A plan of cultural intelligence to reduce deficit talent: a comparative study between Germany and Brazil

Um plano de inteligência cultural para reduzir o déficit de talentos: um estudo comparativo entre a Alemanha e o Brasil

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RESUMO: Este artigo levanta a discussão sobre a importância da criação de conhecimentos e experiências relevantes para o desenvolvimento da Inteligência Cultural - IC de estudantes brasileiros vítimas da fuga de cérebros, especialmente engenheiros e pesquisadores. O trabalho propõe um Plano de Integração entre o Mercosul e a Comunidade Europeia porque o conhecimento tem pouco valor no Brasil devido à abundância de recursos naturais e à falta do hábito de ler e aprender outras línguas, inclusive o espanhol, língua do resto do continente . A proposta norteia-se no desenvolvimento de um modelo de IC baseado em Gestão do Conhecimento - GC e Inteligência Organizacional - IO (modelo Cultura-Conhecimento-Inteligência - CCI) para mudar a "cultura de dependência estudantil" e, consequentemente, reduzir o déficit de talentos no Brasil. O modelo CCI é construído a partir dos resultados de 101 entrevistas realizadas em duas universidades brasileiras e duas alemãs e verifica empiricamente três hipóteses baseadas na metodologia qualitativa de análise de entrevistas. A principal conclusão é que a inteligência é mais importante que o conhecimento para promover o desenvolvimento, mas não funciona sem este e, portanto, a barreira de acesso ao conhecimento relevante no Brasil e sua aplicação pode ser superada por um melhor nível de educação. e, em particular, para um modelo de inteligência cultural baseado num Plano de Integração entre o Mercosul e a Comunidade Europeia para um programa de intercâmbio estudantil semelhante ao Erasmus Mundus na América do Sul.

PALAVRAS-CHAVE: Fuga de cérebros; Inteligência cultural; Indústria 4.0; Gestão do conhecimento; Cultura nacional; Inteligência organizacional.

ABSTRACT: This paper raises the discussion of the importance of creating relevant knowledge and experience developing the Cultural Intelligence - CI of Brazilian students, victims of brain drain, particularly engineers and researchers. The work proposes an Integration Plan between the Mercosur and the European Community because knowledge has little value in Brazil due to the abundance of natural resources and the lack of habit of reading and learning other languages, including Spanish, the language of the rest of the continent. The proposal is based on the development of a CI model based on Knowledge Management - KM and Organizational Intelligence - IO (Culture-Knowledge-Intelligence - CKI model) to change the "culture of student dependency" and therefore reduce the talent deficit in Brazil . The CKI model is built from the results of 101 interviews conducted at two Brazilian and two German universities and empirically verifies 3 hypotheses based on the qualitative interview analysis methodology. The main conclusion is that intelligence is more important than knowledge to promote development, but it does not work sem esse and, therefore, the barrier of access to relevant knowledge in Brazil and its application can be overcome by a better level of education. and in particular for a cultural intelligence model based on an Integration Plan between Mercosul and the European Communities for a Student Exchange program similar to Erasmus Mundo in South America.

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KEYWORDS: Brain drain; Cultural intelligence; Industry 4.0; Knowledge management; National culture; Organizational intelligence.

1 Introduction

Unfortunately, Brazilian emigration to OECD countries, took off especially in 2017, growing by 24% from the previous year. In the ranking of countries that most retain qualified professionals, Brazil plummeted 25 positions between 2019 and 2020: from 45th to 70th.

In line with the ex-chancellor of Germany, Angela Merkel, this work found that the multiculturalism along with some innovations of Industry 4.0 leads to economic growth.

However, Brazil, an isolated country in South America with Portuguese as the unique language, has one of the hugest talent deficit in the world.

In consequence, striving for collaborative entrepreneurship education is more than a material endeavor for Universities and Industries in Brazil. It represents an integration and deep alignment of different capacities: technical, managerial, intellectual and emotional. In particular, qualities such as patience, self-awareness, emotional resilience, motivation, enthusiasm, sensitivity to others are paramount to develop a collaborative entrepreneurship program between University and Industry using, in the University level, Knowledge Management - KM practices, in particular mentoring, best practices and lessons learned.

This program encompass, in the industry level, the advantages of Industry 4.0, based on high-quality education with high digital literacy, in changing how human beings work, live, communicate, thrive, and survive. In other words, Industry 4.0 disrupts societies.

Improved environmental sustainability, profit margin, higher innovation capacity, higher production control, labor productivity, reduced time-to-market for products, reduced waste, improve energy consumption, and avoid harmful

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emissions are examples of benefits under the Industry 4.0 label (Oztemel & Gursev, 2020; Zheng & Ardolino, 2021; Grybauskas et al., 2022).

The challenge is in preparing people to the era of Industry 4.0 and therefore the level of maturity of the students play a very important role.

According to Ito et al. (1998), the ability to sense what other people are feeling is an important factor in allowing us to connect or communicate effectively with others and depends to a great extent on the establishment of a spontaneous entrainment between individuals.

Entrainment is considered as one of the fundamental processes providing an intimate connection between individuals, others, and their environment (Childre & Martin, 1999). Awad and Chaziri (2004) has found that Knowledge is human understanding of a specialized field of interest that has been acquired through study and experience.

Even though examples of entrepreneurship education through university–industry collaboration can be seen in several universities in diverse countries (Etzkowitz & Leydesdorff, 2000; Barr et al., 2009; Janssen et al., 2007; Meyer et al., 2011; Lundqvist & Williams-Middleton, 2013), collaborative education between university and industry has not been sufficiently studied to offer clear model and practices to foster effective knowledge exchange and then creation and application of the new knowledge between these two groups.

Therefore, this article proposes the Culture – Knowledge – Intelligence model (CKI) to understand of the high impact of Cultural Intelligence on Knowledge Management and Organizational Intelligence, and in consequence the importance of the balance knowledge and experience.

This impact depends on the personality factors. Brazilians are traditional and attached to their families, but they are also very flexible and open to new experiences. .

Expressive ties with people of other nationalities (cultural diversity) and therefore the ability to understand the internal and external environment (culture

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intelligence) to open sustainable companies are the weak points of Brazil.

This article is structured as follows. In addition to this introduction and the conclusions, section 1 explains the juxtaposition between Knowledge Management and Organizational Intelligence. The section 2 describes cultural intelligence as a tool to reduce the brain drain in Brazil. Section 3 presents the model of Cultural Intelligence, Knowledge Management and Organizational Intelligence combining the various theoretical elements gathered throughout the previous sections.

2 The integration of knowledge management and organizational intelligence

Bali, Wickramasinghe, and Léaney (2009) define Knowledge Management - KM as a set of tools, techniques, tactics, and technologies designed to leverage the intangible assets of the organization by extracting data, pertinent information, and relevant knowledge to facilitate decision making. KM is a set of practices aimed at the interaction between tacit and explicit knowledge to acquire and create new competencies (knowledge + skills + attitudes) to enable an organization to act intelligently (transform complexity into meaningful simplicity) in different environments (De Angelis, 2016).

OI appears used to refer to the organization's ability to process, interpret, handle and access information in an intentional and directed way to the organizational objectives, thus increasing its adaptability in the environment (Glynn, 1996: Istudor et al., 2016; Malekzsdeh et al.. 2016). ln this sense, OI results from a systematic processing of information and knowledge available internally in the organization and its external environment, used to improve the organization's ability to predict the future and adapt to changes in the environment (Istudor et at.. 2016: Malekzadeh et al., 2016).

OI is the capacity of an organization to develop efficient behavior in order to guarantee adequate reaction to the dynamics and uncertainties present in the environment, thus determining their capacity to create and time knowledge in a

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strategic way to adapt to the market environment (Istudor el al. 2014: Gonzalez & Garcia-Muina, 2016; Istudor et al.. 2016, Malekzadeh et al., 2016).

This definition considers that the OI is adaptive and a social result (Glynn 1996: Yaghoubi et at., 2011), that is, it is modified according to environmental conditions (internal and external), in order to solve the problems, meeting the defined objectives and responding appropriately to environmental challenges (Glynn, 1996)".

OI influences some behaviors considered socially accepted, such as the good relations of the individual with their work colleagues end family - therefore is considered an important capacity for the work environment (Keshtepar & Zare, 2016).

Despite the intuitive appeal that the concepts of KM and OI are complementary and interdependent, this relationship has received relatively little attention in the literature. For Halal and Kull (1998), OI is a function of five cognitive subsystems: organizational structure; organizational culture; stakeholder relationships; strategic processes; and KM. Liebowitz (2001) emphasizes that active knowledge management is critical to enable organizational performance improvement, problem solving, and decision making.

Based on these perspectives, it can be concluded that KM provides methods for identifying, storing, sharing, and creating knowledge, while OI integrates, analyzes, and interprets this knowledge for decision making and problem solving.

3 Cultural intelligence a tool to reduce the brain drain

In line with the previous literature, the results of this study suggest that the development of an organizational culture (National Culture in a macro level) supports the application of KM practices (Davenport and Prusak, 2000; Nonaka and Takeuchi, 1995; Gold et al., 2001; Janz and Prasarnphanic, 2003; Lee and Choi, 2003; Donate and Guadamillas, 2010).

How things are done and how people behave and act (culture) directly influen-

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ces the goals, mission, vision, processes, responsibilities, design, communication, learning, technology, and so on. The statement "culture eats strategy for breakfast" attributed to Peter Ducker, highlights the importance of culture in providing the context for the formulation and implementation of strategies (Ireland & Hitt, 1999; Farjoun, 2002).

Culture has also an important role in creating conditions for learning with internal and external environments.

The results confirm the information presented in the table 1 and conclude that the Germans have a higher orientation to the future in comparison to the Brazilian.

Table I – National culture dimensions in Brazil and Germany

National Culture Dimensions	Germany	Brazil
Future Orientation	high	low
Uncertainty avoidance	high	low
Performance orientation	high	low
In-group collectivism	low	high
Self-protective leadership	low	high

Source: Globe (2004).

The short-term culture, identified in 1991 by Hofstede as the main characteristic of Latin countries, is the main reason for difficulties in integrating the three pillars of intelligence (strategy, prediction and action) in Brazilian government. The culture of "putting out fires" is a result of the difficulty of creating relevant knowledge to predict events and develop a strategy for government action.

On the other side, German society, in the research by Brodbeck and Frese (2002), received a low score of human orientation. This leads to a formal way to behave in the workplace.

However, Germans have the highest level of cultural intelligence, given the fact that they usually travel around the world, even before starting the university, exchanging knowledge and learning from different cultures through comparison.

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Cultural intelligence presupposes high levels of maturity to join other cultures and learn from them.

House et al. (2004), the need for a better understanding of cultural influences on leadership and organizational practices has never been greater.

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On the other side, German society, in the research by Brodbeck and Frese (2002), received a low score of trust in other people. This leads to a formal way to behave in public and sometimes in the workplace.

However, Germans have the highest level of cultural intelligence, given the fact that they usually travel around the world, even before starting the university, exchanging knowledge and learning from different cultures through comparison. Cultural intelligence, unlike other types of intelligence, presupposes high levels of independence and maturity to join other cultures and learn from them.

The extremes, as is the case of the opposing cultures of Brazil and Germany, are never good solutions. A solution to the impasse to find and develop a medium culture between the opposing cultures of Germany and Brazil would demonstrate that the medium-term orientation is better than short- or long-term orientation for attaining best results.

In summary, all cultures have advantages and disadvantages, and therefore, the search for more effective and sustainable results, people and governments should seek a process of learning by comparison and collaboration with other cultures to develop and integrate different intelligence.

Cultural intelligence refers to a general set of capabilities with relevance to situations characterized by cultural diversity (Ang et al., 2007).

Cultural intelligence has a strong impact on the processes of knowledge cre-

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ation and application. This occurs because by being connected to other cultures, it is also connected to other ways of thinking and acting, which increases the ability to create relevant knowledge and apply it in a collective way, given the greater integration in the new community when the first cultural barriers are overcome.

Chaves and Castro (2016) are in full agreement that Brazil needed to have a policy aimed at stimulating good quality training in higher education, so that the country can face the challenges imposed by the globalized world in the economic and technological fields. Sharing the same point of view, the authors believe that our students need a more comprehensive preparation, so that in the future they can promote national technological production.

According to Castro et al. (2012), Brazil has a chronic shortage of qualified professionals and the Science without Borders Program came at the right time. Unfortunately, the two programs, Science and English without Borders, were terminated in 2017.

Endes (2015) holds that Erasmus Program is a student exchange program carried out within the frame of the agreements between higher education institutions of European Union countries and the candidate countries to provide the outgoing students with new abilities and different experiences.

By encouraging the higher education institutions to cooperate with each other, Erasmus Exchange Program aims at allowing students to study abroad and to recognize European countries and cultures , contributing to the strengthening of communication and cooperation between countries; developing and popularizing of European standards in education ; improving the quality of higher education. This Program also aims at raising the equipped individuals who will fulfill the expectations of business world and the universities which provide qualified higher education services (DUMAN ,2001; NATIONAL AGENCY, 2005).

UNESCO (2018) holds that all levels and types of learning to provide quality education and foster sustainable human development should be in place in the intersection of education and business – learning to know, learning to be, learning

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to live together, learning to do and learning to transform oneself and society.

4 A model of cultural intelligence, knowledge management and organizational intelligence

This research empirically tests three hypotheses (Table II):

Table II – Hypotheses in CKI model

Hypotheses	Sources	Results and gaps to be filled
H1. CI influences KM positively	De Vita (2001), Kennedy (2002) and Tweed and Ledman (2002) suggested that by influencing the way individuals perceive, organize and process information, the way they communicate with others and the way they understand, organize and generate knowledge and solve problems, culture is inextricably limited to learning approaches and preferences.	SUPPORTED
H2. CI influences OI positively	Akgun et at. (2007) argue that OI is an everyday activity that is cognitively distributed and demonstrated by people's behavior, their culture and their organizational routines.	SUPPORTED
H3. KM influences OI positively	The active management of knowledge is critical to enabling organizational performance enhancements, problem-solving and decision- making (Liebowitz, 2001)	SUPPORTED

Source: survey data (2023).

5 Data collection

After a wide range review of theoretical and empirical research and survey methods, this research adopted a web survey to obtain input from targeted respondents and achieve the objectives of this research project. The use of key informants from organizations for data collection has been a popular method in many research

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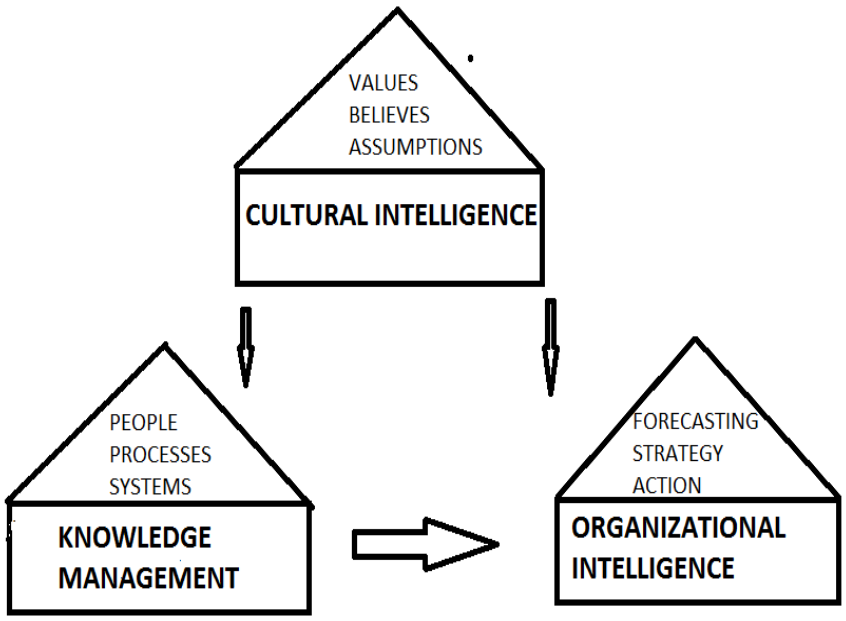
contexts (Huber and Power, 1985).

This research relies on a study performed on two Universities in Brazil (2) - Federal University of Parana and Federal University of Bahia - and two Universities Germany(2) - Freie Universität and Koeln Universität-, conducting semi-structured interviews, 30 questions across 3 dimensions (Emotional Intelligence, Cultural Intelligence, and Spiritual Intelligence). In total 25 interviews with students were conducted.

Interviews are particularly useful for getting the story behind a participant's experiences. The interviewer can pursue in-depth information around the topic (McNamara,1999).

We conducted interviews on one-on-one basis and compared and contrasted the results ourselves, avoiding focus groups due to their elevated potential for acquiescence bias (Schaffer and Riordan 2003). The culture - knowledge - intelligence model (CKI) is presented in Figure 1.

Figure 1- The CKI model



Source: own elaboration (2023).

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The CKI model shows that Cultural Intelligence impacts KM and Organizational Intelligence - OI. Furthermore, KM impacts OI.

5.1 Data analysis

The evaluation of the reflective measurement model has the following elements:

• Internal consistency reliability: Composite reliability should be higher than 0.701 (in exploratory research, 0.60 to 0.70 is considered acceptable).

• Convergent validity: The average variance extracted (AVE) should be higher than 0.50 (Chin, 1998; Hair et al., 2005).

• Discriminant validity: Indicators with high loads (less than 0.7) in their latent variables (LV) and low loads in other LV (cross-load) indicate discriminant validity (Chin, 1998); Correlations between the latent variables are smaller than the square root of AVE (Fornell and Larcker, 1981).

Table III shows the composite reliability and alpha values for the three dimensions of CKI model.

Table III - Composite reliability and alpha in the CKI model

	CI	KM	OI
Composite reliability	0,88	0,84	0,81
Cronbach's alpha	0,72	0,87	0,69

Source: survey data (2023).

All VLs (first and second orders) showed AVE greater than 50 per cent, which meets the criteria of Chin (1998) and Hair et al. (2005) for the indication of convergent validity.

The second criteria states that an indicator's loading with its associated latent

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construct should be higher than its loadings with all the remaining constructs (i.e. the cross-loadings). Indicators with high loads (less than 0.7) in their LV and low loads in other LV (cross-load) indicate discriminant validity (Chin, 1998). The cross-loading are presented in Table IV.

Table IV- Cross Loadings

	CI	KM	OI
CI1	**0,876**	0,319	0,280
CI2	**0,739**	0,332	0,360
CI3	**0,798**	0,409	0,530
CI4	**0,753**	0,278	0,460
KM1	0,473	**0,798**	0,521
KM2	0,504	**0,786**	0,642
KM3	0,319	**0,663**	0,440
KM4	0,435	**0,715**	0,470
KM5	0,433	**0,766**	0,511
KM6	0,543	**0,804**	0,233
KM7	0,474	**0,720**	0,448
KM8	0,339	**0,841**	0,581
OI1	0,493	0,354	**0,889**
OI2	0,553	0,459	**0,681**
OI3	0,385	0,266	**0,797**
OI4	0,443	0,384	**0,780**
OI5	0,421	0,398	**0,717**
OI6	0,295	0,479	**0,786**
OI7	0,372	0,565	**0,932**
OI8	0,531	0,507	**0,791**

Source: survey data (2023).

The discriminant validity analysis revealed that most indicators show adequate discriminant validity, indicating that the concepts are evaluated by respondents as representing different aspects of the phenomenon.

Figures 2 and 3 present the relationships among the model's constructs (path coefficients) of the structural model for Brazil and Germany, respectively.

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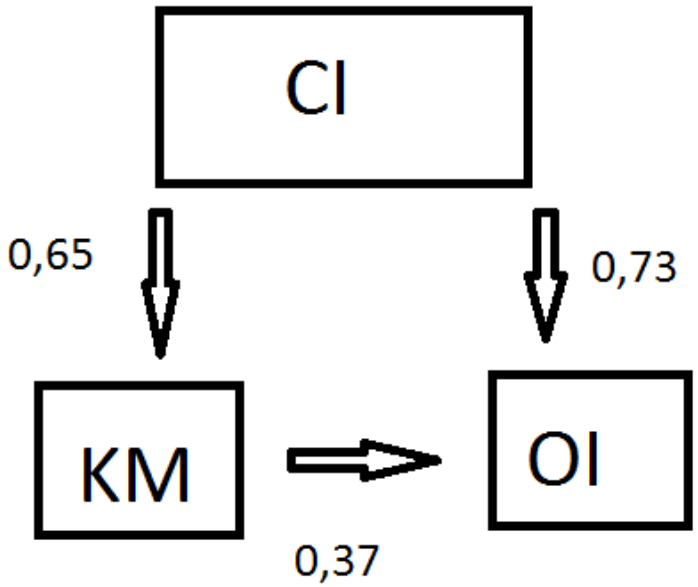
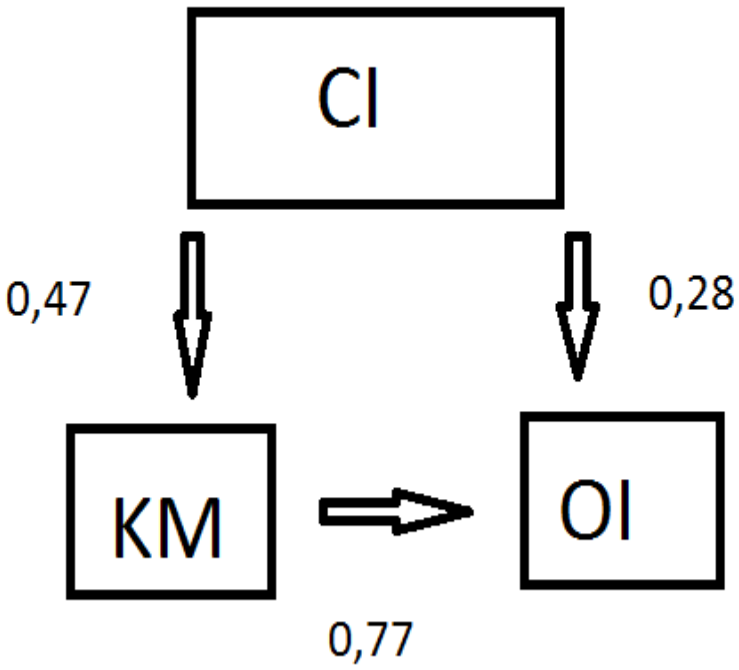
Figure 2 – Path Coefficients for Brazil



Source: survey data (2023).

Figure 3 – Path coefficients for Germany



Source: survey data (2023).

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By analyzing Figures 2 (Brazil - B) and 3 (Germany- G), it is possible to conclude that: In Brazil and Germany, CI has a positive influence on KM (B=0,65 and G=0,47) and OI (B=0,43 and G=0,28), while KM has a positive influence on OI (B=0,47 and G=0,77).

Cultural Intelligence are fundamental to explain changes in practices of KM (R2 Brazil: 0.34 and R2 Germany: 0.45) and in OI (R2 Brazil: 0.65 and R2 Germany: 0.68).

If the influence of CI on OI is removed, then it is possible to conclude, analyzing Figures 7 (Brazil) and 8 (Germany), that:

• In Brazil, CI is responsible for 36 per cent of changes in KM, and KM is responsible for 49 per cent of changes in OI.

• In Germany, CI is responsible for 46 per cent of changes in KM, and KM is responsible for 63 per cent of changes in OI.

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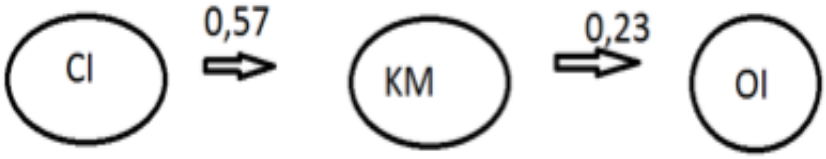
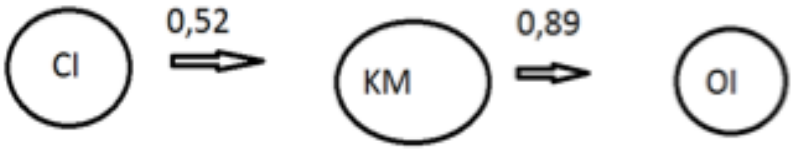
Figure 4 - Path coefficients without the influence of CI on OI in Brazil



Source: survey data (2023).

Figure 5 - Path coefficients without the influence of CI on OI in Germany



Source: survey data (2023).

6 Results and discussion

The impact of culture on intelligence is much higher in Brazil (0,73) than in Germany (0,28). This is related to the fact that German culture, in opposition to Brazil, is future- and performance-orientated, getting information from facts, books and statistics, instead of being people-oriented, getting the first-hand (oral) information and also lack of access to knowledge. Besides that the high level of

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uncertainty avoidance of German people impact their intelligence, without considering the interference of the intermediate variable (Knowledge).

Analyzing the figures 2 and 3, although the relationship between culture and knowledge has presented the direct effect with the higher structural load in both countries (Brazil:0.65 and Germany: 0.47), the relationship between CI and OI was much higher in Brazil (0.73) than in Germany (0.28), revealing that CI has less impact on OI in Germany than in Brazil. This means that in opposition to Germany, in Brazil, the OI is more influenced by culture (0,73) than by knowledge (0,37), since Brazilians have several difficulties to apply knowledge based on the lack of habit of reading and also access to relevant literature.

This is even clearer when the direct influence of culture on intelligence is eliminated of the analysis (figures 4 and 5).

Analyzing the figures 4 and 5, in Brazil KM is responsible for 23% of changes in OI, while in Germany, KM is responsible for 89 per cent of changes in OI.

In line with the previous literature, the results of this study suggest that the development of an organizational culture supports the application of KM practices (Davenport and Prusak, 2000; Nonaka and Takeuchi, 1995; Gold et al., 2001; Janz and Prasarnphanic, 2003; Lee and Choi, 2003; Donate and Guadamillas, 2010).

Caloghirou et al. (2004) support this conclusion when affirming that the availability of knowledge will increase the ability of people to search, recognize and present a problem as well as assimilate and use new knowledge for problem-solving.

In the interview about Cultural Intelligence, the great majority of Brazilians students answered that they share feelings and problems with friends in face to face conversations, indicating the impact of culture on the implicit knowledge. They take the easiest path to enjoy life in the present and help others to do the same. Due to the lack of habit of reading and the culture of speaking only Portuguese, Brazilians students are not motivated to study abroad, their level of experience is too low and also their self-awareness. Even though they appear to pay attention to a visitor's views, they reject ideas that require them to leave their comfort zone in Brazil.

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Most of Brazilians students chose the option "Neither agree nor disagree" in the survey about knowledge Management and Cultural Intelligence, because they don´t understand the importance of learning process with other cultures to develop the capacity to apply knowledge, thus Hypothesis 1 is supported.

Brazilians can not understand properly the importance to explore foreign cultures, a form of risk-taking and cross-cultural adjustment, to change culture and reach maturity, the entrepreneurship mind.

Interviews with participants demonstrated that Germans have more knowledge of technical matters and they emphasized their experiences of other cultures as critical to their decisions.

Thus affirming Hypothesis 2.

Finally, an exploration of KM and OI in the interviews conducted in Brazilians Universities leads to the conclusion that they are not motivated to change the university culture and so the norms guide them and remain fixed.

The levels of English language skills in Germany are much higher in comparison to students of Brazilian Universities, which helps them to understand the world and fight against corruption.This indicates that Knowledge Management positively supports the government's strategy and action. In contrast there are few international universities in Brazil that welcome foreign students. Brazilians are not confident that they can get accustomed to the shopping conditions in a different culture, since their culture is isolated from the rest of the world.

On the other hand, In Germany there are also formal meetings with industry representatives, Government bodies, etc. This indicates that Knowledge Management positively supports the government's strategy and action thus lending support to Hypothesis 3.

In the interview about Knowledge Management with students from both countries it was clear that in

In opposition to the two universities in Brazil, in both Universities in Germany there is a formal and disciplined process for " environment exam, this is, a systema-

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tic review of the University environment to identify key trends, opportunities and threats. Because of these competences, both Universities are successful in using the knowledge to make predictions and therefore better strategies and actions.
The learning of new believes, values, assumptions, traditions, resilience (cultural intelligence), impact the culture of sharing.

The sharing of knowledge is higher in Brazil, but the application is higher in Germany.

Curricula for teacher training should incorporate and promote factors such as openness to intercultural interaction and intercultural learning, readiness to recognize and utilize multiculturalism and cultural diversity as a learning resource (Petrović, 2006) and also create international students exchange programs (Petrović & Zlatković, 2009), such as ERASMUS PROGRAM in Europe. One solution to reduce the high brain drain and economic crises in Brazil should be the interference of the government and university´s leaders by changing the process of selection and development of professors (Organizational Intelligence). In Brazil the government should open new public universities and promote campaigns to incentive people to study.

This study try to motivate the parents and professors, and also the government, from Brazil to recognize the importance of cultural differences to reach maturity.

Cultural differences should be recognized and addressed in creativity training where participants from different cultures have an equal chance to share their perspectives and experiences on creativity and innovation (Tang and Werner, 2017).

A student with high level of experience and resilience has more willing to apply what he/she learned in another culture (experience) and after back to his/her home country with cultural skills and intelligence (knowledge in action) to make the difference. By the time that the students are living abroad they can participate of mentoring activities and also best practices and lesson learned to help Brazil in reducing the brain drain and enhance the agriculture sector.

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In conclusion, Cultural Intelligence influences intention to contribute knowledge and experience in one KM program positively. This KM program is based on three practices: lessons learned, best practices and mentoring.

7 Conclusions

Past studies have indicated university-industry collaboration is an effective approach to entrepreneurial training because it can realize the benefits of the combining university theory with practical experience. There are barriers to industries in gaining academic knowledge and for students to gain practical experience. The objectives of this study were: i) to propose a model that can capture the relationship between culture, knowledge and intelligence and ii) to provide qualitative evidence of its effectiveness to reduce brain drain and enhance agriculture in Brazil. Thus Culture model based on Knowledge and Intelligence (CKI) provides a framework for universities and industries to develop their plan for exchanging knowledge and experience along with motivating and entrainment among students.

The authors recommend further research on a larger scale to gain a deeper understanding the interactions between the variables of the CKI Model, especially the relationship between culture and knowledge in enhancing intelligence.

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