Expatriation-enhanced competencies: A multiple case study of technology-based entrepreneurs

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Abstract

PURPOSE: *Facing the research gap of entrepreneurial learning by self-expatriated technology-based entrepreneurs, the purpose of this research is to explore those entrepreneurs' beliefs and experiences across expatriation to identify the enhancement of their competencies.* **METHODOLOGY:** *Within a qualitative and exploratory multiple case theory-building approach, data was collected from twelve technology entrepreneurs from Brazil, Mexico, Germany, and Israel that went to the following destination countries: Spain, United Kingdom, United States, Germany, Ireland, Turkey, and the Netherlands. With interview data as the primary source, the data analysis rests on a qualitative content analysis.* **FINDINGS:** *Data allows structuring techpreneurs' experience of expatriation along the following steps: (a) arrival in the destination country and initial process of socialization, (b) engaging in activities to get familiar with the culture of the destination country, (c) the gradual comprehensive understanding of the new context, and (d) comparisons between the home and destination country. Expatriation had an evident impact on the technology-based entrepreneurs that materializes in three groups of competencies: entrepreneurial competencies, knowledge and innovative competencies, and international competencies. Entrepreneurial competencies relate to relational and behavioral skills and the learning of doing business in different contexts. Concerning knowledge and innovative competencies, creativity, learning new techniques and international innovation environment stand at the fore. Finally, international competencies relate to the acceptance of different cultures (multicultural learning and perception of cultural differences), developing a sense of an international community and an international innovation culture.* **IMPLICATIONS:** *This study evidenced the influence of expatriation*

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*experiences on the training of skills of technology-based entrepreneurs, in a specific approach to entrepreneurial, innovative, and intercultural competencies. The research portrays self-expatriation as an opportunity for technology-based entrepreneurs to develop different competencies being helpful to innovate, to manage business and to operate in international markets. Universities and innovators may recognize their discretion to develop programs for people like former students who want to self-expatriate. In the same vein, government can design policy to attract self-expatriate in innovations hubs, considering that local inhabitants can benefit from the cultural exchange. **ORIGINALITY AND VALUE:** This study contributes to better understanding the influence of self-expatriation experiences on the development of skills of technology-based entrepreneurs. Compared to previous studies, it advances research through providing a wider range of learning from expatriation experiences beyond the effect of internationalization on market knowledge and cultural aspects. Furthermore, this study focuses the process, not the results of self-expatriation to understand entrepreneurs' learning.*
Keywords: *technology-based entrepreneurs, innovation, entrepreneurs, skills, competencies, expatriation*

INTRODUCTION

International business and entrepreneurship studies have highlighted the role of entrepreneurs in the internationalization process and cross-cultural experiences of entrepreneurs allowing access to different sources and kinds of knowledge and technology (Adler, 1983; Black & Mendenhall, 1990; Black & Gregersen, 1991; Liu, Wright, Filatotchev, Dai, & Lu, 2010; Schweizer, Vahlne & Johanson, 2010; Sullivan & Marvel, 2011; Brzozowski, Cucculelli, & Surdej, 2017; Deligianni et al., 2019; Baier-Fuentes et al., 2019; Majdouline, El Baz, & Jebli, 2022). One type of cross-cultural experience is expatriation, that is, an immersion in a different culture and institutional context that implies coping with difficulties and unknown situations (Terjesen & Elam, 2009).

While expatriation takes place in various shapes (O'Byrne, 2018), self-initiated expatriation refers to individuals temporarily relocating on their own initiative to the desired host country (Suutari & Brewster, 2000), and searching for skilled/professional qualifications (Cerdin & Selmer, 2014). To date, research on this topic did not thoroughly analyze entrepreneurial knowledge and the effect of learning on entrepreneurial competencies during expatriation. Specifically, research on entrepreneurial learning in international contexts by self-expatriated technology entrepreneurs is limited (Szkudlarek, 2010). Experiences abroad can fuel the development of competencies of this specific category of entrepreneurs, as particularly tech entrepreneurship requires the rapid and intensive development of knowledge and innovation skills (Schweiger, 2012). Expatriation can facilitate

the development of new, often tacit knowledge (Burmeister et al., 2015; Junge, Diez, & Schätz, 2015; Liu et al., 2010; Lin, Lu, Liu, & Zhang, 2016; Wang, Zweig, & Lin, 2011; Xiauohui, Buck, & Wright, 2009). As prior research has been silent in this regard, this research seeks to enhance knowledge through exploring the set of skills and entrepreneurial learning derived from expatriation, unraveling self-expatriation experiences, and specifying competencies in the particular light of self-expatriation of technology-based entrepreneurs and their beliefs on skill development during expatriation.

On this note, the purpose of this research is to explore self-expatriated technology-based entrepreneurs' beliefs and experiences across expatriation to identify the enhancement of their competencies. The according research question (RQ) is:

RQ) What are the beliefs of technology-based expatriate entrepreneurs about the development of their competencies during the self-expatriation?

To respond to this question, this research employs a multi case theory-building design. It rests on an in-depth analysis of twelve self-initiated expatriate technology-based entrepreneurs. The entrepreneurs are from different American or European nationalities with expatriation experiences in seven destination countries.

This research contributes to the knowledge of competencies by evidencing the influence of self-expatriation experiences on the learning of skills of technology-based entrepreneurs. While most studies focus only on the effect of internationalization on market knowledge and cultural aspects, this study accentuates learning from self-expatriation experiences and specifies the competency-building character of self-expatriation. Furthermore, this study focuses on the process, instead of the results, of self-expatriation to understand the learning of entrepreneurs at the individual level (Doherty, 2013).

This paper proceeds with conceptual foundations regarding the competencies of technology entrepreneurs and expatriation. The subsequent section describes the method and design, followed by results, discussion, and conclusions.

LITERATURE REVIEW AND CONCEPTUAL BACKGROUND ⎯⎯⎯⎯

Technology-based entrepreneurship

Based on an understanding of entrepreneurship as founding new, small, independent businesses based on perceived entrepreneurial opportunities (Shane & Venkataraman, 2000; Ejermo & Xiao, 2014; Ratinho, Harms & Walsh, 2015), the literature contributed to a nuanced understanding of technology-based entrepreneurs(hip) (Shane, 2001; Giones & Brem, 2017; Majdouline et al., 2022). Commencing with a more *processual* interpretation of technological entrepreneurship, Shane and Venkataraman (2003, p. 181) pointed to "(…) the process by which entrepreneurs assemble organizational resources and technical systems, and the strategies used by entrepreneurial firms to pursue opportunities". This implies creating, developing, and commercializing new technological solutions against internal and external resistance in connection with the need to scale the new solution – often in international markets. A more *asset*-centered understanding regards a technology-based venture as a project that "assembles and deploys specialized individuals and heterogeneous assets that are intricately related to advances in scientific and technological knowledge for the purpose of creating and capturing value for a firm" (Bailetti, 2012, p. 9). *Skill*-based understandings, however, pinpoint the technological innovation as a cornerstone and target of 'techpreneurship' – and regard the integration of technology and business skills as pivotal for implementation (Matejun, 2016; Mosey et al., 2016). Both competencies are vital as technological innovation, rooted in science and engineering, often implies creating new or disrupting old markets – based on technological and managerial moves (Beckman et al., 2012). It also implies accessing international markets early or right from the beginning, which International Business scholars subsume under the 'born global' umbrella (Rialp et al., 2005).

While all the mentioned interpretations contribute to a sound understanding of the nature of technological entrepreneurship, this study particularly builds on skill-based understanding. Given the specific context of expatriation, competencies to cope with content issues of technologies and international or intercultural contexts stand at the fore – and call for learning-based skill development as well as skill refinement and reconfiguring (Teece, 2007; Freiling, Gersch & Goeke, 2008).

Technology-based entrepreneurs, (self-)expatriation, and competencies

Expatriation is an intercultural experience that confronts the expatriate with an unknown context and provokes learning processes to get used to the new setting (Terjesen & Elam, 2009). With the globalization wave of the last decades, the type of assigned expatriation, implying a displacement to a destination country for the sake of work on an extended assignment and in search of an international career, was very prominent in the literature (Howe-Walsh & Schyns, 2010; McNulty & Brewster, 2017; Machado, 2022). While the work context frames the assigned expatriate considerably and limits discretion, the case of self-expatriation is different – and often not considered explicitly or carved out sharply (Andresen et al., 2014). Self-initiated expatriates are people who undertake international experience often without any (organizational) sponsorship. Given the lower level of support, there is much more discretion in what they do – including founding a company (Suutari & Brewster, 2000; Peltokorpi & Froese, 2009).

Notably, the literature is very much aware of assigned expatriation and is more silent in case of self-expatriation (Andresen et al., 2014; Machado, 2022). As the constellation of self-expatriated technology entrepreneurs deviates largely from assigned expatriation – e.g., by a shifted focus from human resource management to entrepreneurship research – this context allows generating new research insights.

The first set of peculiarities stems from the self-expatriation status (Andresen et al., 2014) and relates to longer-term stays and respective embeddedness in the host country, the strong impact of personal motives on their activities, the ambiguous question whether a later repatriation occurs at all, and the official status of their host country stay (Al Ariss, 2010; Banai & Harry, 2004; Andresen et al., 2014). The second set of specific features rests on the international background. On this note, crossing national and/or cultural boundaries and coping with a typically more unfamiliar host country context (e.g., language, habits, practices, rules) are the core challenges self-expatriated technology entrepreneurs face (Al Ariss, 2010). This may cause serious orientation and information problems (Machado, 2022) and goes along with liabilities of foreignness (Nachum, 2003; Politis, 2005), particularly if the individuals are self-dependent. Finally, the third set of factors relates to the 'techpreneurship' background that requires technological orientation, knowledge, and skills as well as absorptive capacity (Zahra & George, 2002) and reliable partners (Liao & Welsch, 2003). Technology-based entrepreneurs can transform the expatriation experience via exploitation or exploration (Politis, 2005). In case of exploitation, the stable behavior becomes the

dominant state of the learner, while exploration implies that individuals learn from experiences by exploring new possibilities (Politis, 2005).

Mirroring this profile of self-expatriated technology entrepreneurs against core constructs of organization and management theory reveals particularly four challenges founders have to cope with. (i) Bounded rationality (Simon, 1991) reveals the limited information with follow-up problems like opportunistic behavior due to limited familiarity with the foreign country and/or culture context. Minniti and Bygrave (2001) add with respect to entrepreneurial learning the myopic foresight of entrepreneurs. (ii) Liabilities of foreignness are an additional burden for self-expatriated technology entrepreneurs as they operate in foreign markets (Nachum, 2003). This holds for (iii) liabilities of newness as well as the entrepreneurs play new roles, need to interact purposefully in an unfamiliar setting and to build relationships (Stinchcombe, 1965; Freeman, Carroll & Hannan, 1983). Moreover, (iv) bounded reliability relates to the potential failure of actors to meet their commitments, due to opportunism, benevolent preference reversal, and identity-based discordance (Verbeke & Greidanus, 2009). Bounded reliability is a dual challenge for self-expatriated technology entrepreneurs as business partners may doubt their reliability and be reluctant in case of collaboration. Besides that, entrepreneurs often do not know well enough how to identify reliable partners. Identifying and building specific competencies appears to be the response to these challenges that modern business theory favors (Teece, 2007).

The first publications on 'techpreneurship' pointed to the dependence on competencies when it comes to the creation and development of technology-based businesses (Yitshaki & Kropp, 2016). While in general, entrepreneurs need technical, practical, managerial, and personal skills (Hatthakijphong & Ting, 2019), technology-based entrepreneurs also need competencies associated with innovation and creativity (Baradaran et al., 2019; RezaeiZadeh et al., 2017). Accordingly, the literature identifies entrepreneurial and managerial competencies to develop a technology-driven business and to respond to the challenges of bounded rationality/ reliability and liabilities of newness. Moreover, self-expatriation calls for specific international competencies to cope with the liabilities of foreignness. The following sub-sections portray research on both categories.

Entrepreneurial and managerial competencies

Entrepreneurial competencies are a "specific group of competencies relevant to the exercise of successful entrepreneurship" (Mitchelmore & Rowley, 2010, p. 93) and relate to an "individual's potential action capacity

involving cognitive, behavioral, attitudinal, volitional and social abilities needed to perform successfully the role of the entrepreneur" (Peltonen, 2015, p. 494). Among several taxonomies for entrepreneurial competencies (e.g., Man, Lau, & Chan, 2002; Lans et al., 2010), Edwards-Schachter et al. (2015) point to the complexity of the entrepreneurial competencies and structure it along personality traits ('who the entrepreneur is') and behavior ('what entrepreneurs do') as well as insights from social cognitive interactive theory ('how entrepreneurs act in interaction with their environment'). While the first-factor category is subsumed under trait-based skills, the latter two categories are addressed as action-based skills.

Trait-based skills. Research regards to motivation and independence (Dinning, 2019; Mets, Kozlinska, & Raudsaar, 2017) as well as proactivity (Man et al., 2002) to identify, develop and exploit business opportunities and markets. While these factors allow entrepreneurs to gain entrepreneurial momentum, other studies show the need to take risks and to tolerate ambiguity regarding the information challenges based on self-confidence, resilience, and determination (Kyndt & Baert, 2015; Bacigalupo, Kampylis, & Punie, 2016; Komarkova et al., 2015; Moreno, Muñoz, & Morote, 2019). Both groups need to be intertwined, as venture development is typically no linear and straightforward process. These profile elements may allow 'techpreneurs' to move into new businesses and change directions in case of market resistance while maintaining psychic strength.

Action-based skills. Entrepreneurs need to develop the ability to persuade and convince others (Chell, 2013; Kyndt & Baert, 2015; Mitchelmore & Rowley, 2010; RezaeiZadeh et al., 2017) and to build networks through relational skills (Chell, 2013; Kyndt & Baert, 2015; Tittel & Terzidis, 2020). 'Techpreneurs' need particular skills of opportunity seeking given their technologically innovative solutions, capitalizing on their creativity, and a related technology absorptive capacity (Santandreu-Mascarell, Garzon, & Knorr, 2013; Weng, Chiu, & Tsang, 2022; Dinning, 2019; Moreno et al., 2019; RezaeiZadeh et al., 2017; Scuotto et al., 2022).

The literature is very strong in detailing the required skills in entrepreneurial and managerial regards (Man et al., 2002; Komarkova et al., 2015; Baradaran et al., 2019; Surdiman & Siswanto, 2020). Anyway, to successfully develop technological ventures, the alignment of specific skills comes to the fore. Ranging on a meta-level, entrepreneurial learning – as an experiential process in which entrepreneurs develop knowledge through experiencing, reflecting, thinking, and acting (Politis, 2005) – helps 'techpreneurs' transform experience and skills into entrepreneurial development (Scuotto et al., 2022).

The role of entrepreneurial learning in developing technological competencies is undisputed (Secundo, Schiuma, & Passiante, 2017). For 'techpreneurs', the emphasis on experiential learning is of great importance, as technological development rests much on experimentation and 'moving back and forth' (Politis & Gabrielsson, 2009). Anyway, more specific modes allow entrepreneurial learning. Besides the explicit failure-based mode that rests on replacing former beliefs through making mistakes and reflection, entrepreneurial learning by habits is under-represented and needs attention, particularly in the case of knowledge- and technology-intensive ventures (Politis & Gabrielsson, 2009; Cannavacciuolo et al., 2017). This mode of entrepreneurial learning rests on situated learning and cognition, where new knowledge emerges as a by-product of the interaction of the 'techpreneur' and peer-based learning (Cannavacciuolo et al., 2017).

International competencies

Self-expatriated technology-based entrepreneurs operate in an international market and, thus, utilize international and intercultural competencies (Bai, Johanson, & Martin, 2017). The literature paints a detailed and colorful, yet highly fragmented, picture of the content of international competencies.

Johnson, Lenartowicz, and Apud (2006) stressed cross-cultural competencies and defined them as "(…) the effective cross-cultural interaction in drawing upon a set of knowledge, skills, and personal attributes in order to work successfully with people from different national cultural backgrounds at home or abroad" (p. 530). They introduced a cross-cultural competency model in international business that considers (a) personal attributes as values, beliefs, norms, and personality traits (flexibility, perseverance, self-efficacy), (b) personal skills as abilities and aptitudes, and (c) cultural knowledge. Cultural distance and institutional ethnocentrism can moderate the effect of these elements on the cross-cultural competencies. In this perspective, cross-cultural competencies can be improved, and individuals can develop cultural intelligence, that is "(…) a person's capacity to adapt to new cultural settings based on multiple facets including cognitive, motivational and behavioral features" (Earley, 2002, p. 271). In terms of outcome, Vandor and Franke (2016) found that international and cross-cultural competencies could increase an entrepreneur's ability to recognize opportunities by facilitating the application of cross-cultural knowledge for the discovery of opportunities and creative recombinations. Kloosterman (2010) adds that developing cross-cultural capacities allows technology-based entrepreneurs to reflect home- and host-country contexts for the development of innovative technological solutions based on embeddedness in different country contexts.

Moreover, there is much research on international competencies with an accent on interpersonal and communication skills (Wang et al., 2014) as well as managing (international) networks (Coviello & Cox, 2006; Schweizer et al., 2010; Burmeister et al., 2015; Cahen & Borini, 2020) with the entrepreneur in the central position. This type of competencies is important for managing stress in international work settings (Wang et al., 2014) and as an opportunity to seek behavior for knowledge transfer worldviews (Chang, Gong, & Peng, 2012; Leung, Ang, & Tan, 2014).

METHODOLOGY

Given the early state of research and the complexity of the research topic, this step of advancing research sets an accent on explorative research. As the specific state of self-expatriated technology-based entrepreneurs is largely unknown, a deeper dive into related venture settings allows the recognition of new skill structures and constellations, as well as to better understand the complex nature of competencies and related beliefs of technology-based expatriate entrepreneurs. To this end, this study rests on several methodical decisions. (i) Due to the idiosyncratic nature of beliefs, a social constructivist position is able to reflect that – and is consequently chosen. (ii) In this vein, as interpretation matters and interpretive approaches seek to understand how and why individuals could come "(…) to behave more or less uniformly and predictably according to social customs and expectations" (Packard, 2017, p. 541), the study rests on interpretivism. This allows one to address questions about "how social experience is created and given meaning" (Eisenhardt & Graebner, 2007, p. 28). (iii) A qualitative exploratory multiple case theory-building approach is useful to analyze the development of competencies during expatriation and to consider the contextualization of the experiences. As it offers an effective way to analyze the topic in depth (Eisenhardt, 1989), this study is based on this research approach.

Case selection and sample

The multiple case theory-building approach emphasizes careful case selection (Eisenhardt, 2021). In this study, the focus is on the typology of technology entrepreneurs provided by Ratinho et al. (2015) and Majdouline et al. (2022). Moreover, we selected self-initiated expatriate 'techpreneurs' that moved from western-to-western countries because studies between western cultures are still scarce in the literature (Brzozowski et al., 2017). To study or to work was also among the criteria of case selection, following Qin

and Estrin's (2015, p. 227) definition of expatriates as "people that pass some time studying or working in another country". Another selection criterion was a minimum stay of four months in the host country. Four months was considered the minimum time of influencing competencies and to distinguish expatriation from other shorter international experiences. In addition, we considered a self-initiated expatriate was an individual that made the decision to go abroad on his/her own initiative (Cerdin & Semler, 2014).

We searched the maximum variation sampling on cases about the same focal phenomenon in purposefully different settings (Eisenhardt, 2021). In this study, the cases are from different origin countries: Brazil, Mexico, Germany, and Israel, and regarding different country destinations, namely Spain, United Kingdom, United States, Germany, Ireland, Turkey, and the Netherlands. The participants were identified with the support of business incubators and universities located in Brazil and Germany.

This adopted strategy led to the identification of twelve individuals to participate in the study. This sample size is in accordance with Stake's (2006) and Eisenhardt's (1989) parameters. The exact number may rest on pragmatic factors like data availability, cognitive limits, and time (Eisenhardt, 2021).

Data collection: Instruments and procedures

For the sake of data gathering and triangulation, data for this research stems from interviews and secondary sources (documents such as books, websites, and videos). This set of data provided an understanding of technological projects and undertakings in their historical context, as well as the apprehension of perceptions about the skills acquired during expatriation.

The interviews, as the prime data source, comprised a narrative part to discover different facts and meanings related to expatriation experiences (Lin & Almor, 2016). The semi-structured interviews included topics regarding the technology-based venture or project and the expatriate experience, such as "Describe your project or venture," "Tell me about your expatriate experience," and "How did your expatriation experience influence your learning to start or develop your business and your technology-based entrepreneur role?" Additionally, information was gathered regarding age, time spent abroad, host and home country, and educational level.

The interviewees were previously contacted, and the researchers informed them about the research aim and obtained their consent to take part in the study. Afterwards, they signed a consent term, and the anonymity of the twelve cases, named A1 to A12, was assured. Interviews were conducted from May 2018 to January 2019 – four interviews face-to-face and eight via the online platform 'Meet.' The interview duration ranged from 40 to 60 minutes.

The innovative character of the participants' projects and the socialization of the researchers with the techpreneurs' expatriation experiences required an effort of the researchers to dive deeply into the context.

All interviews were recorded and transcribed verbatim. The transcription totaled 78 pages. After transcription, the documents were sent via email to the participants for assuring internal validity through the validation of the content. This procedure also helped coping with some language issues as some interviews were conducted in English and some in Portuguese. To ensure external and internal validity, data were collected from the self-expatriated 'techpreneurs' and complementary sources of data.

In addition, full access electronic documents were collected from entrepreneurs, including brochures, videos, project plans, books, and online reports. Furthermore, enterprises web pages helped complement the business description. The information in these documents was transformed into handwritten notes to support the description of the projects/companies and to improve the contextual understanding.

Reliability issues were considered using a research protocol (Tranfield, Denyer, & Smart, 2003), containing the following elements: research question and objective, theoretical bases, case selection criteria, data collection, and analysis.

Data analysis

The integration of data from different sources rested on collecting and analyzing content from the different sources separately via content analysis in the first step to look for patterns and themes. Prior to analyzing the data, both researchers checked the transcripts. After transcribing the data collected from the interviews and other data sources, we started the data analysis. Data were organized in the within-case and cross-case analysis (Stake, 2006). Based on this, data were coded using Nvivo software.

Data were inductively coded with line-by-line and segment-by-segment coding methods. The coding took place by establishing analytical codes for each interview (Flick, 2009), and the coding summary report resulted in 44 pages. Codes were grouped in three categories established in accord with the literature.

The competencies derived from the expatriation were then categorized as (i) entrepreneurial competencies, (ii) knowledge and innovative competencies, and (iii) international competencies. This selection was guided by the literature review and adjusted by the researchers, in a constant discussion process. The final data analysis followed a constant comparison to find common patterns across the cases to enable the categorization

(Eisenhardt, 2021). Table 1 presents the syntheses of codes and categories. The first-order codes stem from the perceptions that participants expressed in the key topics in the interviews. The second-order codes resulted from the grouping of the first-order in accordance with the literature.

Table 1. Codes and categories

Main elements (1st order)	Codes (2nd order)	Categories (3rd order)
To find friends; investors and strategic persons. Social Networks, Business Networks, international networks. Open minded; Proximity with people. Capacity to convince others - People and Investors. To be Open and Talkative	Relational and Networks	Entrepreneurial competencies
From overcome expatriation barriers.	Behavioral/ Resilience	Entrepreneurial competencies
Patient for adaptation process and to start a business in another country	Behavioral/Patience	Entrepreneurial competencies
After overcome new language, new traditions.	Behavioral/ Trustful-Self-confident	Entrepreneurial competencies
Try new thing. Go out of the comfort zone.	Behavioral/ Proactivity and Motivation	Entrepreneurial competencies
Learning about process to start business in several contexts, vision, difficulties, and challenges.	Doing business in several contexts	Entrepreneurial competencies
New ideas; new technological possibilities and technological solutions.	Creativity	Knowledge and innovative competencies
New Methods – Managerial and Techniques.	Learning New Techniques	Knowledge and innovative competencies
International innovation mindset: start-up culture, accelerators, business plan, several places	International Innovation Environment	Knowledge and innovative competencies
Another way of life, another way of doing things, world like a huge international company.	Acceptance of different cultures	International competencies
With bad things: gangs, crimes, flaws and good things. Different values.	Perception of different cultures	International competencies
Social identity, technological world, the same happens in several places. No bridges.	Sense of international Community	International competencies
Cultural business learning, sense of comparison among countries, learning about institutional, social and corporate culture.	Multicultural Learning	International competencies

RESULTS

This study rests on twelve self-expat cases in different destination countries. This results section presents the participants' views about the development of competencies during the expatriation and the relationship between these competencies and expected entrepreneurial practices. Table 2 displays the data on participants and expatriation experiences.

Table 2. Profile of the participants and experiences

Case	Nationality	Age	Activity/ Profess.	Project or business	Destination	Duration of expat.
A1	Brazilian	50	Professor/ startup	Company in dermatoglyphics. He developed a digital process to read the dermal papilla	He has a doctorate in Health Sciences and spent four months as a postdoctoral researcher in Spain	4 months
A2	German	51	Professor/ startup	He came back to Germany and started a business in artificial intelligence	He went to the United Kingdom to pursue his doctorate	5 years
A3	Brazilian	32	Consultant	He works with large digital companies in San Francisco as a consultant in technology	He went to the United States to work with large companies	2 years
A4	Brazilian	30	Informatics	He is working in a project related to digital payments	He went to Berlin to work in a co-working space to develop new products	5 months
A5	German	27	Professor/ Startup	She created a startup, a personal digital assistant for sustainable consumer behavior	She went to the United States because of her job in a company	5 months
A6	German	26	Professor/ Startup	He created a startup, a personal digital assistant for sustainable consumer behavior	He went to the United States for an internship	4 months
A7	Brazilian	34	Business creator	Several projects related to innovation and urban properties	He went to the Netherlands to work in an accelerator company in Amsterdam	2 years
A8	Brazilian	34	Entrepreneur	Technological products for dentists	He went to the United States to discover new markets for his company, which operates in the area of equipment for dental use	4 months

Case	Nationality	Age	Activity/ Profess.	Project or business	Destination	Duration of expat.
A9	Mexican	30	Entrepreneur	Logistics Technology Company	He went to Germany for a Masters in Logistics and founded a Logistics Technology Company	4 years
A10	Brazilian	34	Mechanical Engineer	Consultant in aircraft projects	He went to Ireland to work as a consultant in aircraft projects	18 months
A11	Brazilian	38	Computer Student	Business project for cultural institutions, creating digital platforms to visitors in cultural institutes	Doctoral Student in Informatics in Germany	14 years
A12	Israel	36	Entrepreneur	Digital instruments on the web	He moved from Israel to Munich to continue the business he started in Israel	6 years

Four participants already had previous expatriation experiences (A4, A5, A10, A11) and two participants had already previously visited the country of destination (A1, A3), while the remaining participants arrived at the destination for the first time. One of them (A12) arrived in a city and then moved to another one in the same country. The motivation to go abroad differs largely. Many of them relocated to study abroad (A1, A2, A5, A6, A11). Others decided to go abroad to get more involved in another technological domain (A3, A10). Only one self-initiated expatriate decided to relocate to work for an international business incubator (A4) and another one for a business accelerator (A7). In turn, A9 went abroad to start a technology-based business, while A12 continued his technology-based business in another country. A8 went abroad to search for a market to commercialize the technological products of his enterprise. Most of them evolved in technological fields during the expatriation (A1, A3, A4, A7, A9, A10, A11, A12). One participant had a technological business before the expatriation (A8) and three of them started their technological-based business after the expatriation (A2, A5, A6).

The characterization of expatriation experiences

In the analysis of the expatriation process, we distinguished four steps: (a) arrival in the destination country and initial process of socialization, (b) engaging in activities that allowed getting familiar with the culture of the

destination country, (c) the gradual comprehensive understanding of the new context, and (d) comparisons between the home and destination country.

As for the arrival in the country of destination, the interviewees reported that many difficulties were related to their unknown situation, namely gathering information, getting orientation and access to the culture, including an understanding of local values, and overcoming language barriers. One interviewee reported financial difficulties in the beginning and another one problems with the time zone. The expatriation challenged them to interpret different kinds of events (Drori, Honig, & Wright, 2009). Four participants argued that they faced cultural prejudice (A7, A8, A9, A11). In addition, five interviewees reported difficulties in adapting to language (A7, A8, A9, A10, A12), and two participants cited a cultural shock (A3, A5). Like the difficulties of assigned expatriates in multinationals, in this research, the self-expatriate faced adaptation problems in the initial process. The cultural shock means an "emotional and psychological reaction to the confusions, ambiguity, value conflicts, and hidden clashes that occurs as a result of fundamentally different ways of perceiving the world and interact socially between cultures" (Solomon, 1994, p. 58).

To cope with the initial challenges, several respondents started building networks (A1, A3, A4, A7, A9). In most cases, the entrepreneurs were embedded in institutional contexts (universities, enterprises, incubators, accelerators), which helped them to acquire institutional knowledge gradually. Four participants highlighted the support received from business accelerators (A4, A5, A7, A9).

Gradually, they started to understand the new context and the way of doing business in the destination country. Some of them reported comparisons between the destination and the home country (A5, A10, A11). For instance, the entrepreneur who left Mexico and went to Germany said that he had discovered that in Germany, just like in Mexico, there were gangs, crimes, things that he thought would never exist in Germany. In a similar vein, A11 stated, "Germans are fallible." Moreover, A5 mentioned a few differences in terms of formal and informal culture (A5), and A11 reported differences related to time and environment. Additionally, A2 mentioned differences between expressive and reserved cultures.

The results can be compared to the Black and Mendenhall (1990) curve of cross-cultural adjustment. They described the initial moment of expatriation as a honeymoon, when expatriates express enchantment in the destination country. After this, they have a cultural shock; from the moment they begin to realize that there are imperfections in the destination country. Then, they enter the gradual adjustment stage and, finally, the biculturalism stage.

However, the bi-culturalism stage is hard to achieve and was not observed in this research.

Beliefs about the competencies developed in expatriation

This section reveals the categories of competencies enhanced during the expatriation experiences. Based on the inductive procedure, three different categories emerged.

Entrepreneurial competencies

The analysis of interviews conducted with the self-expatriates revealed three themes with regard to entrepreneurial competencies. These competencies are: relational competencies, including communication skills and network management, behavioral competencies, encompassing trust, self-confidence, patience, resilience and proactivity, and competencies related to learning about doing business in different contexts.

Relational competencies

Three entrepreneurs mentioned that relational competencies arose from the need to cope with the unknown during expatriation. A12, for example, argued that he was compelled "to communicate better." Another participant expressed the need for communication to convince investors. He talked about learning and improving the pitches:

> My first pitch differs a lot from my pitch today, I was more technical, speaking a lot, like about data science and languages, and now I realize what investors are actually about, they always are about numbers, you must make them believe in your idea, so you must be a kind of business showman as well (A4).

In addition, three respondents (A2, A5, A9) expressed that expatriation influenced them to become more "open and talkative" persons. Some interviewees argued the importance of *network skills* in several contexts: social, business, and international. For instance, A9 mentioned that expatriation requires dealing with the unknown, which leads to a "natural way" of building networks. A3 emphasized the technological background, highlighting its very dynamic nature, and added: "Talk as much as possible to several people, because everyone has their own contacts" (A3). Participants developed networks from different sources, such as universities, venture

capital meetings, innovation hubs, and technology companies. According to some interviewees, the information obtained from the networks was important to improve their research and professional careers (A1, A3, A7), to legitimize business ideas (A1, A3, A4) and "to add value to my career and to my knowledge" (A7). A1 argued that expatriation contributed to building international partnerships for his business.

This group of competencies evidenced that the entrepreneurs improved their social abilities. Social abilities are required for the entrepreneurial role (Edwards-Schachter *et al.,* 2015; Peltonen, 2015). Communication capacity included the interaction with investors, which is relevant as venture capital plays a significant role in financing innovation and technology-based businesses (Lerner & Nanda, 2020). Additionally, according to the data, interviewees mentioned the ability to build networks, which is essential for internationalization processes (Johanson & Vahlne, 2009). According to three interviewees (A1, A3, A4), networks were relevant to legitimize business ideas and this can be related to the entrepreneurial learning, specifically in recognizing opportunities and coping with the liabilities of newness (Politis, 2005). Furthermore, business ideas are fundamental insights in the innovation field and the evolution of the business idea is a process according to the following stages: generation and enrichment of ideas, sources of ideas, evaluation and selection of ideas, storage of ideas and sharing of ideas and management of ideas (Teza et al., 2016). Several participants underscored the role of institutions in this process of the evolution of the business idea, like hubs, universities and incubators.

Behavioral competencies

Two interviewees reported that expatriation improved their trust and self-confidence. A12 expressed a variety of perspectives: "I find the power again, today, now in a different situation to do the same … facing emergencies abroad, all those things that make you grow up, and become surer, more responsible, more thinking for yourself" (A12). Another interviewee argued: "Today I feel more self-confident about talking to people because if you are alone and go to another country you do not know how to deal with this situation" (A5).

Six participants argued they become more resilient (A1, A2, A5, A9, A11, A12). Two participants (A2, A9) also highlighted the effect of expatriation on their patience. A9 mentioned that resilience was developed when he was struggling to start and develop a business in the foreign country. Additionally, A2 commented that the expatriation made him act much more proactively.

These behavioral traits are mentioned in the entrepreneurial behavior literature, like proactivity, self-confidence, and resilience (Man et al., 2002; Bacigalupo et al., 2016; Komarkova et al., 2015, Moreno et al., 2019). However, it was expected that the self-expatriation, as a challenge experience, would enhance the ability to face uncertainty and to be tolerant of ambiguity (traits cited by Grichnik et al., 2017; Kyndt & Baert, 2015), yet the interviewees did not refer to these aspects.

Learning to do business in different contexts

In most cases, the informants reported that expatriation helps them develop a vision of how to do business in several contexts. They compared the ease or difficulties of starting a business in different contexts (A2, A3, A4, A9, A12). A8 commented on comparative ethical aspects of doing business in different countries. Another aspect, mentioned by A2, A3, A4 and A7, was the agility to create a technology-based company in some contexts.

At the same time, expatriation enhanced their knowledge of how to do business in different cultural contexts. Although entrepreneurial and international competencies classifications did not mention this skill, the environmental dimensions in international business must be weighted in carrying operations to foreign markets and selecting partnerships to foreign operations (Sethi & Guisinger, 2002). This learning is also important because bounded reliability is a dual challenge for self-expatriated technology entrepreneurs, as business partners may doubt their reliability and be reluctant in the case of collaboration (Verbeke & Greidanus, 2009).

In summary, for the entrepreneurs the expatriation influenced the development of several entrepreneurial and behavioral competencies. Table 3 shows the number of codes by case.

Table 3. Number of codes by cases with reference to entrepreneurial competencies

Theme/Cases	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	Total
Relational competencies	4	3	1	3	1	1	1	0	2	0	0	1	17
Behavioral competencies	1	2	1	2	2	0	1	2	2	0	1	2	16
Learning about doing business in different contexts	2	3	3	1	0	0	1	3	2	0	2	3	20

Table 3 shows that only one participant, A10, did not mention the learning of entrepreneurial competencies. In terms of total codes, learning about doing business in different contexts was the one that reached more codes, but three participants did not express this learning. In addition, the results provide insights that expatriation improved their innovation and knowledge competencies, as will be described below.

Knowledge and innovative competencies

As Table 4 shows, the second category, knowledge and innovative competencies, comprises three sub-categories, namely creativity, learning new techniques, and international innovation environment. The innovation capacity is closely related to creativity (Freiling, 2009).

Table 4. Codes by case with reference to knowledge and innovative competencies

Codes/Cases	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	Total
Creativity	0	1	0	1	0	0	0	1	0	0	0	1	4
Learning new techniques	0	0	1	2	0	0	2	0	1	1	0	0	7
International innovation environment	0	0	0	1	0	0	0	0	1	0	0	0	2

The most cited sub-category was learning new techniques (seven mentions) with relevance to five cases. Four participants mentioned creativity and two participants mentioned the international innovation environment. Cases A1, A5, A6 and A11 did not express learning of knowledge and innovative competencies. The creativity was expressed in new ideas and open-minded behavior. One interviewee argued that expatriation contributed to him coming up with new ideas (A4). Two respondents outlined that they had become open-minded individuals. Talking about this issue, interviewees expressed:

> When you are abroad, what happens is that you open your mind and when you open your mind, there are many times things that come, solutions come, not in the way, it thought they come, but it came because you are open to try to something else or to see another point of view (A12).
> When we see new and different things out there, no doubt, it opens a range of possibilities, not just creativity, the international ones you end up becoming a more creative person (A8).

The second sub-category, the learning of new techniques, was observed in five self-expats cases (A3, A4, A7, A9, A10) that argued the learning of different methods and technical procedures (design thinking, technology). Regarding design thinking, this allows entrepreneurs to recognize situations and give intuitive responses (Mosely, Wright, & Wrigley, 2018). Knowledge is important for technology-based entrepreneurs. However, they did not cite issues such as intellectual property, artificial intelligence, and transfer of technology. One participant expressed that expatriation provides new ideas and not innovation, as he explained:

> I think that it is more, I think about curiosity in terms of innovation because in innovation is always the exception, you know like creating a rocket or like the artificial intelligence machine or something that it is exceptionally in my view, there is like one case on a million. However, in lower level, lower tech innovation, it is always something that you´re accept that have a little bit improvement. I think that is more about being active about the topic that you are working. If it is a logistics, living logistics and talking about logistics every day, working logistics every day, and then you find ground to innovate a little bit and maybe it takes being an expat limits you because you can expose to more ideas. I know how start here in Germany and in Mexico and in US opened my mind, but I do not know if it is necessary being an expat for being doing innovation (A9).

However, some learning regarding new knowledge and innovation was mentioned by participants and this may contribute to their role of technology-based entrepreneurs (Baradaran et al., 2019; RezaeiZadeh et al., 2017) to their exploration and exploitation capacity (Politis, 2005). Moreover, participants highlighted the enhancement of academic (A1, A2, A5) and ecological competencies (A5), which can enable, create and capture value for their enterprises or projects (Bailetti, 2012).

Regarding the third sub-category, two entrepreneurs (A4, A9) stated that expatriation contributes to providing an international view of the innovation environment and the international innovation hubs, such as Singapore and London:

> If I start in Singapore and get like really amazing because are there investments, people are going there, only like to create something or all over the world, Singapore is really international country already! That is what is happens in Berlin. (A4)

These findings suggest that expatriation was an experience that improved creativity, supported learning new techniques, improved the innovative thinking of participants (Morad, Ragonis, & Barak, 2021) and promoted some form of inclusion in the international innovation community.

International competencies

The third category comprises the international competencies with three sub-themes: acceptance of different cultures and multicultural learning, the sense of an international community and an international innovation culture. Table 5 portrays these sub-categories.

Table 5. Code by cases with reference to international competencies

Codes/Cases	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	Total
Acceptance of different cultures/ multicultural learning/ Perception of cultural differences	0	2	0	2	4	1	1	0	3	1	2	1	17
Sense of international community	1	1	0	1	1	0	1	0	1	1	0	1	8
International Innovation Culture	0	0	1	1	0	0	1	0	0	0	1	0	4

The cultural dimension of learning unites the general cultural knowledge – a focus on awareness and knowledge of cultural differences – and the culture-specific knowledge –(Johnson et al., 2006). For instance, in the code named "the acceptance of different cultures, perception of cultural differences and multicultural learning," A9 pointed out that during expatriation, getting in touch with cultural differences was important. Another interviewee reported that: "Germany opened my eyes. (…) it is an open society that accepts people" (A12). In general, participants mentioned that the knowledge of different cultures was an important influence on the expatriation experience.

The cross-cultural experience was also a challenge for them and required coping with an unfamiliar host country context (language, habits, and practices) where liabilities of foreignness occur (Al Ariss, 2010; Nachum, 2003; Politis, 2005):

This is something that I find very difficult, because many times I was unable to express myself and really try to speak German. I start in German, but you know, as foreigner, sometimes you need to use your English because, of course, when you don't speak correct, but then you start to speak and you get back just silent: "*hier wir sprechen Deutsch*". This is very exhausting to get this back, so this is something that was very difficult to me and I had many times shock (A12).

Germans are very welcoming and accepting, but when you have to do business with them, there is also another culture, they are closed and talk a little bit and they have to judge in how you look, how you speak, what you looking, yes that is something else from doing business here (A9).

You are in Germany you must understand what I am talking about. Communication is much more direct, much more direct to the point, less emotional, so people do not have so much question of creating relationships at work (A11).

Another sub-theme coded to relate to international competencies is the sense of (belonging to) an international community. Two participants illustrated the multiculturalism, they found in expatriation, which can be observed in the following quotes: "There was a time we had twenty-four people from fifteen different countries, so it was an international environment" (A7); "Today the project is very international, approximately fifteen or twenty people directly working, and they are not necessarily from the same place" (A10). Some participants stated that they acquired an international mindset that nurtured the feeling of belonging to an international community. This linked to the specific technological background, as some of them commented: "The expatriation makes me have an international mindset" (A2); "I feel like part of a community that is internationalized and if you go to Berlin, you meet people from all over the place" (A5).

In the international innovation culture code, four participants indicated that expatriation reinforced the idea of the culture of innovation (A3, A4, A7, A11), that is "a culture that is in all the world" (A11):

When we think of tech entrepreneurs, we have to go to the big cities, then everything is happening, also Berlin. So, you definitely have to be in Berlin from time to time, all the conferences, all the agencies are here, but it's not only Berlin, it's other cities, for example, it's clear that San Francisco, but if you really are a tech entrepreneur you feel like part of the community. (A4)

Table 6 provides an overview of competencies case by case. In all cases, at least two types of competencies matter. In six of twelve cases, all types of competencies occur. Comparing the three competencies, the entrepreneurial competencies and the international types were presented in eleven cases, respectively. Although with lower incidence, skills associated with innovation and knowledge were observed in eight of the twelve cases.

Table 6. Type of competencies by case study

Case	Entrepreneurial competencies	Knowledge and Innovative competencies	International competencies
A1	✓	✓	✓
A2	✓	✓	✓
A3	✓	✓	✓
A4	✓	✓	✓
A5	✓		✓
A6	✓		✓
A7	✓	✓	✓
A8	✓	✓	
A9	✓	✓	✓
A10		✓	✓
A11	✓		✓
A12	✓	✓	✓

The cases express the entrepreneurs' beliefs about the competencies developed during the expatriation. The three themes that emerged from the analysis are illustrated in Figure 1: (a) entrepreneurial competencies, (b) knowledge and innovative competencies, and (c) international competencies.

DISCUSSION

Competencies are relevant to technology entrepreneurs to perform their roles (Mitchelmore & Rowley, 2010). This research explored self-expatriated technology-based entrepreneurs' beliefs and experiences about the development of their competencies during expatriation. Our study has contributed to understanding the development of several competencies according to the perceptions of technology-based entrepreneurs self-expatriated: entrepreneurial and behavioral competencies, knowledge and innovative competencies, and international competencies.
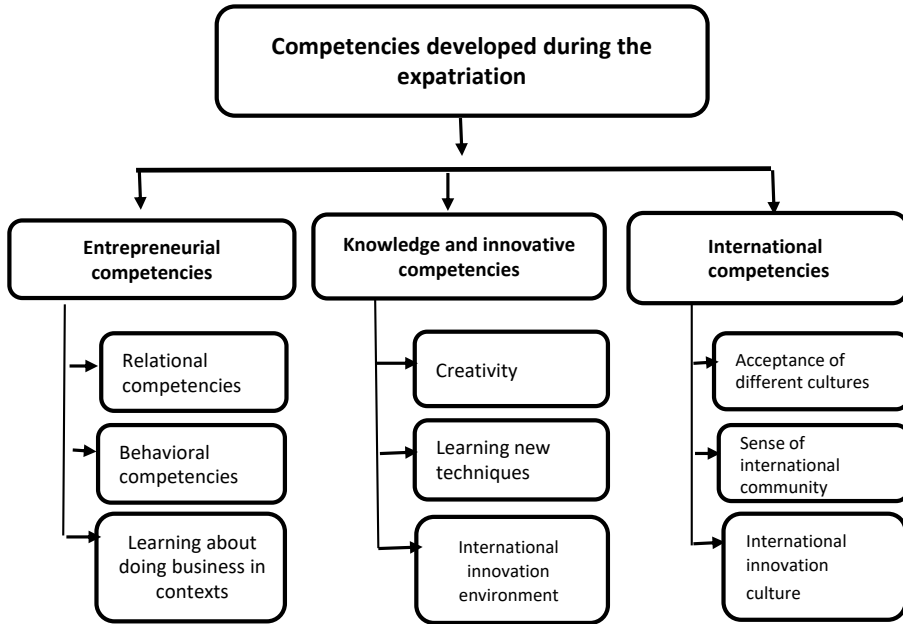
Figure 1. Map of categories related to competencies derived from expatriation according to the technology-based expatriated entrepreneurs

Entrepreneurial and behavioral competencies

Regarding entrepreneurial competencies, our findings showed three groups of competencies: communicative and relational, behavioral, and competencies on how to do business in different contexts. In the first group, the communicative and relational competencies literature highlights that they are necessary for entrepreneurs to develop specific social and business networks (Chell, 2013; Chen & Tan, 2009; Grichnik et al., 2017; Peltokorpi & Zhang, 2020). According to the interviewees, expatriation was a relevant experience to improve their relational and communicative competencies. This experiential learning enables them to expand their ideas and their business. Furthermore, the entrepreneurs stressed networks as a mechanism to overcome barriers, to expand their businesses, and as a source to obtain information, thus influencing entrepreneurial competencies (Chell & Athayde, 2009; Deligianni et al., 2019; Grichnik et al., 2017; Rasmussen, Mosey, & Wright, 2011; RezaeiZadeh et al., 2017).

Another type of entrepreneurial competencies identified is behavioral competencies. Prior studies have noted the importance of psychological or

personality traits, like self-efficacy, self-awareness and self-confidence for playing the role of entrepreneur (Bacigalupo et al., 2016; Komarkova et al., 2015; Moreno et al., 2019). The data in this research showed that expatriation increased resilience, patience, trust, and self-confidence of participants. In line with previous studies, these competencies are important for entrepreneurs not only to create or discover opportunities, but at all stages of the venture (Hansen, Srader, & Monllor, 2011; Chell, 2013). Likewise, resilient entrepreneurs show a high degree of tolerance for ambiguity and adapt quickly to change (Ayala & Manzano, 2014). Especially for technology-based entrepreneurs, resilience is necessary to adapt to changes, as well as to overcome difficulties associated with conquering markets for innovative products.

The current study found another entrepreneurial competency: the ability to do business in another context. Chang, Gong, and Peng (2012) showed that this competency can influence absorptive capacity and knowledge transfer. For techpreneurs this can increase the ability to recognize entrepreneurial opportunities and to put new ideas into practice (Qin & Estrin, 2015; Vandor & Franke, 2016). As highlighted by the Doing Business Report (World Bank Group, 2020), it is necessary to better understand the influence of cultural aspects of doing business. The participants of this research mentioned ease, difficulties, ethical aspects, and the assessment of uncertainty in doing business in different countries.

Knowledge and innovative competencies

Knowledge and innovative competencies are key issues for technology-based entrepreneurs. Our results showed that expatriation improved creativity, learning of new techniques, and developing a culture of international innovation. Previous research has found that creativity can improve the ability to become more innovative (Deligianni et al. 2019). Creativity is particularly important for techpreneurs as it can improve the ability to create opportunities and the ability to generate new ideas, and envision possibilities (Chell, 2013; Hansen et al., 2011). Technology-based entrepreneurs often operate in an international scenario that is complex, and creativity is useful to cope with these challenges. Only four participants mentioned creativity as a skill developed in the destination country. However, it is important to mention that interviewees referred to an "open minded" effect, which can nurture creativity.

In seven cases, the experience abroad allowed them to learn about different methods for new business development, such as design thinking and comparable types of advanced methods. In these settings, institutions

like universities, incubators and hubs, promoted innovation as innovator actors (Ranga & Etzkowitz, 2013).

Regarding the international and innovative identity, Peltokorpi and Zhang (2020) and Bai et al. (2017) commented that expatriation fuels the development of a cultural identity or an international mindset. Our findings show that the technology-based entrepreneurs developed cultural identity and an international innovation mindset, including a start-up culture and atmosphere in accelerators, incubators, and universities. This competency is important for providing capacity to technology entrepreneurs to invest abroad, given that they need to start businesses in several contexts (Bai et al., 2017; Fu, Hou, & Sanfilippo, 2017).

International competencies

The third group of competencies relates to the development of international competencies. Previous studies showed that technology-based entrepreneurs act in changing and complex environments (Bacigalupo et al., 2016; Johanson & Vahlne, 2009) and they need to identify opportunities in an international context (Dimitratos et al., 2016; Muzychenko, 2008). This research identified the following international competencies: acceptance of different cultures and multicultural learning, the sense of an international community, and an international innovation culture. This result adds value to the understanding of international competencies, such as interpersonal and communication skills, networking ability, adaptability, and flexibility (Cahen & Borini, 2020; Wang et al., 2014). Another interesting finding is the sense of an international identity connected to the international technological mindset. This international vision is close to a global competency that can influence entrepreneurs to see the market from a different angle (RezaeiZadeh et al., 2017). This type of competency can encourage technology entrepreneurs to start businesses in other countries and increase exports (Dimitratos et al., 2016; Paul, Parthasarathy, & Gupta, 2017). Moreover, an international mindset can contribute to the development of an international orientation, stimulating entrepreneurs to discover and develop opportunities in international markets in exploration and exploitation dimensions (Politis, 2005). The findings of this research reinforce the statement that competencies can be developed in a cognitive and learning process (Beckman et al., 2012; Chell, 2013; Edwards-Schachter et al., 2015; Mitchelmore & Rowley, 2010), where entrepreneurs learn from past experiences (Politis, 2005).

Although each expatriation experience is singular, this research with diversified cases could demonstrate that self-expatriation can nurture entrepreneurial, international, and innovative learning. Experiences abroad

require the interpretation of different types of events (Aliaga-Isla, 2014), and the challenges for self-expatriates in this research are similar to assigned expatriates. They need to face a cultural adjustment (Black & Mendenhall, 1990); meanwhile, this circumstance did not prevent learning from experience. Nonetheless, our results show that innovative competences were the least highlighted by participants.

CONCLUSIONS

The aim of this research was to explore self-expatriated technology-based entrepreneurs' beliefs and experiences across expatriation to seven destination countries to identify enhancement of their competencies. Findings evidenced that self-expatriation enhances competencies of technology-based entrepreneurs. As an intercultural experience, it provokes learning processes (Terjesen & Elam, 2009) by exploring new contexts and possibilities (Politis, 2005).

This study makes, at least, three main contributions to research. First, the study stresses and specifies the cognitive dimension of self-expatriated technology-based entrepreneurs. This adds to the still rather limited knowledge on self-expatriated entrepreneurship (Andresen et al., 2014; Machado, 2022) and allows a deeper understanding of how self-expatriation is a source of entrepreneurial learning (Politis, 2005), linking entrepreneurial competencies (Chell, 2003), international and intercultural competencies (Johnson et al., 2006; Leung et al., 2014), and innovative competencies (Chell, & Athayde, 2009). Second, the findings contribute to a more nuanced understanding of the process of self-expatriation of techpreneurs and suggests a four-step approach with (a) the arrival in the destination country and initial process of socialization, (b) the engagement in activities to familiarize with the culture of the destination country, (c) the understanding of the new context, and (d) the comparisons between the home and destination country. This study delivers a more specific set of phases that emerges out of the data. These findings complement earlier work in self-expatriation (Al Ariss, 2010; Cerdin & Selmer, 2014; Doherty, 2013) and emphasize it in technology entrepreneurship (Matejun, 2016; Shane & Venkataraman, 2003). Third, the findings specify how self-expatriation results in the development of different competencies and detail the respective skill set, comprising (i) entrepreneurial competencies; (ii) knowledge and innovative competencies, and (iii) international competencies. (i) As for the entrepreneurial competencies, our study goes beyond the integration of technology and business skills relevant to the implementation of technology-based enterprise (Matejun, 2016; Mosey et al., 2016) and sheds

light on technical training, the considerable opportunities for entrepreneurial learning and – building on Mitchelmore and Rowley (2010) and Peltonen (2015) – to emphasize entrepreneurial skills in the light of expatriation and the to date rarely focused technology-based entrepreneurs.

Furthermore, our findings stress relational and behavioral aspects of entrepreneurial skills in line with previous studies (Dinning, 2019; Man et al., 2002; Komarkova et al., 2015), but emphasize the competence of how to do business in the specific context. (ii) Regarding knowledge and innovative competencies in self-expatriation experiences, previous studies emphasize scientific and technological knowledge (Bailetti, 2012; Beckman et al., 2012; Shane & Venkataraman, 2003), while our findings reveal the ability to act in the international innovation environment an additional innovative competency. (iii) Regarding international competencies, technology-based entrepreneurs face the challenge of bounded reliability (Verbeke & Greidanus, 2009) and liability of foreignness (Nachum, 2003; Politis, 2005). Enhancing international competencies may help them to overcome these obstacles. The findings of this research go beyond the existent literature that emphasizes the personal attributes, cultural knowledge, and networking skills (Johnson et al., 2006; Burmeister et al., 2015; Coviello & Cox, 2006; Schweizer et al., 2010). According to our findings, the self-expatriate technology-based entrepreneurs perceive a sense of international community and they learned about the international innovation culture.

Furthermore, this study focused on the process of self-expatriation to understand the learning process of entrepreneurs rather than the results. Our results demonstrate that self-expatriation represents an opportunity for technology-based entrepreneurs to learn a wide range of different competencies that contribute to innovating, to managing their business and operating in international markets.

The findings of this study have several practical implications. Competencies are critical for technology entrepreneurs and our findings bring elements to entrepreneurship education programs aimed at technology entrepreneurs, pointing at entrepreneurial, innovative, and international aspects. Furthermore, considering the favorable effects of expatriation experiences, as well as the reported difficulties of the interviewees, the results show the importance of offering institutional and policy support for technology-based entrepreneurs who aim to have expatriation experiences.

International exchange programs for students in technology-based courses in universities could implement international programs for students intending to start a technology business. Finally, government and society should promote insights into innovation policies that consider expatriation

experiences in innovative environments such as technology incubators and science parks.

Among the limitations of the study, the cases covered only the following countries of origin: Brazil, Mexico, Israel, and Germany, and the following destination countries: Spain, the United Kingdom, the United States, the Netherlands, Germany, and Ireland. It is important to note that the results of this research apply to self-expatriates. Cases of assigned expatriates may show different results. Another limitation is a gender bias as only one woman is among the participants, whereas previous studies demonstrated differences in entrepreneurial competencies between women and men (Mitchelmore & Rowley, 2013).

Further studies could expand the finding of this research, understanding gender effects on competencies in self-expatriation in innovative and international context. Future research may also explore skills in self-expatriation in other types of entrepreneurs different from techpreneurs.

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Abstrakt

CEL: *W obliczu luki badawczej w zakresie uczenia się przedsiębiorczości przez przed-siębiorców korzystających z technologii, którzy wyjechali za granicę, celem jest zbadanie przekonań i doświadczeń tych przedsiębiorców podczas ekspatriacji, aby zidentyfikować wzmocnienie ich kompetencji.* ***METODYKA:*** *W ramach jakościowego i eksploracyjnego podejścia do budowania teorii wielu przypadków zebrano dane od dwunastu przedsiębiorców technologicznych z Brazylii, Meksyku, Niemiec i Izraela, którzy udali się do następujących krajów docelowych: Hiszpania, Wielka Brytania, Stany Zjednoczone, Niemcy, Irlandia, Turcji i Holandii. Ponieważ głównym źródłem są dane z wywiadu, analiza danych opiera się na jakościowej analizie treści.* ***WYNIKI:***

*Dane pozwalają na ustrukturyzowanie doświadczeń ekspatriacyjnych przedsiębiorców technologicznych według następujących etapów: (a) przybycie do kraju docelowego i początkowy proces socjalizacji, (b) zaangażowanie w działania mające na celu zapoznanie się z kulturą kraju docelowego, (c) stopniowe kompleksowe zrozumienie nowego kontekstu oraz d) porównania między krajem macierzystym a krajem docelowym. Ekspatriacja miała wyraźny wpływ na przedsiębiorców technologicznych, który przejawia się w trzech grupach kompetencji: kompetencje przedsiębiorcze, kompetencje wiedzy i innowacji oraz kompetencje międzynarodowe. Kompetencje w zakresie przedsiębiorczości odnoszą się do umiejętności relacyjnych i behawioralnych oraz uczenia się prowadzenia działalności gospodarczej w różnych kontekstach. Jeśli chodzi o wiedzę i innowacyjne kompetencje, na pierwszy plan wysuwa się kreatywność, uczenie się nowych technik oraz międzynarodowe środowisko innowacji. Wreszcie, kompetencje międzynarodowe odnoszą się do akceptacji różnych kultur (uczenie się wielokulturowości i postrzeganie różnic kulturowych), rozwijania poczucia wspólnoty międzynarodowej i międzynarodowej kultury innowacji. **IMPLIKACJE:** Badanie to wykazało wpływ doświadczeń ekspatriacyjnych na szkolenie umiejętności przedsiębiorców opartych na technologii, w specyficznym podejściu do kompetencji przedsiębiorczych, innowacyjnych i międzykulturowych. Badanie przedstawia samoekspatriację jako szansę dla przedsiębiorców technologicznych na rozwijanie różnych kompetencji, które są pomocne w innowacjach, zarządzaniu biznesem i działaniu na rynkach międzynarodowych. Rząd może opracować politykę przyciągania samo-emigrantów do ośrodków innowacji, biorąc pod uwagę, że lokalni mieszkańcy mogą skorzystać z wymiany kulturalnej. **ORYGINALNOŚĆ I WARTOŚĆ**: Niniejsze badanie przyczynia się do lepszego zrozumienia wpływu doświadczeń związanych z własnym wyjazdem za granicę na rozwój umiejętności przedsiębiorców technologicznych. W porównaniu z poprzednimi badaniami zapewnia szerszy zakres uczenia się na podstawie doświadczeń ekspatriacyjnych poza wpływem internacjonalizacji na wiedzę rynkową i aspekty kulturowe. Co więcej, niniejsze badanie koncentruje się na procesie, a nie na wynikach samoekspatriacji, aby zrozumieć proces uczenia się przedsiębiorców.*
Słowa kluczowe: przedsiębiorcy technologiczni, innowacyjność, przedsiębiorcy, umiejętności, kompetencje, ekspatriacja

Biographical notes

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Authorship contribution statement

Hilka Pelizza Vier Machado: Contribution, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Validation, Visualization, Writing Original Draft, Writing, Review, Editing. **Jörg Freiling:** Contribution, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Resources, Software, Supervision, Validation, Visualization, Writing Original Draft, Writing, Review, Editing.

Conflicts of interest

The authors declare no conflict of interest.

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