology market-related opportunities in the international market. In particular, it is surprising that processuality and practice and local and cultural embeddedness are the least relevant. It is surprising because processuality is at the core of internationalization and its core articles, such as Johanson and Vahnle (1979, 2009). Nonetheless, while embeddedness is usually an essential role in IE research, its importance is almost non-existent in opportunity research. It is also possible to notice that IE is not linked to the dominant themes of opportunity

research, namely cognition and learning, knowledge and information, and the processual and practice perspective. For this reason, it is not surprising that IE is the second least prominent theme in opportunity research. The preceding implies that IE research is not broadly concerned with entrepreneurship research, although its critical IE articles conceptualize opportunity as its core but are suggestively part of IB research.

The above also implies that IE researchers are still IB researchers in their identity and are not involved in entrepreneurship research but in international business research. Indeed, researchers involved in entrepreneurship research, especially opportunity research, use IE to research external influences, growth and capital, and technology's commercialization. However, this is an excellent opportunity for IE research: truly combining entrepreneurship and internationalization. By bringing the central ideas of internationalization about processuality, embeddedness, and crossing borders, it might be possible to reform entrepreneurship theory to better reflect the increasingly globalized world in which business is born and built.

Furthermore, Figure 7 below shows that in articles where IE is the central theme, 21–25% of the text is related to IE. This means that IE is a clear central theme in these articles and that its share has remained almost the same since the 1990s. Furthermore, the first opportunity articles with IE as the central theme were published in the early 1990s. Figure 7 also shows how the importance of other themes supporting IE has changed over time. The main support themes in the early 1990s were individual qualities, cognition and learning, and knowledge and information. By the late 1990s, support themes had changed, and IE was interwoven with growth and capital, external determinants, and the processual and practice perspective. At the turn of the 21st century, support themes have diversified,

and almost all of the other themes appear in IE articles. This trend will strengthen in the late 2000s, and most support topics will be roughly equal. Interestingly, however, support themes are reduced, and the IE theme as a standalone theme is strengthened. As we enter the 2010s, cognition and learning and growth and capital will increase, and all other themes will be reduced where IE is the central theme.



**Fig 7.** The development of topics in articles with IE.

If we look at the general trends from Figure 7, the central IE theme from 1990–2000

applied for support on fewer support themes, while the 2000–2015 one has many other themes, but with less weight than before. From the IE theme's point of view, it is a bit worrying that it is positioned so strongly today as a standalone theme. The reason may be that IE opportunity research draws gradually from its own IE theory. On the other hand, it can also be suggested that the central IE theme should benefit from a reliable and more extended theory base of different themes. Trends also show that the role of growth and capital, knowledge and information, process and practice perspectives, and local and cultural embeddedness in IE articles is diminishing significantly. On the other hand, cognition and learning and technology entrepreneurship are growing.

In sum, the articles are not pure; they deal with a particular theme and combinations of different topics. As research progresses over time and the more it becomes, the more it blends. The requirement of purity, i.e., precise definitions and a common agenda, is not realistic. Research lives as any other object of human activity: it is diverse, building on existing networks, and expands. It makes the subject a living, not a lousy, research area. It enables new creative points of view and innovative research results. Consistency does not promote innovation; it stops it. In this respect, opportunity research is going in the right direction. The reduction in the dominance of some topics and the discussion and amalgamation of topics make an exciting future, not the other way around. It is essential to embrace and support the IE theme in this process of diversification.

### **Suggestions for future research**

The analysis above elucidates how the opportunity phenomenon comes out as a dynamic process. However, until now, opportunities as a whole have been examined in two ways. The modern

discovery view posits that the identification of an opportunity is built on its birth and remains about the same over time. It will be developed better and aims to make it possible for it to be more efficiently tackled to be exploited, particularly in markets. Again, the understanding of social-cognitive shaping underlines the opportunity to be socially constructed in relation to others. In this case, the opportunity emerges through the interaction between the entrepreneur's capabilities and the surrounding society's characteristics. The difficulty with both of these situations is that the approaches presume the ex-ante existence of elements (building materials), of which being fitted together in a new way is viewed as giving birth to the opportunity. Instead, this study's analysis shows the research to be multidimensional, blending perspectives, and naturally contradictory on the subject. Here, the challenge is that the traditional approaches striving for purity poorly correspond to today's noisy, unpredictable, experimental, and even chaotic research reality. The above analysis has the following implications for future research.

First, IE and opportunities, in general, do not have fixed or permanent identifications; instead, they continue to take shape and expand in the research. In this case, opportunities encompass contents that are mixed and drawing in different directions. Therefore, the identification of opportunities will vary continuously. The first suggestion of this study is that future research should explore the shaping of opportunities as evolving in social interaction and immersed in the particular historical and cultural contexts of research (see Dana, 1994, 1995; Sadeghi & Biancone, 2018). This enables research in a broad range of cross-border organizational situations and does not require the starting point to be the emergence of a new company or the detection of an international market. Thus, future research should pay more attention to the contextually immersed and processual nature of IE as part of opportunity research.

Secondly, IE research needs a conceptual extension to respond to the everyday practical dynamism and complexity of the phenomenon (Young, Dimitratos & Dana, 2003). In this case, opportunity stems from a cultural-historically immersed collective dialogue in which the arguments based on a mediating artifact and the subsequent counterarguments are discussed and compete and depend on the cultural-historical context (Dana 1994, 1995). Here, mediating artifacts refer to different culture-specific symbols, tools, and activities to communicate and transform individuals' understanding into a community's knowledge and vice versa. Individuals' perceptions are externalized, stabilized, and institutionalized into meaning structures, such as opportunities, the production of which, in a particular community, consists of a set of rules and regulations. This cultural space, in turn, refers to the activities and boundary conditions of IE and the effect of the constitutive norms and regulations on the dialogue between people. The dialogue between entrepreneurs, customers, financiers, and other key players in the shaping of opportunities is not just a dialogue between them; instead, the mediating historical and cultural mechanisms are involved in the debate to the extent that the unique production of individuals or firms may be questioned (Nayak & Maclean, 2013). Thus, the study's second suggestion is that future IE research should examine opportunities as a culturally and historically regulated phenomenon.

Thirdly, IE, as part of opportunity research, often talks about social interaction and cooperation. But in the end, however, the research looks at the individual or the firm's transformation. In the case of opportunities, this most often concerns a single company or a single (observed) (international market) opportunity. However, such an approach would be a formal analysis of the phenomenon's elements and not an understanding of the whole (cf. Tsoukas & Chia, 2002). The third suggestion of this study is that future research should also

focus on the historical conditions that allow specific ways of thinking about opportunities. These historically institutionalized conditions structure the broader system of thought and produce opportunities in specific historical circumstances (Holt, 2008; Jones & Holt, 2008; Rezaei, Jafari-Sadeghi & Bresciani, 2020). The boundaries of ways of thinking about opportunities always depend on the rules of activity in a given situation, and these are born and change historically and constitute the activities and thinking (see, e.g., Alon, Dana & Jenkins, 2009; Anderson et al., 2006; Jafari-Sadeghi, Nkongolo-Bakenda, Dana, Anderson & Biancone, 2019; Sadeghi, Nkongolo-Bakenda, Anderson & Dana, 2019). On this basis, this paper contends that future research should better account for the historical production of the conditions under which something can be seen as an opportunity (Mainela, Puhakka & Sipola, 2018).

Fourthly, according to traditional business thinking, actors must learn to find useful answers and the ways and means to enable the correct operations in the context in question. Against this background, much of the research on opportunities based on the above analysis can approach learning through expert knowledge, resources, competencies, and information. The situation is seen as analyzable, and a solution to the situation can be derived from the analysis and via the elements of the solution. The challenge here relates to how the actors learn, based on the skills and resources that make this possible. Such research has been very influential. The problem here is that the learner is separated from the learning context. However, when this is the case, embedded knowledge and learning also exist below the surface, associated with the context itself. A hidden truth resides in this situation, whereby people have gradually produced historical and contextual knowledge. This requires a learning experience; living and being in the context (Jafari-Sadeghi, 2020). Such research is helpful because it anchors the learning and knowledge in human contexts. In turn, the problem of such research is that it continues to see knowledge and

learning as being free of ideologies and hegemonies. Hence, the fourth suggestion of the present study is that learning opportunities also involve questioning and dealing with contradictions (Hjorth, 2004, 2013). The conflict between the actor and the situation creates a situation whereby the actor must exceed the learned limits to create something new. An entrepreneur needs to detach herself or himself from her or his immediate context, even if it provides the necessary resources because a new opportunity can only be created by questioning the familiar. On this basis, this study suggests that it is useful for research on IE to examine learning in addition to breakout (Engeström, 2006).

### **Concluding remarks**

A literature review is a form of scientific activity in which researchers organize existing knowledge insightfully. In the social sciences, particularly, it emphasizes the organizing in a new creative way and the dialogical outlining of future research avenues. Distinctive of the literature reviews in the social sciences is that they do not expect straightforwardly the accumulation of knowledge, in which the researcher has an instrumental role in piling up, appraising, and transferring knowledge forward. Preferably, it sees the definitions, the arguments on the nature of a phenomenon, and the manifestations of the phenomenon as taking place through active dialogue in a scientific community. Building on this, this study aimed to analyze previous international entrepreneurship research as part of broader opportunity research from the social science perspective.

Social science is immersed in its specific functioning, including a literature review, habitually attached to the natural scientific world view. In most cases, this means that previous research is placed in categories, as defined by previous research or emerging from the data,



despite researchers habitually making human errors. For example, when researchers see something taking place a few times in previous research, they might find confirmation for it, even if, in reality, the finding is based on their cognitive bias as human beings to draw such hasty conclusions. However, the above taxonomic categorization has been a critical modern scientific method to perceive, understand, and explain the world. Nevertheless, for social sciences, this is a significant problem. In reality, humans frame, blend, and transform concepts quickly and continually.

Concepts produced by humans as linguistic meaning systems do not fall easily into alleged natural categories. This is so because concepts are formed and exist in relation to other concepts, their meanings are subject to constant change, and concepts in actual human use unpredictably blend with other concepts. Therefore, social science phenomena are by nature polyphonic. Consequently, the deeper structure of a social phenomenon, like science, might conflict with its emerging manifestations (literature reviews). Thus, science is instead multi-centered, nonlinear, and intersubjective activity. This study suggests that social science's inherent polyphonic nature can adequately be understood when supported by digital resources and computer-assisted text analysis (DiMaggio, 2015). The digitalization of publications, the development and application of search engines, and the maturation of machine-vision-based text analysis tools have made it possible for researchers to explore large quantities of publications quickly, efficiently, and reliably (Blei et al., 2003).

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