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Melhoria do compartilhamento do conhecimento operário e a influência cultural:
estudo comparativo Brasil e China em indústria de bens de capital

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Workers knowledge sharing improvements and the cultural influence:
comparative study Brazil and China in a capital good industry

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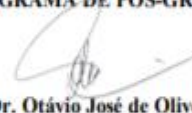
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dedico esse trabalho a Deus, meus pais Adilson e Carmen pela educação que proporcionaram, minha esposa Celeste e meus filhos Guilherme e Tiago que sempre me incentivaram.

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"It does not matter how slowly you go as long
as you do not stop."

Confúcio

ABSTRACT

This research analyses the factors capable of supporting knowledge sharing of workers in the capital goods industry.

The research is based on a case study of an American Multinational Company that produces the same type of made-to-order product in two subsidiaries, one in Brazil and another in China, as well as interviews with industrial leaders who had the opportunity to work in Brazil and China in other business segments. Quantitative and qualitative methods were used to collect data. Regarding the quantitative method, a structured questionnaire was used to collect the opinion of workers, leaders and managers in both units. As far as the factors that influence the sharing of knowledge, these data were treated using the Saaty's Analytic Hierarchy Process (AHP) method (1977). And lastly, for the qualitative method, interviews were conducted on the results found by the AHP with the manufacturing managers units and a global leader who had the opportunity to work in both units.

Additionally, another questionnaire was prepared and applied to leaders who had the opportunity to deal with workers in Brazil and China and were able to assess the cultural influence on knowledge sharing in both countries.

The results found in the quantitative method show that Socialization and Internalization are seen by Brazilian and Chinese workers respectively as the main knowledge conversion factors facilitating knowledge sharing among workers. Some factors, such as Incentive, was highlighted as a positive influence on knowledge sharing in both countries.

Cultural aspects were assessed using interviews results complementing the understanding of the quantitative data.

This research contributes with evidence in order for a favourable context to be promoted, one that fosters knowledge sharing, evaluates cultural aspects, and understands and classifies existing factors, capable of interacting in such creation process.

The results are aligned with research opportunities (gaps) identified in the literature, such as cultural influence in industrial environments, search for competitiveness and knowledge transfer, collaborating and complementing similar researches.

KEYWORDS: Knowledge management. Knowledge sharing. Knowledge creation. Worker knowledge. Culture. Capital goods industry. Human resources. Analytic Hierarchy Process (AHP).

RESUMO

Esta pesquisa analisa fatores capazes de apoiar o compartilhamento de conhecimento entre trabalhadores do setor industrial de bens de capital.

A pesquisa é baseada no estudo de caso de uma empresa multinacional americana que produz o mesmo tipo de produto sob encomenda em duas subsidiárias sendo uma no Brasil e outra na China, bem como, entrevistas com líderes industriais que tiveram a oportunidade de trabalhar no Brasil e na China em outros segmentos de negócio. Foi utilizado método quantitativo e qualitativo para coleta de informações. Para o método quantitativo foi utilizado um questionário estruturado para coleta do julgamento de operários, líderes e gerentes de ambas as unidades, sobre os fatores que influenciam o compartilhamento do conhecimento, esses dados foram tratados utilizando-se do método Analytic Hierarchy Process (AHP) de Saaty (1977), para o método qualitativo foram realizadas entrevistas sobre os resultados encontrados pelo AHP com os gerentes das unidades de fabricação e um líder global que teve a oportunidade de trabalhar em ambas unidades. Adicionalmente, foi preparado um outro questionário e aplicado em líderes que tiveram a oportunidade de liderar trabalhadores tanto no Brasil como na China e puderam avaliar a influência cultural no compartilhamento do conhecimento em ambos os países. Os resultados encontrados no método quantitativo evidenciam que a Socialização e a Internalização são vistas pelos trabalhadores brasileiros e chineses respectivamente como os principais fatores de conversão de conhecimento facilitando no compartilhamento do conhecimento entre os trabalhadores. Fator como o incentivo foi destacado como influenciador positivo no compartilhamento do conhecimento em ambos os países estudados. Aspectos culturais foram avaliados utilizando os dados coletados nas entrevistas complementando o entendimento dos dados quantitativos. Esta pesquisa contribui com evidências para a criação de um contexto favorável na promoção do compartilhamento do conhecimento, avaliando aspectos culturais, compreendendo e classificando fatores existentes capazes de interagir no processo de criação. Os resultados estão alinhados com oportunidades de pesquisa (gaps) identificados na literatura, tais como, influência cultural em ambientes industriais, busca por competitividade e transferência de conhecimento, colaborando e complementando estudos similares.

PALAVRAS CHAVES: Gestão do conhecimento. Compartilhamento do conhecimento. Criação do conhecimento. Conhecimento operário. Cultura. Indústria de bens de capital. Recursos humanos. *Analytic Hierarchy Process* (AHP).

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LIST OF ABBREVIATIONS

AHP	Analytic Hierarchy Process
A-MNC	American Multinational Company
BRICS	Acronym coined for an association of five major emerging national economies: Brazil, Russia, India, China and South Africa
CCKM	Cross-cultural knowledge management
KC	Knowledge Creation
KM	Knowledge Management
KS	Knowledge Sharing
MNC	Multinational Company
MCDM	Multiple-Criteria Decision Making
SECI	Socialization, Externalization, Combination and Internalization
VSM	Value Stream Map

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1 INTRODUCTION

1.1 CONTEXT

This research presents the results found about which factors are capable to support workers' knowledge sharing (KS) and how the local culture influences workers in two subsidiaries of an American multinational company (A-MNC), based in Brazil and China. The research based on a case study carried out with workers in industrial production environments (shop floor) in the capital goods sector that supply made-to-order electrical generator.

Brazil and China are emerging countries representatives by the acronym BRICS (Brazil, Russia, India, China and South Africa), with a high population, cheap labour and based on industrial economy consumption.

The multinationals decided to install subsidiaries in the BRICS, seeking greater competitiveness and profit based on the economy of labour and the need to increase domestic consumption in these countries as well. On the other hand, as more and more subsidiaries were transferred to these countries, implementing their forms of management, standards, norms and procedures, brought along cultural differences compared to the local ones, which interfere in the performance of these companies.

Due to the increase of demand for human resources by multinationals, studies have revealed the need to assess how these new workers would be aligned with corporate and personal values, what behaviours are desired to increase productivity, especially considering the financial impact associated with hiring, training and firing workers. (ARDICHVILI *et al.*, 2012).

Studies on organizational culture and knowledge not only consider the processes of generating and exchanging data or information, but also how the process relates to cultural environment. This cultural influence has a direct impact on the development communication system, on behaviour and on individual learning intention to share and acquire knowledge (CLEVELAND; ELLIS, 2015; INGVALDESEN, 2015; REED *et al.*, 2011).

KS is relevant for retaining valuable assets and strengthening the organizations ability to compete in an increasingly complex, dynamic and knowledge dependent global business environment (SAINI; ARIF; KULONDA, 2017). Developing an effective relationship between managers and workers is difficult, especially when they belong to different cultures.

Managers can appear biased, illogical and unfair when viewed from the perspective of a worker from another culture (ADLER, 2002).

1.2 JUSTIFICATION AND RESEARCH QUESTIONS

Research gaps are identified in published papers, which have mostly studied KS based on different types of industries: hospital electronics (DEVINATZ, 2007); automotive (MUNIZ JUNIOR *et al.*, 2010a; VALIO; GONZALEZ, 2014; MUNIZ JUNIOR *et al.*, 2019); petrochemical (FILHO; ANDRADE; MARINHO, 2010), electronics (MUNIZ JUNIOR *et al.*, 2019), glass (MUNIZ JUNIOR *et al.*, 2019) and no papers were found on KS in capital goods industries.

Knowledge Management (KM) studies consider impacts at different levels of an organization, which can be assessed by the aspect of technologies for knowledge creation (KC), KS, organizational culture, leadership and organizational learning (MAZDEH; HESAMAMIRI, 2014).

Specifically, however, two critical questions remain unanswered in the existing literature:

- How does culture influence KS? (MUNIZ JUNIOR *et al.*, 2019)
- What are the critical factors that influence the willingness to share knowledge? (MANUS *et al.*, 2016)

1.3 OBJECTIVE AND RESEARCH DELIMITATION

This research aims to discuss the cultural influence in the capital goods industry and its impact on KS. Researchers have defended the need to develop cross-cultural structures that can help different people achieve results and work together effectively (FISHER; SMITH, 2003), develop skills in multicultural communities (SHENKAR; ZEIRA, 1987), highlighting the existing need for studies that address KS factors (WANG *et al.*, 2016) and management methods that consider the perception of workers in the shop floor (HOLM, 2018).

A robust KM system requires the identification and evaluation of factors that influence KS, showing its effects and enabling the necessary corrections, which are of great importance for the KM strategy in organizations (LAK; REZAEENOUR, 2018; SHIROUYEHZAD; RAFIEE; BERJIS, 2017; ARMAGHAN; RENAUD, 2017; KAN; GUO; LI, 2016).

This research was delimited for this case study during the years of 2018 until 2020, considering, two subsidiaries from A-MNC installed in Brazil and China that produced the same products in which lines this research was applied, the synchronous electrical generator production based on demand.

It considered the shop floor environment, where workers, supervisors and leaders work in the production lines of components to manufacture the synchronous electrical generators. These production lines are semi-automatic and have different production systems that depend of tacit knowledge of the workers.

This research contributes to KS studies applied in the capital goods industry, using a qualitative and quantitative approach using AHP (Analytic Hierarchy Process) method, interviews with managers from respective plants to discuss the results found and additionally interviews with managers that worked in Brazil and in China and experienced contact with workers from both countries. (MUNIZ JUNIOR *et al.*, 2019; MARTINSONSA *et al.*, 2017; HONG; SNELL; ROWLEY, 2017; MANUS *et al.*, 2016; ARDICHVILI *et al.*, 2011).

The KM introduction in different organizational and social contexts, increased the need to develop cross-cultural structures that can help different people achieve results and work together effectively (HONG; STANLEY; EASTERBY-SMITH, 2006), KS factors (WANG *et al.*, 2016) and management methods that consider the perception of employees on the shop floor. (HOLM, 2018).

Developing an effective relationship between managers and employees is difficult, especially when they belong to different cultures. Managers can appear biased, illogical and unfair when viewed from the perspective of an employee from another culture (SAINI; SINGHANIA, 2018).

1.4 RESEARCH METHOD AND CLASSIFICATION

The method applied in this research consists of five main steps. First, a comprehensive worker KS literature review, based on studies published in ISI Web of Science and Scopus, which updated the literature review made by Muniz Junior *et al.* (2019 and 2010a). The method for critical review of papers follows Nakano and Muniz Junior (2018). Second, it was applied a questionnaire in both subsidiaries. Third, it was analysed the data using the AHP method. Fourth, it was conducted interviews with managers of both subsidiaries to collect their perceptions on the results found in the AHP. Fifth, it was conducted interviews with

leaders that worked in Brazil and China in different businesses to complement the assessment of cultural impact on KS.

A detailed flowchart will be presented in the chapter 3.

This research contributes to KS studies applied in the capital goods industry, using a qualitative and quantitative approach using AHP method, interviews with managers from the respective plants to discuss the results found and additionally interviews with managers that worked in Brazil and in China and experienced contact with workers from both countries. (MUNIZ JUNIOR *et al.*, 2019; MARTINSONSA *et al.*, 2017; HONG; SNELL; ROWLEY, 2017; MANUS *et al.*, 2016; ARDICHVILI *et al.*, 2011).

The research consisted of the following process:

- A questionnaire applied (ANNEX A and B) to workers, leaders and managers (2018) in the production areas in two capital goods subsidiaries, China and Brazil, with the same A-MNC and that produce components for made-to-order synchronous electric generators. The interviews were conducted using the SECI (Socialization, Externalization, Combination and Internalization) questionnaire, translated into local languages, Mandarin and Portuguese, respectively, and applied using the same method.
- Interviews with managers (2020) who are responsible for the two electrical plants in Brazil and China and a global manufacturing specialist from the company itself who had the opportunity to work in Brazil and China, where the SECI questionnaires above were applied. For these interviews, a specific questionnaire (Frame 2) was used with questions regarding the results found after the multicriteria analysis provided by the AHP method.
- Additionally, leaders (2019/2020) who worked in Brazil and China in other industrial environments were interviewed using a specific questionnaire (Frame 1) with questions involving industrial work and culture, comparing the differences and similarities between Brazilian and Chinese workers from the perspective of the interviewees and their experiences in industrial environments (Energy, Automotive and Infrastructure).

This research carried out comparative studies between Brazilian and Chinese workers in the industrial context and how culture influences KS. (MUNIZ JUNIOR *et al.*, 2019; KLAFKE *et al.*, 2016; ARDICHVILI *et al.*, 2012). Researchers have recently defended the need to develop structures that can help different people overcome obstacles and work together effectively in countries with different cultures (FISCHER; SMITH, 2003). This research contributes to complement other researches (CHEN; TJOSVOLD, 2005) that studied

the relationship of foreign managers who worked in other countries and needed to understand the influence of culture in the industrial environment to improve results.

1.5 COMPANY SELECTION

This research was based on two subsidiaries installed in Brazil and China for the same A-MNC that produce capital goods. This specific study considers the synchronous electrical generator production that are produced using similar process and product lines in both countries. The production is made-to-order projects of hydroelectrical power plants.

The Brazilian subsidiary attend America and Western Europe customers and the Chinese attend basically Asia and Eastern Europe and Africa customers.

Hydro generators are customized for each project to ensure enhanced performance for site conditions and customer needs. Each large hydro generator is engineered to run smoothly under any operating condition, while reducing structural stress and improving reliability for the lifetime of the turbine.

In both subsidiaries, there were specific lines for different kind of components and assembly areas in the mechanical and electrical shop. At the time this research was being carried out, there were 800 employees in the Brazilian factory and 1,200 in Chinese one, and this specific research was concentrated in the three different and independent lines of the electrical shop and counted on the participation of the workers, leaders and managers in these specific lines, as defined in the Table 1.

In a general view, the generator workshop where the active parts of the machine are produced, is separated in three different and independent production lines.

The different lines work as a serial production, where the parts are manufactured in sequence and usually in big volumes for different kind of orders.

All processes were designed in both subsidiaries using VSM (value stream map), lean concept and continuous improvement, despite well-designed process and many tools and machines, the knowledge workers have is the main drive and tacit knowledge is embedded throughout the process.

The generator components produced in each line are: Stator Bar, Rotor Poles and Stator Lamination.

The detail description and the overview of the process is given below for each different line:

- Stator winding bars/coils consists of assembling copper strands and insulation materials onto pieces that will conduct the magnetic flow coming from the rotor and transform it into power output. The production line starts with copper elementary strand, and it follows with the insulation material, mainly Mica paper and Epoxy resin, to form the insulation system. The finished stator bar should be electrically tested and dimensionally guaranteed to comply with the Stator requirements. After that it can be delivered piece by piece.

Industrial Resources in the production line: hydraulic press, taping machines, impregnation chambers and several hand tools.

- Rotor poles: pieces attached to the rotor structure that hold the copper windings where the excitation current will flow and then produce the magnetic field that will feed the stator core and windings. The production line starts with copper straight bar, and carbon steel lamination. Some insulation material, such as Nomex paper and Epoxy Resin, are also used to electrically insulate the components. After the rotor pole is assembled, it goes through a dimensional and electrical check. Single finished poles must be packed and delivered piece by piece.

Industrial resources in the production line: laser cutting machines, press and brazing machines and other hand tools.

- Stator core laminations: pieces that fill and form the stator circumference when stacked and are intended to absorb the magnetic field produced by the rotor poles and direct them to the stator winding, where the power output will be generated. The definition for the Stator core lamination production is simply an automated line considering a big press, which punches the lamination mostly made of silicon steel, then it goes to a conveyor automatically and suffer deburring and insulation varnishing applied by a rubber roll. After curing then in the end of the line, each lamination is stacked above the other, forming a single package of stator core lamination, then it will be delivered piece by piece.

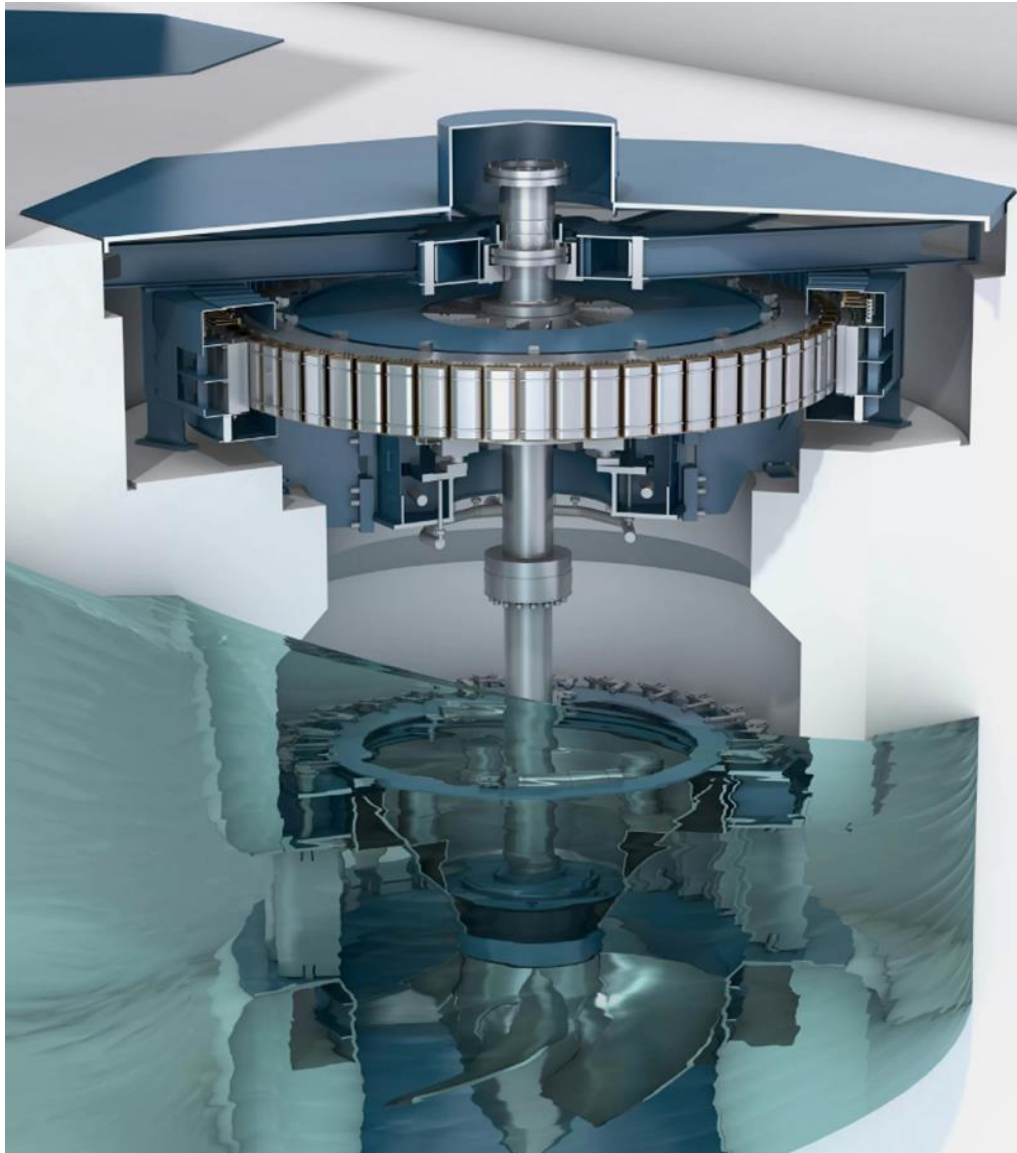
Industrial resources in the production line: punching machine, varnishing machine, spot welding machines, stacking robots.

Finally, in the assembly shop the active parts produced inside the production line are assembled with mechanical components that are produced outside the electrical factory and enter in the end of line where the complete generator is assembled and tested.

When the generator size is so large that transporting it completely assembled is impracticable, only the rotor is pre-assembled and disassembled, all components are packed and delivered at site where the generator is completed assembled and connected with the hydraulic turbine and the grid.

The Figure 1 shows the 3D Image for a hydraulic Vertical Kaplan Turbine including the synchronous electrical generator.

Figure 1 - 3D Still Image | Computer-generated image of a Vertical Kaplan turbine and synchronous electrical generator unit.



Source: GE Renewable Energy (2020).

1.6 WORK STRUCTURE

This research presents in the second chapter the theoretical background, addressing the main concepts related to cultural influence in the industrial environment in Brazil and China followed by the study related to KS in industrial systems. The third chapter describes the research method, detailing the sequence adopted. Subsequently, the fourth chapter develops the record of the observed results and discussions, thus supporting the purpose of this research and its conclusions presented in the fifth chapter.

Finally, the References that were used, Annexes and Appendices that detail and complement this research.

2 THEORETICAL BACKGROUND

2.1 CULTURE INFLUENCE IN AN ORGANIZATIONAL INDUSTRY ENVIRONMENT

Researchers have studied the culture impact in organizational environments, but the theme is very broad and difficult to synthesize.

Understand and investigate the relationship between national culture and KS process is key to understand KM process. No sufficient research (theoretical and practical) has been conducted to establish relationship between national culture and knowledge sharing. National culture affects KM process significantly, and it has been validated by various empirical studies conducted in various countries. (GOSWAMI *et al*, 2020)

SMIRCICH, 1983, traced the ways culture has been developed in organization studies: as a critical variable and as a root metaphor, demonstrated that not only have organizational analysts held varying conceptions of culture, but that these different conceptions give rise to different research questions and interests. The differences in approach to the organization-culture relationship are derived from differences in the basic assumptions that researchers make about both "organization" and "culture."

She studied some researchers that classify culture anthropologically:

In cognitive anthropology, culture consists of shared knowledge (GOODENOUGH, 1971; AGAR, 1982);

In symbolic anthropology, culture is a system of shared meaning (HALLOWELL, 1955; GEERTZ, 1973);

Structural anthropology and psychodynamics, culture is a manifestation and expression of the mind's unconscious operation (ROSSI; O'HIGGINS, 1980);

Anthropologists such as HALLOWELL, 1955 and GEERTZ, 1973 treat societies, or cultures, as systems of shared symbols and meanings.

They see the anthropologist's task as interpreting the "themes" of culture those postulates or understandings, declared or implicit, tacitly approved or openly prompted, that orient and stimulate social activity (OPLER, 1945).

Values and business ethics practices change as the result of social transformations because people try to acclimate to the social, political, and economical circumstances of the country (HITLIN; PILIAVIN, 2004).

Knowledge, a complex amalgam of know-how, values and experience, is dispersed throughout organisations' global networks. A rarely noted aspect of these processes is that the

way in which knowledge is transferred can transform organisations in unhelpful ways, culture is a set of largely tacit or implicit rules for the social game. (PAULEEN; ROONEY; HOLDEN, 2010)

2.2 BRAZILIAN CULTURE OVERVIEW

Ardichvili *et al.* (2012), studied the culture influence in large business organization into the BRICS countries. The author described that Brazilian managerial culture is characterized by paternalism (defined as a dyadic relationship between superiors and their subordinates in which superiors provide protection and guidance in exchange for loyalty and deference on the part of subordinated, power concentration, personal relationships, strong loyalty to one's in-group and leader, and flexibility).

According to Holanda (1995), the colonial legacy also includes the origins of the traditional Latin American personalism, the lack of social cohesion and the looseness of the institutions. Brazilians inherited their characteristics from the Iberians: Hispanic arrogance and Portuguese laxness and plasticity as well as an adventurous spirit and appreciation of loyalty in both. The mixture of all those ingredients probably resulted a certain slackness and anarchy, lack of cohesion, disorder and indiscipline.

Baer (2008), defined "Brazil has surmounted formidable challenges; it is a large country with a diverse population, tackling numerous socioeconomic and political challenges throughout history and experiencing growth and development while facing economic and fiscal pressures in a context of regional inequalities."

Amado and Brazil (2016) studied, even in multinational companies operating in Third World countries, and concluded that research on the influence of Brazilian culture over the management of national and international companies is both relevant and important as a principle of regulation, every action in a social system (in this case, the company) is always influenced by the wider cultural system.

According to Hess (1995), Brazil, in spite of its western-like institutions, is a country where western culture has mixed and mingled with non-western cultures for centuries. He describes Brazil as the product of a particular colonial legacy that includes a class of wealthy landowners who supported a highly centralized Portuguese state. In turn the state imposed a latifundia, or plantation agricultural system in Brazil, where the plantations were controlled by patriarchs who exercised nearly absolute authority over their dominions.

For these authors, Hofstede's (1981) most important finding refers to the importance of national culture in order to explain the differences in work-related attitudes and values. Brazilians, no matter how differentiated they may be in their racial and cultural matrices and in their ecological regional functions, or in respect of being old settlers or recent immigrants, have come to know themselves, to feel themselves, and to act as a single people, belonging to the one same and only culture. They are a national entity distinct from all others, speaking the same language, differing only in regional accents.

Hofstede (1981), as mentioned before, was able to come to a kind of worldwide typology by exploiting international data reflecting differences among national cultures, defined within four reference parameters. But this mapping neglects the typical characteristics of each country, and is, thus, of little help to clear up those issues concerning the influence of a specific country's culture in the organization. Hofstede's contribution, however, reinforces our belief that cultural aspects cannot be neglected in transfers of technology, in the context of organizations.

2.3 CHINESE CULTURE OVERVIEW

China is the largest of the four BRICS in terms of population and size of economy, and the second largest in territory (after Russia). Compared with all countries of the world, China has the largest population, second largest economy, and third largest territory. During the last half of the twentieth century and the first decade of the twenty-first century, mainland China has experienced several major social transformations: The transition to socialism after the Communist party took power in 1949, the Cultural Revolution in the 60s, the economic reform in 1978, and the subsequent 30 years of continuous economic development and exposure to western business practices. The literature suggests a strong Confucian influence on Chinese business ethics practices. (ARDICHVILI *et al.*, 2012).

Culture is a cultural movement and cultural phenomenon in the historical development process of human society. So far as modernization of Chinese culture itself is concerned, it is a cultural phenomenon that is generated in a particular Chinese social and historical background and is a cultural pattern that is formed by Chinese people in specific and particular practical cultural activities. Therefore, our understanding in modernization of Chinese culture should neither be only based on culture itself nor merely based on the so-called general development process of modernization of culture. Instead, we have to take into

consideration of the particular Chinese social and historical background and historical conditions. That is, we should put the scientific explanation of the issue of modernization of Chinese culture into particular Chinese social and historical practical activities with certain principles and height and regard all stages in development particular Chinese society and history as the “source of birth” and “stage” to see through the issue of modernization of Chinese culture. To put it bluntly, a theoretical explanation of the issue of modernization of Chinese culture has to resort to the “historical materialism” built by Marx so as to analyse the internal mechanism and development rule of modernization of culture in a scientific way and also decode scientifically the gene and code of modernization of Chinese culture. Before the Opium War broke out, the mainstream Chinese ideology was the traditional Chinese ideological culture, namely, such feudal ideological culture as “the doctrine of Confucius and Mencius” and “Cheng and Zhu's Neo-Confucianism”. Chinese traditional culture grew out of the foundation of Chinese natural agricultural economy and presented a kind of “unrestrained” development process. In the meantime, as a sort of Chinese national cultural ideology, the traditional Chinese ideological culture has solidly safeguarded the feudal property in China for thousands of years with its powerful ideological function. After the Opium War broke out, the Qing Government began a top-down “Survival and Downfall Movement”, which was mainly initiated by the upper-class intellectuals in Qing Government, including enlightened literati and officialdom, landed aristocracy and landlord class. They learnt from the modern culture, ideological culture, political culture, military culture and scientific culture in developed western capitalist countries and intensively launched the national salvation movement in China. To put it bluntly, ever since the Opium War began, modernization of Chinese culture opened a transfer from “unrestrain” to “act-by-oneself” and a development process of transition from “traditional” culture to “modern” culture.

As the particular Chinese practical cultural activities were continuously launched, it gradually came into the mind of Chinese people that neither developed western capitalist culture nor the traditional Chinese national culture could fundamentally resolve the issue of overall emancipation of Chinese people. Instead, both of them had, on a large scale, aggravated formation of Chinese semi-colonial and semi-feudal society. Thus, Chinese people came to be aware that they had to make a premised criticism on western capitalist culture and the traditional Chinese culture and make revolutionary innovations and development instead of either blindly and mechanically copying the cultural road of developed western capitalist countries or following the traditional Chinese cultural road. When Marxism philosophy was brought to China in succession, Chinese people began to employ advanced Marxism

ideological culture to resolve the issue of modernization of Chinese culture. From then on, the three cultures of traditional Chinese culture, western ideological culture and Marxism culture converged, which marked the historical formation of modernization of Chinese culture and a kind of life stream with cultural innovation was formed and fed into the long historical river of modernization of Chinese culture.

Chinese culture was established on the basis of feudal land natural economy and western capitalist ideological culture emphasized “individual”, whereas the traditional Chinese culture emphasized “collectivity”. It is obvious that quite large discrepancy exists between these two kinds of culture. Thus, the development path of modernization of Chinese culture should neither simulate the western culture that pursues individualism nor follow the collective Chinese traditional culture, which is exactly the core issue of modernization of Chinese culture. To put it bluntly, the issue of modernization of Chinese culture is an issue of comprehensive development of human freedom.

Chinese national culture, combine quintessence of the national culture of other developed countries in the world and make great efforts to create Chinese culture with Chinese national flavour. In the meantime, we have to follow the historical tide of cultural globalization and take a positive initiative in pushing the Chinese national culture to the whole world and having communication and dialogue with other nations in the world. This also lays a certain cultural communication platform for Chinese culture to go towards the historical culture of the world. (KANG; FENG, 2013)

Given that in a Chinese context trust is based on human relationship considerations more than on rational considerations, adhering to the Confucian principles of “wulun” (the five rules of social interactions in interpersonal relationships), *guanxi* (the bonds of close social relationships), and *guanxi* (seeking informal relationships and bonds between families to exchange goods) is highly influential. Building trust through family connections is often a means of survival in troubled times, and once trust is established, the parties must maintain it if they are to continue exchanging explicit or implicit benefits. Furthermore, in a Chinese context, “*guanxi*” and “*mianzi*” are fundamental to the transfer of knowledge in social interactions and can be interlinked (KING; WEI, 2018).

2.4 KNOWLEDGE MANAGEMENT IN INDUSTRIAL SYSTEMS

KC can be understood as a continuous process through which one overcomes the individual boundaries and constraints imposed by information and past learning by acquiring a new context, a new view of the world and new knowledge (NONAKA; KROGH, 2009).

One dimension of KC process can be drawn from a distinction between two types of knowledge- "tacit knowledge" and "explicit knowledge". "Explicit" or codified knowledge refers to knowledge that is transmittable in formal, systematic language. On the other hand, "tacit" knowledge has a personal quality, which makes it hard to formalize and communicate. Tacit knowledge is deeply rooted in action, commitment, and involvement in a specific context (NONAKA, 1994).

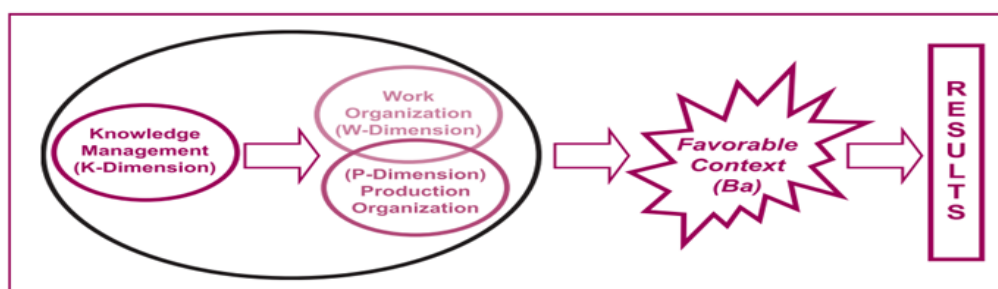
Pauleen, Rooney and Holden, (2010) believe it is reasonable to view culture as a knowledge resource. Mismanaging culture, as with other resources, can undermine corporate endeavour in ways that catch managers – often at senior levels – off guard and in some cases throw corporate strategies off course for years. He defined CCKM (Cross-cultural knowledge management) as the systematic and purposeful management of culture as an organisational knowledge asset. In an organisation with a multicultural workforce, a diverse or international customer base, international suppliers and global competitors, the potential for culture to become a significant organisational knowledge asset is great indeed, one that needs conscientious management and wise leadership.

Only tacit and explicit knowledge is not enough and presented the “dynamic fractal organization” as a new organizational model. This model departs from the conventional information processing paradigm. A new frontier in organizational theory: the “dynamic fractal organization based on dynamic “Ba”. Dynamic fractal organizations build and utilize a triad relationship of knowledge that integrates and synthesizes tacit and explicit knowledge and creates a third type of knowledge, phronesis. The triad relationship is an upward spiralling process of converting tacit and explicit knowledge and propels sustainable knowledge transformation across the diverse boundaries within and between organizations. The “Ba” presents an evolution where the process is dynamic, interdependent where many layers need to be studied (HONG; STANLEY; EASTERBY-SMITH, 2006).

Ba, which is conceptualized as a shared context in motion, can transcend time, space, and organization boundaries to create knowledge, has been studied improving KC theory through the SECI process and Ba, and try to advance them further by incorporating the dialectic thinking. KC is conceptualized as a dialectical process, in which various

contradictions are synthesized through dynamic interactions among individuals, the organization, and the environment. With the view of a firm as a dialectic being, and strategy and organization should be re-examined as the synthesizing and self-transcending process instead of a logical analysis of structure or action. An organization is not an information-processing machine that is composed of small tasks to carry out a given task, but an organic configuration of Ba (NONAKA; TOYAMA, 2003).

Figure 2– Dimensions for promoting the Ba

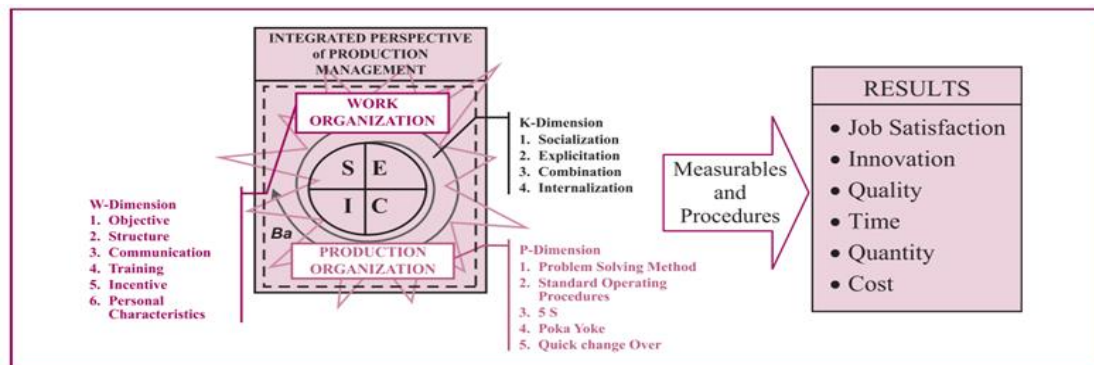


Source: Muniz Junior *et al.* (2010).

Knowledge conversion explains, the interaction between tacit and explicit knowledge and can be understood as a continuous process through which one overcomes the individual boundaries and constraints imposed by information and past learning by acquiring a new context, a new view of the world and new knowledge. (NONAKA, KROGH; VOELPEL, 2006).

Thematically on firms' attempts to globalize the SECI model in terms of imperatives, such as new product development, process innovation, safety enhancement, cost savings and environmental protection. China and Brazil score high on Hofstede's dimension of collectivism, and it would therefore be expected that workers in both countries are likely to be reluctant to share knowledge with members of the organisation with which weak or no social ties exist. Moreover, as "high context" communication cultures, workers in Brazil and China are likely to look for contextual cues in information and tend to disregard information in writing (WILCZEWSKI; GUT; GORBANIUK, 2017, MUNIZ JUNIOR *et al.*, 2019).

Figure 3– Knowledge based production management model (K-PMM) with dimensions and factors



Source: Muniz Junior *et al.* (2010)

2.5 THE AHP METHOD

The purpose to use MCDM (Multiple-Criteria Decision Making tool is support the analysis of decision-making, identifying actors, alternative solutions, consequences, stakeholders, assisting in the organization of the decision-making process in order to achieve consistency between objective decision and the final decision reached, cooperation and consensus between decision-making actors and legitimization of the final decision. Among the various methods of MCDM, the AHP was chosen for this research because it is the most used method so far, despite some criticisms from researchers as to its effectiveness and that must be evaluated by the users of this method in face of their respective surveys. (MARINS; SOUZA; BARROS, 2009)

According Muniz Junior, 2014, AHP is a systematic method of synthesizing priorities, structurally represented by its hierarchy. The mathematical modelling of MCDM involves three steps:

- a) identification of decision, criteria, and alternatives.
- b) assignment of weights to the criteria and priorities for alternatives.
- c) synthesis of the results.

In the same way that this tool can bring us quantitative data about multicriteria and provide a basis for the interviewees' choices, it can bring another series of data that together with managers who are in the daily work can use this data to obtain scenarios discussions that allow assistance in decision making. (MUNIZ JUNIOR *et al.*, 2019)

The AHP is a hierarchy of top down linear structure, with no feedback from the lower levels to the upper levels. At its top, it presents the global objective that influences the Criteria.

Alternatives are influenced by the next higher level and each Alternative depends only on itself. (PETRINI, 2015)

All the elements that make up each hierarchical level are considered independent from each other (SAATY, 1988).

Here we will emphasize the main criticisms presented to the AHP method and that must be considered from the point of view of each research, Goodwin and Wright (2003) presented the following criticisms:

- Difficulty in converting linguistic to numerical comparisons.
- Inconsistencies imposed by the linear scale from 1 to 9.
- Understanding of the questions by those who answer the comparisons.
- Priority order inversion comparing with existing alternatives, with the exclusion or inclusion of alternatives or criteria.
- The necessary number of comparisons can be high.
- The axioms into the methods.

Evaluating the criticisms raised above, we took care in applying the questionnaire used in this research, a questionnaire that has been applied in a significant number of surveys to KS assess in different industrial environments in recent years, as it will be mention later.

Care was taken to explain the survey method and the objective for all interviewees, the pertinent doubts were removed before start to filling out, after collecting all the questionnaires and before using them, some questionnaires that were not clearly filled out were discarded.

The AHP method does not seek to find the optimal solution to the decision problem, but rather seeks quantitative and comparative data that can generate knowledge for decision makers. (MUNIZ JUNIOR, 2014)

The approach of this research is based on a case study using the AHP and also interviews with managers, seeks to evidence the results with a qualitative and quantitative approach, with the application of surveys. Although the AHP has a strong mathematical basis in view of the possible inconsistencies results in an analytical way, we seek to use the data generated in the AHP to guide and give a perception for managers to reflect on the results found in order to generate discussions and analyses how KS and what is culture influence in the industrial environment. (ISHIZAKA; NEMERI, 2013)

According MARINS, SOUZA and BARROS, 2009, if in a research there is a combination of case study with mathematical modelling, with an emphasis on the application of AHP (for example, describing in detail the attribution of importance to the criteria) it can be said that it followed a quali-quantitative approach.

3 METHOD

Factors related worker KS and culture analysis involves qualitative and quantitative judgment. Express factors in measurable units and structure evaluation criteria into a framework to facilitate understanding can be supported by expert judgement and multi criteria method.

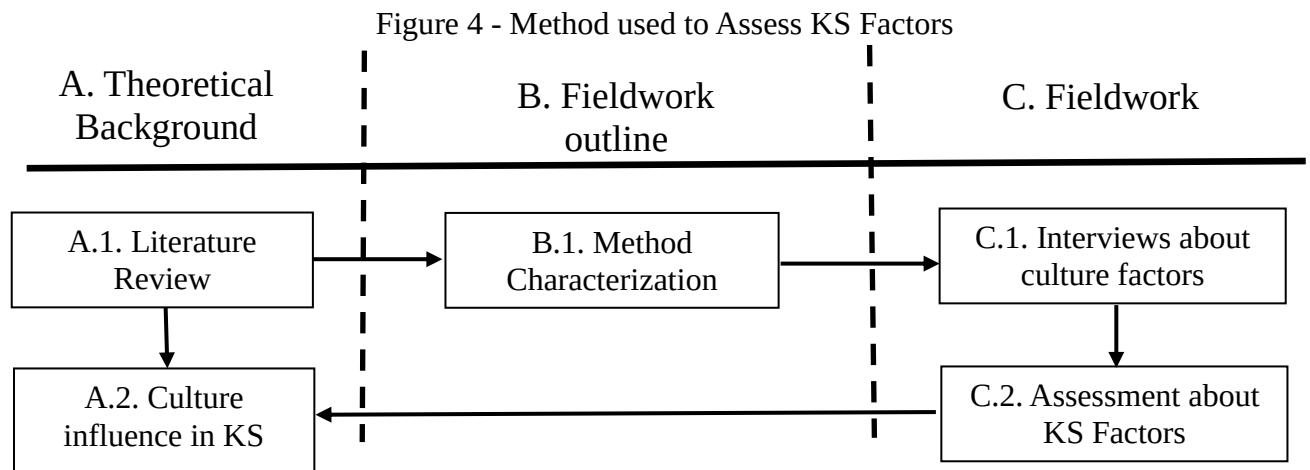
The research method applied 3 steps according to Figure 2: A) Theoretical Background was conducted using a literature review about Brazil and China industrial worker culture, KS factor analysis in the industry shop floor environment and the culture influence in KS.

The fieldwork outline B.) The method characterization consists of presenting the SECI research instrument to the interviewees in the two subsidiaries, explaining the reason for the research and clarifying doubts about filling it out, applying the research, performing the data processing based on the AHP method, evaluating the results, presenting them to the managers and collecting their perceptions through semi-structured interviews and process the interview data. In addition, semi-structured interviews will be conducted with leaders who had the opportunity to work in Brazil and China with workers in the industrial area and apply these results together with the results found in the AHP method, verifying the cultural influence on the factors that contribute to knowledge sharing.

The step C) Fieldwork consist in two steps:

C1) Fieldwork 1, KS assessment applying AHP Saaty's scale to assess knowledge human and process factors and the interviews with China and Brazil managers that work in the subsidiaries.

C2) Fieldwork 2, was applied another questionnaire considering leaders that worked in Brazil and China in different industrial environment leading workers in both countries to understand the culture influence in the shop floor.



Source: Adapted from Muniz Junior et al. (2014)

The Step A.1., was reviewed from Web Science and Scopus platforms (2000-2020), considering the follow topics KS / KM/ KC/ Industrial workers/ Cross-culture/ Confucian values/ Guanxi/ Face/ Industrial manufacturing/ Capital goods/ Culture diversity/ Human resource/ Management/ Cultural values/ Chinese culture/ Brazilian culture/ Blue-collars/ Workers.

The Step A.2, the literature review was concentrated in the Brazilian and Chinese culture in industrial environment and how the culture can influence KS, regarding the differences and similarities between the two cultures.

The literature review permitted to understand the co-relation between cultural aspects and KS in the shop floor comparing researches made in other industrial sectors.

KS studies based on different business were performed, as example:

Medical electronics (DEVINATZ, 2007), the author asserts that the organization of US industrial manufacturing is irrational as well as appearing chaotic from the workers' viewpoint because of management's refusal to integrate the workers' knowledge into the production process.

Automotive (MUNIZ JUNIOR *et al.*, 2010), proposed a model of production management that integrates KM, as a third dimension.

Automotive (VALIO; GONZALES, 2014) proposed with their research that it is both social and of coordination, aiming to identify contextual factors, internally developed in the organizations, which support the KM process in the Brazilian companies in the automotive sector.

Automotive (MUNIZ JUNIOR *et al.*, 2019), proposed to evaluate factors that influence KS in automotive production context in Brazil and China.

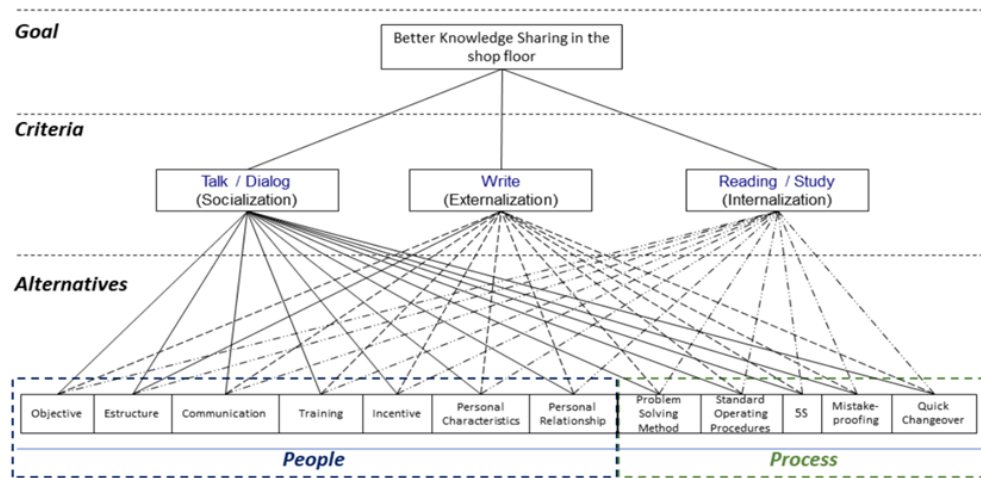
Glasses (MUNIZ JUNIOR *et al.*, 2019), the authors based their assumptions on previous work in automotive industry (MUNIZ JUNIOR *et al.*, 2010a), which is now applied to a moulded and pressed glass factory. Moulded Glass production is more dependent on blue collar tacit knowledge than automotive production, which makes it a perfect setting for this study. They saw a research gap when they didn't find any papers on KS in capital goods industries.

Considering these studies, it was possible to find a research gap in KS applied in capital goods industry and develop this research based on this bibliography references and adding culture influence in the shop floor workers.

Step B.) Fieldwork outline, the use of AHP developed by Saaty (1980) is a MCDM, decomposes complex decision-making problems (i.e., with multiple judgments at different levels) into sub-problems within hierarchical level. Each hierarchical level represents a set of attributes or alternatives related to each sub-problem (Figure 5). The top level of the entire hierarchy represents the goal of the problem, which in the presented study, has better KS among blue collar workers. An important step for the AHP method is the structuring of the decision problem into hierarchical levels and the construction of a model that relates the factors in terms of their priorities. In this step the overall objective, the criteria and the alternatives are identified. Next, the perceptions of people involved with the decision in question are collected. Following the identification of the objective (better sharing of worker knowledge), at the next level, we discerned three major sub-categories, namely Socialization (communication) Externalization (written down codes of practice and rules) as well as Internalization (the studying and/or reading of such codes of practices and rules). Finally, we considered different alternative tools to reach the means of better KS, some of which included alternatives including formal communication channels, the forging of informal personal relationships etc.

The factors applied were selected based on their relevance to promote the use of worker knowledge and engagement (MUNIZ JUNIOR *et al.*, 2010b). It then uses pairwise comparisons to model mutual interaction between the different elements and then measures and ranks their impact on the entire system. The relative order of importance between the elements, which is the objective KS factors evaluation, is obtained.

Figure 5- AHP Structure Support



Source: Adapted from Muniz Junior et al. (2014)

The AHP guided the questionnaire design (Appendix A), which allowed the respondents to assess multiple key factors in hierarchical decision-making process by using Saaty's scale (SAATY, 1980). The questionnaire was developed, translated into Brazilian Portuguese and Chinese (Mandarin) languages. In the Figure 6 is showed an example for the comparison criteria.

Figure 6: Question example for the respondent comparing two different factors

To ensure improved Knowledge Sharing between Workers, based on the scale, check the relative significance to the following alternatives:

Conversation among plant workers	9	7	5	3	1	3	5	7	9	Update the work instruction
Update the work instruction	9	7	5	3	1	3	5	7	9	Studying the Standard Operating Procedure
Conversation among colleagues	9	7	5	3	1	3	5	7	9	Study the work instructions

Source: Muniz Junior et al. (2019)

The research instrument is based on the same questionnaire already applied in other researches considering SECI method (Appendix C) and adapted from Petrini's application (2015), carried out in the automotive sector, also exploring previous works, such as, Muniz

Junior *et al.*, (2014), which evaluates a smaller number of factors and Muniz Junior *et al.* (2019), in automotive companies in Brazil and China. The instrument includes KS factors mapped, and related production organization.

The Step C.) was divided in two interviews:

C.1.) Interviews about culture factors

It was prepared a semi-structured questionnaire (Frame 1) based on advisor experience in culture influence in Brazil and China. This questionnaire has the objective to compare how culture influence the KS in both Countries and the differences between each one.

Frame 1– Questionnaire- Leaders worked in Brazil and China

1- What are the characteristics of Brazilian and Chinese workers?
2- What is the difference between Brazilian and Chinese workers?
3- How does the Brazilian manager deal with Brazilian workers?
4-How does the Chinese manager deal with Chinese workers?
5- What´s the incentive approach to Brazilian workers?
6- What´s the incentive approach to Chinese workers?
7- What´s the punishing approach to Brazilian workers?
8- What´s the punishing approach to Chinese workers?
9- How is the Union influence over the Brazilian worker?
10- How is the Union influence over the Chinese worker?
11- What are the personal values of the Brazilian workers?
12- What are the personal values of the Chinese workers?
13- What are the personal characteristics of Brazilian workers and Chinese workers?
14- What are the organization systems in Chinese companies?
15- What are the organization systems in Brazilian companies?
16- How does the Chinese worker work/deal with other workers?
17- How does the Brazilian worker work/deal with other workers?
18- What were the difficulties encountered when you were working with the Chinese/Brazilian?
19- How did you overcome them? Any examples?
20- What are the similarities between Brazilian and Chinese workers?
21- Why do you think such problems/difficulties occur?
22- What are the similarities between Brazilian and Chinese workers?
23- How do the Brazilian workers share knowledge and experience in the industrial environment?
24- How do the Chinese workers share knowledge and experience in the industrial environment?
25- What´s the concern about sharing knowledge in the Brazilian companies?
26- What´s the concern about sharing knowledge in the Chinese companies?

Source: Author´s own production.

The interviews were conducted through open individual interviews with leaders considering their work experience in industrial environment in both countries, leading workers and comparing the culture aspects. (Table 1).

Table 1- Profile - Managers that Worked in Brazil and China in Industrial Environment

Job Function (CODE)	Business	Professional Experience (YEARS)	China Experience (YEARS)	Brazil Experience (YEARS)	Nationality
Advanced Manufacture Engineering Manager (MG1)	Energy	20	6	14	Brazilian
Operation Director (DIR1)	Automotive	30	5	25	Brazilian
Process Developing Supervisor (ENG 1)	Automotive	20	1	19	Brazilian
Acquisition Director (DIR2)	Automotive	22	3	19	Brazilian
Commercial Manager (COM 1)	Infrastructure	8	4	4	Chinese
Commercial Manager (COM 2)	Infrastructure	7	2	5	Chinese

Source: Author's own production.

The survey was individually applied in a virtual meeting with each manager per around one hour. The questionnaire presented in Frame 1 was used and all meetings were recorded and transcribed - around 6 hours of interviews were recorded to allow comparison between Brazilian and Chinese workers based on factors that influence KS on the shop floor context.

It was used content analysis techniques (STEMLER, 2000) to identify conceptual categories and worker culture aspects related to industrial context in both countries. Frame 3, illustrated content analysis based on meaning units from interviews, through condensed meaning units, translated into codes, and then it was ranked.

In the Frame 2 it is showed an example of the complete interviews with the opinions of the leaders about Brazilian and Chinese workers, which were totally transcribed in the Appendix C, and it was performed an analysis based on Nakano and Muniz Junior, 2014.

Frame 2- An example of the interviews with leaders that worked in Brazil and China in different industrial environments

Meaning unit	Condensed meaning unit	Codes
Interviewed Manager 1(MG 1) <i>The Brazilian worker is afraid of losing his/her job, while the Chinese comes from a communist policy, where companies are more preventive, the chance of him/her losing his/her job would be smaller, but today there are many companies that do not belong to the government.</i>	Afraid of losing his job Economic	Job Security High Context

Meaning unit	Condensed meaning unit	Codes
<i>What happens is that China has been experiencing economic growth for a long time, so China is in a position to full employment chances, which makes the company be the showcase of the employee, who can change it at any time.</i> <i>Brazilians are more afraid of losing their job and because of this they strive a little more, focus on showing results, growing. They have the ambition to become a boss. The Brazilian employee studies more, is always looking for opportunities, even if it is outside the company. In Brazil, employees seek more knowledge. Brazilians even pursue specializations and master's degrees, while in China you won't see many employees with master's degrees, because once the Chinese are employed, he ends up accommodating himself.</i>	growth Afraid of losing his job	Job Security

C.2.) Assessment about KS Factors

The SECI questionnaire were applied in Brazil and China plants in Aug.19 and Dec.10 respectively considering the workers, leaders and managers that work in the production lines for synchronous electrical generators. These business units from an American Multinational Company, produce these generators for hydroelectric power plants using similar production lines and assembly system in Brazil and China.

It was carried out meetings with the teams and explained the method for all, and after some doubts were clarified, a trial was made and finally the questionnaire was applied.

The SECI questionnaire respondents (Table 2), included managers with electrical engineer's background, production leaders with technical experienced and blue collars workers, this census considering all people that worked in this production lines and were responsible for synchronous electrical generator production.

Table 2– Respondents– Brazil and China -Electrical Production Lines

Plant-Electrical Production Lines	Number of respondents	Manager	Production Leader	Workers
Brazil	20	1	1	18
China	48	1	9	38

Source: Author's own production.

All participants responded a paper copy of the questionnaire in a 1-hour section in each plant, before the application the method was discussed and the questions were read and some examples were given, in order to make the instrument more familiar for the respondents.

It was presented the answers based on the questionnaire (Frame 3) in 3 distinct interviews with managers responsible respectively for China and Brazil plant, and a global manufacture expert manager that worked in Brazil and in China also answered it to consolidate the results. (Appendix C).

A new questionnaire with AHP data was prepared and it was used to make a separated interview with the managers. (Frame 3)

Frame 3- Questionnaire- Plant Managers in Brazil and China

1. <i>Why socialization is more important among managers and workers in Brazil? Why Brazil leaders think it is more important than internalization (study)?</i>
2. <i>Why in China does everyone think that internalization (study) is more important? Why does the Chinese manager give the same weight to internalization (study) and socialization (speak)?</i>
3. <i>How do new employees learn (internalize) new activities or practices?</i>
4. <i>What is the process currently used for knowledge transfer between workers?</i>
5. <i>Is the result presented above in line with what is currently practiced?</i>
6. <i>Related to people, why was there a strong emphasis on incentives?</i>
7. <i>How are these incentives in the company?</i>
8. <i>Managers also emphasized training. Why do you think it happened in both plants?</i>
9. <i>Regarding the processes, all of them are practically key at the same level of importance in the Chinese plant. However, in Brazil, there was a concentration in the processes of zero defect and quick change. Why do you think this happened?</i>
10. <i>Regarding zero defect and quick-change processes in Brazil, it pointed to a great weight for quick changes for the manager and zero defect for the leader, why do you think this happened? Brazilian workers also emphasize these two processes, why?</i>

Source: Author's own production.

The AHP results and the questions above were presented for the three managers and their perceptions were collected. Below, in Table 3 it was collected the manager profiles that were interviewed in June 20.

Table 3- Profile- Managers that Work in the Electrical Factories Subsidiaries

Job Function (CODE)	Business	Professional Experience (YEARS)	China Experience (YEARS)	Brazil Experience (YEARS)
Global Advanced Manufacture Engineering Manager (MG D)	Energy	20	6	14
Electrical Factory Manager China (MG S)	Energy	11	11	0
Global Advanced Manufacture Manager located in Brazil Electrical Factory (MG M)	Energy	11	0	11

Source: Author's own production.

In Frame 4 an example is showed, and the complete interviews with the critical analysis from AHP data and the respective perceptions for the managers were totally transcribed in Appendix B. After that, an analysis based on Nakano and Muniz Junior, 2014 was prepared.

Frame 4- Example of Interview with a Manager that Works in the Electrical Factories Subsidiaries

Meaning unit	Condensed meaning unit	Codes
Interviewed Manager M (MG M) <i>So, for me it is a bit of a surprise to have appeared such divergent result in the leader position.</i> <i>I understand that the leader here is the direct leader of the workers. I think it depends exactly on the moment you are saying that. This research was carried out in 2018.</i> <i>Perhaps, the leader perception comes directly from the workers, he thinks many people need to read process sheets, instructions, drawings, quality instructions, everything, and the way they are doing it is what really brings knowledge. Studying, right, what really, let's say, is exactly where knowledge spreads, right, knowledge is established.</i> <i>I even found it a bit interesting because we as Brazilians, we like it a lot. I see the guy coming over on the other side a lot more and saying "how do you do that?" and the other one says, "Oh, this does this, like this, like this, that's how they said to do it". Much more than that, you can see that they signalled it themselves, Brazilian workers signalled this part of socialization more than internalization and it is the vision that I understand most happens. I will not say that it is the most important, but I will say that it is what I see as a result in our electrical factory in Brazil. It is true in Brazil.</i>	Brazilian leader desire that workers study the documents. Brazilian workers learn speaking and passing knowledge on to each other.	Internalization Socialization

A critical analysis was ranked and the consolidation results were presented in Appendix D, being prepared based on Nakano and Muniz Junior (2014).

4 FINDINGS

This section explores Brazil's and China's managers' perceptions on worker culture, and blue-collar and white-collar workers' KS in the shop floor.

4.1 BRAZIL-CHINA WORKER CULTURE ANALYSIS

The Contents Analysis technique allows one to raise cultural factors of Brazilian and Chinese blue-collar workers (Frame 4). Some codes came from Chinese culture literatures (Face, Guanxi).

Frame 5- Worker Culture Codes and Factor Definitions

<i>Codes</i>	<i>Number of Citations</i>	<i>Factor Definitions</i>
<i>Authority</i>	13	<i>Respect for hierarchy conditions, decision-taking, respect in the work environment. Respect for authority, filial piety, ancestor worship, male dominance, fatalism, conservatism, and endurance (LI; NGO, 2018)</i>
<i>Guanxi</i>	9	<i>The way that workers learns, interact day by day, culture The bonds of close social relationships (KING; WEI,2018)</i>
<i>Job Security</i>	10	<i>Work conditions and perception of stability in the job. When managers know how job security could affect trust in organization and how subordinate-supervisor guanxi could affect trust in supervisor, they can take appropriate actions to improve human relations at work. (WONG, 2017)</i>
<i>Face</i>	3	<i>Relationship in work environment, culture, behaviour Face as a factor to consider in trust and trust building. (KING; WEI, 2018)</i>
<i>Transparency</i>	4	<i>The way Companies manage, organize the process, lead in open discussions A clear and open understanding of the objectives and aims of an organisation. Open and honest communication between individuals. (MANUS et al., 2016)</i>
<i>Low Context</i>	9	<i>Social conditions in the work environment, aspects, example traditionalism, collectivism, etc. Chinese traditionality is a culture-based construct developed by Yang et al. (1989) several decades ago, which tries to capture the influence of Chinese culture on individual attitudes and behaviours. The construct is rooted in Confucianism, an ethical and philosophical system in China that affirms norms of behaviours in social institutions and interpersonal relationships (LI; NGO 2018) Collectivist cultures is strongly linked to a specific understanding of the self-defined in relation to others. The interdependent self induces a tendency to focus one's attention on others' actions, wishes, knowledge and needs. Because collectivism and interdependent self-construal have been recognized as dominant among Eastern cultures as opposed to Western cultures characterized by strong individualism. (MICHAL; GORBANIUK ,2017)</i>
<i>High Context</i>	8	<i>General overview about economic aspects and influence work environment, example employees' conflicts, union involvement, etc. Extant KM literature provides a host of extrinsic motivators, such as status change, promotions, and raises, positively affect knowledge contributing behaviour. Work-related characteristics, such as in-role behaviour, work and task conflict, decentralization, and work engagement also drive knowledge contributing behaviours (ELLIS, 2015)</i>
<i>Total</i>	56	

Source: Author's own production.

The data evidence cultural differences between Brazilian and Chinese workers. Some cultural characteristics impact the way of work and KS practices, and the interviewers are observed in Brazilian and Chinese workers this similarities and differences.

We organized some part of the interviews that indicate the most important factors mentioned above. The answers evidences Authority and Guanxi relevance.

The Chinese workers strongly respect hierarchy conditions, take decision, respect in the work environment. Inside these work context, high-traditionality employees are likely to perceive congruence between the norms and values of the organization and their own (LI; NGO, 2018). Traditionality the Chinese culture emphasize Authority, which means respect for hierarchy conditions to take decision in the work environment. The Brazilian worker is more flexible about it. (TONG; MITRA, 2009)

“... In China, hierarchy is strong, and the workers are very disciplined, they don't make a lot of questions, they simply follow the instruction. In Brazil the workers question more, until they understand why the instruction is important.” (ENG 1)

“... The Brazilian manager has less strength of authority and more commitment than the Chinese, in other words, in China the hierarchy is very strong and important, sometimes the boss is a military man. The hierarchy of the Chinese company is like an army, the Chinese bosses don't even talk to the factory floor workers, however he treats all employees equally, without personal colleagues and always respecting the hierarchy. The Brazilian boss usually has a commitment and a strong relationship with everyone around him.” (DIR 2)

“Regarding the Chinese characteristics, I think that the Chinese works harder, they do not respect working hours, they always work overtime, and they have a characteristic that they always find it easy to obey boss orders and they are also conservative ...” (COM 1)

“... a culture of Asian or Chinese companies, the level of positions is very clear and you can only report your work to your direct boss...” (COM 2)

Guanxi in human relations refers either to the state of two or more parties being connected or the connected parties themselves. As a state of being connected, it is either in existence or not (e.g., two people either have or do not have guanxi), good or bad, close or distant, deep or shallow, in tension or in harmony (REN; CHEN, 2018). Guanxi factor in the

Chinese work environment contributing to the enforceability of reciprocity, which is important for the development of a subordinate's trust in his or her supervisor (WONG, 2017).

"... When the company had a production record, it was common for the supervisors and managers to celebrate drinking and eating, it is traditional for them. The Chinese have some cultural traditions like "Losing Face" and "Guanxi". The managers tried to focus not only on the financial point but on the personal too, appreciating all employee's efforts. The "Lauban" (boss) was always encouraging and recognizing. But the strongest point of the Chinese is the financial one." (DIR 2)

Job security is considered as an antecedent of affective commitment, and subordinate-supervisor guanxi is viewed as an antecedent of loyalty to supervisor (WONG, 2017). In the interviews, some managers indicated that the KS doesn't affect job security, but someone indicated that due to the China economic growth, it is not a sensitive matter, meanwhile in Brazil, due to the unstable economic situation, Brazilians fear losing their jobs.

Brazilian people are obsessed with relationships and personal bonds, so as to be able to find the key to their own lives. Their history and sociocultural roots are the basis for these intermediations, of which the Brazilian "jeitinho" - a special way of managing obstacles to find a way out of bureaucracy - makes a paradigmatic synthesis. (AMADO; BRAZIL, 2016)

"... The Chinese comes from a communist policy, where companies are more preventive, the chance of him/her losing his/her job would be smaller, but today there are many companies that do not belong to the government." (MG1)

"... In Brazil the relationship between workers was very friendly. Their knowledge was limited, but they used to share information, they were not afraid of losing their jobs." (MG 1)

"... What happens is that China has been experiencing economic growth for a long time, so China is in a position to full employment chances, which makes the company be the showcase of the employee, who can change it at any time." (DIR 1)

"... Brazilians are more afraid of losing their job and because of this they strive a little more, focus on showing results, growing. They have the ambition to become a boss. The Brazilian employee studies more, is always looking for opportunities, even if it is outside the

company. In Brazil, employees seek more knowledge. Brazilians even pursue specializations and master's degrees, while in China won't see many employees with master's degrees, because once the Chinese are employed, he ends up accommodating himself.” (MG 1)

“Guanxi in China is stronger than in Brazil, if you want a career promotion you need to maintain a good “Guanxi” relationship with superior people, with important people, because it creates strong dependence on the relationship. Asian countries are more dependent on this kind of relationship than other countries in the world, this indicates that bosses can determine more things... (COM 1)

Face is related to trust building, in the social interactions between persons, at least one of whom is Chinese (KING; WEI, 2018). Face is relevant in Chinese business practice and can be traded, or at least considered, in exchange negotiations. In Brazilian business merit recognition is the most important value.

“... Brazilians like recognition. They don't need a promotion, but a recognition from the boss, while the Chinese wants a financial pleasure and recognition in public, he wants people around to see the boss happy with his work...Guanchi ...do not lose the Face... lost Face.” (DIR 1)

Transparency is related flows of honest communication among individuals (MANUS *et al.*, 2016). The Brazilian worker appreciates transparent behaviours.

“... In Brazil there is a greater freedom and questioning, “have you thought about it?” “Couldn't this cause a problem?” so, the Brazilian worker is a little more conscious and there is a more open dialog, which differs from China.” (MG 1)

Low context is related to social conditions in work context, economic aspects, example traditionalism, collectivism. It is relevant in both countries.

“... In China there is a better camaraderie/companionship than here because people are more committed to each other (complementing each other). Here in Brazil, it is easier to find one employee ratting the other who is doing something wrong and in China no, they are more compliant and help each other more.” (DIR 1)

“... When there is a foreign that respects their culture and try to understand them, they make everything easier. It's important to respect their culture and show the necessary results, so that you can have success together.” (ENG 1)

High context is related to social and economic aspects between Brazil and China, and Union influence. Some conflicts are generated in both countries when we look for these aspects.

“... The Chinese union is strong, with its well-structured office being the government. The guy in the union checks out every week.” (ENG 1)

“... The Government controls everything in China. There was in every company a Chinese Union. In our factory we had one in the Planning area. They work very well, but they took all the information to the Chinese Union. The Government is the Union. In China they have a ‘lending regime’, the factory was not ‘ours’. In every time the government could take it. It was a 60-70 years contract.” (DIR 2)

Snell et al. (2017) analysed knowledge and the organizational learning in various regional contexts, giving the assumption that organizational learning processes are socially constructed and are embedded in specific social contexts. The basic research question for this contextualist perspective is: how do differences in cultural and institutional conditions between countries, such as home and host, shape the learning processes of organizations? Early research studies identified learning-related barriers faced by developed multinational corporations (MNCs). More recent studies indicated how the diverse and idiosyncratic economic, social and institutional factors in Asia can induce an organization to blend global perspectives with local insights.

Our study indicated these characteristics comparing regional contexts in China and Brazil classifying these perspectives in High and Low Context. (Frame 1)

4.2 WORKER KNOWLEDGE SHARING ENABLERS ASSESSMENT

The perception among blue and white collars indicates importance of Socialization (dialogue) in Brazil (Table 4), and Internalization (study) in China. Brazilians like to share

their knowledge through Socialization, group work, conversations between the workers and pass of tacit knowledge between colleagues. Chinese are more introspective, disciplined and seek understanding through written instructions to find the knowledge necessary for their duties.

"... the Chinese worker is proactive, likes to learn, has no day and time limitation, considers his entity as his own business. The problem is that the Chinese do not like to pass knowledge to each other for fear of losing their job, so it is difficult to work as a team with them." (Dir 2)

Other executive interviewed reported that: *"... The Brazilian worker is very unproductive and undisciplined, but has an easy relationship, if an employee is motivated, he can pass it on to others." (Dir 1)*

Regarding the specific criteria, the highest score for both Brazilian and Chinese respondents was the incentive, which shows that the American culture promoting financial incentive to workers has been absorbed in both units and is a unanimous point regarding the way to reach competitiveness and meritocracy.

The most internalized indications of KS are highlighted by Chinese respondents, such as problem-solving method and work instruction, otherwise the actions with quick changeover and zero defect that take more working in group and with higher degree of socialization, presented higher percentage among the Brazilian respondents.

Table 4– Key Factor Comparisons- Brazil and China Electrical Factories

Criteria and Alternatives		Electrical Factory Overall Results [%]								
		Brazil			China			Brazil	China	Overall
		Manager	Leader	Workers	Manager	Leader	Workers			
Socialization		85.6	1.1	56.5	42.9	13.1	23.9	56.3	21.9	39.1
Externalization		12.3	9.9	33.2	14.3	26.1	34.0	31.8	31.4	31.6
Internalization		1.8	89.0	10.3	42.9	60.8	42.1	11.9	46.6	29.3
People	Objective	0.4	0.3	0.2	8.5	7.1	7.2	0.3	7.6	3.9
	Structure	3.7	2.3	0.2	1.5	1.9	2.1	2.4	1.9	1.9
	Communication	1.3	0.5	0.4	8.5	3.6	6.5	0.7	6.2	3.5
	Training	9.5	3.5	1.3	11.6	6.7	5.8	4.8	8.1	6.4
	Incentive	9.9	32.2	51.8	14.9	12.4	19.2	31.3	15.5	23.4
	Personal Characteristic	5.4	1.3	2.5	5.1	4.8	4.3	0.9	4.1	2.5
	Personal Relationship	1.1	0.6	1.2	3.2	5.9	3.2	3.1	4.7	3.9
Process	Problem Solving Method	1.1	0.2	4.4	25.4	13.5	10.7	1.9	16.5	9.2
	Work Instruction	7.5	0.9	7.6	14.9	18.3	9.4	5.4	14.2	9.8
	5S	1.1	6.4	4.5	3.0	8.1	9.0	4.0	6.7	5.3
	Mistake Proofing	9.1	45.2	15.1	0.6	7.6	11.7	23.1	6.6	14.9
	Quick Change	50.0	6.5	10.8	3.0	10.1	10.9	22.4	8.0	15.2
Resp#		1	1	18	1	9	38	20	48	68

Source: Author's own production.

4.3 KEY FACTORS AHP ANALYSIS – BRAZIL BY FUNCTION

Socialization (85,6) is considered the most important factor following externalization and far Internalization by the Brazilian managers interviewed. In the managers' evaluation,

workers could improve Socialization to learn faster and share information each other. Quick changeover could bring more productivity, and structure follows it.

From leading perspective in Brazil, Internalization (89) is the most important factor, following it comes externalization and Socialization. In the leader's evaluation, workers could improve Internalization to learn faster reading and understanding the instruction. Mistake proofing could bring more productivity, after it comes structure and training.

From workers' perspective in Brazil, Socialization (56,5) is the most important factor, coming after it externalization and Socialization. In the worker's evaluation, workers could improve Socialization to learn faster and share information each other. Incentive is the most important factor and could bring more productivity.

"... I see the guy coming over on the other side a lot more and saying "how do you do that?" and the other one says, "Oh, this does this, like this, like this, that's how they said to do it". Much more than, you can see that they signalled it themselves, Brazilian workers signalled this part of socialization... (MG M)

"...The Brazilian worker is also giving more value to speaking, I mean, you see that the worker is aligned with the manager... I think the leader is looking to become a little more professional, to leave informality, to be a little more formal, that is why the leader in both situations, as he is that guy, he is not the worker, but he is also not the manager there, he is a guy who is becoming professional, he is going from worker to employee manager." (MG D)

4.4 KEY FACTORS AHP ANALYSIS – CHINA BY FUNCTION

From managers' perspective in China, Socialization and Internalization (42,9) have the same weight and are important for productivity. In the managers' evaluation, workers could improve Socialization and Internalization, learn the instruction and share the information to each other. Training, incentive, and work instruction have the same weight and could bring more productivity for the team.

From leaders' perspective in China, Internalization (60,8) is the most important factor, and then comes externalization and socialization. In the leaders' evaluation, workers could improve Internalization to learn faster, by reading and understanding the work instruction. Work instruction could bring more productivity, and then comes incentive.

From workers' perspective in China, Internalization (42,1) is the most important factor, and after that there is externalization and socialization. In the workers' evaluation, they could improve Internalization, respecting work instruction. Incentive is the most important factor and could bring more productivity.

"...Chinese leaders, I think it is more related to the cultural aspect, because the leader and the workers, they will hardly, at the same hierarchical level, talk about what they have to do. Usually, Chinese understands that they will assimilate the information better and know what s/he must do by looking at the document, following what the document is saying, so, Chinese has a lot more of this cultural aspect of "I follow what is written, what is written I follow"." (MG M)

"... I think it's kind of a cultural thing... like we say new things. Sometimes we don't feel ashamed to ask somebody's opinion or how to do it. So, we like to learn by ourselves because we want to demonstrate I have this ability, to do it by myself. I think that is kind of a cultural thing... I see that the Chinese people want to do it first by themselves and then ask help to others. So, for me, my personal point of view is that this is cultural. (MG S)"

4.5 KEY FACTORS AHP ANALYSIS – CHINA BRAZIL COMPARISON

The comparison between respondents of the questionnaires applied in the two Factories, in Brazil and China, evaluated that the main differences in data are in Socialization (56,3) on Brazil's side and Internalization (46,6) on China's side; the externalization data in both units have roughly the same percentage.

We will concentrate, in the first step, on Socialization and Internalization, making a comparison to understand the differences in the way workers share knowledge.

The data can demonstrate the cultural differences between Brazilian and Chinese workers, corroborating with what we heard in the interviews with executives who worked in both countries and that were shared with us.

Brazilians like to share their knowledge through socialization, working in group, conversations between the workers and passing on tacit knowledge between colleagues.

Chinese are more introspective, disciplined and seek through written instructions to find the knowledge necessary for their activities.

“...The Chinese, s/he valued more studying too, but you see that s/he was not so far from the others. For the minor score of writing, it was close to reading, it was a little more distant from speaking, but the dissipation of the values of the Chinese worker was less than that of the Brazilian worker; there was more dispersion...anyway, the Chinese worker, maybe he is, maybe the Chinese leader is managing to align himself more with his worker, passing his concern of having a document. I think the Chinese leader manages to have more ancestry, to have more influence on the behaviour of the worker.” (MG D)

Regarding the specific criteria, the highest score for both Brazilian and Chinese respondents was the incentive, which shows that the American culture promoting financial incentive to workers has been absorbed in both units and is a unanimous point regarding the way to reach competitiveness and meritocracy.

“...We have a skill matrix within the organization, in the factory, that you have from level 1 to level 4. According to knowledge and behaviour you say “this guy has skill level 1, this one has level 2, 3 and 4 ” and the more you become a senior, becoming a multiplier of knowledge, more you go up in this scales matrix and consequently, more you will increase your salary, increasing your positioning, your level within the organization.” (MG M)

“... I think they recognize that this is important, that this human contact between the leader and the led helps, is the main lever to be able to make the motivation and incentive for people. And this can be in the form of a compliment, an orientation, having a cup of coffee together, feeling close to the person.

But the training that appeared there, which we had already mentioned before, in China has a lot of training, more than here. In China it is very common to have training outside, or inside our factory.” (MG D)

“For us, in the manufacturing side training is always an important thing. Because we need to have the worker to know all the requirements, all the procedures, right? So, training would be the first step to bring them into his stage.” (MG S)

The most KS internalized indications are highlighted by Chinese respondents, such as problem-solving method and work instruction, otherwise the actions with quick changeover

and zero defect that have more group work and with higher degree of socialization presented higher percentage among the Brazilian respondents.

“... I think that the perception of being “quick change” among managers and workers is because, one is thinking about financial result and other is thinking about agility of their work, and more or less there is a priority. The issue of error proofing is due to the scenario that, really, if I have a system that doesn’t allow me to cause a defect, it has to be a priority.”
(MG M)

“..., the right work instruction will be the most important think for the workers. Because all of them will follow the work instruction, right? If the work instruction is good, delivered with good quality, it means that the worker has less opportunities to make a mistake. And we can have a result in terms of EHS, quality and operation, right? So, I think that’s why, especially for the manager and the leaders, I think these two levers are most important.” (MG S)

5 CONCLUSIONS

This paper contributes to other researches and studies related to work organization, KM in emerging countries with different cultures and demonstrates the impact of culture on KM.

Developing and understanding how culture influences KS is not an easy task and the results are directions that aim to bring the theme to managers in order to show one more aspect to be considered as KM studies in different groups and different countries. The objective of this research was not to deepen the study of culture, even because it would require another type of approach that was not the main objective of this case study.

This research, we were able to find data in the interviews carried out that demonstrate the influence of culture in KS.

Other aspects not addressed in this case study and which can be studied in future research are the social, economic and political aspects of each country and their development strategies and their influence and impacts on KM in the industrial environment.

How workers and the value chain are encouraged to increase the impact of their work with a more long-term thinking and with national development thinking as part of a great social, economic and political gear.

Certainly, although we have not directly addressed these aspects in the culture influence in the KS in this case study, future studies may seek new connections between the countries' long-term development plans and the influence in the industrial environment.

Another aspect to be highlighted in this case study was the AHP method application in capital goods industry and can show managers how important it is to study ways of sharing knowledge while respecting workers' culture.

Analysing cultural aspects in the workplace can provide managers with better tools for sharing knowledge tailored to each country's style and culture.

It was possible to evaluate significant differences between Chinese and Brazilian workers. While the Chinese prefer to share knowledge through written procedures, respecting the hierarchy in a disciplined manner, the Brazilian prefer to share knowledge through socialization, teamwork, conversations between peers and pass on tacit knowledge between colleagues.

These findings can't be generalized, these specific case study can bring perceptions on the workers that were analysed in this opportunity.

We can also state that Brazilian employees are the most enthusiastic about sharing information with others in their organization.

Deference to hierarchy creates another culturally specific KS barrier. No less so in China, where respect for the leaders together with top-down decision making processes appear to undermine KS effectiveness, in a Confucian society where hierarchical systems of domination exist in the authority chains. It is disrespectful and defiant if subordinates dare to openly express opinions that are divergent from those of the superiors. This may limit opportunities for constructive debates and reflexive thinking that are crucial for KS.

The SECI data analysis and the interviews with managers show that “Socialization” and “Internalization” are viewed by Brazilian and Chinese workers respectively as the main KC process facilitating KS among employees. Factors such as Incentive are also highlighted by interviewees as positively influencing in both subsidiaries and demonstrate that the A-MNC introduce the incentives procedures in a good way in both subsidiaries and the incentive system is recognized by workers.

Further researches about how culture influences KS is a promisor track to follow, and research questions appears as:

What is culture-specific characteristics to influence KS?

What are the workers perceptions about the factors studied?

What are the main difficulties to introduce these methods in others countries?

The authors advocate further intensive research in different industries along with more extensive data collection. Second, institutional theory appears to provide a good theoretical foundation for organizational research in China and other economies in transition, but further theorizing should accompany the design of additional studies. Other research suggestion, while a punctuated equilibrium perspective on organizational change brings the potential for clean-cut change, jolting an organization out of its safe but ineffective torpor, the rejection of a more normative approach may be anthemic to organizational leader’s keen to preserve an organizational culture that is noted for its lack of surprises or discomforts.

Comparison between another capital good companies in BRICS can contribute to the studies about KM, KS, KC and how understanding the culture influences their results, providing the companies the best way to improve employee’s performance.

Individual differences (e.g., personality and attitudes) affecting KS behaviours will likely interact with the cross-national and cross-cultural environment in which the employees are working could be another interesting further research to be studied.

Finally, we can conclude that this case study found some answers to the research questions raised in chapter 1.2:

- How does culture influence KS?

- What are the critical factors that influence the willingness to share knowledge?

These responses are a qualitative and interpretative sample of the discussions with leaders and managers and can serve as a basis for the implementation and monitoring of KM, the responses are not intended to be conclusive, definitive, but rather to open the inquiry and the appetite of managers in the evaluation of other KM aspects in an industrial environment, as well as, contributing and motivating future researchers to explore other cases of studies and reflections in such a way as to support KM as a fundamental pillar for the most precious asset of any the intrinsic know-how of each industrial organization.

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ANNEX A –RESEARCH INSTRUMENT IN PORTUGUESE

Bem - Vindo Colega

A Universidade Estadual Paulista (UNESP) está realizando uma pesquisa em várias Empresas. Você foi convidado para responder a este questionário devido a sua experiência de trabalho. O objetivo da pesquisa é avaliar os fatores, que na sua opinião, contribuem para o melhor compartilhamento do conhecimento entre os técnicos-operários. Precisamos da sua colaboração no preenchimento deste questionário. Certamente, você irá respondê-lo em poucos minutos e esse esforço será muito útil para melhor conhecermos o setor de produtivo e orientar oportunidades de melhoria no chão-de-fábrica. Você pode ficar à vontade para responder exatamente o que você pensa, pois as perguntas são simples e não envolvem aspectos confidenciais de onde você trabalha. Os dados de perfil são sigilosos.

PARA RESPONDER TENHA SEMPRE EM MENTE O OBJETIVO DE MELHORAR O COMPARTILHAMENTO DO CONHECIMENTO ENTRE OPERÁRIOS

Exemplo: Quando você vai comprar um carro, assinale o grau de importância para a melhor alternativa baseado na escala que segue.

Intensidade de Importância	Definição (...de uma alternativa em relação a outra)
1	Igual importância
3	Pequena importância
5	Média Importância
7	Grande Importância
9	Excepcional Importância

A	MANUTENÇÃO	9	7	5	X	1	3	5	7	9	PREÇO
B	PREÇO	9	X	5	3	1	3	5	7	9	CONFORTO

- A. Esta resposta indica que MANUTENÇÃO foi considerado ter pequena importância (3) comparado a PREÇO para compra de um carro novo.
- B. Esta resposta indica que PREÇO foi considerado ter uma grande importância (7) comparado a CONFORTO para compra de um carro novo.

QUESTIONÁRIO

A partir de agora, seu julgamento será baseado em alternativas conhecidas como Treinamento, Instrução de Trabalho, 5S e outros. Agora use a mesma escala e assinale o grau de importância para as Alternativas a seguir:

Para que haja melhor Compartilhamento do Conhecimento entre Operários, baseado na Escala, assinale a importância relativa para as Alternativas a seguir:

Conversa entre os operadores	9	7	5	3	1	3	5	7	9	Registro na Instrução de Trabalho
Registro na Instrução de Trabalho	9	7	5	3	1	3	5	7	9	Estudo da Instrução de Trabalho

2

Para que haja melhor **Conversa entre Operários**, assinale o grau de importância relativa das Alternativas a seguir:

Objetivo	9	7	5	3	1	3	5	7	9	Estrutura (Papéis e Responsabilidades RH, Recursos Materiais)
Estrutura (Papéis e Responsabilidades RH, Recursos Materiais)	9	7	5	3	1	3	5	7	9	Comunicação (Troca de Informação, Ideia e Sugestões)
Comunicação (Troca de Informação, Ideia e Sugestões)	9	7	5	3	1	3	5	7	9	Treinamento
Treinamento	9	7	5	3	1	3	5	7	9	Característica Pessoal
Característica Pessoal	9	7	5	3	1	3	5	7	9	Relacionamento Pessoal
Relacionamento Pessoal	9	7	5	3	1	3	5	7	9	Método de Solução de Problemas
Método de Solução de Problemas	9	7	5	3	1	3	5	7	9	Instrução de Trabalho
Instrução de Trabalho	9	7	5	3	1	3	5	7	9	5S
5S	9	7	5	3	1	3	5	7	9	Zero Defeito (Meios usados para evitar erros na sua atividade)
Zero Defeito (Meios usados para evitar erros na sua atividade)	9	7	5	3	1	3	5	7	9	Troca Rápida (Meios usados para agilizar sua atividade)
Troca Rápida (Meios usados para agilizar sua atividade)	9	7	5	3	1	3	5	7	9	Incentivo (Premiação ou Reconhecimento)

Para que haja melhor **Registro na Instrução de Trabalho**, assinale o grau de importância relativa para as Alternativa a seguir:

Objetivo	9	7	5	3	1	3	5	7	9	Estrutura (Papéis e Responsabilidades RH, Recursos Materiais)
Estrutura (Papéis e Responsabilidades RH, Recursos Materiais)	9	7	5	3	1	3	5	7	9	Comunicação (Troca de Informação, Ideia e Sugestões)
Comunicação (Troca de Informação, Ideia e Sugestões)	9	7	5	3	1	3	5	7	9	Treinamento
Treinamento	9	7	5	3	1	3	5	7	9	Característica Pessoal
Característica Pessoal	9	7	5	3	1	3	5	7	9	Relacionamento Pessoal
Relacionamento Pessoal	9	7	5	3	1	3	5	7	9	Método de Solução de Problemas
Método de Solução de Problemas	9	7	5	3	1	3	5	7	9	Instrução de Trabalho
Instrução de Trabalho	9	7	5	3	1	3	5	7	9	5S
5S	9	7	5	3	1	3	5	7	9	Zero Defeito (Meios usados para evitar erros na sua atividade)
Zero Defeito (Meios usados para evitar erros na sua atividade)	9	7	5	3	1	3	5	7	9	Troca Rápida (Meios usados para agilizar sua atividade)
Troca Rápida (Meios usados para agilizar sua atividade)	9	7	5	3	1	3	5	7	9	Incentivo (Premiação ou Reconhecimento)

Source: Petrini (2015).

Para que haja melhor **Entendimento da Instrução de Trabalho**, assinale o grau de importância relativa para as Alternativas a seguir:

Objetivo	9	7	5	3	1	3	5	7	9	Estrutura (Papéis e Responsabilidades RH, Recursos Materiais)
Estrutura (Papéis e Responsabilidades RH, Recursos Materiais)	9	7	5	3	1	3	5	7	9	Comunicação (Troca de Informação, Ideia e Sugestões)
Comunicação (Troca de Informação, Ideia e Sugestões)	9	7	5	3	1	3	5	7	9	Treinamento
Treinamento	9	7	5	3	1	3	5	7	9	Característica Pessoal
Característica Pessoal	9	7	5	3	1	3	5	7	9	Relacionamento Pessoal
Relacionamento Pessoal	9	7	5	3	1	3	5	7	9	Método de Solução de Problemas
Método de Solução de Problemas	9	7	5	3	1	3	5	7	9	Instrução de Trabalho
Instrução de Trabalho	9	7	5	3	1	3	5	7	9	5S
5S	9	7	5	3	1	3	5	7	9	Zero Defeito (Meios usados para evitar erros na sua atividade)
Zero Defeito (Meios usados para evitar erros na sua atividade)	9	7	5	3	1	3	5	7	9	Troca Rápida (Meios usados para agilizar sua atividade)
Troca Rápida (Meios usados para agilizar sua atividade)	9	7	5	3	1	3	5	7	9	Incentivo (Premiação ou Reconhecimento)

Perfil do Respondente (trabalha ou trabalhou direto com operário)

Cargo: _____

Tempo no cargo: _____

Foi fácil entender as perguntas? Sim () Não ()

Se "Não" indique as questões que teve dificuldade: _____

Espaço para anotações e/ou comentários: _____

ANNEX B –RESEARCH INSTRUMENT IN MANDARIN

I



介紹

澳門大學正在進行一項關於知識管理的調研，根據您豐富的工作經驗，我們誠摯邀請您填寫如下問卷。本研究的目的旨在評估那些因素能夠更好地促進生產工作人員之間的知識分享。通過您幾分鐘的寶貴時間，將會使我們更能瞭解到如何在工場推廣知識管理。您儘管依據您的所想作答，因為這些問題並不包含您工作的隱私層面。

從現在開始，您的判斷將針對一些生產管理因素，譬如培訓，工作指引，5S 進行判斷。以下是一些說明，請使用同一標準來衡量以下各選項的重要程度。

結構：人力資源，材料和時間資源的角色和責任

溝通：信息、觀點、感覺的交換

激勵：物質的或認知的

指示

回答以下問題時，請記住此問卷的目的是旨在提高生產人員的知識分享效能

例子：對於一隊想要取得勝利的足球隊，請評量以下選項的重要性。

重要程度	描述
1	兩者同等重要
3	兩者比較上略微更重要
5	兩者比較上相當程度重要
7	兩者比較上非常重要
9	兩者比較上絕對重要

例子 A

球員的個人技術	9	7	5	3	1	X	5	7	9	球員間的關係
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此回答顯示，若要球隊取得勝利，對比球員的個人技術，球員間的關係為略微更重要。

例子 B

球員間的關係	9	X	5	3	1	2	5	7	9	比賽中的球迷數量
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此回答顯示，若要球隊取得勝利，對比球迷數量，球員間的關係為非常重要。

問題 1：對以下兩種促進生產人員知識分享的因素，哪一項對您來說較重要？

與同事的交談	9	7	5	3	1	3	5	7	9	更新工作指引
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更新工作指引	9	7	5	3	1	3	5	7	9	閱讀工作指引
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問題 2：對以下兩種促進生產人員之間交談的因素，哪一項對您來說較重要？

目的	9	7	5	3	1	3	5	7	9	組織結構
組織結構	9	7	5	3	1	3	5	7	9	溝通
溝通	9	7	5	3	1	3	5	7	9	培訓
培訓	9	7	5	3	1	3	5	7	9	個人特點
個人特點	9	7	5	3	1	3	5	7	9	人際關係
人際關係	9	7	5	3	1	3	5	7	9	解決問題方法
解決問題方法	9	7	5	3	1	3	5	7	9	工作指引
工作指引	9	7	5	3	1	3	5	7	9	SS
SS	9	7	5	3	1	3	5	7	9	零轉換
零轉換	9	7	5	3	1	3	5	7	9	快速轉換
快速轉換	9	7	5	3	1	3	5	7	9	獎勵

問題 3：對以下兩種促進更新工作指引的因素，那一項對您來說較重要？

目的	9	7	5	3	1	3	5	7	9	組織結構
組織結構	9	7	5	3	1	3	5	7	9	溝通
溝通	9	7	5	3	1	3	5	7	9	培訓
培訓	9	7	5	3	1	3	5	7	9	個人特點
個人特點	9	7	5	3	1	3	5	7	9	人際關係
人際關係	9	7	5	3	1	3	5	7	9	解決問題方法
解決問題方法	9	7	5	3	1	3	5	7	9	工作指引
工作指引	9	7	5	3	1	3	5	7	9	SS
SS	9	7	5	3	1	3	5	7	9	零轉換
零轉換	9	7	5	3	1	3	5	7	9	快速轉換
快速轉換	9	7	5	3	1	3	5	7	9	獎勵

問題 4：對以下兩種促進了解工作指引的因素，那一項對您來說較重要？

目的	9	7	5	3	1	3	5	7	9	組織結構
組織結構	9	7	5	3	1	3	5	7	9	溝通
溝通	9	7	5	3	1	3	5	7	9	培訓
培訓	9	7	5	3	1	3	5	7	9	個人特點
個人特點	9	7	5	3	1	3	5	7	9	人際關係
人際關係	9	7	5	3	1	3	5	7	9	解決問題方法
解決問題方法	9	7	5	3	1	3	5	7	9	工作指引
工作指引	9	7	5	3	1	3	5	7	9	SS
SS	9	7	5	3	1	3	5	7	9	零轉換
零轉換	9	7	5	3	1	3	5	7	9	快速轉換
快速轉換	9	7	5	3	1	3	5	7	9	獎勵

問題 5: 您從事該行業已多長時間? _____ (年)

問題 6: 您的職位是什麼?

- | | |
|-----------|---------------|
| 1) 總裁/副總裁 | 2) 高級經理 |
| 3) 經理 | 4) 副經理/主任 |
| 5) 組長 | 6) 工人 (轉問題 8) |

問題 7: 您任職管理層已多長時間? _____ (年)

問題 8: 請提供其他資訊

APPENDIX A- AHP COMPLETE RESULTS BRAZIL AND CHINA

	BRAZIL FACTORS								
	SOCIALIZATION			EXTERNALIZATION			INTENALIZATION		
	MANAGER	LEADER	OPERATOR	MANAGER	LEADER	OPERATOR	MANAGER	LEADER	OPERATOR
	86,0%	1,1%	56,5%	12,3%	9,9%	33,2%	1,8%	89,0%	10,3%
OBJETCIVE (OBJ)	0,0%	0,0%	0,1%	3,2%	3,3%	0,3%	0,1%	0,0%	0,6%
ESTRUCTURE (EST)	0,1%	0,0%	0,1%	28,9%	23,2%	0,3%	0,4%	0,0%	0,2%
COMUNICACION (COM)	0,9%	0,0%	0,3%	4,1%	3,3%	0,5%	0,1%	0,2%	0,9%
TRAINING (TRA)	8,1%	0,0%	1,0%	20,7%	23,2%	1,4%	0,4%	1,4%	2,8%
PERSONAL CHARACTERISTICS (PC)	0,9%	0,1%	1,2%	2,3%	4,6%	1,1%	0,1%	0,2%	1,4%
PERSONAL RELATIONSHIP (PR)	6,3%	0,9%	2,9%	0,3%	0,7%	2,2%	0,3%	1,4%	1,4%
INCENTIVE (INC)	11,3%	1,6%	51,7%	0,5%	18,0%	51,7%	9,2%	34,2%	37,8%
PROBLEM SOLVING METHOD (PSM)	0,9%	0,1%	4,8%	2,3%	0,1%	3,8%	1,3%	0,2%	4,1%
WORK INSTRUCTION (WI)	6,3%	0,9%	7,7%	16,1%	0,5%	6,7%	9,2%	1,0%	10,4%
5S	0,9%	8,5%	5,3%	2,3%	2,6%	2,8%	1,8%	6,8%	5,5%
MISTAKE PROOFING (MP)	8,1%	76,8%	14,1%	16,1%	18,0%	12,9%	12,9%	47,8%	27,1%
QUICK CHANGOVER (QC)	56,4%	11,0%	10,9%	3,2%	2,6%	11,7%	64,4%	6,8%	7,7%

	CHINA FACTORS								
	SOCIALIZATION			EXTERNALIZATION			INTENALIZATION		
	MANAGER	LEADER	OPERATOR	MANAGER	LEADER	OPERATOR	MANAGER	LEADER	OPERATOR
	42,9%	13,1%	23,9%	14,3%	26,1%	33,9%	42,9%	60,8%	42,1%
OBJETCIVE (OBJ)	3,4%	1,4%	8,7%	39,9%	13,7%	5,7%	3,4%	5,5%	7,6%
ESTRUCTURE (EST)	0,5%	0,4%	2,0%	8,0%	3,5%	2,0%	0,5%	1,6%	2,2%
COMUNICACION (COM)	3,4%	1,4%	7,4%	39,9%	6,7%	6,2%	3,4%	2,8%	6,3%
TRAINING (TRA)	23,9%	2,6%	6,7%	8,0%	10,6%	5,9%	23,9%	5,9%	5,3%
PERSONAL CHARACTERISTICS (PC)	4,8%	2,0%	3,3%	1,6%	4,6%	2,9%	4,8%	7,2%	3,5%
PERSONAL RELATIONSHIP (PR)	1,0%	2,5%	6,3%	0,3%	3,4%	3,0%	1,0%	5,8%	4,1%
INCENTIVE (INC)	23,9%	28,0%	17,8%	0,3%	10,3%	20,5%	23,9%	10,0%	18,9%
PROBLEM SOLVING METHOD (PSM)	4,8%	6,9%	11,7%	1,6%	10,3%	10,5%	4,8%	16,2%	10,2%
WORK INSTRUCTION (WI)	23,9%	17,7%	8,7%	0,3%	13,1%	9,3%	23,9%	20,7%	9,9%
5S	4,8%	12,3%	7,9%	0,1%	8,1%	8,9%	4,8%	7,1%	9,7%
MISTAKE PROOFING (MP)	1,0%	8,6%	10,0%	0,0%	7,7%	12,3%	1,0%	7,4%	12,1%
QUICK CHANGOVER (QC)	4,8%	16,2%	9,4%	0,1%	7,9%	12,8%	4,8%	9,7%	10,2%

Source: Author´s own production.

APPENDIX B- Interview with Managers that worked in the Electrical Factories Subsidiaries

I- INTERVIEWEE PROFILE

The interviewees were selected considering your knowledge with the electrical factory team in Brazil and in China was considered an interviewee has been worked in Brazil and China during a period of time and know the culture experience and two managers that are responsible for the production in both countries.

The interviews were made in 2020.

Table 3- Profile- Managers that Work in the Electrical Factories Subsidiaries

Job Function (CODE)	Business	Professional Experience (YEARS)	China Experience (YEARS)	Brazil Experience (YEARS)
Global Advanced Manufacture Engineering Manager (MG D)	Energy	20	6	14
Electrical Factory Manager China (MG S)	Energy	11	11	0
Global Advanced Manufacture Manager located in Brazil Electrical Factory (MG M)	Energy	11	0	11

Source: Author's own production.

II- INTERVIEW QUESTIONS

The questions were prepared with advisor's support, considering the AHP results, the intention was creating an environment able to capture the best AHP data analysis considering the experience with the interviewees.

The answers were used to identify how the workers learn and knowledge sharing in the shop floor and understand the differences between workers, leaders and managers in both countries.

During the interviews other questions was discussed and included in the next chapters.

Frame 2- Questionnaire- Plant Managers in Brazil and China

1. Why socialization is more important among managers and workers in Brazil? Why Brazil leaders think it is more important than internalization (study)?
2. Why in China does everyone think that internalization (study) is more important? Why does the Chinese manager give the same weight to internalization (study) and socialization (speak)?
3. How do new employees learn (internalize) new activities or practices?
4. What is the process currently used for knowledge transfer between workers?
5. Is the result presented above in line with what is currently practiced?
6. Related to people, why was there a strong emphasis on incentives?
7. How are these incentives in the company?
8. Managers also emphasized training. Why do you think it happened in both plants?
9. Regarding the processes, all of them are practically key at the same level of importance in the Chinese plant. However, in Brazil, there was a concentration in the processes of zero defect and quick change. Why do you think this happened?
10. Regarding zero defect and quick-change processes in Brazil, it pointed to a great weight for quick changes for the manager and zero defect for the leader, why do you think this happened? Brazilian workers also emphasize these two processes, why?

Source: Author's own production.

III- CRITERIA ANALYSIS

Table 4– Key Factor Comparisons- Brazil and China Electrical Factories- Part 1/3

Criteria and Alternatives	Electrical Factory Overall Results [%]								
	Brazil			China			Brazil	China	Overall
	Manager	Leader	Workers	Manager	Leader	Workers			
Soc	85.6	1.1	56.5	42.9	13.1	23.9	56.3	21.9	39.1
Ext	12.3	9.9	33.2	14.3	26.1	34.0	31.8	31.4	31.6
Int	1.8	89.0	10.3	42.9	60.8	42.1	11.9	46.6	29.3
Resp#	1	1	18	1	9	38	20	48	68

Source: Author's own production.

- II.1. Why in China everybody think that study is the most important criteria?
 II.2. Why manager in China give the same weight for study and speak?
 II.3. What is the process applied for knowledge sharing in Tianjin electrical factory?
 II.4. How the new workers learn the process today?
 II.5. Do you think that the results are aligned with the actual knowledge sharing process in Tianjin?

Meaning unit	Condensed meaning unit	Codes
(to be continue) Interviewed Manager M (MG M) <i>So, for me it is a bit of a surprise to have given such divergent result in the leader position.</i> <i>I understand that the leader here is the direct leader of the workers because I think it depends exactly on the moment you are saying that this was done research, 2018.</i> <i>Perhaps, the leader perception as direct from the workers, he thinks many people needs read process sheets, instructions, drawings, quality instructions, everything, with the form of what they are doing this is what really brings knowledge studying, right, what really, let's say, exactly where knowledge spreads, right, knowledge is established.</i> <i>I even found it a bit interesting because we as Brazilian, we like it a lot, I see the guy coming over on the other side a lot more and saying "how do you do that?" and the other one says, "Oh, this does it, like this, like this, that's how they said to do it". Much more than, you can see that they signalled themselves, Brazilian workers signalled this part of socialization than internalization and the vision that I understand most happens. I will not say that it is the most important, but I will say that it is what I see as a result in our electrical factory in Brazil, as true in</i>	Brazilian leader desire that workers study the documents. Brazilian workers learn speaking and passing knowledge one each other.	Internalization Socialization

Meaning unit	Condensed meaning unit	Codes
<i>Brazil.</i> <i>(to be continue)</i> <i>Chinese leaders, I think it is more related to the cultural aspect, because the leader and the workers, they will hardly, at the same hierarchical level, talk about what they must do.</i> <i>Usually, Chinese understands that they will assimilate the information better and know what he must do by looking at the document, following what the document is saying, so, Chinese has a lot more of this cultural aspect of "I follow what is written, what is written I follow".</i> <i>The Chinese manager's perception is also related to the desire there. In 2018 it was another guy who was there, I think he upset and left. But perhaps it is more related to the desire that people would also need to talk more among themselves, obviously believing that studying is important, but people talking and everything else would be an important form of knowledge transfer. I think that if I did a research today in China it would be very similar, the manager who is there today, should be very similar to this result.</i> <i>Today Brazilian workers learn by talking. All operators, for example, who come from "Formare" (internal workers preparation), most new operators today come from "Formare", and a lot of learning is socialized, it is socializing.</i> Interviewed 2- Manager D (MG D) <i>I think this is a characteristic of Brazil and China managers. We are not very formal in terms of writing paper, procedure, we place a lot of value on person - person contact. I think this is a similarity between Brazil and China. That is why I think that both the China manager and the Brazil manager, both valued this contact of speaking, to transmit knowledge.</i> <i>China receives a lot of input from Europe where stay hydro leadership and where the Chinese product need to export, Europe stays there, tutoring, over China, so Europe, I think, ends up passing on a little of its culture, which is a little more formal for China, so that is why there is also the part of studying for the Chinese manager. This must be influenced by the pressure from Europe, the incentive that Europe keeps doing so that they have everything documented, procedure, I think that must be why. I think Brazil and China are much more talkative, they value people's contact much more and write less.</i>	Chinese leaders understand that the workers assimilate information reading documents Chinese manager desire that workers studying the procedures Brazilian workers learn by talking Brazilian and Chinese managers valorise the personal contact and transfer knowledge speaking. Brazilian and Chinese are much more talkative, but China receive a pressure for	Internalization Internalization Socialization Socialization Socialization and Internalization Socialization and Internalization

Meaning unit	Condensed meaning unit	Codes
<i>The Brazilian worker is also giving more value to speaking, I mean, you</i> <i>(to be continue)</i> <i>see that the worker is aligned with the manager. I didn't even answer a piece of the previous question about the leader. Here is saying that the leader valued studying.</i> <i>I think the leader is looking to become a little more professional, to leave informality, to be a little more formal, that is why the leader in both situations, as he is that guy, he is not the worker, but he is also not the manager there, he is a guy who is becoming professional, he is going from worker to employee manager.</i> <i>He understands the need to be formal, to follow the procedure, when audits hit the head of the leader, he is not following the procedure, so I think that's why he valued studying.</i> <i>Just to finish closing the previous question of leader, speaking now of the worker, the Brazilian worker I think he is a guy who is also talking, he is not very formalized, more informal, aligned with the manager, maybe even with, I don't know, background that they have all this, little study.</i> <i>The Chinese, he valued more studying too, but you see that he was not so far from the others. For the minor there of writing, it was close to writing, it was a little more distant from speaking, but the dissipation of the values of the Chinese worker was less than that of the Brazilian worker, there was more dispersion.</i> <i>Anyway, the Chinese worker, maybe he is, maybe the Chinese leader is managing to align himself more with his worker, passing his concern of having a document. I think the Chinese leader manages to have more ancestry, to have more influence on the behaviour of the worker.</i> <i>Chinese culture has this ... "follow the boss." If the boss tells you to do something wrong, you will do something wrong, without question.</i> <i>So, I think the ancestry of the Chinese leader over his followers is greater than here in Brazil.</i> <i>Here in Brazil the impression he gives is that everyone stayed in his</i>	quality, and they are influenced by Europe that your main customer. Brazilian manager and worker giving more value to speaking, leaders valued studying. Leaders recognize the importance of study as the way of receiving knowledge. Brazilian workers are concentrated more in speaking and Chinese presented study first but less dispersion with other criteria.	Internalization Socialization and Internalization Internalization

Meaning unit	Condensed meaning unit	Codes
<i>comfort zone where he wants to be, right.</i> <i>(to be continue)</i> <i>I think it's talking. As, for example, this questionnaire was made only in an electrical factory, it is a very repetitive activity, very mechanical there. As much as there is a procedure there, a procedure that will give you a criterion for something, a sequence of operations. But the person will learn even from another person who is doing it, who already knows how to do the job. So, I think that both here and there it ends up happening more. Also due to our lack of formality, having a lot of procedure, a lot of written document.</i> Interviewed 3- Manager S (MG S) <i>The survey wonders to know the worker is thinking, the best way to share the knowledge, right? And then we ask the manager and the leader to give the comments. In Brazil I see the result is fully aligned between the manager and worker, right? Workers said they prefer to talk to each other to share the knowledge and the manager comment the same result of the workers but in China we see some difference. That's the data you showed to us, right?</i> <i>I can say also it's normal, I see the same thing in the workshop even from myself, right? I think it's kind of a culture things... like we say new things. Sometimes we don't feel ashamed to ask somebody opinion or how to do it. So, we like to learn by ourselves because we want to demonstrate I have this ability, to do it by myself. I think that is kind of culture thing. But I cannot say 100% sure the thing is still like I imagine because not was that I take over I also see some cases that the workers discuss to each other to share to each other what was made for today operation. Do you have any support, do you have any idea to help me to solve the problem? But I think this the change we are seeing but in a traditional way I see the Chinese people want to do it first by ourselves and then to ask help to others. So, for me, my personal point of view that is a culture think for sure. I don't know I've answered your question, that is my understanding.</i> <i>I think it is the part of the thing specially for new workers you know. Then you can imagine if we have the workers working together for more than five years or even three years, some problems when they fix, they talk to each other. I think that is maybe more specific for new workers,</i>	Chinese workers like to learn first and demonstrate his ability. Chinese workers with more experience transfer knowledge each other speaking.	Socialization Socialization

Meaning unit	Condensed meaning unit	Codes
<i>for the newcomers in the organization face the procedure they would like</i> <i>(conclusion)</i> <i>to learn by themselves and then ask for help for other people as the second choice.</i> <i>So, I think when they know each other in a period of they can, they would like to talk to each other rather than just looking to the process, procedure, or documentation.</i> <i>We are now more focused on lean, also in the factory we have a program we call lean development program.</i> <i>So, we invite workers to join the lean program to development their lean skill and the lean tools. Like you imagine the problem solving and all the lean tools to solve the day to day, to use in the day-to-day operations. So yes, now in China, special in GE in China, lean concept is more and more applied and trained for all the workers. And workers are more and more engaged on this topic.</i>	Lean program helps Chinese workers to learn and knowledge sharing.	Internalization

IV- PEOPLE ANALYSIS

Table 4– Key Factor Comparisons- Brazil and China Electrical Factories- Part 2/3

Criteria and Alternatives		Electrical Factory Overall Results [%]								
		Brazil			China			Brazil	China	Overall
		Manager	Leader	Workers	Manager	Leader	Workers			
People	Obj	0.4	0.3	0.2	8.5	7.1	7.2	0.3	7.6	3.9
	Est	3.7	2.3	0.2	1.5	1.9	2.1	2.4	1.9	1.9
	Com	1.3	0.5	0.4	8.5	3.6	6.5	0.7	6.2	3.5
	Tra	9.5	3.5	1.3	11.6	6.7	5.8	4.8	8.1	6.4
	Inc	9.9	32.2	51.8	14.9	12.4	19.2	31.3	15.5	23.4
	PC	5.4	1.3	2.5	5.1	4.8	4.3	0.9	4.1	2.5
	PR	1.1	0.6	1.2	3.2	5.9	3.2	3.1	4.7	3.9
Resp#		1	1	18	1	9	38	20	48	68

Source: Author's own production.

III.1. Related people, why was there a strong emphasis on incentive?

III.2. How are these incentives in the company?

III.3. Managers emphasized training, why do you think these occurred in both plants?

Meaning unit	Condensed meaning unit	Codes
(to be continue) Interviewed Manager M (MG M) <i>I think that, therefore, the availability of procedures exists. But it is one thing to have availability and another thing to have recurrence in what exists. So, today I see in Brazil as having little incentive in this structuring to study for new workers. I'm not saying it's ideal, okay, I'm saying it's what we're living for.</i> <i>We have a skill matrix within the organization, in the factory, that you have from level 1 to level 4. According the knowledge and behaviours you say “this guy has skill level 1, this one has level 2, 3 and 4” and the more you become a senior, becoming a multiplier of knowledge, more you go up in this scale’s matrix and consequently, more you will increase your salary, increasing your positioning, your level within the organization.</i> <i>I think it is the dream of every manager and training is one of the priorities, right?</i> Interviewed 2- Manager D (MGD) <i>I think that encouraged the other word that we spoke before is ... motivation. I understand that who answered that there was understanding that the incentive comes from the contact, from the interpersonal relationship between the leader and the led.</i> <i>So, I think they recognize that this is important, that this human contact between the leader and the led helps, is the main lever to be able to make the motivation and incentive for people. And this can be in the form of a compliment, an orientation, having a cup of coffee together, feeling close to the person.</i> <i>But the training that appeared there, which we had already mentioned before, in China has a lot of training, more than here. In China it is very common to have training outside, or inside our factory.</i> <i>They value that very much. I don't know, if it is so much for the knowledge that is transmitted in the training or for the fact that you get a person, I think there is this in China, you take a team member of yours and say “I will give you a training!” and put him in a room, in an environment there to receive training from another person, I think the team member feels very valued with this. But I think he feels valued with training.</i> Interviewed 3- Manager S (MG S) <i>Yes, it’s clear what you just explained, for my understanding incentive means all the workers in Brazil and China they took the survey, according my understanding they will share some knowledge to others</i>	Knowledge growing impact in the salary. Managers desire train the workers. The workers incentive is the recognizing from the managers and leaders. Training as an incentive.	Incentive Training Incentive Incentive

Meaning unit	Condensed meaning unit	Codes
(conclusion) <i>they want to get some award from company, right?</i> <i>If I understand well. Yes, but that's my concern or my question. I don't know if the survey in China we properly translate the meaning of incentive.</i> <i>Because in our workshop, we are not doing knowledge sharing, like I mentioned, now we have the lean, lean develop program (LDP), so we select these people to join the program. We will ask them to share the knowledge or lessons learned to other people. But for sure we will give an extra award but not only for knowledge sharing, for they has been selected for this program and for other aspect like the EHS Quality, we have the EHS alert and Quality alert this will be shared by the workers but we will not give them some award.</i> <i>So, it's a little bit different in my understanding or on my observations. So I'm concerned or awarding if we gave the property translation for this incentive when we did the survey.</i> <i>For incentive I have one more comment. Like Adilson said, what I want to say is that the worker is more focused in the incentive but not on money. Because they want to have the opportunity to grow. To explore in this sharing session, sharing activities. That is what I think the people, why they said this is the most important thing, not only focused on the money, that's the point I want to say. That is my comments for incentive.</i> <i>For us, in the manufacturing side training is always an important thing. Because we need to have the worker to know all the requirements, all the procedures, right? So, training would be the first step to bring them into his stage. That's why I think, I agree with Adilson and Marcelo, so I agree with him. So, we always thing that training is much more important for workers to learn the knowledge first and then they can share, but they need to learn at the first stage. They need to know the rules, procedures, all the quality requirements, the safety requirements in the work environment and then they can work, right? But that's why we always think that training is an important thing. For me I have the same feeling that Adilson talked also.</i> <i>I think, for my understanding, maybe is related to the way we are working in China, so we everything we want to have a clear objective, or target. And then we can define actions, define other things according to it. But I think that's why you see the managers, the leaders and the workers think that objective is a very important thing. That's more related to the things, the way we are working, we want to have a clear objective at first, and then we can move forward.</i> <i>For me, I don't think objective is a kind of culture thing, because I think if you make this survey in the factory, in the manufacturing side, most people will see I need to know what will be the target, what will be the objective and then I can proceed. If you do the survey in other industry maybe in some, I don't know how to say, other industry not in the factory maybe they will give us a different answer.</i>	Sometimes incentive is an award for some employee. Selection workers to participate in lean program. Workers see the opportunity to grow. Chinese workers believe that training is important to learn. Chinese consider so important to have clear objective identified.	Incentive Incentive Incentive Training Objective

V- PROCESS ANALYSIS

Table 4– Key Factor Comparisons- Brazil and China Electrical Factories- Part 3/3

Criteria and Alternatives		Electrical Factory Overall Results [%]								
		Brazil			China			Brazil	China	Overall
		Manager	Leader	Workers	Manager	Leader	Workers			
Process	PSM	1.1	0.2	4.4	25.4	13.5	10.7	1.9	16.5	9.2
	WI	7.5	0.9	7.6	14.9	18.3	9.4	5.4	14.2	9.8
	5S	1.1	6.4	4.5	3.0	8.1	9.0	4.0	6.7	5.3
	MP	9.1	45.2	15.1	0.6	7.6	11.7	23.1	6.6	14.9
	QC	50.0	6.5	10.8	3.0	10.1	10.9	22.4	8.0	15.2
Resp#		1	1	18	1	9	38	20	48	68

Source: Author's own production.

IV.1. Regarding process, all are practically important in the same level for Tianjin workers and in Brazil was concentrated in mistake proofing and quick change. Why do you think that these occurred?

IV.2. Tianjin Manager gave more emphasis for PSM and WI and Taubate manager more emphasis for MP and QC. Why do you think that these occurred?

IV.3. Why Tianjin leaders gave more emphasis for all process and Brazil leader gave more importance to MP and QC?

Meaning unit	Condensed meaning unit	Codes
(to be continue) Interviewed Manager M (MG M) <i>The reading I do is also related to maybe the time you did, for the leader who was directly connected to the operation, he was suffering a lot with quality problems, so systems that were able to detect, like error proofing, to generate zero defects, for him that was a priority.</i> <i>Manager, on the other hand, all that quality problem and everything, was causing loss of productivity, loss of cost and speed. It turned out that the interpretation here, I think it is more important for a manager to think together with the workers.</i> <i>Workers see that the percentage of them also for defects is quite large, because the pressure was very focused on this scenario.</i> <i>At the same time, quick change is important because it facilitates the delivery they have to make at the end of the day.</i> <i>So I think that the perception of being a quick change manager and worker is because, one is thinking about financial result and other thinking about agility of their work, and more or less there as a priority the issue of error proofing is due to the scenario that, really, if I have a</i> (to be continue)	Brazilian manager and workers want to solve quality problems using tools. Brazilian manager thinks about delivery on time impact.	Error proofing, Zero defects Quick change

Meaning unit	Condensed meaning unit	Codes
<i>system that doesn't allow me to cause a defect, it has to be a priority. First of all, thinking about leadership, both the manager and the leader are analytical, so the guys say, what we talked about, method and problem solving, prioritizing this will bring me a result and I work on the work instructions, prioritize the work instructions will also bring me a result. They see this as important for the analytical culture of the Chinese people.</i> <i>The Chinese worker's mix is interesting, even the 5S started prioritizing. I don't have much of an opinion about that column.</i> Interviewed 2- Manager D (MG D) <i>I can see that ... that's what I would have imagined. This dispersion, not the worker. Chinese workers to be so tied I have no idea. I don't know. But speaking of leaders and managers and speaking of Brazil and China, I think that our Brazilian profile here is less bureaucratic, because of these first 3 tools here, they are more bureaucratic process tools, and the last two are more practical, they are more hands on. And I think that the Brazilian is much more interested in a practical result faster than the Chinese.</i> <i>The Chinese gives the impression that he is more focused on a more bureaucratic solution, not in the pejorative sense of the thing, but he is trying to find ... he values a little more the more bureaucratic ways of these concepts that are more elaborate behind, that in the end maybe fall in those last two here, probably. And again, probably because they get a lot of influence from European culture, they are more bureaucratic, they are more structured, they want to structure things more, bureaucratize things a little more and that matches my view of the Chinese way of being, of thinking.</i> <i>I think the Brazilian knows how to do it. I think he has little patience to keep elaborating a lot, you know, he already wants to go to the finals, he already wants to go to action.</i> <i>The Chinese, as the factory is kind of new and there is always a big job rotation there, every time people change there, I think they have less knowledge than the Brazilian, less practical knowledge in the factory. So, he ends up relying more on tools, to help him understand the process.</i> Interviewed 3- Manager S (MG S) <i>I think, for my understanding, I think all this answers maybe different, in different stages, different period. I think back two years ago, I think we were suffering some problems for quality and manufacturing. So as the manager, for sure, I want all my employee have the skills to solve all the problems we are facing, right? That's I think why workers put this as his top priority and working instructions, I think we want all the thinks has been done properly, right? And right in the first time.</i> <i>So, the right work instruction will be the most important think for the workers. Because all of them will follow the work instruction, right? If</i> (conclusion)	Chinese workers want to prioritize all the process. Brazilian workers more interested in a practical result faster Chinese workers more interested in make the job according procedures. Brazilian workers more maturity, Chinese workers great job rotation. Quality issues in China during interview period influence the	Process and tools Process and tools Process and tools Workers experience

Meaning unit	Condensed meaning unit	Codes
<i>the work instruction is good, good quality, it means the worker has less opportunity to do mistake. And we can have a good result in terms of EHS, quality and operative, right? So, I think that's why, especially for the manager and the leaders, think these two levers are most important. That's what I can see because two years ago I was not here. But I think</i> <i>list won't be change in different period, especially for the manufacturing sides. For example, for now in this year, maybe our quality is stable or EHS is stable, maybe we can focus in other levels. That's my perspective.</i>	manager answer	Process and tools

APPENDIX C- Interview with Managers that Worked with Workers in Brazil and China in Different Industrial Business

VI- INTERVIEWEE PROFILE

The interviewees were selected with the conditions that the professional has the experience to leading workers in the industrial environment in both countries Brazil and China. The interviews were made in 2019 and 2020.

Profile - Managers that Worked in Brazil and China in Industrial Environment

Job Function (CODE)	Business	Professional Experience (YEARS)	China Experience (YEARS)	Brazil Experience (YEARS)	Nationality
Advanced Manufacture Engineering Manager (MG1)	Energy	20	6	14	Brazilian
Operation Director (DIR1)	Automotive	30	5	25	Brazilian
Process Developing Supervisor (ENG 1)	Automotive	20	1	19	Brazilian
Acquisition Director (DIR2)	Automotive	22	3	19	Brazilian
Commercial Manager (COM 1)	Infrastructure	8	4	4	Chinese
Commercial Manager (COM 2)	Infrastructure	7	2	5	Chinese

Source: Author's own production.

VII- INTERVIEW QUESTIONS

The questions were prepared with advisor's support, considering the culture comparison for both countries, the intention was creating an environment able to capture the best comparison considering the experience with the interviewees when they worked with the workers in the countries and how they feeling the main characteristics and cultures differences.

The answers were used to identify how the workers learn and knowledge sharing in the shop floor and the interaction between workers and the main stakeholders.

Frame 1– Questionnaire- Leaders worked in Brazil and China

1- What are the characteristics of Brazilian and Chinese workers?	<i>(to be continue)</i>
2- What is the difference between Brazilian and Chinese workers?	
3- How does the Brazilian manager deal with Brazilian workers?	
4-How does the Chinese manager deal with Chinese workers?	
5- What's the incentive approach to Brazilian workers?	
6- What's the incentive approach to Chinese workers?	
7- What's the punishing approach to Brazilian workers?	
8- What's the punishing approach to Chinese workers?	
9- How is the Union influence over the Brazilian worker?	
10- How is the Union influence over the Chinese worker?	
11- What are the personal values of the Brazilian workers?	
12- What are the personal values of the Chinese workers?	
13- What are the personal characteristics of Brazilian workers and Chinese workers?	

14- What are the organization systems in Chinese companies?	(conclusion)
15- What are the organization systems in Brazilian companies?	
16- How does the Chinese worker work/deal with other workers?	
17- How does the Brazilian worker work/deal with other workers?	
18- What were the difficulties encountered when you were working with the Chinese/Brazilian?	
19- How did you overcome them? Any examples?	
20- What are the similarities between Brazilian and Chinese workers?	
21- Why do you think such problems/difficulties occur?	
22- What are the similarities between Brazilian and Chinese workers?	
23- How do the Brazilian workers share knowledge and experience in the industrial environment?	
24- How do the Chinese workers share knowledge and experience in the industrial environment?	
25- What's the concern about sharing knowledge in the Brazilian companies?	
26- What's the concern about sharing knowledge in the Chinese companies?	

Source: Author's own production.

VIII- DATA COLLECTION AND ANALYSIS

Was applied the questionnaire above for all interviewees, each interview was recorded, totally transcribed, included in the meaning unit column, after that was condensed the main subjects that the interviewee mentioned and defined a code.

The first column presents the meaning units that were extracted from interview transcripts (the extraction of meaning units from these transcripts constitutes the first step of the interpretation process). The second column provides condensed meaning units, which are interpreted from the meaning units in the first column; one meaning unit may contain more than one condensed meaning unit. The third column indicates the concepts that were produced by comparing several condensed meaning units; these concepts represent the final results of the interpretation process.

To validate the coding process and the interpretations of researchers, after each analysis and data reduction all of the meaning units and condensed meaning units were presented and discussed with each interviewee; this procedure enabled the interviewees to verify that these meaning units and condensed meaning units faithfully represented the sentiments that they wished to communicate. (Nakano et al., 2013)

IX- COLLECTED ANSWERS- INTERVIEWED MANAGER 1 (MG 1)

Meaning unit	Condensed meaning unit	Codes
Interviewed Manager 1(MG 1) <i>The Brazilian worker is afraid of losing his/her job, while the Chinese comes from a communist policy, where companies are more preventive, the chance of him/her losing his/her job would be smaller, but today there are many companies that do not belong to the government. What happens is that China has been experiencing economic growth for a long time, so China is in a position to full employment chances, which makes the company be the showcase of the employee, who can change it at any time. Brazilians are more afraid of losing their job and because of this they</i>	<i>(to be continue)</i> Afraid of losing his job Economic growth Afraid of losing his job	Job Security High Context Job Security

Meaning unit	Condensed meaning unit	Codes
(to be continue) strive a little more, focus on showing results, growing. They have the ambition to become a boss. The Brazilian employee studies more, is always looking for opportunities, even if it is outside the company. In Brazil, employees seek more knowledge. Brazilians even pursue specializations and master's degrees, while in China you won't see many employees with master's degrees, because once the Chinese are employed, he ends up accommodating himself. The Chinese union is strong, with its well-structured office being the government. The guy in the union checks out every week. In Brazil, when the employee does something stupid, he ends up being fired, there (China) you don't see much of it, the Chinese end up changing the employee of area trying to get it right, in other words, there are employees who have already expired and yet are in the company. Brazilian likes recognition doesn't need promotion, but a recognition of the boss, while the Chinese wants a financial pleasure and recognition in public, he wants people around to see the boss happy with his work (Guanxi) (do not lose the face - lost face) I think multinational company from China still does this, in the past I know they used to, but I'm not sure right now. So, when the head of the area sees that an employee worked well he usually gives a financial incentive at the end of the month that generates incredible benefits because this buys people's engagement, employees sometimes work so hard that they even disrespect the EHS, but they meet the deadline. While the Brazilian works within certain limits, it imposes a little more limit to make an extra effort, while in China these limits are a little more flexible, so it has this advantage for China, because it manages to accelerate more. In China there is a little more whip in hand, there is a lot of obedience, "I say, and you do it without question it", if someone at the top hierarchical level told you to do something just do it. Here in Brazil there is a greater freedom and questioning, "have you thought about it?" "Couldn't this cause a problem?" so, the Brazilian worker is a little more conscious and there is a more open dialog that differs from China.	Union is strong Recognition, Guaxi, not lose the face Financial incentive there is a lot of obedience, "I say, and you do it without question it", greater freedom and questioning, "have you thought about it?" "Couldn't this cause a problem?"	High Context Guanxi High context Authority Transparency

Meaning unit	Condensed meaning unit	Codes
(conclusion) <i>As for the punishment: Here in Brazil the punishment is based on the law and is something more paternalistic. In China punishment is easier, "someone questioned?" - The boss is going to have the employee come to work on the weekend (Saturday and Sunday) without gaining anything.</i> <i>I didn't have contact with the Chinese union, what I know is that in China there is a fourth element to be considered beyond the company - union - employee relationship, it exists a fourth element that is the communist party.</i> <i>There are people who will work with the communist party brooch. The union within the company is as if it were a government representative within the company. Example, outside of the company, an employee became pregnant with the second child, then the union guy ordered the boss to dismiss this pregnant person because she was against the law. Here the official seeks to defend the worker more but is also a little. In China there is a better camaraderie/ companionship than here because people are more committed to each other (compliments of each other), here in Brazil it is easier to find one employee handing over the other who is doing something wrong and in China no, they are more compliant and help each other more.</i> <i>The personal value that stands out does not come to the head now. According to my experience in Brazil and China companies, the structure of values in Brazil and China are the same values but the reaction is different, in Brazil there is a tendency to try to understand and adjust the company policy, already in the China they do not make as much effort to fit in effectively.</i> <i>From top to bottom is the same structure, but the reaction from the bottom up in China is different, the Chinese have the culture of not saying no but it will continue to work in the same way, that is already cultural.</i> <i>Chinese leaders have a very strong ascendancy who are most influential in changing their behaviour due to punishment and the culture of obeying the leader. Foreigners must try to convince the boss straight to get something, then he cascades down if necessary.</i> <i>There is complicity, already in Brazil we have "internal customers" (relation welded structure and machining) here in Brazil if one receives bad things from another area, the complaint will be made to those who have failed, in China this does not happen because managers are close friends. "A practical case is that a piece entered a vertical lathe machine and was missing material and they stopped the piece and called the welders to weld that area, this occurred in 2011, with the 6 units in the case, ie did not resolve the root cause.</i>	punishment company - union - employee relationship, it exists a fourth element that is the communist party. The union within the company compliments of each other obeying the leader complicity, managers are close friends	Authority High Context High Context Guanxi Authority Authority

X- QUESTIONS AND ANSWERS- INTERVIEWEE DIRECTOR 1 (DIR 1)

Meaning unit	Condensed meaning unit	Codes
(to be continue) Interviewed Director 1(DIR 1) <i>The Brazilian worker is very unproductive and undisciplined, but has an easy relationship, for example if an employee is motivated, he can pass it on to the others. On the other hand, the Chinese worker is proactive, enjoys learning, has no limitation of day and time, considers their entity like their own business. The problem with China is that the Chinese don't like to pass the knowledge to the other, for fear of losing the vacancy, so it's difficult to work in teams with them.</i> <i>When Chinese people don't know how to do an activity, they won't ask you how to do it, they will keep trying to do it until the problem explodes, and if you get someone to help him, you will create a relationship problem because they don't appreciate it. It's a strong characteristic of the Chinese, I can say that it was like this in the two companies that I've worked, including the one that I was vice president.</i> <i>Two Chinese people sitting side by side prefer to send an email than talk to the person, all to avoid losing their job.</i> <i>A similar characteristic between Chinese and Brazilian workers is that they both respect authorities.</i> <i>The Brazilian manager has less strength of authority and more commitment than the Chinese, in other words, in China the hierarchy is very strong and important, sometimes the boss is a military man. The hierarchy of the Chinese company is like an army, the Chinese bosses don't even talk to the factory floor workers, however he treats all employees equally, without personal colleagues and always respecting the hierarchy. The Brazilian bosses usually have a commitment and a strong relationship with everyone around him.</i> <i>In Brazil the motivation is based on inspiring the workers to feel proud to belong in that organization, the company make this happen through a bunch of programs like program of veterans, improvement programs, awards, program of breaking barriers etc. They even offer dinners and coffee with directors and superiors, all to make them to feel part of the team. Often this relationship and programs are more motivational than the salary itself.</i> <i>On the other hand, the Chinese are through recognition, when something is done, they like to be exalted, they don't feel part of a team, they don't have a loyalty link, a slightly better financial aspect is enough for a worker to change the area independently of any relationship that was built between the worker and the boss.</i> <i>In Brazil they talk in privately and explain in a transparent way.</i> <i>In China it is already based on the assumption that the employee knows how to do the job, so they draw attention as if the mistake was an act of</i>	fear of losing the vacancy avoid losing their job both respect authorities commitment and a strong motivation is based on inspiring the workers are through recognition, when something is done, they like to be exalted privately and explain in a transparent way	Job Security Job Security Authority Transparency Guanxi Transparency

(conclusion) indiscipline. <i>Example given at the end: The Chinese have a huge advantage of learning, to the point of being so proactive that it leads to big mistakes like skipping approvals, for example, the Chinese are born buyers, so when they see a demand they already quote, then buy and apply, even if is not their function, and by skipping steps and approvals like that creates a huge problem for the company.</i>	based on the assumption that the employee knows how to do the job	Low Context
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XI- QUESTIONS AND ANSWERS- INTERVIEWEE SUPERVISOR 1 (ENG 1)

Meaning unit	Condensed meaning unit	Codes
(to be continue) Interviewed SUPERVISOR 1(ENG 1) <i>The company started from zero. In this aspect, it is easier to "convince" the employee, because they have no knowledge, they are learning. The employees who were hired at that time received the lowest possible salary. Some had experience from other companies but for others, it was the first time working at a factory, most of them were farmworkers. First difference noticed was the commitment. There was a big difference between the staff and blue-collar workers. They were used to do just what was asked for, not spending one more minute after the time to clock out. The white-collar workers were the opposite. This difference was the first noticed between Brazilian and Chinese workers. Other point was the requirement level for hiring.</i> <i>In Brazil, to work in an automotive industry, it's necessary to have a level of education or a technical course is required. In China, it was not necessary at that time. It was not needed to have any qualification. The person could leave the field and go straight to work at the factory. It was just be interested in it.</i> <i>A minimum level of education is required of a Brazilian employee and training is given so that they can handle their activities. And there are "steps" that blue collar workers can achieve, they are motivated to step up.</i> <i>There was not much incentive. The region where the factory is located, southeast, is highly evolved, developed and with financial resources. Most companies are in that region.</i> <i>There was a delay considering some inputs that the West side already had in that time. For example, while the world was running an anti-</i> (to be continue) <i>smoking campaign at the time, they were encouraging the Chinese to smoke. The company was not concerned about having a program to motivate blue collar workers. Just being hired was a big motivation. Nothing more was necessary, like offering a scholarship, for example. When needed, the task was given to production supervisors. But of</i>	The employees who were hired at that time received the lowest possible salary. A minimum level of education is required of a Brazilian employee The company was not concerned about having a program to motivate blue collar workers	Low Context Low Context Low Context

Meaning unit	Condensed meaning unit	Codes
(to be continue) course, it was "top down". The warning to punish the employee used to come from the Brazilian managers, but it was applied by the supervisors. The employee was warned once or twice and then was fired. But it was common to have a conversation with the employee, explaining the reasons related to unacceptable behaviour or poor results. It was very easy to end an employment contract by the law, for both employer and employee. When the employees didn't want to work in the factory anymore, they simply disappeared. There was no bureaucracy, it was not necessary to sign anything, it was very simple. It was easy to fire the employee or ask to be fired. During the period, no union or employees' claims were seen. The Communist Party of China (CPC) has a significant influence in commercial networks, sometime the company was competing with Chinese factors, they were producing similar products but selling on low price, it was the price of our raw material. Their raw material was subsidized by the CPC, it was hard to compete. Another example: the company wanted to make a contract to be able to impose a fine when the lights went out and we lost production numbers. But the energy company belonged to the Government, how to sue the Government? The electricity was given by them, but talking about the Union, we didn't see anything in this period. The culture is very different, but the personal values are very similar. The basic principles are the same. But comparing behaviour, Brazilians usually hang out with co-workers. The Chinese don't do it: they don't go to each other's houses neither go out with a co-worker. When a Chinese invites you to go to his house you must be honoured, it's not common. When it happens, it's because they trust you, and consider you a special person. The Brazilians are the opposite: they start working with a person in a day and in the day after invite to their house. Chinese's are always smiling, they never say 'no', but they don't give way to intimacy. The Chinese hierarchical structure was like Brazilian one. There was a Plant Manager and each area had a manager. At the beginning it was mixed Brazilians and Chinese. The controller was Chinese. Quality and Process Engineering managers were Brazilians. Sales manager was Brazilian. Maintenance manager was Chinese, it was really mixed. We saw physical aggression between Chinese many times. And it was a reason to fire an employee, as in Brazil it is. But it happened a lot. At the beginning, parts movement was manual, there were no robots. There were 2 or 3 operators in each machine to dimension and to load-unload it. It was common an operator guess that was working more than the another operator. It was enough to start a discussion and aggression. Sometimes they could hide it, but when the managers found out it, they were fired. To most of them were the first time working at a factory, most of them were farmworkers, they weren't aware of the rules or their acts consequences. Discussions were daily, all the time Most of them were around 35 years.	It was very easy to end an employment contract by the law no union or employees' claims were seen When a Chinese invites you to go to his house you must be honoured Chinese hierarchical structure was like Brazilian one was common an operator guess that was working more than the other operator most of them were the first time working at a	Low Context High Context Traditionalism Authority High Context High Context

Meaning unit	Condensed meaning unit	Codes
(conclusion) <i>Example: there were some operators that used to take a rest during the day for 30 minutes and I couldn't understand the reason. After that period, they come back to work. The HR manager explained that they didn't have resistance to work 8h, considering the unbalanced feed they had during childhood (grass soup). The nutrient deficiency was very big, they couldn't develop.</i> <i>It was not possible to talk to the operators and supervisors, they didn't t speak English. It was necessary to take a manager to translate for us. In administrative area everybody spoke English. It was very easy to make them follow the rules, the procedures. They were not very disciplined but also not reactive to follow the procedures. They never said no.</i> <i>Sometimes they didn't t do something because were not able to do. But it is easy to work with them, they are friendly. They are not very committed but follow the procedures. The biggest problem was the language. Most of the time we needed someone to speak Chinese so as we could communicate. Example, if we need to rework a tool, it was necessary to wait someone, to explain in English and this person could explain in Chinese. It took a lot of time to make any tooling or maintenance modification or implementation. and it was very difficult to explain it to Brazilian leadership team.</i> <i>Machines: they purchased around 30 machines to the production line. Most of them were Chinese. It was very difficult to work with it, machines didn't have repeatability.</i> <i>Blue collar: daily challenge, they didn't have any experience.</i> <i>We used to sell more to China and Africa. Most of information was systematized, technical documentation was given to manufacturing area with dimension information of the product and machine set up information. The same concept we had in Brazil we took to China, we cannot have the information in mind of the operator, we used to call them "heroes". For example, you have a problem in the production line, and you must ask to some operator in his house in a Sunday because nobody know what must to be done. We don't have this "hero" anymore, The company is always looking for continuous improvement and process control to be dependent of the system, not of the operator.</i> <i>The same concept of technical documentation was taken to China.</i> <i>Sometimes we registered a set up machine information and after 2 weeks we couldn't use it anymore. Brazilian employees were taken to China to share knowledge and support the factory. Employee rotation was done for 5 years. The turnover of Chinese employees was very high. We didn't have a backup training. The operators just knew how to push a button. If was necessary, some big intervention in the machine it was necessary Brazilian support. It was not done a training strategy.</i> <i>In Brazil is very common to see operators that don't share the knowledge or develop a co-worker because they are afraid of losing their jobs. It's not very common anymore, but it happens sometimes.</i> <i>The relationship between the co-workers was very friendly. They knowledge was limited, mas they used to share the information, they were not afraid of losing their jobs.</i>	factory, most of them were farmworkers They are not very committed but follow the procedures. Most of information was systematized , technical documentation was given to manufacturing area turnover of Chinese employees was very high they are afraid of losing their jobs	Transparency Transparency High context Job Security

XII- QUESTIONS AND ANSWERS- INTERVIEWEE DIRECTOR 2 (DIR 2)

Meaning unit	Condensed meaning unit	Codes
(to be continue) Interviewed DIRECTOR 2(DIR 2) Development zones were built on the coast (Shanghai, Beijing), cities (districts) were built with infrastructure to receive the companies, but operators came from all over China, with accommodations to up to 40 thousand people. You can have one child (pays tax if more). Most of them didn't take the family together but used to send money to them. Depending on the job post, the shared the room with 2 people (supervisor, for example), or 7 people (blue collar). Most of them was not qualified, with no experience, and came from the fields. Weekly, they had to do a shift rotation, to avoid the workers, find another job in the period they were supposed to be at home. The Chinese were not very committed with the companies, they wanted just to make money. There was a big turnover that time, for a short amount of money they quit their jobs. At that time, it was very common to have outsourced employees in government companies, and it helped our company when it was necessary to have the statistics of layoffs and hiring. In crises, you didn't fire from your company, but the outsourced employees. The operators were not qualified, not proactive. You couldn't wait anything else than you asked for been done. The hierarchical structure was very important, starting at the accommodations, considering the post to have the division of the rooms. The factory started from zero. At the ramp up, we started using "paper random": red, yellow, and green. Green: production rate higher than expected, we used to celebrate with the employees, to demonstrate recognition. It is not very common here in Brazil, but in China, the managers used to some handwork. In short, employees with low qualification, little proactivity, low commitment, very high turnover and basically the operator was working to support the family. Language challenge: Only the managers spoke English, but at the time it was difficult to find engineers that did the same. For example, if RMB 5000 was paid to an engineer who did not speak Chinese, RMB 10,000 was paid for the one who did. Usually, in that development zones, most of the companies were multinationals, so English was needed. Managers learned a little mandarin to communicate. The conception of fluent English is different between Chinese and Brazilian. Although the Mandarin became a big challenge, it was not obstruction, so the quality KPI's must be reliable. The Chinese has a strong point, they are very clever. They understand the issues very quickly, and always find an easy way to make things happen. Doing more with less resources, doesn't matter if it (to be continue)	Development zones were built on the coast (Shanghai, Beijing), cities (districts) were built with infrastructure to receive the companies, but operators came from all over China we used to celebrate with the employees, to demonstrate recognition It's very important to	High Context Guanxi

is safe. Sometimes they found a safer way to do their job, Chinese are very smart, with very quick thinking. The problem is when they don't want to do. Chinese thinks it's everything about money. We must be careful with some promises like: 'If the company has a production record, the leadership will earn more money', a limit is necessary. Balancing it is a problem. It's very important to have in China a remuneration policy for results achieved. Other point of view, the Chinese love to celebrate in restaurants. When the company had production record, it was common the supervisors and managers celebrate drinking and eating, it is traditional for them. The Chinese have some traditions like "to show your face...". The managers tried to focus not only in the financial point but the personal too, appreciating all employee's efforts. The 'Labuan' (boss) was always encouraging and recognizing. But the strongest point of the Chinese is the financial. The Government controls everything in China. It must be the only place in the world that you are in a hotel and they ask you another visa because yours is expired. It happened to me, they asked me another visa, otherwise I would be deported. There was in every company a person of CPC. In our factory we had one in the Planning area. They work very well, but they took all the information to the CPC. People from CPC are not from the Union, Government is the Union. The CPC controls everything. In China they have a "lending regime", the factory was not "ours". In every time government could take it. It was a 60 or 70 years contract. Blue collars were very poor, the financial point was very important. They wanted to earn more money to bring the family to his town. Since the beginning (2003 to 2013) the operator cost tripled. More qualification was necessary, and we had to pay for it. Main points are to focus in financial side, and they are very competitive - it is very important for them when the shifts are compared. But they have a good point: when there is a foreign that respects their culture and try to understand them, they make everything easier. It's important to respect culture and show the necessary results, so as you can have success together. When we were almost leaving China, a Chinese supervisor had said that the Brazilians were his family in Nantong. Because the Brazilians workers were living in China without their families and so were the Chinese because they came from the fields. For this reason, a synergy and an empathy were created, we suffered and celebrated together. At the end, they said it was a pleasure to work with Brazilians. It could be an isolated point our it could be part of their culture, but they could feel our energy, our good will. They respect you when you have knowhow. They needed to see in locus that it was possible to do somethings, we had to show them. If we show an operation done in our Brazilian factory in 10 seconds, after some time the Chinese worker was doing in 8 seconds. (conclusion) (to be continue)	have in China a remuneration policy for results achieved. have some traditions like "to show your face..." Government is the Union It's important to respect culture and show the necessary results we suffered and celebrated together. At the end, they said it was a pleasure to work with Brazilians	Transparency Face High Context Low Context Face
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Once a Chinese supervisor invited us to have dinner in his house, and it is extremely rare. There are different values between son and daughter in the Chinese culture. It is an honour to be invited by the Chinese to have dinner specially in their houses. But Chinese are always focused earning money. If there isn't a system, it is not possible to share the knowledge with the employees. We tried to procedure everything and to have alignment meetings. Departmentalization is worse in China than in Brazil. For example, they complained a lot when people of an area couldn't do their jobs, but they never ask if they need help, or what happened. It is very difficult to change this kind of behaviour. In Brazil, we are trying to break this 'area edges', but it is very difficult. For the Chinese worker is not common to help people from other areas. You must promote a lot this idea. We didn't faced any problem of knowledge sharing, but you must promote it. Work in teams: Our factory was Green Field, so all the Chinese employees were trained. They used to see us working in teams, but it is not a typical Chinese characteristic. Chinese are very competitive, and if they were paid to do something, they only do that thing. It was very difficult to share knowledge among Brazilian workers in the past. Now it is much easier. Workers realized that if they don't share the information, they won't get a promotion. In China, after some time, they were working very well, like a team. To make communication easier between Chinese and foreigners, they usually use an occidental nick name. Things went better when we could understand their culture. Chinese respect hierarchical structure a lot. For them, it is very easy to be adapted, and they are very smart. They copy everything easily and quickly, and they are proud of doing it. Chinese: you pay low salaries, but you cannot expect much. For example, Chinese textile industry, it is difficult to understand how they can sell products with that low price: a lot of people, they pay low salaries, they have repetitive activities. Our job could be easier if we have taken Chinese leadership to Brazil, to learn in locus. It's different when you say, and you show the job. It is important to provide technical and cultural knowledge of the company. For the workers: for some key operational leaders we could have brought it to Brazil too. It is expensive, but it is cheaper than the having production lines stopped in China. The biggest difficulty is implementing the company culture in China. Chinese companies: when they face any problem to manufacture some product, they hire the best people in that business to their factories. For example, in Olympic Games (2008), they were first place, but they hired the best athletes in world who had already won a gold medal to train the Chinese, after 10 years training, they reached the perfection. It's a matter of time for the Chinese car industries overtake the Japanese (conclusion)	they complained a lot when people of an area couldn't do their jobs, but they never ask if they need help Chinese respect hierarchical structure a lot It is important to provide technical and cultural knowledge of the company. When they	Low Context Authority Transparency
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market position. They have money enough for the development, when they are focused on something, they reach the perfection. But it must have a contest for that because they don't have the discipline that Japanese have. They are not focused on 5S Method as Japanese are. To finish, we must be careful to not disrespect their culture and try to implement only ours.	are focused on something, they reach the perfection.	High Context
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XIII- COLLECTED ANSWERS- INTERVIEWEE COMMERCIAL MANAGER 1(COM 1)

Meaning unit	Condensed meaning unit	Codes
(to be continue) Interviewed COMMERCIAL MANAGER 1(COM 1) Brazilian workers are more optimistic, while Chinese are always more concerned with meeting schedules and prefer to accelerate from the beginning. My Brazilian colleagues are focused on deadlines too, but the difference with Brazilians is that they are more optimistic about the schedule and the Chinese are always more pessimistic. Regarding the Chinese characteristics, I think that the Chinese work harder, they do not respect working hours, they always work overtime, and we have a characteristic that we always find easy to obey boss orders and they are also conservative , especially workers in state companies, all workers are more conservative, no one is aggressive, they don't take more responsibilities or risks. I worked at a Chinese steel factory production in 2014 so I can give my observation, the workers earn very little and work like a machine, they have no fair rights, no bonus, no benefits and yet they are disciplined and are afraid of losing their jobs. Foreman always used illegal actions with the workers, for example, always shouted at workers, made threats, cursed and did cold violence, I don't know what the word is, cold violence, delayed payment of wages and retention bonus, dismissed workers, expelled, this is bad, but it is real. This kind of 'management' also happens in other Chinese mass production industries, in this type of industry there is a greater intensity of young workers, who do not have technical knowledge, but they are the majority of the workforce in China, these things always happen, unfortunately. (to be continue)	Brazilian workers are more optimistic, while Chinese are always more concerned... ...we always find easy to obey boss orders... ...and yet they are disciplined and are afraid of losing their jobs. ...delayed payment of wages and retention bonus, dismissed workers... ...there is a greater intensity of young workers...	Low context Authority Job security Low Context Low Context

Chinese factories are more punitive towards workers because it is easy to look for a replacement for the worker. If you dismiss, it is easier to recruit a new one. There are more people to work.	...it is easy to look for a replacement. ..	Job Security
In these mass production factories there is a union, but it is weak, they do nothing, there is a union, but the union does not work.	...but the union does not work.	High Context
In Brazil, industries follow the law and Brazilian standards, in China there are also laws, but nobody is following, production above all.	...production above all.	High Context
"Guanxi" in China is stronger than in Brazil, if you want a career promotion you need to maintain a good "Guanxi", relationship with superior people, with important people, because it creates strong dependence on the relationship. Asian countries are more dependent on this kind of relationship than other countries in the world, this indicates that bosses can determine more things and can understand that the people below have more distance than those above, have more hierarchical levels.	... this indicates that bosses can determine more things...	Guanxi
I was a supervisor at the steel factory in China in 2014, it was easy to manage workers if you pay well, if you give more bonuses, more incentives, workers will work hard, it is easy to control Chinese workers, the market is more competitive, if you want a job, you have to work harder if you pay right it's easy to deal with workers.	... if you want a job, you have to work harder...	Job Security
In Brazil, you must respect the workers , provide a fairer, better environment, to fit them in, make the workers happy, not in China, in China, just pay well is enough.	In Brazil, you must respect the workers... in China, just pay well is enough.	Low Context
In China, there is an incentive plan in most factories , for example, workers who have been working the longest can teach the youngest and the factory will give a bonus if they teach well. The factory can give a bonus, benefits, for this worker who has been working for a long time, there is this incentive plan and the factory I think sometimes has courses, has training the workers I think are the main forms of learning and transfer knowledge.	In China, there is an incentive plan in most factories...	Job Security
In China, workers are afraid to teach, they have this kind of concern, so when teach they will not teach everything out of fear of losing their job , in Brazil is the same, I think. In China they give specific training to do the job , to know the procedures and processes, each worker does a certain procedure, for example a welder did a certain type of welding and in the same area he had another procedure for another welder who did another type of welding.	...they will not teach everything out of fear of losing their job... In China they give specific training to	Low Context
(conclusion) In China the boss authority is very important, Chinese respect a lot, in		

<i>Brazil it is different they respect but make question about the tasks, procedures and the boss need to convince the workers. The Chinese worker must obey, he cannot question the boss, the worker cannot partner smarter than the boss. It cannot show that you are more intelligent than the boss. The boss is smarter.</i>	do the job... ...boss authority...	Authority
<i>Chinese workers cannot be transparent, if something is not right it cannot be transparent, you must hide it when you have a problem, so you don't appear smarter than the boss. Chinese culture is strong, very traditional and with a lot of discipline and hierarchy, you must respect it.</i>	Chinese culture is strong, very traditional...	Transparency
<i>The collective refers to a value in China, it is stronger than the individual value, for example, the worker even receiving little, does not want to be dismissed, the worker assesses whether the job is good or not always thinking about whether this group is good or do not. Workers work together, share information together, they carry the group vision. The worker likes the company that values teamwork, they are proud to belong to that company, the workers have it as a value to work for the collective and not for the individual, for example, on Instagram in China my colleagues share that the company won a prize everyone is happy, it is this type of collective that is valued more than the individual. In Brazil I see more individual attitude if the worker has another opportunity they go.</i>	The collective refers to a value in China... In Brazil I see more individual attitude...	High Context

XIV- COLLECTED ANSWERS- INTERVIEWEE COMMERCIAL MANAGER 2(COM 2)

(to be continue) Interviewed COMMERCIAL MANAGER 2 (COM 2) <i>In fact, first I want to say that initially, when I arrived in Brazil, first I worked in Rio de Janeiro, and then I moved to São Paulo and travelled to a lot of different cities in Brazil. I want to say that each city is different, cities have differences in cultures, a lot of changes. So, I worked longer in São Paulo City and I also want to show more this type of accustomed in São Paulo with "Paulistas" (people that live in São Paulo City). Related culture differences, when we arrived in Brazil, the first thing when we arrived here was food, and I want to say that it is totally different from Brazil and China. Even though Chinese food has several types, but compared to Latin America, with Brazil, for example, we get used to eating a lot of rice and pasta too and I think that when you are taking Chinese culture courses, you also have more or less knowledge about Chinese foods. What we would like to fry foods with different meats, with different vegetables and different fishes. But when it comes to Brazil, we must get more used to eating meat. Meats are good</i> (to be continue) <i>for young people, for men, right? We really like to eat meat, but once or</i>	... culture differences, when we arrived in Brazil, the first thing when we arrived here was food...	High Context
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do it and say that “I was not hired to do that job”, or say that “you have to teach me” or “tell me how to do it” or “I will not do it”. But for Chinese, what is the scope of your work? What the boss says is his scope. Speaking with my experience, or my history, I joined my company 7 years ago, my boss, the highest position in the company I know is our boss in Latin America. I never met. I never saw a higher boss. We also don't have this channel to visit or talk to. Why, because it is a culture of Asian or Chinese companies, the level of positions is very clear and you can only report your work to your direct boss and another scene is the boss of the boss, at most. My boss is an Account Manager for Brazil and his boss, our president of Latin America is the tallest I know. So, it is difficult to report our ideas when we have conflicts with our bosses to the highest. And also, another reason that we know, not only when we start to work, when we are in college, all of them, every day are listening to our parents say that competitiveness of China is very high, and you have a very high population, so it will emerge that ... if you have a job, you have to do it. If a job doesn't belong to you, but your boss lets you do it, you must do it too. If not, the boss will not say that you must leave or you are bad, or that kind of thing. But you can feel, have a feeling, that the boss doesn't like you.	...a culture of Asian or Chinese companies, the level of positions is very clear, and you can only report your work to your direct boss...	Authority
In China, when your boss doesn't like your job he won't say anything, he'll leave the job to another colleague and when the end of the year comes, the bosses will give a note to each person and you don't know, only the bosses know. We only see that we have no evolution in our career, no one will explain why, you will not have any bonuses or be less and no one will explain. This is what we call “The Chiefs' right.”	“The Chiefs' right.”	Authority
When Chinese companies open a branch outside China, this entity needs to demonstrate sales and growth every year and increase the number of projects in the country, if the performance is not good, we have to unemployed all workers and close the company and maybe return again when the economy has improved. This is our strategy for managing entities outside China. Within China it is different our company exists if the Chinese government wants. This will influence incentives or punishments for Chinese workers inside and outside China, for example for workers in Brazil, the highest position to put in this company is as president, when we have more projects, we can hire more people and create other departments with managerial positions.	...managing entities outside China...	High Context
The managers it's an important role in the Chinese companies outside China and can become vice president or president, but president is the end of the position in the country. In China, managers career is very long, it takes 30 or 40 years to become president. The promotions and incentives are different, but in Brazil we don't have enough difference in (to be continue) incentives, we don't have punishment for Brazilian workers, we have to	In China, our position is	High Context

<i>make the team more concentrated and it is bad to make dismissals.</i> <i>To hire Brazilian employees, we do 3 or 4 rounds of interviews and decide if this person is good to hire, then we have three months of evaluation, going through this it is difficult to say that you are not suitable for this job and have to leave.</i> <i>Whenever we sign a contract that is valid for one or two years.</i> <i>Regarding the bonuses or incentives for workers, we follow what is practiced in the local market for Brazilian workers and we have differences in regulations for Chinese workers, for example the Chinese need to fulfill their goal, otherwise they will only have the basic salary which is very low . If you want to cover your consumption, home financing, car, make money for your family you must earn the bonus which is usually 50% of your basic salary. When we work in China the salary is low because there are many employees and we are a state company, even making many mistakes it is difficult to be unemployed. But when we arrive, we set up a company in Brazil, this company is similar to a private company, we create incentives for local workers different from expatriate Chinese.</i> <i>A major difficulty is the language and culture for a Chinese company to settle in Brazil.</i> Language is always difficult to manage in multinational companies, for example, to report a project, we must do it for two bosses, from Brazil and the one from China. Both have different ideas and views. When we explain to the Chinese, we can speak <i>Mandarin, it is easier and we also have the same culture, it is very easy for them to understand, but when we explain it to Brazilian chefs, they do not understand why you have this different behavior or thinking.</i> <i>For example, Brazilians say that we must do Working Capital to earn revenue, but the company in China does not allow it and we have to explain the difference between the two companies for both sides. When we speak Mandarin, our Chinese chefs can understand, but when we speak English or Portuguese, because we have few people who can speak Portuguese, and even English our Brazilian chefs will not understand.</i> <i>Language is always a problem and a difficulty to manage, customs and culture are also different, when we visit Chinese customers, eat “hot hot” in Chinese restaurants and drink Chinese alcoholic beverages, because they like it and are used to it, and we speak mandarin, but when we receive Brazilian customers, we have to take our Brazilian employees together because they have the same culture, the same conversations. When we went out to lunch, we also divided into two groups: Chinese with Chinese and Brazilians with Brazilians. Because the food is different, and when we discuss at meals, during meals, we must speak Portuguese, we must speak English, it is very tiring.</i> <i>It is difficult to share different cultures this will influence at work</i> <i>(conclusion)</i>	very long, it takes 30 or 40 years to become president. ...in China the salary is low because there are many employees and we are a state company, even making many mistakes it is difficult to be unemployed. A major difficulty is the language and culture for a Chinese company to settle in Brazil.	Job Security Low Context
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<i>because the ways of life are very different for the two workers nationalities and you cannot cover in the same way for example, which soccer team played best over the weekend always Brazilians argue about it but for the Chinese it doesn't make any sense, it doesn't have the same interest.</i> <i>The Chinese like to drink tea, the Brazilian likes to drink coffee, we like to drink coffee too, but if you let us choose, tea is better. They seem small things, but the cultural and customs differences are great. Another example that occurs with Chinese workers who are here in Brazil, when the holidays arrive, my Brazilian colleagues will discuss how you will spend your holiday where you will travel, see family, etc. and when they ask us Chinese, we will stay in home, it's complicated, then they don't ask anymore because he knows that you always stay at home. But we must gradually get closer and understand people's culture to be able to work and live better.</i>	But we must gradually get closer and understand people's culture to be able to work and live better.	Low Context
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XV- FACTOR DEFINITION

Was defined some Codes based on the literature and the answers, after the condensed meaning unit, was codified according the criteria presented below.

Frame 3- Worker Culture Codes and Factor Definitions

<i>Codes</i>	<i>Number of Citations</i>	<i>Factor Definitions</i>
<i>Authority</i>	13	<i>Respect for hierarchy conditions, decision-taking, respect in the work environment.</i> <i>Respect for authority, filial piety, ancestor worship, male dominance, fatalism, conservatism, and endurance (LI; NGO, 2018)</i>
<i>Guanxi</i>	9	<i>The way that workers learns, interact day by day, culture</i> <i>The bonds of close social relationships (KING; WEI,2018)</i>
<i>Job Security</i>	10	<i>Work conditions and perception of stability in the job.</i> <i>When managers know how job security could affect trust in organization and how subordinate–supervisor guanxi could affect trust in supervisor, they can take appropriate actions to improve human relations at work. (WONG, 2017)</i>
<i>Face</i>	3	<i>Relationship in work environment, culture, behaviour</i> <i>Face as a factor to consider in trust and trust building. (KING; WEI, 2018)</i>
<i>Transparency</i>	4	<i>The way Companies manage, organize the process, lead in open discussions</i> <i>A clear and open understanding of the objectives and aims of an organisation. Open and honest communication between individuals. (MANUS et al., 2016)</i>
<i>Low Context</i>	9	<i>Social conditions in the work environment, aspects, example traditionalism, collectivism, etc.</i> <i>Chinese traditionality is a culture-based construct developed by Yang et al. (1989) several decades ago, which tries to capture the influence of Chinese culture on individual attitudes and behaviours. The construct is rooted in Confucianism, an ethical and philosophical system in China that affirms norms of behaviours in social institutions and interpersonal relationships (LI; NGO 2018)</i> <i>Collectivist cultures is strongly linked to a specific understanding of the self-defined in relation to others. The interdependent self induces a tendency to focus one's attention on others' actions, wishes, knowledge and needs. Because collectivism and interdependent self-construal have been recognized as dominant among Eastern cultures as opposed to Western cultures characterized by strong individualism. (MICHAL; GORBANIUK ,2017)</i>
<i>High Context</i>	8	<i>General overview about economic aspects and influence work environment, example employees' conflicts, union involvement, etc.</i> <i>Extant KM literature provides a host of extrinsic motivators, such as status change, promotions, and raises, positively affect knowledge contributing behaviour. Work-related characteristics, such as in-role behaviour, work and task conflict, decentralization, and work engagement also drive knowledge contributing behaviours (ELLIS, 2015)</i>
<i>Total</i>	56	

Source: Author's own production.