INTERNATIONAL DIGITAL COMPETENCIES MAXIMIZING LEAN INTERNATIONALIZATION IN HEALTHCARE STARTUPS

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RESUMO

O objetivo deste artigo é verificar se as competências digitais internacionais ajudam as startups a alcançar a internacionalização enxuta. Utilizamos uma abordagem exploratória qualitativa e um estudo de caso crítico foi desenvolvido com a startup brasileira: Varstation. Nossos resultados mostram como as competências digitais internacionais maximizam a internacionalização enxuta em startups de mercados emergentes da seguinte maneira: a habilidade de programação intercultural é uma competência que ajuda as startups a atingirem a baixa necessidade de acesso a ativos específicos estrangeiros locais; o networking virtual global é uma competência que ajuda as startups a alcançar elevado poder de acesso e mobilização de recursos internacionais e a alavancar o poder das reputações online; a adaptabilidade da monetização digital transfronteiriça, a reconfiguração do modelo de negócios internacional e a rede virtual global são competências que ajudam as startups a alavancar o seu poder de reputação online; e o networking virtual global é uma competência que ajuda as startups a alcançarem a adoção de identidades locais em mercados estrangeiros, alto poder de acesso e mobilização de recursos internacionais e baixa necessidade de acesso a ativos específicos estrangeiros locais. Nossos resultados identificaram cinco contribuições teóricas e duas contribuições gerenciais que confirmam o modelo conceitual proposto.

Palavras-chave: Internacionalização Enxuta; Competências Digitais Internacionais; Startups; Negócios internacionais.

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1

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

1

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ABSTRACT

The purpose of this paper is to verify whether international digital competencies help startups achieve lean internationalization. We use a qualitative exploratory approach, and one critical case study was developed with Brazilian startup: Varstation. Our results show how the digital international competencies maximize lean internationalization in emerging market startups in the following way: cross-cultural programming skill is a competence that helps startups achieves the low need to access local foreign specific assets; global virtual networking is a competence that helps startups achieves high access and mobilization power of international resources and leverage power of online reputations; cross-border digital monetization adaptability, international business model reconfiguration and global virtual networking are competencies that help startups leverage their power of online reputations; and global virtual networking is a competence that helps startups achieve adoption of local identities in foreign markets, high access and mobilization power of international resources and low need to access local foreign specific assets. Our findings identified five theoretical contributions and two managerial contributions that confirm the conceptual model proposed.

Keywords: Lean Internationalization; International Digital Competencies; Startups; International Business.

1. INTRODUCTION

Lean internationalization refers to a specific kind of foreign market entry mode in which new ventures leverage digitization to fasten their internationalization strategies with a low marginal increase in the resources consumed in the internationalization process (AUTIO, & ZANDER, 2016). Firms with digitized market processes can expand more quickly their clientele given that efficient low-cost market methods such as sales via website or online marketing tools undermine the need for large investments in local production or sales force. Moreover, this kind of strategies allows firms to quickly learn about new markets and develop local networks, therefore adapting its products to local tastes and increasing client interaction (NEUBERT, 2018).

In this context, companies that offer software-as-a-service (SaaS) services are continually growing in importance in the global market. SaaS is a business model in which

2

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

2

consumers pay fees to use software. Five main characteristics are typically associated with SaaS definitions: (1) product is used by web browser, (2) is not tailored, (3) is not associated with any location, (4) does not require installation work and (5) is usually charged based on actual usage (MÄKILÄ, JÄRVI, RÖNKKÖ, & NISSILÄ, 2010). According to the lean internalization theory, these characteristics favor SaaS-based companies on internationalizing (VADANA, TORKKELI, KUIVALAINEN, & SAARENKETO, 2019).

In the global market, SaaS mode cloud application services achieved revenue of USD 85.1 billion, with a 41.2% market share in the cloud services industry and in the category are expected to increase the revenue in 32.1% until 2021, reaching an impressive mark of USD 113.1 billion (GARTNER, 2019). In Brazil, the SaaS business scenario presents promising results, although it is still in its embryonic stage. According to StartupBase (2019), startups in Brazil have reached a historic mark of 12,000 registered companies, of which approximately 41.15% have a SaaS-based business model. Studies by the SaaSHolic Institute (2017) show that SaaS companies grow faster than business-to-consumer startups (B2C) and startups focused on small and medium enterprises (SMEs). In addition, over 49% of Brazilian startups have business-to-business (B2B) strategies.

Considering this scenario, we selected Varstation, a startup that works with cloud software that processes raw genetic data and generates analytics for clinical labs, researchers, and academics. Created in 2015 as an internal project of Hospital Israelita Albert Einstein, Varstation is a Brazilian SaaS-based initiative at early-stage which has rapidly entered in foreign markets. We understand that Varstation has a great opportunity to abruptly expand its international presence because it has already developed international digital skills and because this startup has managed to acquire over 2,000 new users from 48 countries over the last three years without having a consistent expansion strategy.

Therefore, Varstation is the subject of this study because it represents a success case that explains the following research question. How to maximize lean internationalization in emerging market startups? We believe that the use of international digital competencies is the answer to maximizing this type of internationalization strategy. To attest this, the article aims to verify whether international digital competencies help startups achieve lean internationalization. To achieve this goal, we deductively map four subcategories derived from international digital competencies Cahen, and Borini (2019) and four subcategories derived from lean internationalization Autio and zander, (2016) and show the interrelationship between them.

3

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

3

The research brings relevant theoretical and managerial contributions. We clarify the causal factors of accelerated international expansion, from the perspective of Lean Internationalization theory by explaining the phenomenon of a new internationalization dynamic and how this type of internationalization can be achieved through the development and use of international digital competencies. Through the results we identified five theoretical contributions and two managerial contributions that are presented in the discussion section of this article that lies in explaining the knowledge needed and used by Vartation to move rapidly to international markets.

2. THEORETICAL FRAMEWORK

2.1 Lean internalization

Lean Internationalization literature comprehends two main perspectives of internationalization, being one the effects of digitalization on firms' internationalization and the other firms' characteristics for early internationalization. Digitalization can intensify internationalization processes (AUTIO AND ZANDER, 2016). First, improvements in communication with smartphones, social networks and new accessible tools have reduced the cost and increased the speed and efficiency of communication across borders, therefore facilitating the coordination of an international business network of customers, suppliers and investors. Second, digitalization offers an opportunity to take better advantage of outsourcing and offshoring strategies by using standardized online software, such as Trello, Monday.com or Office 365, or contracting services via international marketplaces, such as Fiverr (SILVA, NORONHA & FERRARO, 2023). Third, services are getting increasingly more standardized, therefore reducing asset specificity; and based on the Internet, consequently reducing location specificity. All the previous factors improve the way companies coordinate their international operations and generate insights for further development of innovative business models.

One fundamental consequence of the influence of digitalization in companies' internationalization is that digitalization can also enable companies to enter foreign markets in the early stages of existence (AUTIO AND ZANDER, 2016). This occurs due to four components: (1) digitalization reduces the need to access local specific assets, (2) digitalization facilitates access and mobilization of resources, (3) digitalization assists on building online reputations and (4) digitalization helps on the adoption of local identities in foreign markets

4

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

4

(AUTIO, & ZANDER, 2016; WITTKOP, ZULAUF, & WAGNER, 2013). As it is clearly noticeable, the first two aspects are intrinsically related to new ventures' asset management, while last two aspects refer to new venture's image and communication.

While analyzing asset management aspects, the possibility of service automation and offering through the Internet reduce the need to search for local assets (AUTIO, & ZANDER, 2016). New ventures with digital-based business models that intent to pursue new opportunities in foreign markets may need to implement minor changes in their products or services, such as language translation, to adapt to local markets. Furthermore, digitalization promotes technology standardization and modular product architectures, such as APIs, that undermine the effect of hold-up concerns between new ventures and potential buyers, consequently creating a more liberal business environment. In other words, it means that a business which depends on consuming products and services in specialized roles will not be held hostage by their suppliers, being able to freely move across different services and platforms. Nevertheless, this aspect is also beneficial to new ventures, which can easily mobilize and combine resources from foreign origins. This is particularly true considering that no firm can acquire enough resources to explore continually changing markets, thus depending on the efficiency of its international networks to acquire resources held by other firms (OJALA, EVERS, & RIALP, 2018).

As mentioned, digitalization also brings benefits to new ventures image and communication in foreign markets, alleviating two specific entry barriers: lack of reputation and non-domesticity. Digitalization can leverage global reputations by using the Internet to build and showcase successful track records with transparency. Besides, it is simple for digital-based companies to hide their origins or even assuming a domestic reputation by stealth, requiring only small adaptations in communication (AUTIO, & ZANDER, 2016). Also, social sharing and virtual community strategies are pointed as relevant factors to reduce CAGE distances. Social sharing assists on creating a cross-interest online network in which users from around the world could connect and exchange experiences, therefore reducing lack of reputation barriers. Likewise, virtual communities encourage co-creation processes, consequently decentralizing production from the home country and hence reducing non-domesticity issues (SHAREER, & LEE, 2018).

Thus, lean internationalization strategies is feature by four main dimensions. Low need to access local foreign specific assets involves the company's capacity to leverage global assets without local resources from foreign markets. High access and mobilization power of

5

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

5

international resources refers to the company's accessibility to assets from foreign countries, directly connected to outsourcing strategies. Leverage power of online reputations indicates how the company uses its global connections in the Internet to rapidly attain a positive image. Finally, adoption of local identities in foreign markets englobes methods used to hide one's true origin to assume a local identity. Then, the question that follow is about the competences that support and foment these dimensions (AUTIO, & ZANDER, 2016; WITTKOP, ZULAUF, & WAGNER, 2013).

2.2 International digital competencies

During the process of expanding technology and digitally based companies, managers and entrepreneurs develop device hardware and software expertise to perform well in international markets (FERRARI, 2012; NORONHA, FERRARO & SILVA, 2023). This knowledge is manifested in strategic competencies used by companies to exploit new opportunities in global markets (BACIGALUPO, KAMPYLIS, PUNIE, & VAN DEN BRANDE, 2016). Ilomäki, Kantosalo and Lakkala (2011) states that digital competences are knowledge that came from the technology skills of individuals or organizations. This knowledge encompasses studies that investigate digital competences and their relationship with information literacy, digital literacy, information technology skills, and Information and Communication Technology (ICT) (OTTOSEN, & KRUMSVIK, 2011; KRUMSVIK, 2008). Programming skills, Bigdata and Data Science are also knowledge operated by digital competencies in organizations and are treated as central to the movement and mobilization of the company in digital environments (RASHEVA-YORDANOVA, CHANTOV, KOSTADINOVA, ILIEV, PETROVA, & NIKOLOVA, 2018; HEINTZ, MANNILA, NORDÉN, PARNES, & REGNELL, 2017).

In the field of International Business studies, recent research shows that companies born from a technological and digital foundation develop skills to exercise digitization competences that corroborate the advancement of entrepreneurship in global markets (VADANA ET AL., 2019; CAVUSGIL, & KNIGHT, 2004). Gabrielsson and Pelkonen (2019) investigate the internationalization of companies and the formation of structured digital competences based on data services, the use of software and the internet as driving mechanisms for the internationalization of companies. Business model reconfiguration and virtual

6

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

6

networking are crucial insights for building partnerships to meet global demands through the digital environment (CAHEN, & BORINI, 2019).

For Cavusgil and Knight (2015), technological knowledge facilitates access to digital platforms that maximize the innovation potential for rapid internationalization (DE NORONHA, MARTINS, LIETTI & SILVA, 2022). Autio and Zander (2016) ratify the internationalization process via resource allocation through a digital strategy for a lean internationalization process, creating knowledge of software, hardware and maintenance of technologies and data. Cahen and Borini (2019) explore companies that expand into global markets using the internet as a strategic pathway to innovation creation, consumer engagement and global partnerships.

Based on this premise, Cahen and Borini (2019) confirms that high-tech startups have four specific characteristics that differentiate digitally companies from conventional physical-product-based companies. These competencies are *cross-cultural programming skills, global virtual networking, cross-border digital monetization adaptability* and *international business model reconfiguration*.

Cross-cultural programming skills involve the ability of companies to adapt their digital interfaces in different locations, enabling them to connect digital products and virtual markets to their consumers (CAHEN, & BORINI, 2019). This ability is related to the ability of programmers to incorporate new forms of culture through the digital and technological environment to reach new users.
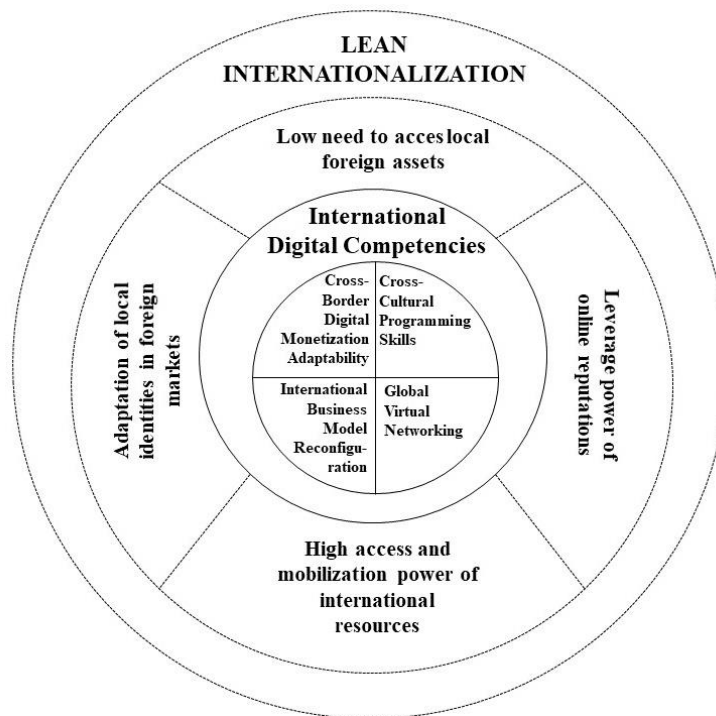
7

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

7

Figure 1. Theoretical framework.
Source: Authors (2019).

For these business models to fit the international market, the company must also have the competence for *international business model reconfiguration*, i.e., the company must adapt its business in global markets, have the ability to respond quickly to change and also have the ability to create new routines and strategic processes that reach international markets (CAHEN, 2019).

The theories presented in the theoretical framework are used to form a new framework for analyzing startups as shown in Figure 1.

In this paper, we articulate digital international competencies to understand the maximization of lean internationalization in startups located in emerging markets. Based on this premise, we suggest propositions with some cross-relationships to investigate this phenomenon:

- Proposition 1. International digital competencies maximize lean internationalization in emerging market startups.
- Proposition 1a. Cross-cultural programming skill is a competence that helps startups achieves the low need to access local foreign specific assets.

8

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

8

- Proposition 1b. Global virtual networking is a competence that helps startups achieves high access and mobilization power of international resources and leverage power of online reputations.
- Proposition 1c. Cross-border digital monetization adaptability, international business model reconfiguration and global virtual networking are competencies that help startups leverage their power of online reputations.
- Proposition 1d. Global virtual networking is a competence that helps startups achieve adoption of local identities in foreign markets, high access and mobilization power of international resources and low need to access local foreign specific assets.

Thus, Figure 2 shows the structure of the conceptual model that represents the Proposition 1. Propositions 1a to 1d are formulated to give robustness to the proposed conceptual model.
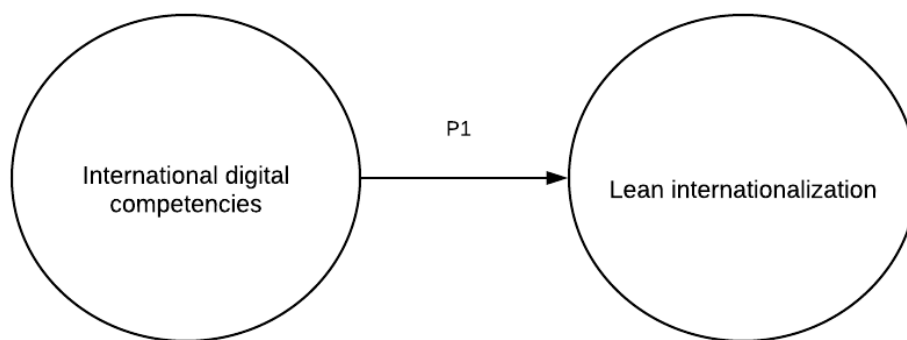

Figure 2. Conceptual model
Source: Authors (2019).

3. METHODOLOGY

The article is based on the case study method and addresses the startup Varstation with unit of analysis (EISENHARDT, & GRAEBNER, 2007; MARIOTTO, & ZANNI, 2014). The case study method seeks to treat the investigation of the phenomenon in a real context, scientifically delimiting the specificities of the research object (YIN, 2005). The research follows the qualitative approach because seeks to address the participants' perspectives and representations of the facts experienced within the global expansion process of the company (MAXWELL, 2008).

9

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

9

To enable the execution of the case study, we used primary and secondary data. Primary data are extracted from interviews conducted with three executives from international positions, i.e., the interviewee 1 (I1) is Varstation's International Chief Executive Officer (CEO), the interviewee 2 (I2) is Varstation's International Head of Seller Services, and the interviewee 3 (I3) is Varstation's International Chief Marketing Officer (CMO). The interview time with each interviewee was 52 minutes, 42 minutes and 102 minutes, respectively. The interviews were collected between August and September 2019. All interviews were recorded and transcribed for analysis data supported by Atlas T.I software to aid in categorization, organization and material relevance (FRIESE, 2019). The criterion for selecting respondents is based on two principles: the interviewee's executive position and the experience with international issues at the company (MARSCHAN-PIEKKARI, & WELCH, 2011). The choice of professionals with high executive positions was fundamental so that they could convey their experience during the interview. The main instrument for primary data collection is a research script with questions for semi-structured interviews (GERHARDT, 2009). Table 1 shows the main topics of the script and the data source from which they were collected.

Table 1. Question topics and data source.

Question Topic	Data Source
Company History and Expansion Plans	Interviews, Reports, Websites, Newspapers, Internal Data Access
The internationalization process of Varstation	Interviews, Reports, Websites, Newspapers, Internal Data Access
Digitalization and local specific assets	Interviews, Reports, Websites, Newspapers, Internal Data Access
Digitalization improving the access to another kinds of resources	
Online performance and reputation	
Digitalization and adoption of local identities in foreign markets	
Cross-cultural programming skills	
Global virtual network	
Cross-border digital monetization adaptability	
Business model reconfiguration for different global scenarios	

Source: Authors (2019).

10

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

10

With regard to secondary data, we used internal reports, websites, stories and data provided by the interviewees. Thus, document analysis is based on company reports, websites and data provided for analysis as shows Table 2.

Table 2. Secondary data documents used.

Interviews	Publicly available news	Internal documents	Company's website
Interview 1 = I1	**Document 1 = D1**	**Document 4 = D4**	**Document 7 = D7**
Interview with Silvio Moreto, International CEO	Startups apresentam soluções no encontro de empreendedorismo do Einstein	Berkeley Haas Business plan	Homepage
Interview 2 = I2	**Document 2 = D2**	**Document 5 = D5**	**Document 8 = D8**
Interview with Carla Teixeira, International Head of Sales	VarStation, a nova plataforma do Einstein para automação das análises genéticas	Berkeley Haas Competition analysis	About us
Interview 3 = I3	**Document 3 = D3**	**Document 6 = D6**	**Document 9 = D9**
Interview with Lucas Lyra, International CMO	VarStation, a nova plataforma do Einstein para automação das análises genéticas	Strategic marketing plan	LinkedIn page

Source: Authors (2019).

We adopt the technique of crossing between primary and secondary data to perform analysis categories (HOX, 2005). The crossing has the function of assisting in the validation of the material collected from the interviews and documents and reports used. For this we adapt in three different stages, the strategy of crossing between primary and secondary data (HOX, 2005). These stages are: data source; treatment and categorization, and document analysis and content analysis.

The data source stage aims at material selection and interview transcription. The stage of treatment and categorization is the preliminary identification of the collected material with the categories presented in the results section. This internship has the support of Atlas ti. software to verify the importance of the categories within the interviews (FRIESE, 2019). The stage of content and document analysis is based on the methodology applied to data crossing. Figure 3 shows an illustration of the data crossing steps.

So, for the analysis of the interviews we used the technique of content analysis. According to Gerhadt (2009), content analysis aims to relate semantic structures based on the transcription of the interviewees' statements. For data organization and selection, the also use the Atlas ti. software. The software was chosen as a guideline in the division of deductive and inductive categories and subcategories that emerged from the literature treated in the theoretical

11

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

11

framework and are described in Table 3, including the number that shows the relevance / repetition of the subcategories. The use of both types of data gives validity and reliability to the research (VENTURA, 2007; CRESWELL, 2014; YIN, 2016).
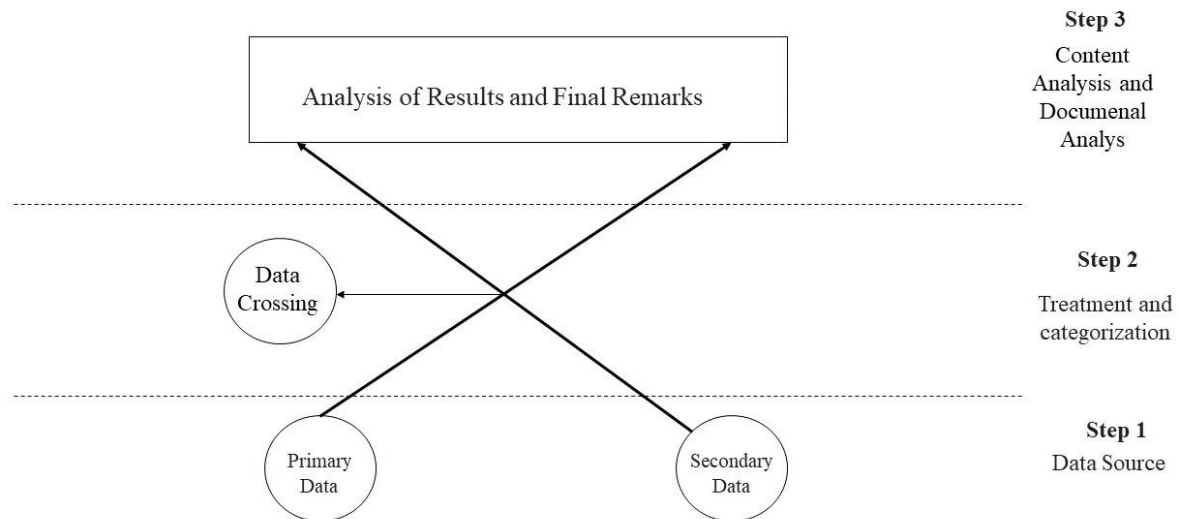

Figure 3. Steps for data crossing and analysis.
Source: Authors (2019).

Table 3. Main deductive and inductive categories and subcategories.

Inductive category	Deductive Subcategory	Relevance/Repetition
Lean Internationalization	Low need to access local foreign specific assets	22
	High access and mobilization power of international resources	20
	Leverage power of online reputations	24
	Adoption of local identities in foreign markets	19
International Digital Competencies	Cross-cultural programming skills	22
	Global Virtual Netwoking	28
	Cross-Border Digital Monetization Adaptability	15
	International Business Model Reconfiguration	18

Source: Authors (2019).

The results analysis consists on summarizing the main subcategories described and interpreted by the authors on lean internationalization and international digital competences literature and identify traces of such concepts on excerpts of the supporting documents used on this research. This method, referred as content analysis, primarily serves as mean to increase the understanding by systematically crossing the collected data (YIN, 2001). It also contributed on the creation of new subcategories not described on the literature, which could be further explored by the scientific community.

12

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

12

Furthermore, data from interviews was also analyzed quantitatively by counting the number of repetitions of terms related to each subcategory (Table 3), consequently supporting the qualitative analysis. We also use Atlas T.I to count and validate the number of times that each concept treated within the subcategories emerged in the transcribed interviews (FRIESE, 2019). Moreover, data from secondary sources was gathered to inspect and confirm findings from the interviews. The documents provided fall into the following categories: interviews, publicly available news (newspaper or magazines), internal documents and company's website as shown in Table 2.

3.1 The case: varsatation

Varstation is a healthtech startup which offers cloud-based software in SaaS mode that is primarily offered to clinical laboratories and researchers who conduct exams or clinical trials regarding the human genome. The software automatizes mapping and analysis processes of genetic samples, therefore reducing costs and fastening genetic results.

The startup was conceived on 2014 as an internal innovation initiative from Hospital Israelita Albert Eintein (HIAE) - the most respected healthcare institution in Brazil according to a research conducted by Merco Consulting Group (EXAME, 2014), leaded by Silvio Moreto (International CEO) and Murillo Cervato (International CTO). The initiative was design, tested and validated by the hospital's genetics and bioinformatics professionals, and became a spin-off from HIAE on 2019, conducting its operations separately. It now has 23 employees, of which approximately 50% work on IT and software development. Market value is still unknown given that HIAE is still its only investor.

Although the startup is already operating for five years, it has only started to expand its customer base outside of HIAE on 2018. It has now 1,429 accounts created from 48 distinct countries. The study also focused on the international expansion to Mexico and Chile, although the company was able to acquire new clients from other foreign countries organically through scientific congresses, client referrals and internal relationship networks.

The company offers a 15-day free online trial on its website for its potential clients. After this period, users must choose between two paid options. According to the company's CEO, customized plans are also offered to universities, which depend on limited resource budgets, and large clinical laboratories, whose large number of samples justifies a customized plan.

13

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

13

The startup has structured financial projections for the next five years and a complete business plan, built by MBA students from Berkeley's Haas School of Business on 2019. The business plan evaluates the main competitors on the global scenario and suggests possible ways to pivot the business model on the future, such as extending genetic analysis to the final consumers and marketing genetic data to healthcare business to boost predictive models. The competitors identified were exclusively native from developed countries from North America and Europe, mainly from the United States, Canada and Switzerland.

4. RESULTS

First, we will start with the analysis of the deductive subcategories within lean internationalization concept. As described by Autio and Zander (2016), *low need to access local specific assets* is a vital factor for fast internationalization of new ventures due to their capacity to scale the business model without the need to make changes for local markets in the products or services provided. Excerpts from I1 reiterate this concept:

> *"We never had to make changes in our product to satisfy any local market. In fact, our clients expect us to have a very standardized product which complies to patterns and analysis approved by the international scientific community. This raises our credibility and proves that we have a scientific support behind our algorithms"* (Interview 1)

This same claim can be confirmed by documents D1, D2 and D3, which affirm that the company complies with the guidelines from the College of American Pathologists and follows the analysis recommended by the American College of Medical Genetics to categorize the findings. Furthermore, D7 also gives support to assert that Varstation has a low need to assess local specific assets, given that the website shows that the company support its clients by offering "*automatic pre-classifications for germline and somatic variants*" and incorporating "*more than 200 genetic mutation databases*".

Although the website homepage cites terms referring to service customization several times, such customization is limited to the level of automatization presented within the algorithm, which can be identified in the claim that Varstation also supports their customers with the "*Availability of multiple analyzes for each exam, according to good practices*".

On a final note, it is noticeable that, though the company is present on 48 countries, all the employees work at the same office in Sao Paulo, according to I1, I2 and I3, and that the company only has its website translated to English, proved by D7 and D8.

14

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

14

Going forward on our analysis, the next goal is to identify whether Varstation has *high access and mobilization power of international resources* (AUTIO, & ZANDER, 2016). On this aspect, valuable insights came from I2:

> *"We have recently released a new feature in our platform that helps our customers to upload their files 99% faster. Implementation was quite simple with the APIs developed within the platform and availability of external open codes. We connected the software with Illumina's BaseSpace platform, which where our clients usually process their samples to generate a file. Usually, they would have to download this file and then upload it manually to Varstation, which can take some time since files can be very large. Now they can do it within our platform with just one click"* (Interview 2).

It becomes clear on this passage that Varstation developed a resourceful and open platform which can access resources from outside sources in a fast and dynamic way. Moreover, I1, and D4 provide evidence that the company's business model does not bind its customers or force then to continue to consume its products. Actually, the company operates in SaaS mode with monthly payments made by deposit or credit card. Implementation is easy and fast, as shown in D6, and there are no fees or charges for cancelling the platforms signature, as shown in D4. Interview 3 also enlightens this aspect:

> *"We do not want to keep our clients as hostages of our services. There are other similar services on the international market, so we will only be able to retain our clients through top-of-notch technical and scientific support. What is game-changer is to gain our clients trust and to let them know that we are here for them if they need us"* (Interview 3).

This aspect of Varstation's business plan is not particularly true to many of its competitors analyzed in D5, which only offers software solution combined with hardware acquisition. This could constitute a competitive advantage for Varstation as consumers are getting increasingly more adept to versatile platform (AUTIO, & ZANDER, 2016).

The next subcategory to analyze is deductive *power of online reputations*. Varstation showcases some of its main clients on its website homepage (D7) and shares constant updates on its LinkedIn page (D8), where customers can follow software updates, original content about genetic and business produced by Varstation's team, news about the company and general news about the healthcare precision medicine market. Interview 3 comments about this:

> *"Our goal is to be as much transparent as possible and to convince people to believe in our product by showing that we have experts on genetics and bioinformatics*

15

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

15

crafting their final product. Our LinkedIn content reflects precisely this strategy." (Interview 3)

Moreover, D5 and D6 presents evidence that many competitors are still more skilled in this aspect, by showcasing scientific articles and relevant international customers on their websites. A competitor named 10x Genomics, for instance, has a full area on its website dedicated to "Resources", in which they provide publication, datasets and even offer a community page to exchange doubts and experiences through blog and forum pages.

The last subcategory within lean internationalization to be explored is *adoption of local identities in foreign markets*. Although all publicly available news collected are in Portuguese and cite that Varstation was created inside of HIAE, which is a Brazilian company, Varstation's website and LinkedIn page (D7, D8 and D9) have never mentioned the company's origins, being almost impossible for an inadvertent new user to identify its home country. This factor is also present on the company's sales pitch:

> *"I only mention our origin to Brazilian customers because HIAE is a highly prestigious institution in Latin America, but I don't feel the need to tell that to foreigners. They might not understand that serious work in genetics and artificial intelligence can be developed in Brazil, which has now a bad image abroad"* (Interview 2).

It is possible to identify that the company's board of directors believes that being born in Brazil is not favorable to Varstation's image. Documents D5 and D6 show that most of the venture's competitors come from developed countries, which could raise the necessity to hide Varstation's origin from a developed country (AUTIO & ZANDER, 2016). Also, those same documents point Varstation's plan to expand first to boarding countries, such as Mexico and Chile, which is coherent with the presented concepts of Neubert (2017). Interview 1 also reiterates this view:

> *"Varstation needs to expand as fast as possible to gain territory quicklky, and I believe that the fastest and most safe way to achieve this is to expand to neighboring countries with the highest sales potential. Those countries are near, so we can visit our clients if necessary, and the cultural distance is not too high"* (Interview 1).

After investigating lean internationalization concepts, it is time to analyze the presence of international digital competences (CAHEN, & BORINI, 2019) within the organization and attempt to identify whether they have influence over Varstation's lean internationalization mode. The first subcategory to be considered is *cross-cultural programming skills*. According to research gathered by document 6, approximately 40% of all

16

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

16

employees have some experience in programming. At first glance, there seems to be no connection to this specific competence, considering that the company is based in Sao Paulo and doesn't have any people employed in foreign countries. Nevertheless, it is possible to identify cross-cultural programming skills from excerpt extracted from I1:

> *"I currently have scored more than 2,000 points on Stackoverflow. It is commonly used by coders to ask questions and share information. Although the website has a version in Portuguese, I access its version in English because they have more people from around the globe contributing there. This way, if I have a doubt it will be answered more quickly" (Interview 1).*

It is possible to identify that a global community of developers indirectly helps on product development through the sharing of tacit knowledge about programming. By using cross-cultural programming skills, the venture leverages international assets instead of using local specific assets (NEUBERT, 2018), therefore supporting the claim that the presence of international digital competences can boost lean internationalization.

Moving forward, the presence in *global virtual networks* assisted the company in its internationalization process, according to I3:

> *"I started to focus on online campaigns on the past three months, but even before that we already had users in more than 40 countries. How is it possible? Because genetics has a close community around the globe. Depending on the event that you go, you can meet people from all around the world. Plus, professionals talk to each other and word travels fast" (Interview 3).*

This fact can also be confirmed by D5, in which Varstation's main competitors are identified and examined. According to this document, there are five main players on this industry worldwide and none of them were founded in Latin America. Such a lack of strong local competition suggests that the assertion about a close global community could be correct. Moreover, D6 corroborates with this idea because it specifies that customers from different origins, when asked about which sources of reliable information they used, pointed out the same magazines, such as Science and Nature. On this scenario, influence over this kind of media raises the importance of global virtual networks. To conclude this analysis, I1 and I2 provides valuable insights on how Varstation leverages its global network of suppliers, as demonstrated on previous citation about API development. The company developed an API to support files extracted from the largest supplier of genetic medical equipment in the world and uses this partnership to get in touch with potential clients in foreign countries. Besides, contact with foreign clients is exclusively conducted through digital means:

17

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

17

> *"When it is necessary to provide support to clients in distant locations, we usually do online training sessions and calls with Skype, Hangouts or similar tools. They are great because we can talk as if we were face-to-face and also give the opportunity to share our screen and conduct live presentations" (Interview 2).*

This is a clear example on how digitalization enhances communication and coordination capabilities (AUTIO, & ZANDER, 2016), enabling the rising of global virtual netwoks (CAHEN, & BORINI, 2019) and consequently resulting in a higher access and mobilization power of international resources and leveraging of its online reputation (AUTIO, & ZANDER, 2016).

When analyzing the *company's monetization strategy*, it becomes clear that there isn't an institutionalized model. Instead, according to I1 and I3, the company has already tested a few international monetization strategies, but hasn't decided on a definite one yet.

> *"We have recently launched a credit card payment option on the platform and inserted a promocode field that we use in marketing campaigns. This is new to the company and was implanted very fast, within just 2 weeks. We are now testing it worldwide to see how it works" (Interview 3).*

For this reason, there are no prices showcased on the company's website (D7 and D8). I2 also indicates that the company is highly flexible to negotiate its prices, explaining that many contracts are customized to fit its clients' interests. In addition, D4 forecasts pivoting its focus to selling genetic data on the next five years, which would represent a large change from the way that de company operates today. Not only this would change pricing, but also drastically revolve the company's business model. This is an interesting finding, in the sense that indicates that international digital competences could have influence over each other, intertwined in a network instead of isolated from each other. Excerpt from I1 also contributes to this topic, showcasing how the presence in global virtual networks affected how the company reconfigured its international business model:

> *"One of our clients in Brazil started to ask for a pharmacogenetic analysis and we started to develop some internal trials. After talking to other clients from other regions, we detected that there was a latent demand for this kind of product, so we started to work on this new solution. It will probably turn into a distinct program with different business model" (Interview 1).*

The combination of these competencies helps to leverage the power of online reputations through a process similar to co-creation, in which prices and business models are tested rapidly and feedback from consumers is collected to refuel this process. This two way

18

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

18

conversation strengthens relationships among the company and its clients, reinforcing the concept of community.

On a final note, it is possible to identify a new driver for the development of international digital competences. According to I1, I2 and I3, Varstation *doesn't need to customize its products by distinct local markets*. Even language, a common entry-barrier, doesn't appear to constitute an issue, given that the company only has versions of its website in Portuguese (local language) and English, according to documents D7 and D8. Information from I2 enlightens this aspect:

> *"Our business is focused on genetic medicine, a field that has global standards for practice and research. All reliable sources of information are in English and uses a globally accepted notation. So far, we don't feel the need to adapt anything to local markets" (Interview 2).*

By leveraging the specificity of its market and globally accepted notation, Varstation found an opportunity to better develop its international digital competences and improve its lean internationalization strategy. This could help to explain how *global virtual networking* helps Varstation in the *adoption of local identities* by the company, given that D7, D8 and D9 don't show information about its origin. Nevertheless, while this factor minimizes the importance of the subcategory of adoption of local identities, it also reiterates the subcategories of high access and mobilization of international resources and low need to access local foreign specific assets, considering the previously mentioned global standards. This provides material for further research and discussion.

5. DISCUSSION

This study examined how the process of lean internationalization can be maximized. We have found that Varstation's use of international digital competencies has maximized its lean internationalization strategy. The study has several contributions to the Lean Internationalization (AUTIO AND ZANDER, 2016) and International Digital Competences Cahen and borini (2019) theories.

The first and most important contribution of our research is that we confirm that international digital competencies maximize lean internationalization in emerging market startups. According to Autio and Zander (2016) the process of global expansion leanly depends on digital resources that need to be operationalized from the knowledge and skills of managers and entrepreneurs. From the perspective of competencies, it is possible to infer that managers

19

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

19

or companies with varied digital competences can perform their lean internationalization process more effectively. The findings of this research support Proposition 1 of the study and confirm the proposed conceptual model (Figure 2).

Propositions 1a to 1d that were elaborated to make the conceptual model more robust were also supported, with at least one international digital competence supporting the development of lean internationalization aspects. Cross-checking on at least two distinct sources for each subcategory analyzed provides consistency for this research's findings.

Our second contribution shows that the *cross-cultural programming skill* is a competence that helps startups achieves the *low need to access local foreign specific assets* (P1a) because when the startup hiring programming professionals, the company enables, among other things, the online exchange of programming knowledge including through internet forums, which eliminates the need to make changes to products or services provided in local markets. In this point, further understanding of this competence could be achieved by analyzing new ventures which have outsourced, entirely or partially, their programming department. Following this perspective, the findings reinforce the studies by Neubert (2018) which state that the ability to internationalize is linked to the core competence of small economy firms seeking to achieve their global expansion in a lean and digital way. Our findings also suggest that programming skills and global virtual network are keys to lean internationalization. This is because for a lean internationalization process to take place, deep technological and digital expertise is required to be able to reduce costs and allocate the resources of the right way (NEUBERT, 2017).

Third, we have shown that *global virtual networking* is a competence that helps startups achieves high access and mobilization power of international resources and leverage power of online reputations (P1b). In addition, this competence also influences again the range of leverage their power of online reputations (P1c), the adoption of local identities in foreign markets, the high access and mobilization power of international resources and the low need to access local foreign specific assets (P1d). While these findings support the research by Cahen and Borini (2018), they also show a new path to the digital international competency paradigm, as it presents the power to allocate resources and expand their access to new customers and markets through online communities, social networks and outreach platforms that do not require high investment values. In this perspective competencies related to social networks can be deepened and investigated in future studies as a way to adhere to foreign markets. So, we confirm that g*lobal virtual networking* (CAHEN & BORINI, 2019) is the most preeminent

20

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

20

competence on maximizing lean internationalization because this competence affects all subcategories identified in lean internationalization, given that it was directly linked to three confirmed propositions (P1b, P1c and P1d).

Thus, global virtual networking has been found to be a predominant factor in leveraging technology-based startups that operate on internet models (CAHEN, & BORINI, 2018). Cahen and Borini (2019) also demonstrate that contact with international consumers through the internet enables the brand to adopt an identity and a new business model reconfiguration to enter the market with low resources and low cost.

Fifth, we have shown that *cross-border digital monetization adaptability, international business model reconfiguration and global virtual networking* are competencies that help startups leverage their power of online reputations (P1c). This is due to the strong interrelationship of these competences. We have identified that articulating the business model to meet new consumer requirements has raised the need to generate and test new monetization strategies. In addition, these competencies also affect how companies leverage global virtual networking to increase the power of their online reputations through a constant process of generating and leveraging feedback. In this way, the case of high-tech startup Varstation corroborated the results of the research by Autio and Zander (2016), which states that new ventures that leverage digital assets through sales to foreign markets using networking may be able to internationalize earlier than companies looking to establish themselves globally through physical structures.

As a *second managerial contribution* to our study, we suggest that managers be able to use these findings to develop new competencies to maximize lean internationalization strategy in other companies, as the Varstation case provides practical examples of how international digital competencies were used by Varstation to reach several foreign markets, even though it is a company located in an emerging market.

To consolidate the main findings discussed in this section we suggest a simplified table with the results and the main explanations that led to the fulfillment of propositions analyzed in the Varstation case study (Table 4).

21

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

21

Table 4. Propositions, Results and Explanations for the Varstation Case of Lean Internationalization

Propositions	Results	Explanations
P1: International digital competencies maximize lean internationalization in emerging market startups.	- High-technology starups in emerging markets like Varstation use digitization-related knowledge and skills to internationalize quickly (AUTIO AND ZANDER, 2016). - Programming skills and international network of managers and entrepreneurs facilitate the lean internationalization (CAHEN AND BORINI, 2019).	- Varstation expansion to 48 countries without any foreign base of operations.
P1a: Cross-cultural programming skill is a competence that helps startups achieves the low need to access local foreign specific assets.	- Programming skills in digital companies not only contributes to expansion but also has the ability to leverage online reputation through Network Global by showing that Programming and Networking are related competencies to a good reputation in international markets (CAHEN AND BORINI, 2019).	- Use of Stackoverflow's website international programming knowledge base.
P1b: Global virtual networking is a competence that helps startups achieves high access and mobilization power of international resources and leverage power of online reputations.	- The power to mobilize resources in digital environments is fostered through international digital networking expertise, as digital trading platforms allow employees and customers from different locations around the world to connect to services delivery (NEUBERT, 2018; AUTIO AND ZANDER, 2016).	- Construction of a professional global networking through events and online contact.
P1c: 1c. Cross-border digital monetization adaptability, international business model reconfiguration and global virtual networking are competencies that help startups leverage their power of online reputations.	- Internet-mediated monetization adaptation expertise in international business helps companies to adapt their business models (CAHEN AND BORINI, 2018); - Innovation and partnerships with payment sites and platforms have helped to adapt the business model and payment formatting in North American and European countries (CAHEN AND BORINI, 2019).	- Constant testing of new business models, such as data offering, - New monetization models as a consequence of new business models - Constant feedback from clients in a co-creation process.
P1d. Global virtual networking is a competence that helps startups achieve adoption of local identities in foreign markets, high access and mobilization power of international resources and low need to access local foreign specific assets.	- Online communities, contact with consumers from other countries, and training of international teams via internet-connected platforms enable resource mobilization and access to local information for the adoption of expansion destination identities (AUTIO AND ZANDER, 2016).	- Lack of available information online about the company's origin - Online client support and training, - Online expansion through digital campaigns.

Source: Authors (2019).

6. FINAL REMARKS

The research question that guided this study aims to answer how to maximize lean internationalization in emerging market startups? Our results prove that the use of international digital competences maximizes lean internationalization. The unfolding of the international digital competences into four deductive subcategories and the unfolding of the concept of lean internationalization also into four deductive subcategories showed a strong interrelationship in

22

Int. J. Health Manag. Rev.| São Paulo (SP) | v.9 | p.01-26 | e0334 | 2023.

22

several aspects that proved the propositions that we made for this study, as well as proved the consistency of the presented framework and the robustness of the conceptual model.

As the main limitation of this study, we indicated the sample size because the study was conducted as a single case study. However, due to the characteristics of Varstation, that is, because it is a very young startup, operating in a very specific niche market and being located in Brazil, an emerging market, the case study presents itself as a critical case study (YIN, 2015) that justifies its use and consequent validation. Thus, we preciosinistically recommend that larger samples of start-ups or start-ups with the same or similar characteristics be replicated to corroborate our findings and provide further evidence on our research results, thereby diminishing a possible bias.

We suggest that further research could explore the effects of International digital competencies on lean internationalization in emerging market startups from different local markets and industries, therefore evolving the discussion over lean internationalization strategies. We also recommend that future studies draw up a survey to quantitatively test the proposed conceptual model and the propositions that complement it.

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23

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24

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26

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26