DEVELOPMENT OF COMPETENCIES FOR INNOVATION: A COMPARATIVE STUDY BETWEEN BRAZIL AND GERMANY

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ABSTRACT

This article investigates the key factors for the development of innovation skills among young leaders in the industrial sector, through a comparative analysis between educational institutions in Brazil and Germany. The objective is to identify good practices and essential factors applied in German institutions that can be adapted to the Brazilian context, to improve the qualification of professionals with a more innovative mindset. The research analyzed public policies, innovation indicators and the syllabuses of 35 courses, mapping trends and practices aimed at the formation of strategic skills. The results highlight the relevance of education for the development of innovation and the need to prioritize skills such as problem-solving, critical thinking, creativity, data analysis, business strategy, and innovation management modeling. This study offers contributions by proposing ways to improve the training of young leaders in Brazil, based on the best practices observed in Germany, strengthening the competitiveness and innovation capacity of Brazilian industry.

Keywords: Leadership training. Skills. Innovation.

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INTRODUCTION

Innovation is an essential factor for the economic development and competitiveness of most nations. Its capacity depends not only on the existence of public policies and investments in research and development (R&D), but, crucially, on the formation of qualified human capital, capable of leading and implementing transformations in various sectors of the economy. In this sense, it is essential to develop skills focused on innovation, especially among young leaders who work and will work in the Brazilian industry.

However, most of these young Brazilian leaders were not encouraged, during their school education, to value innovation in their decision-making. Faced with the rapid changes in the current scenario, these leaders need to learn, with agility, how to adapt and how to transform the environment around them effectively.

The qualification of workers in the industry is a crucial aspect for Brazil, since the shortage of qualified labor tends to intensify with the increase in the pace of economic expansion. This represents one of the main obstacles to the growth of productivity and national competitiveness.

Germany is considered one of the main global references in innovation, both for its strong industrial tradition and for the structuring of public policies aimed at the development of highly qualified human capital. (PORTULANS INSTITUTE, 2021).

On the other hand, in the Brazilian context, the trajectory in relation to innovation is more recent. Although Brazil has implemented public policies aimed at promoting innovation, such as the 2004 Innovation Law (Law No. 10,973), which brought incentives for scientific and technological research, the country still occupies a modest position in global innovation indicators. Despite the advances in recent years, Brazil has significant gaps in terms of the qualification of human capital for innovation, especially compared to leading countries such as Germany. Brazilian public policies aimed at innovation lack more robust incentives, just as the educational system is not yet fully aligned with the needs of the industry.

Given this scenario, the survey seeks to answer the following question: what are the key factors in the development of innovation-oriented competencies that can serve as inspiration for the training of young Brazilian leaders, with a professional focus on the industry, in order to strengthen their competitiveness?

The main objective of this study is to examine the experiences, good practices and key factors in the development of skills for innovation in Germany and Brazil, identifying aspects that can positively impact the training of young leaders and serve as inspiration for

the development of skills of young people who work and will work in the Brazilian industry, drawing a parallel between these two countries.

The research analyzed public policies aimed at innovation, educational indicators related to innovation, menus and courses offered to young leaders in educational institutions, mainly in Germany, complementing the study with the analysis of Brazilian institutions.

With this study, it is expected to stimulate reflection on the subject in the Brazilian context, in addition to offering concrete subsidies that can contribute to the promotion of innovation among young industry leaders in the country.

METHODOLOGY

This study was developed from a detailed bibliographic research, contemplating several databases of academic relevance. For the collection of materials, Google Scholar was used; the Institutional Repository of the University of Brasília (UnB) and the Support Center for Technological Development of UnB (CDT/UnB); the CAPES Journal Portal and the *Social Science Research Network* (SSRN). The research was carried out in Portuguese, English and German, in order to cover the main literatures and approaches related to the central theme of innovation and competence. The keywords used, considering linguistic variations, are shown in Chart 1 below.

Table 1. Combination of keywords used in the search

Language	Search Terms
Portuguese	*innovation; Innovation competence*
English	*innovation; innovation competence*
German	*Innovation*; *Innovation Competence*

Source: Prepared by the authors, 2023.

The searches were conducted from September 2021 to March 2023, and the literature collected included scientific articles, dissertations, theses, and other academic documents relevant to the understanding and deepening of the topic investigated.

The results of this research were organized into different stages of analysis, starting with the selection of Germany as a reference due to its high indicators of innovation and excellence in the qualification of human capital. To carry out this comparative evaluation, the Brazilian and German contexts were investigated, focusing on their public policies aimed at innovation and the qualification of human capital. In addition, the rankings of these countries in internationally recognized innovation rankings were examined.

In the second stage, educational institutions in Germany and Brazil were mapped, with the objective of identifying, in their curricula, trends and practices aimed at the

development of young leaders with a focus on innovation. This survey allowed a comparative analysis to be carried out between the approaches of both countries with regard to the training of leaders for the industrial sector.

RESULTS

With regard to Brazilian public policies, Law No. 10,973 of 2004 stands out, which inaugurated a regulatory framework aimed at encouraging innovation and scientific and technological research. Other important milestones include the Legal Framework for Innovation, Law No. 13,243 of 2016 and Decree No. 10,534 of 2020, which instituted the National Innovation Policy (PNI). The latter aims to guide, coordinate and articulate the strategies and actions to foster innovation, promoting greater synergy between government agencies and the productive sector. The PNI has four main objectives, which are:

1. To stimulate research, development and innovation by companies, Institutes of Science and Technology (ICT) and private non-profit entities, with a view to increasing the productivity and competitiveness of the economy, the generation of wealth and social well-being;
2. Promote the coordination and alignment of public policy instruments, programs and actions related, directly or indirectly, to the promotion of innovation;
3. To foster the transformation of knowledge into innovative products, processes and services;
4. Develop the human capital necessary to increase the levels of innovation in the economy.

This study focused specifically on the objective related to the development of human capital. The PNI outlines six axes, with emphasis on the Education Axis, which involves 43 actions aimed at stimulating interest in the areas of exact and agrarian sciences, health, technology and engineering; as well as the revision of higher education curricula and the approximation of academic training to the demands of the national productive sector; incentive to increase the number of graduates in higher education in the areas of exact and agrarian sciences, health, technology and engineering; and encouragement of scientific and technological exchange.

In terms of innovation policies in Germany, the country has a strong tradition and seeks to promote research, technological development, and innovation in various sectors of the economy. These policies aim to boost the country's competitiveness and economic growth and are directly related to the education and qualification of professionals. According to Sérvulo Vicente Moreira, already in the eighteenth century, Germany was implementing

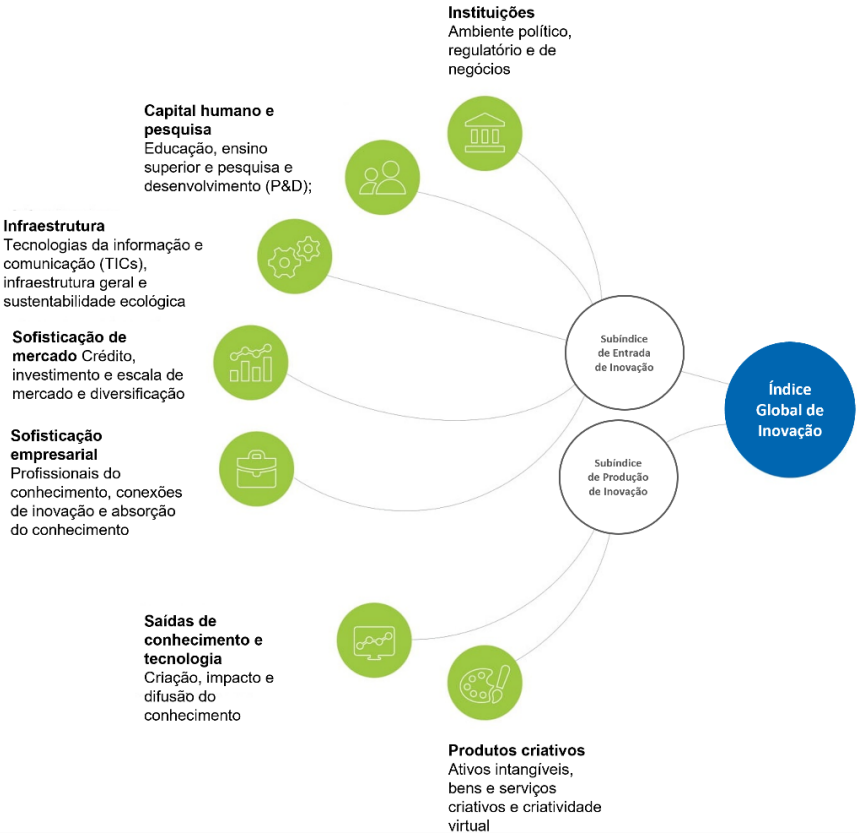
initiatives to bring educational institutions closer to the needs of industry. In this century, Germany made some changes to its doctoral programs, aligning theoretical teaching with practice. Initially, it was due to the shipbuilding industry and gradually they were replicated to other sectors. In addition, the country is known for investing significantly in Research and Development (R&D). The government strongly encourages companies to invest in research and development activities through a range of measures, such as subsidies, tax incentives, and funding programs. Some institutions known for their dedication to research and innovation: *Fraunhofer* Society; *Helmholtz Society*; *Leibniz* Association; *Max Planck Institute*, in addition to universities and other forms of institutions (MOREIRA, 2015).

When it comes to education, Germany values vocational training as a key element for innovation. The German education system focuses on technical and professional training, in order to ensure that there is a highly qualified workforce to meet the demands of the industry. And this also includes initiatives to attract scientists from all over the world to compose their staff in research institutions, universities and industry, valuing the diversification of professionals with different experiences and knowledge.

Other initiatives also stand out, such as Intellectual Property protection, which includes patents, copyrights, among others, to encourage creation and innovation.

As for the innovation indexes, the Global Innovation Index (GII) and the Industrial Survey of Technological Innovation (PINTEC) stand out, which served as tools to measure the degree of innovation of the two countries and compare them. The GII uses a methodology based on seven sub-indices, with pillars and indicators, as represented in Figure 1, which illustrates the structure of the index criteria.

Figure 1. Structure of the Global Innovation Index (GII) criteria



Source: *Global Innovation Index,* 2021 (https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021.pdf) Accessed on Oct 3, 2024. Translated by the authors.

In this research, the analysis focused on two main pillars: human capital and research, which evaluates indicators of education, higher education, and research and development (R&D); and business sophistication, which measures the performance of knowledge professionals, innovation connections and the capacity of companies to absorb knowledge.

In the human capital and research pillar, Germany stands out as the second among the 132 countries analysed, according to the report published in 2022 (Figure 2).

Figure 2. Classification according to pillars

País/Economia	IGI geral	Instituições	Capital humano e pesquisa	Infraestruturas	Sofisticação do mercado	Sofisticação empresarial	Produtos de conhecimento e tecnologia	Produtos criativos
Suíça	1	2	6	4	7	5	1	1
Suécia	2	18	3	2	10	1	3	8
Estados Unidos	3	16	12	25	1	2	2	12
Reino Unido	4	24	8	6	3	13	7	2
Singapura	5	1	2	8	6	3	10	18
Finlândia	6	3	5	1	12	4	4	16
Países Baixos	7	6	13	14	15	8	8	9
Alemanha	8	22	4	23	14	16	9	7
Brasil	49	99	56	58	50	39	52	46

Source: *Global Innovation Index, 2022*. Accessed on Mar 4, 2023

In this pillar, the indicators of education, higher education and research and development were analyzed, which are defined according to Table 2 presented below.

Table 2. Education, higher education, and research and development (R&D) indicators

Indicator	
Education	Government spending on education, government funding per high school student, school life expectancy, Program for International Student Assessment (PISA) scale, and high school student-teacher ratio.
Higher education	Higher education enrollment rate and number of graduates in the fields of science and engineering.
Research and Development (R&D)	Number of researchers involved in the conception or creation of new knowledge, gross expenditure on R&D, average score of the three best universities in the country.

Source: Prepared by the authors, 2023.

The results of this pillar highlight the need for Brazil to increase its investments in basic education, universities and the reformulation of engineering curricula. Although these aspects are not the main focus of this study, they provide opportunities for future investigations.

In the business sophistication pillar, three sub-indicators were considered, which are presented in Chart 3.

Table 3. Professional indicators of knowledge, innovation connections and knowledge absorption.

Indicator	
Knowledge workers	Employment of people in knowledge-intensive services, percentage of employed women with advanced education, among others.
Innovation connections	Industry-business collaboration, foreign investment in R&D, number of *joint ventures* and strategic alliances, number of patents.
Knowledge Absorption	Researchers from the business sector involved in the design or creation of new knowledge, products, processes, methods and systems, as well as in the management of these projects, disaggregated by the sectors in which they are employed, importation of high technology, charges for the use of intellectual property.

In the knowledge absorption sub-indicator, it is important to highlight the relevance of collaboration between educational institutions and industries/companies. This exchange of knowledge is one of the engines for innovation in the country. Whereas, the more qualified this professional is, the better and more connections there will be between university and company.

It is worth mentioning that, still on the pillars of human capital and research and business sophistication, Brazil showed a drop in all indicators comparing 2022 with 2023, although it has shown a positive evolution in the overall classification in the last four years.

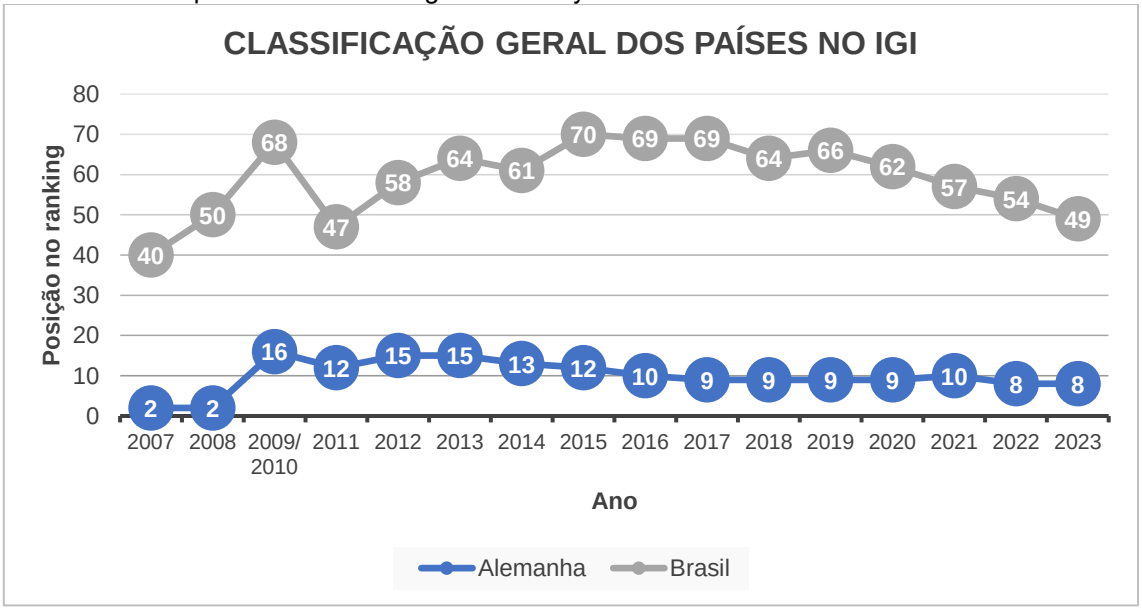
Table 1. Comparison between indicators from Germany X Brazil

Pillar	Indicator	Classification	
		Germany	Brazil
Human capital and research	Education	23	68
	Higher education	8	90
	Research and Development (R&D)	7	35
Business sophistication	Knowledge workers	21	41
	Innovation connections	10	60
	Knowledge absorption	26	32

Source: Prepared by the authors, 2023 (Based on *Global Innovation Index*, 2023).

Since the index began to be produced in 2007, Brazil has performed better in the first two years of the index's preparation. From 2012 onwards, Brazil began to show a drop in its ranking and from 2020 onwards there was a constant improvement in its performance, as illustrated in Graph 1. However, there is still a need to increase investment in various sectors, and education to qualify its professionals is a priority sector to boost innovation and competitiveness of Brazilian industry.

Graph 1. Overall ranking of Germany and Brazil of the innovation index.

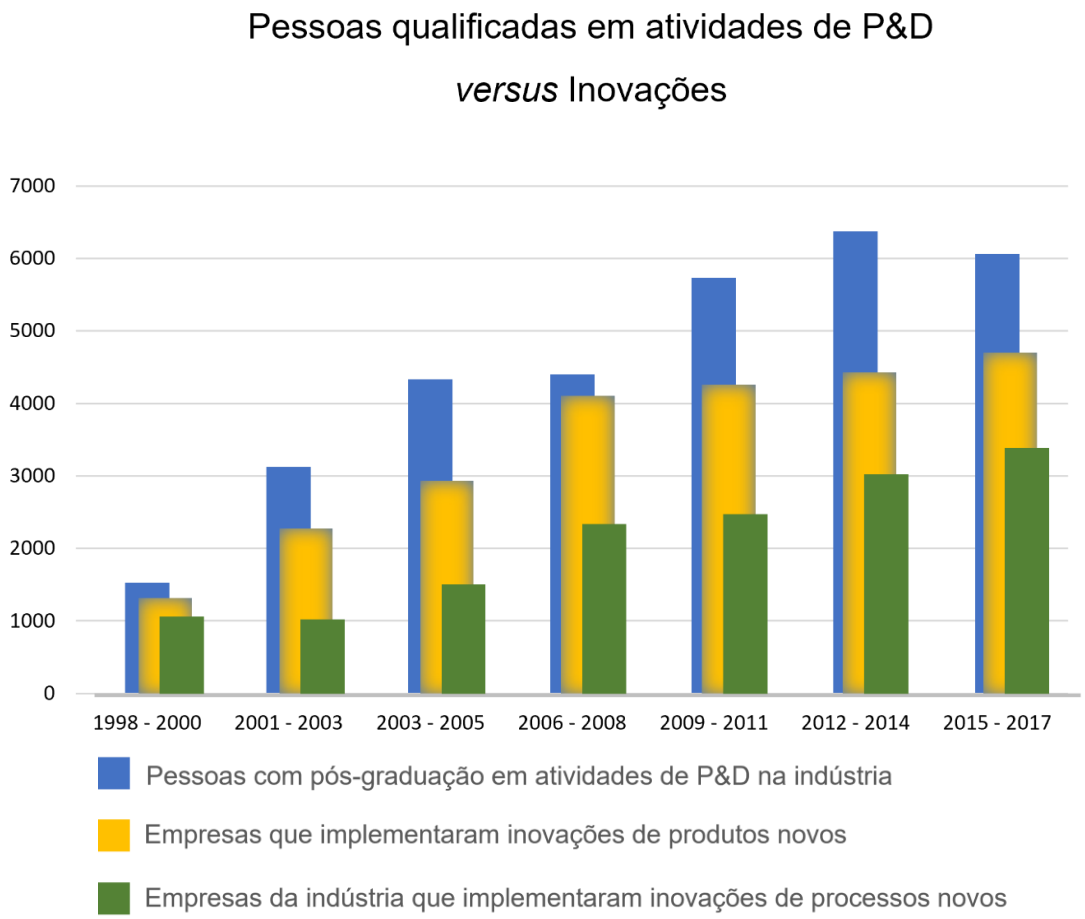


Source: Chart prepared by the authors, 2023 (Based on *Global Innovation Index*, 2023).

Still on innovation indexes, data from the Industrial Survey of Technological Innovation (PINTEC) were analyzed. This report presents, among several variables, the total number of people with graduate degrees involved in internal R&D activities in Brazilian industry, specifically companies that have implemented innovations. Graph 2 shows, in a

historical sequence of recent years, a relationship between the companies that implemented innovation and the staff of qualified people engaged in R&D, that is, people with postgraduate degrees involved in internal R&D activities of these companies, who implemented innovations of new products and processes for the national market.

Graph 2. Total number of people with graduate degrees engaged in internal R&D activities in industry versus total number of companies in the industry.



Source: Prepared by the authors, 2023 (Based on PINTEC 2000 to 2017).

The analysis of PINTEC data reveals that, from the beginning of the research in 1998 until the penultimate edition of 2014, there was a steady increase in the number of people with postgraduate degrees employed in R&D activities in industry, as well as in the number of companies that implemented innovations in products and processes. However, in the last edition, from 2015 to 2017, there was a slight decrease in the number of professionals with postgraduate degrees, although the growth in the number of companies that adopted innovations was maintained. The article "*Human capital, intensity of innovation in industry and economic growth in Brazil*", by Reis and Gomes (2017), presents results that prove a correlation between human capital (number of postgraduates) and intensity in innovations (new products and processes for the national market), as well as demonstrated

the relationship between the human capital variable (number of postgraduates) and real GDP. With this, the authors conclude that human capital is the fundamental input of R&D, and R&D is indispensable for the generation and intensity of innovations, and innovations stimulate and dynamize the process of economic growth.

After collecting the results on the innovation indexes, a mapping of higher education institutions in Germany and Brazil was carried out, focusing on the development of professional skills focused on innovation.

For this stage of the research, the *Times Higher Education* (THE) ranking, the *Financial Times* ranking and the "*studieren.de" website were used*. Through these rankings, an analysis was made of the courses, disciplines and respective syllabuses of German and Brazilian educational institutions, of greater prominence, with a focus on developing skills focused on innovation, in addition to the good practices developed by them. The details of these rankings and the results of this analysis are presented below.

The *Times Higher Education ranking* got its start in 2004 and annually provides a list of universities. In 2023, more than 1,500 universities from 104 countries were considered. The ranking is based on 13 performance indicators, subdivided into 4 pillars: teaching, research, knowledge transfer and international perspective. One of the pillars that deserves to be highlighted in this *ranking*, which is in line with this research, is the knowledge transfer pillar, which analyzes the results linked to the industry. This indicator assesses an institution's ability to support industry with innovations, inventions, and consultancies, and the extent to which companies are willing to pay for research, as well as an institution's ability to attract funding in the market.

In this *ranking*, it is noted that, in all, 51 German institutions were considered in the result. Among the top 100 highest ranked are 9 German universities. When analyzing the courses and menus offered by these 9 institutions, 2 stand out for their performance in the area of innovation. They are: *Technical University of Munich* and *RWTH Aachen University*. Regarding Brazilian institutions, 61 institutions were considered. It is important to mention that the first two universities ranked are in positions below number 200, they are: University of São Paulo (ranked between positions 201 to 250) and University of Campinas (ranked between positions 401 to 500). The rest of the Brazilian institutions classified occupy positions from number 600 onwards. When checking the courses offered by the two institutions, in both were found courses aimed at innovation, which were considered in this analysis.

The second ranking surveyed for the selection of educational institutions was that of the *Financial Times*, published in May 2023 with the best-ranked schools in offering

Executive Education. Out of 75 schools evaluated by the magazine, 6 are German or have partnerships with German schools. By examining the 6 institutions, 4 were selected, which have a curriculum aimed at innovation skills: *ESMT Berlin, ESCP Business School, Henley Business School and WHU – Otto Beisheim School of Management*. As for the national institutions, 4 are Brazilian or have partnerships with Brazilian schools. After studying these institutions, the four presented at least one course focused on the innovation mindset, which are: Fundação Dom Cabral, Fundação Getúlio Vargas, *IESE Business School* and INSPER.

The third tool used to investigate educational institutions in Germany was the website "studieren.de". In the research, institutions and courses that develop innovation-oriented personal competencies and skills were identified, and in this analysis the following institutions were detected: *BSP Campus Hamburg, Friedrich-Alexander-Universität, Hochschule Ansbach, Hochschule Fresenius, Hochschule Pforzheim, OTH Amberg-Weiden, SRH Fernhochschule, TAE Esslingen, Universität Hamburg* and *Universität Oldenburg*.

When analyzing all the *rankings* and sources researched, a total of 22 educational institutions were evaluated in depth, 17 of which were German institutions and the curriculum of 26 courses; and 5 Brazilian institutions and the curriculum of 9 courses, as shown in Chart 4.

Table 4. Total of educational institutions and courses selected with a focus on the development of skills for innovation.

	Institution	**Course**[4]
1	*BSP Campus Hamburg*	Business model innovation
		Business Innovation and Entrepreneurship
2	*ESCP Business School*	Identity. Innovation. Impact
		Innovation
3	*ESMT Berlin*	*Innovation Sprint*
		Design Thinking and Corporate Change
		Leading Digital Transformation
4	*Friedrich-Alexander-University*	Advanced Materials and Processes
		Leading Digital Transformation
5	*Henley Business School*	MSc in Entrepreneurship and Innovation
6	*Ansbach University of Applied Sciences*	Innovation and Entrepreneurship
7	*Hochschule Fresenius*	Business development and digital innovation
8	*Pforzheim University of Applied Sciences*	Strategic Innovation Management

[4] The titles of the courses were freely translated by the authors from their original titles, which were English and German.

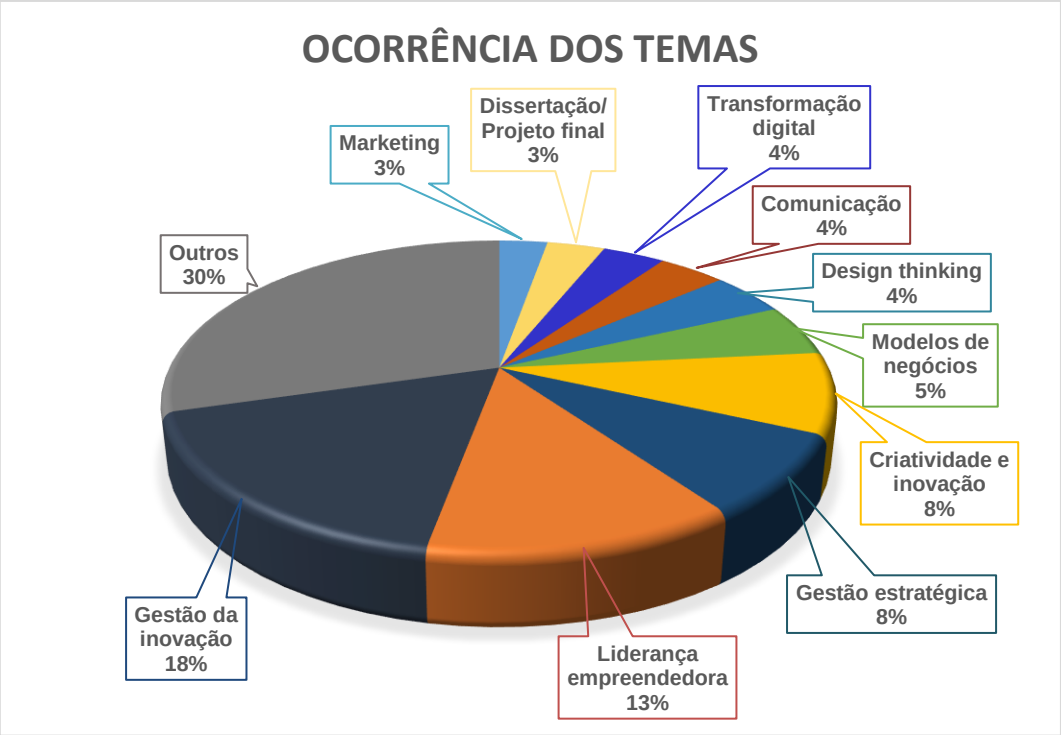
9	IESE Business School	Management Development Program
10	*OTH Amberg-Weiden*	Digital Entrepreneurship
11	*RWTH Aachen University*	Master of Management and Engineering in Technology, Innovation, *Marketing* and Entrepreneurship
12	*SRH Distance Learning University*	Innovation and research for the future
13	*TAE Esslingen*	Growth through innovative digital business models
		Innovation and creativity in construction and development
		Agile expert
		Creativity techniques for innovative solutions
14	*Technical University of Munich*	Executive MBA in Innovation and Business Creation
		Master in Management and Innovation
15	*University of Hamburg*	Innovation, Business and Sustainability
16	*University of Oldenburg*	Innovation and Entrepreneurship Management
17	*WHU – Otto Beisheim School of Management*	Innovative tools to digitally transform entrepreneurship
18	Dom Cabral Foundation	Data Specialist and Digital Manager
		Innovation: From narrative to results
19	Fundação Getulio Vargas	Strategic Innovation
		Organizational Innovation Management
20	INSPER	Entrepreneurship and innovation
		Strategic Innovation
		Entrepreneurship and Innovation Journey
21	State University of Campinas	Strategic management of technological innovation
22	University of São Paulo	Entrepreneurship

Source: Table prepared by the author herself, 2023

The analysis of these institutions and the course syllabi allowed us to identify recurrent thematic groups. In Graph 3 it is possible to verify the groups of themes and the recurrence in which they appeared in the analysis.

When evaluating the syllabus, similarities and differences were identified in the course offerings between Brazilian and German institutions. German institutions have more clearly defined blocks of major themes, with an emphasis on the development of innovation-oriented competencies such as leadership, innovation management, creativity, strategic management, and business models.

Graph 3. Occurrence of the themes



Source: CAVICHIOLI, 2023

In relation to Brazilian institutions, it was possible to verify less convergence between the courses and the themes offered by them, and the themes are very fragmented. Although central themes correspond to German institutions, such as leadership, innovation management and strategic management, several other themes appear and in smaller incidence, such as *startup*, ESG/Governance, sustainability, finance, marketing, among others.

Moving on to a deeper analysis, the key factors that presented the greatest occurrence and impact on the development of skills for innovation of professional managers and young leaders were found. They are: strategy and business models, leadership and entrepreneurship, innovation management, creativity and agile methods for ideation and rapid prototyping of ideas. Communication skills also appear with some frequency, being worked on in a transversal way in most courses. Although it is not always highlighted as a keyword in the course descriptions, this competence is stimulated through various practices adopted by the educational institutions analyzed.

Other topics such as marketing, digital transformation, finance, and sustainability had some occurrence, but not enough to affirm that they have an impact on the qualification of professionals for the innovative bias.

The graph also includes two items: 1) "dissertation/final project", which is not related to the development of specific competencies, but rather to the final activity of the courses; and 2) "others", which covers various topics that are poorly connected, such as

organizational culture, software engineering and startup management, which were not considered relevant to the key factors sought by this research.

Regarding the most relevant topics in this research, the factors that are understood to be key for the formation of competencies with a focus on innovation were classified into 5 blocks, which are detailed in Chart 5.

Table 5. Selection of topics for innovation skills training

Key Topics	Innovation Skills Training
Design Thinking e Design Sprint	Methods and approaches that enable the improvement of ideas, tools that encourage innovative, courageous and exploratory thinking, so that they can be prototyped and tested in an agile way, while still using systematic tools for ideation. These methods were cited as important for the improvement of the organization's entire value chain and are methods such as *Design Thinking* and *Design Sprint.* Of the 35 courses analyzed, 14 of them presented topics on ideation tools and rapid prototyping.
Entrepreneurship	The role of entrepreneurship and leadership for an innovative mindset. Guiding a company or a business in new directions, driving the launch of new products or services requires the professional to have a holistic corporate vision, know how to identify business opportunities, behave proactively and be able to create adequate conditions to implement ideas. For this, it was identified in the analysis of the courses, content for knowledge of traditional models of people management and new leadership models such as lateral leadership, transformational leadership, empowering leadership, shared leadership and the democratic enterprise. Leadership and entrepreneurship appeared predominantly in 20 courses.
Creativity	It is an element of fundamental importance for the development of an innovative *mindset*, because through creativity it is possible to expand the mind to find new and different solutions to problems. Disruptively understand the difficulties of the moment or context in which the organization finds itself. The theme was presented in 15 of the 35 courses analyzed.
Strategic Management and Business Modeling	Ability to critically analyze strategic actions, understand how to disseminate new ideas inside and outside your company, and develop innovative, sustainable and scalable business models are highly required to constitute value to the organization's business. In this topic, it is encouraged to understand the language of data, in order to benefit from this knowledge and make it effective for the development of innovative strategic ideas. The theme appears in 25 courses out of the 35 analyzed.
Innovation Management	Of the 35 courses surveyed, 24 mention this theme. Here we suggest a deepening of the concepts of innovation, its types, knowledge of theories and approaches to innovation management in

	organizations and characteristics, which differ from innovation management. In addition, tools are proposed to identify sources of innovation, influencing factors of innovation management, concept and application of open innovation. Managing innovation is a process that, if done systematically, can lead to the development of new products, services and processes, can open the mind to new ways of serving existing markets.

Source: Prepared by the authors, 2023.

In order to complement the research, in addition to the analysis of the institutions, their courses and their respective syllabus, three studies were taken into account for a test of consistency of the factors raised. These studies deal with skills of the future, which are: one from FORBES magazine (August 2022), which presents the 10 most sought-after skills for the next 10 years; another from *the Institute for the Future* (2020), in which the ten skills for the workforce of the future stand out; and, finally, the most important skills for workers in 2023, according to a report by the World Economic Forum (2023). In Chart 6 below, these skills are listed, separated by entity.

Table 6. Skills of the future

Forbes	***Institute for the Future***	**World Economic Forum**
Digital literacy	*Sense-making* (dar sentido)	Analytical thinking
Data literacy	Social intelligence	Creative thinking
Critical thinking	Innovative and adaptive thinking	Resilience, flexibility, and agility
Emotional intelligence	Intercultural competence	Motivation and self-knowledge
Creativity	Computational thinking	Curiosity and continuous learning
Collaboration	New media literacy	Technological literacy
Flexibility	Transdisciplinarity	Reliability and attention to detail
Leadership	*Design mindset*	Empathy and active listening
Time management	Cognitive load management	Leadership and social influence
Curiosity and continuous learning	Virtual collaboration	Quality Control

Source: table prepared by the authors, 2023 (Based on FORBES, 2022; *INSTITUT FOR THE FUTURE,* 2020; WORLD ECONOMIC FORUM, 2023).

When faced with these three studies, it was interesting to note that many of the skills listed connect with the key factors found in the research. Curiosity and continuous learning, creativity, innovative and adaptive thinking, and creative thinking are directly related to the topic of creativity.

Design mindset, analytical thinking, and critical thinking are associated with the topic of *Design Thinking*, as the method seeks to stimulate exploratory thinking and analytical reasoning through methods.

Leadership and social influence, emotional intelligence, social intelligence, resilience, flexibility, and agility are skills that are directly linked to the topic of leadership.

The skills focused on data knowledge, such as digital literacy, data literacy, new media literacy, technological literacy and computational thinking, are close to the topic of strategy and business models, since this topic encourages knowledge and data analysis for a strategic diagnosis of the organization and how to implement new ideas.

Finally, communication was also a skill pointed out in the studies through empathy, active listening and collaboration.

DISCUSSION

The results presented raise important reflections on the relevance of the development of innovation-oriented competencies in young leaders and professionals working in the industry in Brazil, with a comparative analysis between Brazil and Germany.

The choice of Germany as a reference is justified by its global leadership role in innovation and the implementation of effective public policies aimed at the development of qualified human capital. And at this point, it is clear that Brazil's initiative to give due importance to the development of human capital for innovation was recent. However, the country lacks more government incentive to foster the training of human resources for the industry of the future, through concrete proposals. This is exemplified through the results raised on innovation indexes, in which it was possible to identify the influence and relevance of qualified human capital for the growth and development of innovations in companies.

The other highlight in this study were the findings in the mapping of higher education institutions in Germany, which demonstrated a clear emphasis on the development of strategic skills, such as leadership, innovation management, creativity and business models. This approach reveals a well-structured educational system to prepare professionals to meet the challenges of the innovation-based global economy.

The analysis of the syllabi of the Brazilian courses revealed a lower convergence of the themes compared to the German institutions. In the Brazilian institutions analyzed, the themes are more fragmented and have less focus on core competencies such as innovation and leadership. This reinforces the need for a clearer strategic vision, not only on the part of the government, but also of educational institutions and organizations themselves for the development of innovative leaders in Brazil.

From the key factors identified in this study — strategy and business models, leadership, entrepreneurship, innovation management, creativity, and agile methods — it is

clear that there is a strong intersection with the skills of the future pointed out in the three publications: FORBES magazine, *Institute for the future*, and the World Economic Forum report. The connection between the competencies raised and skills such as curiosity, continuous learning, analytical thinking and leadership suggests that global trends for the development of innovative professionals are being required.

These results indicate the need for concrete actions to improve the training of young leaders in Brazil. By fostering the development of these skills, Brazil can, in the long term, ensure a more competitive industrial environment prepared for the challenges of the future.

CONCLUSION

This study sought to investigate and identify experiences, good practices and the key factors of the development of skills for innovation, which impact young talents in the industry in Brazil, using as reference and inspiration the findings in educational institutions in Germany and Brazil, with a focus on the training of young leaders.

The results demonstrated the relevance of education for the development of innovation and the importance of developing a diverse set of skills to stimulate innovation in people, organizations and governments, through public policies.

Through a detailed analysis of the courses and menus of the selected educational institutions, it was found that the training of young talents should prioritize a set of skills, which were organized into five themes: problem solving (*design thinking* and *design sprint*), entrepreneurship, creativity, strategic management and business modeling, as well as knowledge of innovation management.

In addition, skills such as communication and cooperation between peers and people from different hierarchical levels are good practices perceived in the survey, which can be strengthened and stimulated in young Brazilian leaders, with the aim of improving the training process and fostering the creation of an environment favorable to innovation.

Finally, the study demonstrated that the key factors and good practices, which were detailed and structured in the research, can be incorporated into the Brazilian context, making professionals better prepared to collaborate with the innovative process of companies and, thus, contributing to and boosting national competitiveness.

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