

Intra entrepreneurial skills and the impact on engineer employability

Competências intraempreendedoras e o impacto na empregabilidade do engenheiro

Habilidades intraempreendedoras e impacto en la empleabilidad del ingeniero

DOI: 10.55905/ijsmvtv10n3-025

Originals received: 04/15/2024

Acceptance for publication: 05/20/2024

Ana Luiza Silva

Graduate in Engineering of Production

Institution: University of São Paulo (USP)

Address: Estrada Municipal do Campinho, S/Nº, Campinho, Lorena - SP,
CEP: 12602-810

E-mail: anas.luiza019@usp.br

Orcid: <https://orcid.org/0009-0000-7489-2150>

José Aprígio Carneiro Neto

PhD in Intellectual Property Science

Institution: Federal Institute of Sergipe (IFS)

Address: Avenida Padre Airton Gonçalves Lima, 1140, São Cristóvão, Itabaiana - SE,
CEP: 49500-543

E-mail: jose.neto@ifs.edu.br

Orcid: <https://orcid.org/0000-0002-4393-4917>

Herlandi de Souza Andrade

PhD in Aeronautical and Mechanical Engineering

Institution: University of São Paulo (USP)

Address: Estrada Municipal do Campinho, S/Nº, Campinho, Lorena - SP,
CEP: 12602-810

E-mail: herlandi@usp.br

Orcid: <https://orcid.org/0000-0003-3293-3991>

ABSTRACT

This article presents a study on intrapreneurial skills and their influence on the employability of engineers. These skills are highlighted as a strategic differentiator, both for professionals and for the companies that employ them. The research shows the importance of the constant evolution of intrapreneurial skills and abilities on the part of engineers, to stay up to date with new technologies and job market demands, thus increasing their chances of success in the market. Furthermore, the presence of intrapreneurial professionals in companies not only boosts competitiveness in the market, but also contributes significantly to the organization's success in the face of competition.

Keywords: Skills, Intrapreneur, Employability, Engineer.

RESUMO

Este artigo apresenta um estudo sobre as competências intraempreendedoras e sua influência na empregabilidade dos engenheiros. Essas competências são destacadas como um diferencial estratégico, tanto para os profissionais quanto para as empresas que os empregam. A pesquisa mostra a importância da constante evolução das competências intraempreendedoras e habilidades por parte dos engenheiros, a fim de se manterem atualizados com as novas tecnologias e demandas do mercado de trabalho, aumentando dessa forma suas chances de sucesso no mercado. Além disso, a presença de profissionais intraempreendedores nas empresas, não apenas impulsiona a competitividade no mercado, mas também contribui significativamente para o sucesso da organização frente à concorrência.

Palavras-chave: Competências, Intraempreendedor, Empregabilidade, Engenheiro.

RESUMEN

Este artículo presenta un estudio sobre las habilidades intraempreendedoras y su influencia en la empleabilidad de los ingenieros. Estas habilidades se destacan como un diferenciador estratégico, tanto para los profesionales como para las empresas que los emplean. La investigación muestra la importancia de la constante evolución de las competencias y habilidades intraempreendedores por parte de los ingenieros, para mantenerse al día con las nuevas tecnologías y demandas del mercado laboral, aumentando así sus posibilidades de éxito en el mercado. Además, la presencia de profesionales intraempreendedores en las empresas no sólo impulsa la competitividad en el mercado, sino que también contribuye significativamente al éxito de la organización frente a la competencia.

Palabras clave: Habilidades, Intraempreendedor, Empleabilidad, Ingeniero.

1 INTRODUCTION

Given the constantly changing global scenario and a horizon full of uncertainty, the jobs of the future will require professionals to adapt and develop their skills. According to the World Economic Forum, in a report released on the future of jobs, published in 2023, employment opportunities have undergone continuous changes and adjustments to adapt to the technological and economic demands of the contemporary era. As a result of this evolution, jobs and companies are increasingly looking for qualified and innovative professionals, to maintain their competitiveness in the market

against the competition (Wef, 2023).

In this way, problems that were previously simple now have a greater degree of complexity, requiring extra effort from professionals, as well as a differentiated profile in the market. In this context, both professionals and institutions must always be in tune, working together, transferring skills between themselves, through innovative and training actions that involve both sides. Therefore, this is an important aspect that directly impacts the training of engineers, as well as their employability in the market (Wef, 2023).

In this context, professionals' skills are essential to deal with difficult and adverse challenges, helping to strengthen the strategic perspective of organizations. Therefore, it is essential that professionals improve their skills and competencies to increase the impact of their actions, which will make them stand out and provide competitive advantages for companies (Fleury, 2006; Santos; Simon, 2018).

As a result, a newly graduated engineer, as well as other professionals, need to have their competences well developed to meet the expectations of companies and increase their employability in the market. Therefore, knowing the skills of the intrapreneurial engineer helps to maximize future opportunities (Suleiman; Abahre, 2020).

Therefore, the objective of this study is to show how the development of intrapreneurial skills can influence the employment opportunities of engineering students.

2 THEORETICAL FRAMEWORK

2.1 COMPETENCIES

A competency is defined as a skill and consists of a set of related but different behaviors organized around an underlying construct (Boyatzis, 2008).

Competencies are associated with knowledge, skills and attitudes, adding social value to employees and generating strategic value for organizations. The competency model is advantageous for organizations, as well as for professionals, allowing for flexibility, personal development, strategic alignment, as well as strengthening work teams (Rocha *et al.*, 2018).

The differentiation of companies can be established through the harmony between clearly defined skills, along with their targets and goals. Recognizing and characterizing the fundamental skills within the organization is the initial step in developing strategies that generate positive results (Carmo, 2015).

According to Maia (2017), competencies are related to handling unexpected situations that require an exchange of knowledge and skills. In addition, they strengthen the company's objectives and the employee's differential, through new markets and the perception of added value.

To strengthen professionals and make them stand out in the job market, skills are intrinsically related to productivity, thus contributing to the development of transversal skills (Rodríguez; Puerta, 2016).

Table 1 presents a portfolio of skills distributed across four distinct dimensions related to professional life.

Table 1. Portfolio of competencies	
Dimension	Competence
Intrapersonal	Self-control and emotional stability
	Confidence and self-assurance
	Resistance to adversity
	Communication
Interpersonal	Networking
	Negotiation
	Influencing
	Teamwork
Task Development	Professional technical knowledge
	Initiative
	Orientation and results
	Analytical skills
Environment	Taking of decision
	Innovation and creativity
	Continuous learning
	Holistic vision
	Vision and anticipation
	Customer orientation
	Identification with the company

Source: Adapted from Hashimoto, 2009

In this context, Dornelas (2007) lists the characteristics of entrepreneurial behavior as follows: 1) Risk-taking; 2) Autonomy; 3) Innovation and Achievement; 4) Self-control and Creativity; 5) Self-confidence; 6) Responsibility; 7) Determination, Enthusiasm, Leadership, Goals and Tolerance of Uncertainty; and 8) Ambition, Money,

Initiative, Opportunities, Network, Information Search, Commitment, Persistence, Power and Positivism.

2.2 INTRAPRENEUR

The term intrapreneur means internal entrepreneur. It was used for the first time by Pinchot in 1985 and can be characterized by different terminologies, as can be seen in Table 2.

Table 2. Terminologies used for intrapreneur

Authors	Year	Terminology
Cooper	1981	Intra-corporate entrepreneurship
Achollhammer	1981	Internal corporate entrepreneurship
Miller	1983	Entrepreneurial orientation
Pinchot	1985	Intrapreneurship
Khandwalla	1987	Innovative pioneering management
Ellis & Taylor	1987	Corporate Venturing
Sathe	1989	Organizational renewal
Stevenson & Jarilo	1990	Entrepreneurial management
Morse	1996	Entrepreneurship at company degree
Dess, Lumpkin & Covin	1997	Entrepreneurial strategy
Birkinshaw	1997	Corporate alliances

Source: Adapted from Hashimoto, 2009

The intrapreneur has similar aspects to the entrepreneur, assuming a strategic role within organizations, generating long-term impact and providing competitive advantages (Baruah; Ward, 2015).

Pryor and Shay (1993) believe that intrapreneurship is the creation of an environment in which innovation can flourish, transforming ordinary people into successful entrepreneurs.

With the evolution of the concept of entrepreneurship, which was previously understood only as starting a new business, today companies are aware of the importance of entrepreneurial characteristics for development and competitive position in the market (Cordeiro, 2020).

According to Baruah and Ward (2015), the evolution of intrapreneurship and the challenges of establishing it are closely related to organizational culture, as it can resist change and hinder the implementation of new ideas. Furthermore, they can also be

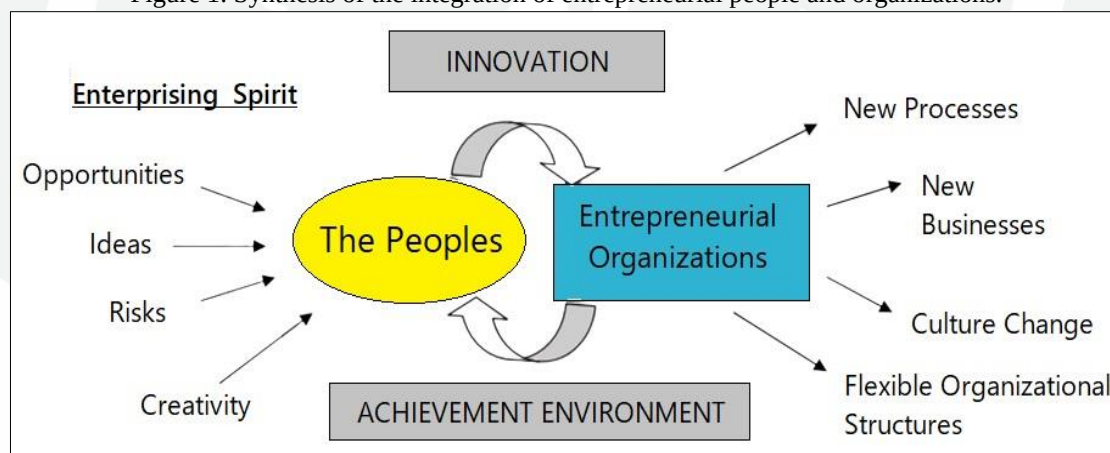
influenced by the demand for companies' products and services. When a company has many orders and seeks to meet consumer needs, it strives to constantly innovate to stand out in the market compared to its competitors. In this sense, an organization that is willing to take risks and cultivate an entrepreneurial spirit will naturally attract more innovative suggestions from its employees, which will increase its chances of success and expansion in the market, as well as expanding the potential of its employees.

For Hashimoto (2009):

“Intrapreneurship emerges with measures to create alternative paths to institutionalization and agency conflicts, facilitating the process of generating ideas and allowing the barriers imposed by structures, rules and agents to be minimized using the same basis as job satisfaction, but aiming for innovation as a way of achieving competitiveness”.

Figure 1 shows the opportunity cycle defined by Costa *et al.* (2007) as “*Synthesis of the integration of entrepreneurial people and organizations*”.

Figure 1. Synthesis of the integration of entrepreneurial people and organizations.



Source: Adapted from COSTA *et al.*, 2007.

For Formansk *et al.* (2015), intrapreneurship results in learning and stability, which is why many entrepreneurs seek intrapreneurship instead of starting a new business.

2.3 INTRAPRENEUR ENGINEER

After the Second World War, engineering education went through several changes until it established and defined the current profile of the engineer. For a long time, the academic profile and knowledge were the opposite of what industries were looking for in the market. As a result, several adaptations were made to the curricula of engineering courses in academic institutions so that engineers could meet this demand from companies and expand their technical and transversal skills (Santos; Simon, 2018).

The current national curricular guidelines for engineering courses recommend *“that activities be organized in a way that brings students closer to the professional environment, creating forms of interaction between the institution and the area in which they will work”* (Mec, 2019).

Teaching focused on skills is aligned with the current demands of the job market, which require preparation from students. Companies are increasingly adopting skill profiles to hire employees, instead of traditional and rigid job descriptions (Leiva; Seabra; Oliveira, 2021).

According to Xaver and Santos (2020), among the engineering-oriented skills, the following stand out: adaptive innovative capacity, which is most often worked on in joint projects with entrepreneurship; and innovation.

In this context, the expected profile in the job market for an engineer is that of a professional capable of solving problems in an analytical and entrepreneurial way. So that, through creative deliveries, it is viable to establish new and better processes and, consequently, add development for the professional and the organization (Santos; Simon, 2018).

Therefore, the engineer's skills must be aligned with those of the intrapreneur, as companies are increasingly looking for individuals who are willing to take risks and who are innovative, which contributes to their competitive advantage in the market.

2.4 EMPLOYABILITY OF ENGINEERING GRADUATES

Entering the job market is closely linked to the skills that engineering students can acquire, expanding their opportunities to stand out in a job selection process. In addition to technical skills, engineering students need to develop their interpersonal skills in social, business and cultural situations, keeping up with technological and organizational changes (Ssegawas; Kasule, 2017).

According to Ssegawas and Kasule (2017), CEOs of companies in several countries consider the employability gap to be one of their top five concerns, as it restricts companies' ability to innovate, grow, deliver products and services early, comply with quality standards, as well as meet the environmental aspects and social requirements of the countries where they operate.

For Roja and Kishore (2018), the employability skills of engineering graduates are directly associated with the course's teaching-learning process and are developed through experiences in different situations. This shows the importance of understanding employability gaps and thus discovering how students can prepare to meet the demands of existing vacancies in the market.

3 METHODOLOGY

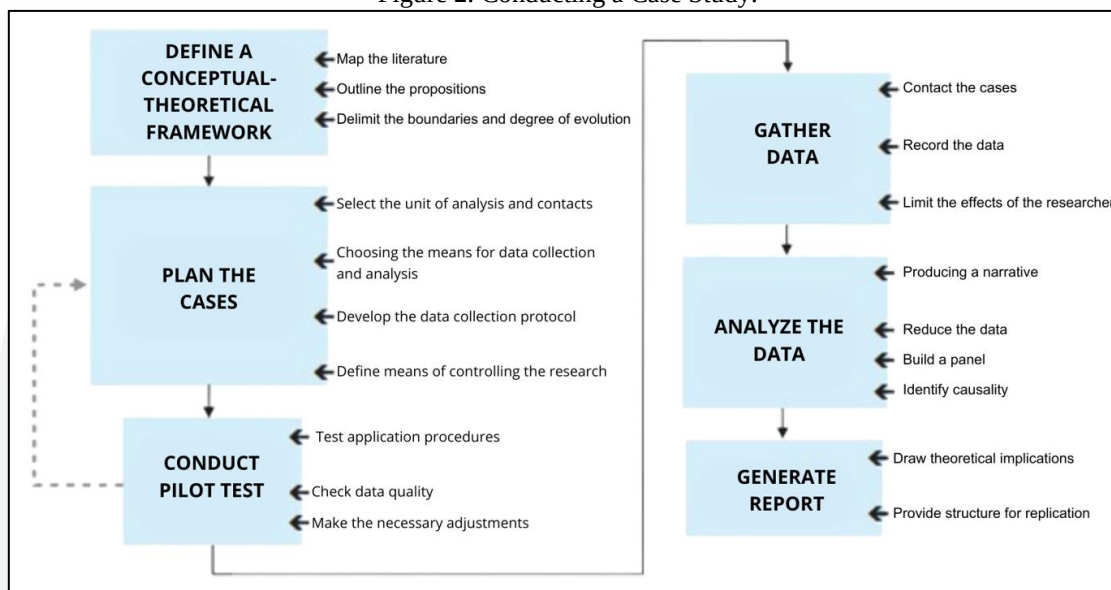
3.1 CASE STUDY

The methodology used in this article is characterized as basic, qualitative research, with descriptive and exploratory objectives. The work included a bibliographical survey of articles, theses, dissertations, books and periodicals related to the topic in various scientific databases.

To achieve the objective of this work, the method used was the case study, which consists of a solid and well-founded theoretical foundation, allowing a broad and detailed knowledge of the subject (Gil, 2002).

For Yin (2001), the case study contributes to an investigation that fully preserves the real-life event. The case study applied in this work meets the proposal defined by Miguel (2007), as can be seen in Figure 2.

Figure 2. Conducting a Case Study.



Source: Adapted from Miguel, 2007.

3.1.1 Theoretical conceptual framework

With the aim of consolidating and expanding the theoretical framework of this work, a bibliometric analysis was carried out on the topic based on the following research question: “*How can intrapreneurial skills influence the employability of engineering students*”?

The database chosen for this research was Scopus, due to its international reach and because it is one of the most respected scientific databases in the academic world. The following keywords were chosen for the searches: Competence, Intrapreneurial Competence and Employability. At the end of this process, 21 articles were selected to compose the final research portfolio.

3.1.2 Definition of the units of analysis

After delving deeper into the theoretical framework, three units of analysis were defined: engineering students, recently graduated engineers and human resources managers:

- a) engineering students: students in the last two years of their course, whether they are doing an internship or not;
- b) newly graduated engineers: engineers who have been graduated for no more than two years and are working in various types of company, such as: industry, services, start-ups, among others;
- c) human resources managers: professionals who are responsible for the candidate selection process and who hire engineers within companies such as: industries, services, start-ups, among others.

3.1.3 Data collection

Data were collected in different ways for each analysis group. For engineering students, an online questionnaire prepared in Google Forms was used, with the objective of obtaining 100 responses. For newly graduated engineers, interviews were carried out with a specific script aligned with the research objectives, totaling 8 interviews. In the case of human resources managers, interviews were also carried out with a different script, totaling 4 interviews. For the interviewees, the semi-structured interview technique was adopted, which allows the script to be adapted as necessary during the interview.

During the literature review and bibliometric analysis, relevant skills were identified, which were then grouped into three categories. These categories served as a guide for the questions asked to participants, facilitating comparative analysis between the groups:

- a) technical competencies: Basic Engineering Knowledge; Technological Knowledge; Logical Reasoning; Financial Knowledge; Entrepreneurial Skills; Global Awareness; and Analytical Capacity;
- b) intrapersonal competencies: Creativity; Flexibility; Openness to receiving

feedback; Proactivity; Persuasion; Emotional Intelligence; Self-confidence; and Decision-making;

c) interpersonal competencies: Communication; Relationship building; Negotiation; Teamwork; and Empathy.

3.1.4 Data analysis

After collecting data from different sources, the triangulation technique was used to integrate the collected data and support the reliability of the research. Thus, data must be converged and filtered, reducing its quantity (Miguel, 2007).

The analytical strategy used to complete the research was described by Yin (2001) as being based on theoretical propositions. Once the data has converged, this approach allows reflection based on the theoretical framework, allowing new interpretations. Furthermore, this strategy helps to structure data analysis, since causal answers, such as: “how” and “why”, can guide the case study.

In this research, data were analyzed using content analysis, which allows the interpretation of data collection through refined techniques used in qualitative analyses. Bardin (2006) classifies the use of content analysis into three fundamental phases: pre-analysis, exploration of the material and treatment of results. The first phase organizes the data, specifying the focus of the investigation. In the second, it is analyzed based on the theoretical framework and hypotheses. In the third, analyzes and conclusions are made.

4 RESULTS AND DISCUSSIONS

4.1 PRE - ANALYSIS

After the interviews ended, they were transcribed into electronic documents (Microsoft Word and Excel) and then organized into summaries by unit of analysis, to facilitate visualization of each interviewee's responses and identify similarities between the responses.

The responses obtained through Google Forms (forms) were summarized and made available through graphics generated by the Google platform itself.

A summary table of the questions was created about the level of development that the students considered their skills to be, to facilitate understanding of the answers. The scale used was that of Likert (1932), where they classified them from 1 to 5, with 1 being “not developed” and 5 being “fully developed”. The organization of responses by competence can be seen in Figure 3, where the highest percentages of agreement for each competence are highlighted.

Figure 3. Summary board: engineering students' answers.

GROUP	COMPETENCIES	PERCENTAGE BY LEVEL OF AGREEMENT				
		1	2	3	4	5
Technical Competencies	Basic engineering knowledge	1,2%	8,4%	37,3%	43,4%	9,6%
	Technological knowledge	1,2%	15,7%	43,4%	33,7%	6%
	Logical Reasoning	0%	1,2%	13,3%	59%	26,5%
	Financial knowledge	7,2%	26,5%	38,5%	21,7%	6%
	Entrepreneurial skills	3,6%	16,9%	36,1%	31,3%	12%
	Analytical skills	0%	1,2%	20,5%	45,8%	32,5%
	Foreign Language	1,2%	16,9%	21,7%	31,3%	22,9%
Intrapersonal Competencies	Creativity	1,2%	3,6%	25,3%	45,8%	24,1%
	Flexibility	0%	1,2%	12%	49,4%	37,3%
	Openness to feedback	0%	1,2%	8,4%	33,7%	56,6%
	Proactivity	0%	0%	9,6%	34,%	55,4%
	Persuasiveness	0%	10,8%	37,3%	37,3%	14,5%
	Emotional intelligence	1,2%	4,8%	44,6%	36,1%	13,3%
	Self-confidence	1,2%	12%	39,8%	31,3%	15,7%
	Taking of decision	0%	4,8%	28,9%	39,8%	26,5%
Interpersonal Competencies	Communication	0%	0%	15,7%	50,6%	33,7%
	Interpersonal Relationships	0%	2,4%	8,4%	55,4%	33,7%
	Negotiation	2,4%	7,2%	39,6%	38,6%	13,3%
	Teamwork	0%	0%	3,6%	43,4%	53%
	Empathy	0%	0%	10,8%	43,4%	45,8%

Source: Prepared by the authors.

4.2 EXPLORING THE MATERIAL

After organizing the interviews in the summary table, they were read again and, from this second reading, key words from each unit of analysis were highlighted. These keywords were separated and reorganized, relating them to the answers referring to the intrapreneurial profile and opportunities for developing the mentioned skills.

The results of the responses from each unit of analysis were correlated to draw similarities between the responses, thus being combined into a single summary table, as shown in Figure 4.

Figure 4. Correlation of competencies in the perception of the 3 units of analysis.

Competencies Groups	Competencies	Competencies associated with the Intrapreneur	Development opportunities
Technical	Logical reasoning; Technological knowledge and software skills (Excel, Power Bi and Data programming); Project management; Basic engineering knowledge; Systemic vision; Concepts of Design Thinking, Lean Startup and Lean Manufacturing; Financial knowledge; Entrepreneurial skills; Global awareness; Capacity for analysis;	Logical reasoning; technological knowledge and software skills (Excel, Power Bi and data programming), project management; basic engineering knowledge; financial knowledge; entrepreneurial skills; global awareness; analytical skills;	Subjects offered in the engineering course, complementary courses, extracurricular activities and practice
Intrapersonal	Leadership; Agility; Adaptability; Holistic vision; Customer focus; Resilience; Organization; Sense of ownership; Creativity; Flexibility; Openness to feedback; Proactivity; Persuasion; Emotional intelligence; Self-confidence; Taking of decision;	Leadership; Agility; Adaptability; Holistic Vision; Customer Focus; Resilience; Organization; Sense of Ownership; Creativity; Flexibility; Openness to Feedback; Proactivity; Persuasion; Emotional Intelligence; Self-Confidence; Decision Making; Autonomy, Critical Capacity;	Student organizations, extracurricular activities, practice in projects, sports, internships, volunteer activities
Interpersonal	Communication; Empathy; Teamwork; Negotiation	Communication; Empathy; Teamwork; Negotiation; Relationship Building; Influence Management	

Source: Prepared by the authors.

Finally, to enrich the data analysis and highlight some points that can facilitate the visual analysis of the results, after going through the phases suggested by Bardin (2006), a cloud of keywords was created referring to the most cited skills associated with the profile intrapreneur, generated using the INFOGRAM software, as can be seen in Figure 5.

Figure 5. Most cited competencies in the 3 units of analysis associated with the intrapreneur profile.



Source: Prepared by the authors.

4.3 DATA PROCESSING

At this stage, all relevant content relating to the exploration of the research was gathered through the analysis of the summary tables, the correlation table and the visualization of the keyword cloud generated by the INFOGRAM software.

Based on the analysis of the material, the strong relationship between the intrapreneurial profile and skills stands out, especially in relation to transversal skills. Transversal skills were consistently associated with the transversal profile across the units of analysis. When correlating the three units, several skills showed similar importance in the keyword cloud.

In the context of newly graduated engineers, communication, proactivity and empathy were the most mentioned skills, developed mainly through academic organizations, internships and extracurricular activities.

About engineering students, the following skills were cited as the most “*fully developed*”: Openness to receive feedback (56.6%), Proactivity (55.4%), Teamwork (53%) and Empathy (43.8%). For 88% of students, the development of their skills came from participation in academic and student organizations, followed by the family environment (61.4%) and the engineering course itself (55.4%). Regarding confidence in entering the job market, given the skills they have developed, 56.6% feel “*maybe*” prepared, followed by 28.9% who believe they are “*yes*” prepared for the job market.

Regarding preparation for the job market, most students feel possibly prepared. Skills provided significant differences in selection processes and in the job market, with human resources managers emphasizing the advantage of engineers with intrapreneurial skills.

5 CONCLUSION

Currently, the job market in all areas is undergoing changes to meet the technological and economic demands of the modern world. This results in the need for highly qualified and innovative professionals with different profiles.

This research highlights that technical, intrapersonal and interpersonal skills are fundamental to dealing with challenges in the job market and can add strategic value to companies, becoming a competitive differentiator. New graduates need to constantly develop their skills to stay up to date and increase their chances of employability.

The results of this research show that skills such as: communication, proactivity, teamwork and empathy are essential for the employability of a professional in the current job market. Having intrapreneurial and innovative professionals in companies increases their competitiveness and chances of success. It is essential that students of any undergraduate course, including engineering, participate in extracurricular activities, such as research, internships and exchanges, to improve their skills before entering the job market.

REFERÊNCIAS

BARUAH, Bidyut; WARD, Anthony. Metamorphosis of intrapreneurship as an effective organizational strategy. **International Entrepreneurship and Management Journal**, [S.L.], v. 11, n. 4, p. 811-822, 6 maio 2014. Springer Science and Business Media LLC. <http://dx.doi.org/10.1007/s11365-014-0318-3>.

BARDIN, L. **Análise de conteúdo**. Tradução L. de A. Rego & A. Pinheiro. Lisboa: Edições 70, 2006.

BOYATZIS, Richard E. Competencies in the 21st century. **Journal of Management Development**, [S.L.], v. 27, n. 1, p. 5-12, 4 jan. 2008. Emerald. <http://dx.doi.org/10.1108/02621710810840730>.

CARMO, Luiz Otávio do. Gestão de Pessoas Baseada em Competências: um modelo avançado de gestão. **Revista de Administração Geral**, v. 1, n. 2, p. 101-117, 2015.

CORDEIRO, Flávia Roesler et al. Production engineers profiling: competences of the professional the market wants. **Production**, v. 30, 2020.

COSTA, Alexandre Marino; CERICATO, Domingo; MELO, Pedro Antonio. Empreendedorismo corporativo: uma nova estratégia para a inovação em organizações contemporâneas. **Revista de Negócios**, v. 12, n. 4, p. 32-43, 2007.

DORNELAS, José Carlos Assis. **Empreendedorismo corporativo: como ser empreendedor, inovar e se diferenciar em organizações estabelecidas**. Rio de Janeiro: Elsevier, 2003. 179p.

FLEURY, Afonso. **Estratégias empresariais e formação de competências: um quebra-cabeça caleidoscópico da indústria brasileira**. São Paulo: Atlas, 2006, 3. Ed. 148 p.

FLICK, Uwe. **Qualidade na pesquisa qualitativa: coleção pesquisa qualitativa**. Bookman editora, 2009.

FORMANSKI, Francieli Napolini *et al.* Intraempreendedorismo: Identificando Patrocinadores e Redes de Contato. In: **V Congresso Internacional do Conhecimento e Inovação**, 2015, Florianópolis.

GIL, Antônio Carlos. **Como elaborar projetos de pesquisa**. Antônio Carlos Gil. 4 ed. São Paulo: Atlas, 2002.

HASHIMOTO, Marcos. **Organizações Intraempreendedoras: construindo a ponte entre clima interno e desempenho superior**. 2009. 363 f. Tese (Doutorado) - Curso de Administração de Empresas, Administração, Fundação Getúlio Vargas, São Paulo, 2009.

LIKERT, R. A technique for the measurement of attitudes. **Arch Psychol.** 1932, 140:1-55.

MAIA, Bruno Inácio. Sistemática para Planejamento Estratégico de Futuro. **Revista de Extensão e Iniciação Científica da UNISOCIESC**, v. 4, n. 2, p. 1-9, 2017.

MEC. Ministério da Educação. **RESOLUÇÃO Nº2:** Diretrizes Curriculares Nacionais do Curso de Graduação em Engenharia. Brasília, 2019. 6 p. Disponível em <http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=112681-rces002-19&category_slug=abril-2019-pdf&Itemid=30192>. Acesso em 14 ago. 2023.

MIGUEL, Paulo Augusto Cauchick. Estudo de caso na engenharia de produção: estruturação e recomendações para sua condução. **Production**, v. 17, p. 216-229, 2007.

PRYOR, Austin K.; SHAYS, E. Michael. Growing the business with intrapreneurs. **Business Quarterly**, v. 57, p. 42-42, 1993.

ROCHA, Guilherme Busch; PASSADOR, Claudia Souza; SHINYASHIKI, Gilberto Tadeu. What is the social gain from competency management? The employees' perception at a Brazilian public university. **Revista de Administração**, [S.L.], v. 52, n. 3, p. 233-245, jul. 2017. Elsevier BV. DOI: <http://dx.doi.org/10.1016/j.rausp.2017.05.001>. Acesso em: 14 ago. 2023.

RODRÍGUEZ, José María Romero; PUERTA, José Gijón. Redefinición de competencias vinculadas a la productividad. **Revista Internacional de Formação de Professores (Ripf)**, Itapetininga, v. 1, n. 3, p. 163-174, 25 jun. 2016. Disponível em: <https://bibliotecadigital.ipb.pt/bitstream/10198/13236/1/431-1606-1-PB_ARTIGO_RIFP_2016.pdf>. Acesso em: 15 ago. 2023.

ROJA, Rani V.; KISHORE, Babu M. Factors of employability skills of engineering graduates: An analytical study using Friedman Test Multiple Regression. **International Journal of Engineering and Technology (UAE)**, v. 7, n. 2, p. 18–21, 2018.

SANTOS, Patrícia Fernanda dos; SIMON, Alexandre Tadeu. Uma avaliação sobre as competências e habilidades do engenheiro de produção no ambiente industrial. **Gestão & Produção**, [S.L.], v. 25, n. 2, p. 233-250, jun. 2018. FapUNIFESP (SciELO).

SILVEIRA, Marcos Azevedo et al. Pesquisa em Educação em Engenharia. In: **XXXV Congresso Brasileiro de Educação em Engenharia, 2007**.

SSEGAWA, J. K.; KASULE, D. A self-assessment of the propensity to obtain future employment: a case of final-year engineering students at the University of Botswana. **European Journal of Engineering Education**, v. 42, n. 5, p. 513–532, 2017.

SULEIMAN, Akram; ABAHRE, Jafar. Essential competencies for engineers from the perspective of fresh graduates. **Engineering Management in Production and Services**, v. 12, n. 1, p. 70-79, 2020.

WEF. WORLD ECONOMIC FORUM. **The Future of Jobs Report 2023**. 2023. Disponível em: <<https://www.weforum.org/publications/the-future-of-jobs-report-2023/>>. Acesso em: 15 nov. 2023.

XAVER, Neumeyer.; SANTOS, Susana C. **IEEE Technology & Engineering Management Conference (TEMSCON)**, 2020.

YIN, R. K. **Estudo de Caso: Planejamento e Método**. 2. ed. São Paulo: Bookman, 2001.