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Digital skills in Mexico's gig economy. A temporary employment option

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Abstract. The objective of the research is to categorize the demand for digital skills in the online digital job market in Mexico in the period December 2019-February 2020. For the development of the study, three digital job platforms Workana, Freelance and Freelancer Writing Jobs were considered. The study was developed considering the vacant projects published on gig platforms on a daily basis that allowed identifying the skills demanded, through content analysis. This allowed quantifying the participation of digital skills and grouping them according to their characteristics based on the literature review. The findings of the research for the gig job market mediated by platforms in Mexico, were the following, Workana is the leading platform with the highest demand for digital skills, Graphic Design was the digital skill with the highest frequency in demand, finally; the category of specialized digital skills represented the greatest opportunity for freelance and temporary employment.

Keywords: Digital Skills, Gig economy, freelance platforms, Flexible labour markets.

1 Introduction

Unemployment is one of Mexico's main problems; between 2005 and 2018, it stood at 4.3% and in 2009 it rose to a rate of 6.1% [1]. Approximately half of the formal workers who lost a job in Brazil and Mexico, and 30% in Argentina, managed to formally reincorporate a year later; as opposed to 10%, and 15% of informal workers [2].

In Mexico, a large number of Mexicans work in the informal economy under precarious working conditions, especially women and young people, and there is a tendency to specialize in low value-added activities, which leads to a predominance of informal employment of approximately 52% [3].

In the Latin American region, short-term movements of formal workers are higher than in other countries of the world, and Mexico reports the highest rate of job creation and destruction in the range of 6% to 7% per month. [2]. Rapid and relevant technological change challenges the economy's ability to create new and displaced jobs and the ability of workers to change their skills and adapt to new labor structure [4].

Skills shortages are related to rapid innovation and adoption of new technologies, industry alignment, education, lack of interpersonal and entrepreneurial skills among young professionals [5].

A study in the Latin America and Caribbean (LAC) region showed that young people are looking for more independent and flexible jobs that allow them to study, perform different activities at the same time or gain experience in different fields. Employed youth accounted for 47% of part-time work, and could combine it with study, such as caring for other household members or others [6].

Opportunities to access jobs with technological requirements may be diminished in developing countries, especially in the least developed countries (LDCs), which are not adequately prepared to capture digital opportunities [7].

The Mexican Internet Association (AMIPCI) reported that users who used at least once a job board to find a job stood at 58% in 2013 and 94% in 2018. [8]. The European Union reported that in online vacancies there is still a lag and companies have reported in 38% shortage in specialized ICT skills [9].

The incorporation of new virtual marketplaces such as TaskRabbit, Lyft, Axiom threaten to displace traditional labor markets that do not seem to guarantee workers' protection.[10].Therefore, some platforms increase opportunities for new flexible types of work that complement traditional forms of employment through the on-demand economy [11].

The European Union aims to equip at least 80% of people with at least basic skills and increase the number of ICT specialists to 20 million (approximately 10% of employment) by 2030 [12].

In Mexico, the new labor market reports that there are more than 15 million independent workers and it is estimated that by 2025 there will be more than 20 million people incorporated into this modality [13]. Independent workers who develop temporary work are called freelancer, this type of workers are strengthening the new work schemes.

The niche of temporary employment is labor platforms that allow access to low-cost and relatively unskilled labor or focused on highly skilled and specialized workers without the need to be associated with an employer [14]. It is estimated that approximately 15% of freelancers have used digital platforms [15].

2   Literature Review

Gig Economy, is a type of work of a different nature from long-term jobs, in which ¨"gigs" or punctual jobs are performed. [16]. Similarly, it is a free market labor system in which temporary positions are common and organizations hire freelancers for short-term contracts rather than permanent jobs [17,18].

The Gig economy or the on-demand economy identifies that the number of on-demand firms matching the labor supply is increasing, as these schemes can increase opportunities for people willing to find a job or increase their wages. [10].
Online job postings have a potential as a source of information on unemployment characteristics such as: supply and duration of supply, claimants; real-time market information with high frequency data, analysis of job profile changes based on job requirements in skills, education and experience [9].

This represents advantages for the self-employed because of the availability of information, but also brings advantages for companies that recruit a varied set of skills in a geographic scope determined by local labor markets, allowing them to reduce the cost of search [19].

Adequate information systems enable workers to identify opportunities outside their local market, and employers to recruit a broad set of skills nationally or internationally [20]. The contract on a specific project is made by matching interests on the salary, time, and skills required for the development of the published project and with delivery of the completed work by a certain date [22].

From the above, the labor relationship is established where workers are subject to the terms and conditions that the operator tacitly determined in the software, aware that they are not considered employees of the company [23].

This is mediated by platforms that enable freelancers to work from anywhere, anytime, choosing the projects they want to do [13]. The advantage in this type of work is that it uses technology intensively and allows mobility at work, resulting in more time working in autonomy [24].

Regarding autonomy, electronic devices have supported the development of the gig economy, considering the impacts of technologies on the nature of labor relations, such as the shift to self-employment [25].

In addition, the platforms allow eliminating or reducing the geographical, information and administrative barrier in the hiring process of length and scope in the short term; and give the option for the freelancer to work from anywhere and at any time choosing the projects he/she wants to develop [21,26.27].

Gig workers are self-employed and highly skilled, working for one or more employers for short, specific periods of time [16]. Freelancers consider their preferred place of work to be their home (83% main space for professional activities), this is linked to the decision to work as a freelancer and manage their own schedules, so in this type of work tends to predominate solitary work [13].

Freelance workers report the following advantages: i) not having to be limited to a fixed salary, ii) choosing the jobs where to participate, iii) obtaining an extra income, with respect to schedules; however, labor discontinuity is considered a disadvantage [13].

The development of the digital ecosystem drives the platform economy, which is an innovative business model through digital intermediation platforms that guarantees the conditions or the appropriate scenario for the supply and demand of labor services that operate entirely digitally to interact [28].

Platforms facilitate remote temporary work and provide income opportunities [29]. In some cases, they represent the primary job, provide employment opportunities for many people, integrate those who are homebound, and allow for additional remuneration in addition to their employment or provide income-earning opportunities [10, 29].

In this model, the types of work are professional, creative, manual, personal, service, administrative, cab driving, and delivery [25]. In addition, it considers the work of web designers, coders, translators, salespeople, accountants, and other types of professionals who can sell services to overseas clients [7].

The growing use of platforms brings freelancers and jobs together, boosting freelancer activity. [30]. This is done through a form of work known as microwork, which is used to assign work online, focusing on the size of the task, rather than the employment relationship [28].

To capitalize on the opportunities coming from high-tech solutions, companies are requesting digitally skilled workforce that can implement advanced technology, for this they require enhancing the skills of the workforce; given that digital technologies in most industries have created a demand for digital skills requesting a wide range of skills and competencies [30].

Success in a digital economic environment depends on the ability to match the workforce with the complementary digital skills needed to effectively leverage digital technologies [31]. Factors that support skill development are computer at home, socioeconomic status, and years of experience using computer [32].

For the development of temporary online work, high-level digital skills are necessary [20]. It is important to note that digital skills are relevant because they support the development of modern work and for many modern professions they are essential, so in the typical labor market there is an inclination to ask employees for advanced skills [33].

Regarding job vacancies, finding employees with the right mix of business, interpersonal, technical business and digital skills is a major challenge that would contribute to company productivity [31]. Therefore, it is indispensable to determine the Skills Profile, which are necessary to perform the tasks involved in a given occupation and are based on job requirements such as skills, education and experience [9].

It is essential to consider digitalization at work, where tasks may change or become obsolete; therefore, it is necessary to acquire new skills that are appropriate to technological change [34,35].

Currently, there is a characterization called 21st century skills that integrates foundational skills, including digital skills (computational thinking), advanced cognitive skills, skills related to executive function and socioemotional skills [6].

The demand for complementary ICT skills promotes the use of ICT and drives the demand for new skills linked to changes in the way work is performed [9]. In addition, digital skills are associated with middle skills, which are present in jobs without university degrees [36].

In the freelance mode, millennials and centanials are interested in being in control of how and where they work; in the last 5 years they have chosen to freelance as a result of an intentional job search [13]. Therefore, it is important to identify technology readiness, which refers to people's ability and propensity to adopt and use new technology for life or work [37].

Digital skills are particularly important in the economy, so essential in the digital ecosystem. For the digital economy, a digital skills framework was developed by the Information and Communication Technology Council (ICTC) that proposes a five-category model: foundational skills, interpersonal business skills, digital and technical skills, information skills, and entrepreneurship skills [31].

Regarding jobs, it is of great importance to find employees with the right mix.basic skills must be complemented by business or interpersonal skills, in itself insufficient, technical skills are essential for the production of goods and services; technical skills and business skills are indispensable for the digital economy and the management of digital technologies [30].

Digital skills range from basic usability skills that enable people to participate in digital society and consume digital goods and services, to advanced skills that empower the workforce to develop new digital goods and services [12].

For the development the projects it is necessary to identify the intensity of the factor especially in a market of skills of high technological value among which there are Specialized ICT Skills reflect the frequency in the use of programming languages and the intensity of ICT specialists at work using programming languages daily; and Complementary skills are of cognitive type and support the development of non-routine activities, they have developed in pace with the development of ICT and with the work in a new technological environment; they are not related to the ability to use technology effectively [9].

The digital economy links production in a digital transformation scheme, for which skills that generate productivity are necessary. The digital technical and digital skills are focused on computing and the use of software, application of security measures and others, are essential to work jobs linked to digital technology rather than digital information. In addition, the digital skills of information processing, cognitive type of high level processing involving search, synthesis, evaluation, creation, application and others [31].

In the field of economic activity and work, business and interpersonal skills offer commercial vision, detection of new trends, strategic thinking that integrates critical thinking, interpersonal communication and team management, among others. [31].

3 Methodology

The study of the skills demanded in the projects published in Mexico through digital work platforms in a period December 2019- February 2020 was developed under the following methodological framework. Non-experimental research design. No situation is constructed, but rather already existing situations are observed, not intentionally provoked by the researcher and the independent variables have already occurred; therefore, they cannot be manipulated [38].

The research is cross-sectional and data are collected over a period of time [39] The quantitative approach represents a set of processes, it is sequential and evidential [39]. A sample is established, the study considers data over a period that represents a substantial number of observations that can be easily analyzed [40].

The data collection technique was secondary, using information from online work platforms, which constitute the units of study. Specialized work sites called technological platforms are a source of data in a scenario that imposes work habits with other rules [41].

The research is developed by mixed methods, using qualitative and quantitative analysis [39]. The data collection was through content analysis, which supports the search for meaning in the contents, documents or daily observations [42]. In data processing, descriptive statistics were used to identify the behavior of the data that make up the sample [39].

The research shows the descriptive scope that seeks to specify properties, characteristics and people, groups, communities, or other phenomena that are subjected to analysis, describes more precisely the characteristics of a phenomenon [39]. Considering the limitation that the alternative ways of working are dispersed and the methodologies present disparity, it is useful to establish a framework for the study of the phenomenon [43].

The units of analysis for the research are the freelancing gig platforms. Three online freelance gig platforms were considered in this study.

Table 1. Main Freelance Platforms in Mexico. December 2019-February 2020

Number	Freelance platforms	web site
1	Workana	www.workana.com
2	Freelancer	www.freelancer.mx
3	Freelancar Writing Jobs	www.freeelancewritinggigs.com

Source: Own elaboration.

The research consulted sources of information, from different gig sites called freelancers which contributed to shape the situation of skills in freelance work in Mexico. Data was collected from three online work platforms, which compiled the digital skills demanded in the published projects.

The study considered a quarterly period December 2019-February 2020 for the Mexico location. The portals were selected in order to obtain the representativeness in terms of higher data traffic per page as a proxy for a higher number of published ads. The digital skills coming from the content analysis of the projects published daily were concentrated for the construction of a database that allowed the identification of information on the number of skills in demand and their frequency.

For the development of this research, the digital skills in demand were associated with similar characteristics in six categories: Specialized Skills, Generic ICT Skills, Complementary ICT Skills, Interpersonal and Business Skills, Technical and Digital Skills, and Information Skills. The specialized skills category was divided into two categories, Specialized Skills _ Programming Languages and Specialized Skills: Software Architecture and Networking, to better understand the behavior of the demand for skills in this ICT-intensive market.

The seven categories of digital skills concentrated the total of the data. Finally, the Pearson correlation technique was used to identify the behavior of the association between the seven groups of digital skills.

4   Data analysis

The online job platforms of gig sites Workana, Freelancer and Freeelancer Writing Jobs, reported the demand for freelance work in Mexico concentrating 2160 vacant projects in the quarter. The online vacancies of the published projects yielded 7954 digital skills in demand; these are of different types in relation to the profile of each site and the requirements of the platform's clients. Figure 1.

Figure 1. Participation of the skills demanded in each gig platform for the trimestre.
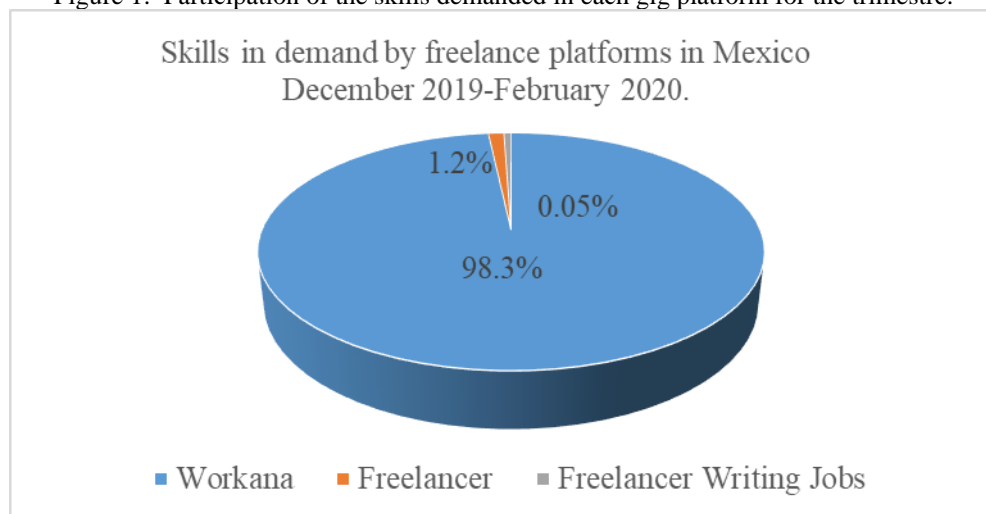
Source: Own elaboration.

Online work platforms demanded 7954 digital skills for the development of projects. The participation of digital skills reported by Workana 7817 digital skills that represented 98% of the total, positioning it as a leader in the gig work market in Mexico in the period. The platform Feelancer published with 94 digital skills, represented 1.2% and Freelancer Writing Jobs with 43demands, achieved 0.08%. Figure 3.

Figure 2. Participation of digital skills in freelance platforms Workana, Freelancer and Freeelacer Writings Jobs
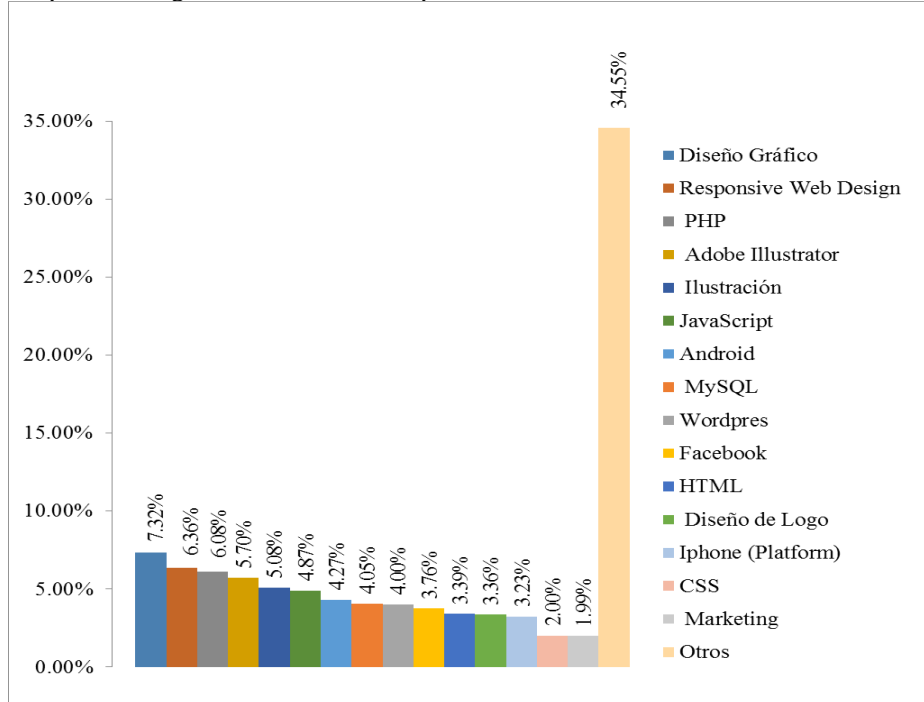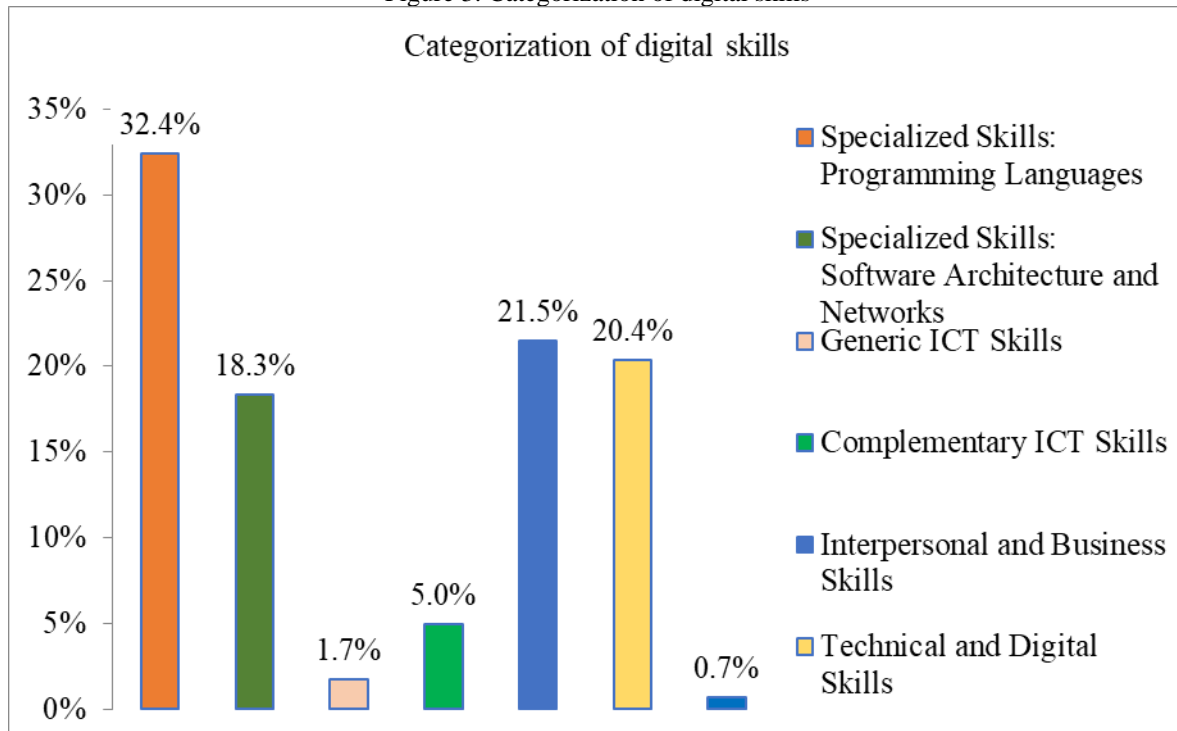

Source: Own elaboration.

The research finding reported 51% of the demand for digital skills in the following elements. Graphic Design, 7.32; Responsive Web Design, 6.36%; PHP, 6.08%, Adobe Illustrator, 5.07%, Illustration, 5.08%, JavaScript, 4.87%; Android, 4.27; MySQL 4.05%, Wordpres 4.00% and Facebook 3.76%.

The 15 digital skills with the highest frequency on the platforms accounted for 65.4% of the total 177 skills. The share of the skills demand is made up by research finding, in addition HTML with a share of 3.39%; Logo Design, 3.36%; Iphone (Platform), 3.23%; CSS, 2.00% and Marketing, 1.99%. The remaining 152 digital skills represented 34.6% of the total composition.

The skills were categorized by ICT environment domain. Figure 3.

Figure 3. Categorization of digital skills

Source: Own elaboration.

The conformation of digital skills report the following participation. Specialized Skills: Language Programming concentrates 32.4% and Software Architecture and Networks 18.3%, Interpersonal and Business Skills 21.5%; Technical and Digital Skills, 20.4%, Generic ICT Skills represent 1.7%, Complementary ICT Skills, 5.0%; and Information Skills 0.7%. The research finding reports that 50.7% is concentrated in specialized skills.

The categorization of digital skills associates the behavior of the groups in the labor market, the selection of skills by similarity reports certain characteristics linked to the intensive use of technology.

Tabla 2. Correlation of digital skills categories

Digital Skills	Specialized Skills: Programming Languages	Specialized Skills: Software Architecture and Networks
Specialized Skills: Programming Languages	1	
Specialized Skills: Software Architecture and Networks	0.1753	1
Generic ICT Skills	-0.0344	-0.0658
Complementary ICT Skills	-0.2124	-0.0326
Interpersonal and Business Skills	-0.5794	-0.3268
Technical and Digital Skills	-0.4901	-0.4041
Information Skills	-0.0955	-0.0849

Source: Own elaboration.

In terms of statistical correlation, the category Specialized Skills: Programming Languages behaves as follows: i) The highest finding is associated with the category Specialized digital skills: Software architecture and networks in 17.5%, between the groups there is a weak positive relationship, this implies that some of the skills used for programming are linked to digital skills of Software architecture and networks.

ii) The relationship of Specialized Skills: Programming with the other groups shows negative trends, given that one category increases, while the other has a decreasing behavior. The relationship with generic digital skills presents an inverse and insignificant association -3.4%, and with interpersonal and business digital skills -57.9%, that is, an inverse and moderate dissociation.

The group of Specialized skills: Software architecture and networks behave in the opposite direction to the other groups of digital skills. The least marked inverse behavior is that of the group of ICT complementary digital skills, -3.26%, the group of digital and technical skills represents -40.4%, and is located among the moderately inverse relationships.

Tabla 3. Correlation of digital skills categories. Continuoation

Habilidades digitales	Generic ICT Skills	Complementary ICT Skills
Specialized Skills: Programming Languages		
Specialized Skills: Software Architecture and Networks		
Generic ICT Skills	1	
Complementary ICT Skills	-0.0392	1
Interpersonal and Business Skills	0.0433	0.1361
Technical and Digital Skills	-0.1352	0.0804
Information Skills	0.306	0.0192

Source: Own elaboration.

Generic ICT skills are positively and weakly associated with the digital information skills group at 30.6%. The interpersonal and business group varies by 4.3%; this means that the relationship between the two is positive but insignificant. On the other hand, there are insignificant negative associations with another gruops, the group of Complementary ICT skills in -3.9 and the group of digital and technical skills, -13.5. The inverse relationships mean that while one group of digital skills grows and the other shows a decreasing behavior.

Complementary ICT skills have positive and weak associations with the interpersonal and business skills groups in 13.6%, interpersonal and business skills are associated only in 8.0% and the group with the lowest positive association is the information skills group in 1.9%.

Tabla 3. Correlation of digital skills categories. Continuation

Habilidades digitales	Interpersonal and Business Skills	Technical and Digital Skills
Specialized Skills: Programming Languages		
Specialized Skills: Software Architecture and Networks		
Generic ICT Skills		
Complementary ICT Skills		
Interpersonal and Business Skills	1	
Technical and Digital Skills	0.3289	1
Information Skills	0.1174	-0.0801

Source: Own elaboration.

The group of interpersonal and business skills shows weak positive relationships with respect to technical and digital skills at 32.8%. An insignificant positive association is established with the information skills of only 11.7%. The technical and digital skills group and the information skills group were negatively associated with -8.0%.

5   Conclusions

The freelance platform Workana is the leader of the gig market in Mexico for leading the number of skills demanded in the projects published online with a 98.3% share. The platform is an online temporary work niche for freelancers.

The groups of specialized digital skills, Language Programming with a share of 32.4% and Software Architecture and Networking with 18.3% represent more than half of the digital skills published in the gig platform projects. The demand for specialized skills constitute for highly qualified professionals an option to obtain a temporary job with its respective income.
The category of interpersonal and business skills represents the second most important group with respect to frequency in demand with 21.5%. This group of digital skills supports the business environment, through the perspective of business, marketing, innovation, among others.

The demand for technical and digital skills has an important share with 20.4%, grouping the use of software for office and business, use of social media technologies, mobile, analytics, applications, cloud and digital communication among others.

The complementary categories ICT, Generic ICT and Information report the lowest frequency in the demand for digital skills, reporting only 7.4%.

The research concludes that freelance platforms represent a temporary employment option for independent workers who manage their time and technological resources to integrate into the labor market and develop a task that allows them to generate income and participate in the gig economy by providing high-value skills in the management of ICTs.

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