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Toyota's knowledge-sharing intention in Brazil and Japan: does organisational cross-culture matter?

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ABSTRACT

This study evaluated whether the organisational culture of the country causes a moderating effect on the relationship between motivational factors and knowledge sharing intention (KSI) from the perspective of Toyota managers in Japan and Brazil. The questionnaire applied to Toyota managers, in Brazil ($n = 84$) and Japan ($n = 111$) through online access. The data treatment applied structural equation modelling. The results revealed that Brazilian managers attributed higher mean values than the average values of Japanese managers. Analysis of the two samples revealed no significant differences in the structure of the structural equation model through the use of PLS-PM. While for the Brazilian sample only anticipated reciprocal relationship explained KSI, for the Japanese sample, the anticipated reciprocal relationship and sense of self-worth contributed to explaining KSI. Three interactions between the three moderation variables and the three independent variables were significant when analysing the sample of Brazilian managers.

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1. Introduction

Knowledge-sharing intention (KSI) is a source of competitiveness (Liebowitz & Chen, 2001) that allows organisations to become more adaptable and innovative and contributes to improving the management of human resources and production performance (Javadi et al., 2012; Reyhav & Weisberg, 2010). KSI is influenced by employees' psychological motivation factors, such as anticipated reciprocal relationship (ARR), anticipated reward relationship (AER), and sense of self-worth (SSW, Bock et al., 2005).

KSI among employees may also be influenced by the cultural context of the country where the company is located, even in companies of the same corporate group (Ding et al., 2017; Muniz Jr. et al., 2019; Hong & Muniz Jr., 2022; Sanboskani et al., 2020; Torres et al., 2015; Teixeira et al., 2019; Trung & Thang, 2017). Labour characteristics such as hierarchy level, education background, language, and cultural differences have been identified as factors that might explain the worker's behaviour and KSI (Hong & Muniz Jr., 2022). Warrick (2017) notes that organisational culture can significantly influence company performance and effectiveness, the morale and productivity of its employees, and its ability to attract, motivate, and retain talented people. Although many factors influence culture, organisational cultures primarily reflect their managers' strategies, practices, values, leadership style, and examples (Souza et al., 2020; Warrick, 2017).

Toyota is known worldwide for its Quality System and Toyota Production System (TPS), also known as the Lean System (there are a multitude of synonyms for this in the literature). TPS enables organisations to meet and exceed customer expectations and consequently increase process performance. The growth in the application of TPS principles in various sectors raises questions about their applicability in a cultural context distinct from that of Japan. The success of TPS is largely determined by hybridisation with the place where it is being implemented. In other words, the implementation of TPS may require different strategies, which to some extent adapt to the local culture of the host country (Muniz Jr. et al., 2022).

Toyota Motor Corporation was founded in 1937 and operates in more than 160 countries with 359,542 employees around the world; there are 15 plants and three head offices in Japan and 50 plants outside Japan. The company was founded in Brazil in 1958 and currently has four manufacturing units and three distribution centres in the country, with a total of 5,700 employees and an installed capacity of 170,000 vehicles/year. In Japan, the Tahara plant was founded in 1979 and currently has 8,000 employees to produce Lexus engines and vehicles and the Land Cruiser (Toyota, 2021).

Toyota is a model of efficiency in terms of results, and a comparative study between Japanese and Brazilian Toyota plants provides research opportunities related to KSI in different cultures (Goswami

et al., 2020; Muniz Jr. et al., 2022) and to tacit knowledge sharing in groups organisations (Muniz Jr. et al., 2022). Toyota represents a favourable context for research because, unlike most companies that make acquisitions of factories with distinct cultures (e.g., Renault, Nissan, Mitsubishi), it always builds new factories to maintain its own Toyota Production System (TPS), regardless of the culture in the country where it operates. However, it is assumed that cultural differences may cause some moderating effects related to motivational factors for KSI.

This study applies the protocol from Ding et al. (2017) to assess psychological motivation, country organisational culture, and KSI. Its original construct, *guanxi* orientation evaluation is related to the Chinese context, and was here adapted to reflect the organisational culture of Brazil and Japan. In Japan this interpersonal relationship behaviour in organisational culture is called *wa*, which differs from *guanxi* because it involves a holistic characteristic of harmony between employees and their company (Alston, 1989; Christopher, 1984). For example, when asked about his position, a Toyota employee replies “*I am Toyota*” (Alston, 1989). In Brazil, interpersonal relationships at work are relevant and informal, and guide employee involvement in solving problems applying teamwork and creativity (Hong & Muniz Jr., 2022; Rodriguez et al., 2021; Teixeira et al., 2019).

Very little is still known about the psychological motivations and organisational culture issues that favour or hinder KS in different cultures and how organisations can implement this knowledge with their Human Resources (Ding et al., 2017; Hong & Muniz Jr., 2022; Rodriguez et al., 2021). Recent articles have indicated research opportunities related to understand: a) motivating factors that influence intention to share knowledge examining the work context (Rodriguez et al., 2021), b) relationships between psychological motivation factors, organisational culture, and knowledge sharing through multivariate statistical analysis (Ding et al., 2017; Kim & Park, 2020), and c) knowledge management in different cultures (Goswami et al., 2020; Hong & Muniz Jr., 2022; Muniz Jr. et al., 2019). These research gaps grounded the research question: How is the relationship between organisational cultural, psychological motivation factors, and knowledge sharing Intention in the Toyota corporation in the Brazilian and Japanese context?

This study compares the perspective of Toyota managers in Brazil and Japan regarding how they share knowledge considering the motivational factors and cultural organisational factors of each country. Thus, this article has three objectives: first, to assess whether indicators of the individual psychological motivations factors (anticipated reciprocal relationship [ARR], anticipated reward relationship [AER], and sense of self-worth [SSW]), cultural

organisational factors ([COF], face gaining [FGA], and face saving [FSA]), and KSI are different when comparing the responses of managers located in Japan with the responses of managers located in Brazil; second, to evaluate whether the structural equation models of the responses of Toyota managers in Brazil and in Japan differ; and third, to evaluate whether the country’s cultural organisational factors have a moderating effect on the relationship between motivational factors and KSI.

After this introduction, this article presents the concepts of organisational culture, motivational factors and knowledge sharing (Section 2). The remainder of the article consists in the presentation of the research model hypotheses with a theoretical discussion relating the concepts. This is followed by the details of the methodology (Section 3), analysis, and results, ending with the discussion, limitations, managerial and theoretical implications, and suggestions for future studies and a conclusion.

2. Theoretical background

This section describes Organisational Culture with emphasis on Brazilian and Japanese culture. Psychological motivation factors such as anticipated reciprocal relationship (ARR), anticipated reward relationship (AER), and sense of self-worth (SSW) and their relationship with the intention to share knowledge are also analysed, assuming country culture as the main moderator of these relationships. The theoretical analysis constitutes a theoretical update for each variable in the questionnaire from Ding et al. (2017) and the underpinning for the application of the instrument and the analyses in Section 3.

2.1. Organisational culture

The organisational culture of a country is defined as a set of social representations constructed and reconstructed in everyday relationships within the organisation. These relationships are expressed in values, norms, meaning, and interpretations. Organisational culture contributes to a sense of direction and unity, making the organisation a source of identity and recognition for its members (Freitas, 1999; Pereira et al., 2013). It is a pattern manifested by employees when dealing with problems of external adaptation and internal integration, and it generally works well enough to be considered valid. Organisational culture therefore refers to values and beliefs that provide expected patterns and behaviours that employees can follow (Schein, 1996). This way of unifying the body of the organisation, as a reflection of the personality of the institution and in a similar way to the personality of an individual, allows one to predict its attitudes and behaviours (Bowditch & Buono, 2007).

The role of a country's organisational culture as an impact factor on KSI is influenced by trust in interpersonal relationships, teamwork, communication, and participatory decisions (Al Alawi et al., 2007; Quereshi, 2013) and has an effect on organisational knowledge management. Knowledge management influences the effectiveness and efficiency of the organisation through the sharing of current knowledge and best practices among its employees (Hong et al., 2011). Teixeira et al. (2019) and Torres et al. (2015) have argued that differences due to the cultural context in which the company is located may affect knowledge management involving different cultures, resulting in different ways of sharing knowledge among company employees and even between companies in the same corporate group.

2.1.1. Cultural organisational factors in the Brazilian context

Brazilian society has certain characteristics or traits – hierarchy, personalism, patrimonialism, foreignism, formalism, the Brazilian way (*jeitinho*), collectivism and adventurer – that influence its integration, conflicts, social practice, and cultural reproduction among its individuals, as well as decisively influencing the organisational culture of the country (Pereira et al., 2013; Silva, 2003).

Formalism is a very common cultural trait in Brazil, especially for laws and compliance, and represents a tacit way of accepting norms and rules, but adapting them to the context, which often yields an apparent discrepancy between conduct and the prescribed norms (Pereira et al., 2013; Silva, 2003). Personalism is linked to the importance given by Brazilians to the relationships established between people, families, friends, and co-workers. This trait is characterised by a complex set of intermediations that favour individuals according to criteria that vary based on their relationships (Pereira et al., 2013). A key characteristic of Brazilian culture is *jeitinho*, which indicates creative ingenuity to quickly achieve short-term solutions to problems and may include ways to circumvent bureaucratic rules or ways of dealing with potential difficulties with superiors in a rigid and strongly hierarchical management. It can lead to equality and a positive and diffuse reciprocity, which can favour KSI (Rodriguez et al., 2021; Teixeira et al., 2019; Torres et al., 2015).

Brazil thus provides a unique context for the analysis of knowledge management, because Brazilians are distinguished by collectivism, in which individuals hope to contribute to the group in exchange for loyalty, and which is characterised by cooperation and humility (Teixeira et al., 2019).

2.1.2. Cultural organisational factors in the Japanese context

Japanese companies are organisations with strong respect for hierarchies, in which everyone is fully aware of their place, but at the same time all people also feel that they are an indispensable part of the team. Japanese workers believe that rising within the organisation rests on the shoulders of each individual. The feeling of being a valuable member of the company explains the extraordinary loyalty that Japanese workers feel towards their companies (Christopher, 1984).

In Japanese culture, all employees, except the top executives, are paid according to seniority. For some cultures, this may be demotivating, but in Japan, if the other members of your group work hard and you do not, you will end up being ostracised. More experienced members are expected to detect any problem, even if the error occurred elsewhere in the factory, and all responsibility for each item produced rests with each individual worker. Almost all high-ranking executives in Japan value their early career sitting on the factory floor (*gemba*; Christopher, 1984).

Japanese companies value collaboration and the synergy of individuals to achieve common goals (Den Hoff & De Ridder, 2004) and promoting continuous improvement activities, as well as engaging in problem solving among employees that produces solutions that can be implemented in other contexts, favouring learning and standardising operational procedures in organisational production processes (Biazzo & Panizzolo, 2000).

2.2. Hypotheses

Consideration of the cultural organisational factors in Brazil and Japan suggest that employees of automotive industrial plants, as in the case for Toyota, should also manifest disparate positions on KSI as a result of their motivational factors and the organisational cultural context. KSI involving different cultures may show similarities and differences due to the cultural context in which the organisation is located (Muniz Jr. et al., 2019; Teixeira et al., 2019; Torres et al., 2015), resulting in multiple ways of sharing knowledge between company employees and even among companies in the same corporate group. For this study, the country's cultural organisational factors are characterised as a moderating variable and have three components: country COF, FGA, and FSA (all variables defined in the introduction). Motivational factors are characterised as an exogenous variable and involve three components: ARR, AER, and SSW. These six components, as discussed in the elaboration, are related to KSI to identify their effects in this last variable.

This study suggests seven hypotheses. The first hypothesis (H₀) refers to objective 1, which compares each indicator of each variable to verify if the mean values of the responses of Japanese managers differ from the mean responses of Brazilian managers. No explicit theoretical justification will be presented for this hypothesis, because the considerations are part of the literature on the two cultures. Three refer to the measurement of the individual effects of ARR, AER, and SSW on KSI, considering the model for Japanese and Brazilian managers separately (Objective 2). Three other hypotheses refer to the incorporation of COF as a moderating variable in the relationship between motivational factors and KSI (Objective 3). In this case, each of these hypotheses is divided into three sub-hypotheses, considering the Japanese and Brazilian managers separately. Figure 1 represents the relationship between the variables of this study.

2.2.1. ARR and KSI

ARR shows the employee's stance as to whether he or she views KSI as a way to maintain relationships with other organisation members (Deluga, 1998). Bock et al. (2005) have related ARR to the beliefs of improving the mutual relationships in KSI. Employees who believe that their mutual relationships with others can improve through their knowledge sharing are likely to have positive attitudes towards KSI. ARR therefore, has an impact on KSI (Liou et al., 2016; Sanboskani et al., 2020; Trung & Thang, 2017).

H₁. Employees' ARR is positively associated with their KSI. (Brazil [H_{1a}], Japan [H_{1b}])

2.2.2. AER and KSI

AER are benefits or incentives that employees expect to receive in sharing their knowledge, such as salary, promotion, praise, benefits, or recognition, among others (Bock et al., 2005; Lombardi et al., 2020). Previous studies indicate that the influence of rewards on KSI depends on the research context. Liou et al. (2016) indicate that anticipated extrinsic rewards have a significant and positive effect on the KSI behaviour with Yambol virtual learning community members from Taiwan. Wang and Hou (2015) also confirmed

that there are direct positive effects of hard rewards (i.e., extrinsic motivations such as rewards, reciprocity, financial incentives, and promotion), and soft rewards (i.e., improved self-image such as recognition/reputation) on sharing knowledge among professionals from financial services organisations in Taiwan.

Lombardi et al. (2020) showed that extrinsic rewards relationship significantly hamper the positive effect of both intrinsic motivation and lateral integrative mechanisms on KSI, resulting in a detrimental impact on employee social relationships and helpful behaviours (Sedighi et al. (2018)

H₂. Employees' AER is positively associated with their KSI (Brazil [H_{2a}], Japan [H_{2b}]).

2.2.3. SSW and KSI

SSW highlights how much the employee views KSI as valuable to and efficient for the organisation (Gardner & Pierce, 1998; Okyere-Kwakye et al., 2020). Previous studies indicate that SSW has a positive significant influence on individuals' KSI (Dulayami & Robinson, 2015; Matić et al., 2017; Okyere-Kwakye et al., 2020), which represents a source of recognition and power (Okyere-Kwakye et al., 2020) and can be an alternative form of reward (Dulayami & Robinson, 2015).

Okyere-Kwakye et al. (2020) noted that SSW has a positive influence on individuals' KSI among teachers in senior high schools in Ghana, as they perceive knowledge sharing activities to be a source of recognition and power. Matić et al. (2017) found that SSW has a significant positive influence on the attitude towards KSI among employees of public and private sector organisations in Serbia's province of Vojvodina, while the attitude towards KSI has a significant positive influence on actual intention to share knowledge. Dulayami and Robinson (2015) observed that SSW is an important and undervalued motivator for KSI in Saudi private companies and across all industry sectors with a knowledge management policy, and that SSW can be an alternative form of reward.

H₃. Employees' SSW is positively associated with their KSI (Brazil [H_{3a}], Japan [H_{3b}])

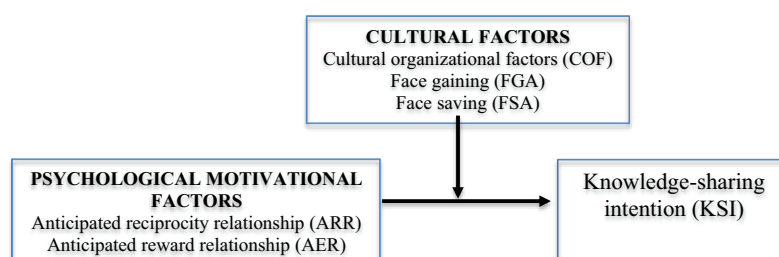


Figure 1. Relationship among variables. Source: Ding et al. (2017)

2.2.4. Brazilian and Japanese organisational culture, motivational factors, and effects on KSI

This item presents the hypotheses that connect the three moderating variables related to cultural factors (COF, FGA, and FSA) with the three independent variables related to motivational factors (ARR, AER, and SSW). For each moderating variable, three hypotheses are stated for the two samples: Brazilian managers and Japanese managers.

2.2.4.1. Brazilian and Japanese organisational culture and ARR. The culture of Asian organisations, in general, shows the presence of a relational network that can favour KSI, because it implies obligations, guarantees, and implicit mutual understanding, and these govern employee attitudes in social and employment relations in the long term. This cultural pattern is hierarchical, bureaucratic, and emphasises etiquette and social harmony (Torres et al., 2015). These issues deserve to be analysed in detail, because if hierarchy and bureaucracy manifest in extremes they can hinder reciprocal relations, which are relevant to the KSI (Mahmood et al., 2015).

Japanese companies are extremely hierarchical organisations. They recognise the value of each employee, but above all, the value of the team (Li & Puterrill., 2007). This explains the extraordinary loyalty that Japanese workers feel towards their companies and their working group (Christopher, 1984). The COF in Japan seeks to ensure that employees are engaged in problem solving and suggesting improvements, which are issues related to KSI (Biazzo & Panizzolo, 2000). Japanese management is characterised by the maximum use of human resources. Harmony (*wa*) is the most emphasised component of corporate philosophies. *Wa* enables the efficient development of organisational and human resources. Harmony in the workplace facilitates KSI in various contexts (Clercq et al., 2016).

The culture of Brazilian organisations is distinguished by collectivism, in which individuals hope to contribute to the group in exchange for loyalty, characterised by cooperation and modesty, which can contribute to KSI (Rodriguez et al., 2021; Teixeira et al., 2019). *Jeitinho*, which is characteristic of Brazil, indicates creative ingenuity to quickly achieve short-term solutions to problems and may include ways to circumvent bureaucratic rules or ways of dealing with potential difficulties; it can lead to equality and a positive and diffuse reciprocity, which may favour KSI (Pereira et al., 2013; Torres et al., 2015).

H₄₁ COF moderate the relationship between ARR and KSI (Brazil [H_{41a}], Japan [H_{41b}])

H₄₂ COF moderate the relationship between AER and KSI (Brazil [H_{42a}], Japan [H_{42b}])

H₄₃ COF moderate the relationship between the SSW and KSI (Brazil [H_{43a}], Japan [H_{43b}])

2.2.4.2. Face gaining, face saving, and the relationship to the KSI. Within Asian culture, the term *mianzi* (face) refers to dignity, honour, and prestige, which facilitate trust and thus KSI. FGA refers to a behavioural strategy or orientation to maintain and promote a positive image and social esteem from people. It can also be defined as a behavioural strategy or orientation to avoid negative assessments and maintain a social position in all potentially harmful situations (i.e., FSA; Ding et al., 2017). Face maintenance and the value of social harmony can facilitate KSI among employees of an organisation (Mahmood et al., 2015).

H₅₁. FGA moderates the relationship between ARR and KSI (Brazil [H_{51a}], Japan [H_{51b}])

H₅₂ FGA moderates the relationship between AER and KSI (Brazil [H_{52a}], Japan [H_{52b}])

H₅₃ FGA moderates the relationship between SSW and KSI (Brazil [H_{53a}], Japan [H_{53b}])

H₆₁. FSA moderates the relationship between ARR and KSI (Brazil [H_{61a}], Japan [H_{61b}])

H₆₂ FSA moderates the relationship between AER and KSI (Brazil [H_{62a}], Japan [H_{62b}])

H₆₃ FSA moderates the relationship between SSW and KSI (Brazil [H_{63a}], Japan [H_{63b}])

3. Research methodology

3.1. Measurement

Following Ding et al. (2017), items related to psychological motivations, namely, ARR, AER, and SSW, were adapted from Bock et al. (2005). The items related to organisational culture of each country were adapted from Hong & Muniz Jr. 2022. FGA was based on prior research, and measures were created for FSA according to Cheung et al. (2001). Items measuring KSI were adapted from previous research (Ryu et al., 2003). The current study considered seven control variables: gender, age, time experience in industry (years), time experience working with workers (years), current position, training, and academic level. A seven-point Likert type scale was used ranging from 7 – totally agree, 6 – partially agree, 5 – agree, 4 –

neutral, 3 – disagree, 2 – partially disagree, and 1 – totally disagree.

3.2. Common method bias

To minimise the effect of common method bias (CMB), exogenous variables were separated from endogenous variables and employee responses were kept anonymous. To evaluate the effect of CMB, we used Harman's single-factor test (Podsakoff et al., 2003). The unrotated exploratory factor solution of all 17 indicators (main components extraction) resulted in seven components (66.7% of total variance extracted) with eigenvalues greater than 1.0 for sample of Brazil. The first component extracted just 25.9% of variance. For Japan, the total variance explained was 63.0%, and the first component extracted 44.0% of variance. The results do not eliminate the possibility of any CMB, but they suggest that it is unlikely to confuse their interpretation. Although Harman's test did not detect the percentage of variance due to the method or from the model itself (legitimate relations), it is a method widely used in current publications (e.g., Bansal & Zahedi, 2014; Popadiuk & Bido., 2016).

3.3. Data collection

The pre-test was performed with 32 Brazilian employees to allow adjustments in the writing of the questions. The Brazilian and Japanese versions of the questionnaire were translated from the original English version, which was sent to the Toyota Tahara plant in Japan with the support of Toyota of Brazil. A brief explanation of the context and objectives of the investigation was prepared and sent together with the questionnaire to all participants to improve respondents' understanding. The survey was answered by production managers from four Toyota factories in Brazil and the main Japanese plant in Tahara.

The questionnaire was applied digitally in the industrial division of the Tahara (Japan) Sorocaba, Indaiatuba, São Bernardo do Campo and Porto Feliz plants. The two samples considered, selected by convenience, had different sizes due to the target audience defined for this research. In Brazil, the survey was conducted with all 93 managers from the industrial area and had a return of 84 employees (90.0%), including managers (23.81%) and supervisors (76.19%). The managers were between 34 and 55 years of age, with a time of experience between 10 and 36 years, with higher education (engineering and administration), and the majority with specialisation in the area in which they worked. At Toyota Motor Corporation in Japan, the survey was conducted with 130 managers from the industrial area and responses were obtained from 111 employees (85.0%), including top management (11.71%) and supervisors (88.29%). The managers were between 31 and 64 years old, with

a length of experience ranging from 8 to 41 years, with higher education.

3.4. Data treatment and analysis

The analyses were of three types. The first type involved the comparison of the evaluations of the indicators of the seven latent variables, according to the responses of the Brazilian and Japanese managers, through analysis of variance (ANOVA), to meet objective 1 and hypothesis H_0 . The second type referred to the analysis of hypotheses using SEM with the SmartPLS 3.0 software (Ringle, 2014). This met objective 2 and hypotheses H_1 , H_2 and H_3 , involving separate analysis for the data of the sample from Brazil and the sample from Japan. The analysis was developed in three stages. The first evaluated whether the measurement model revealed discriminant validity, convergent validity, and reliability. The second stage allowed us to verify whether the structural model met the adjustment criteria related to structural coefficients and direct and indirect effects. A further step met objective 3 (H_4 , H_5 , and H_6) and referred to the analysis of the presence of a moderating effect of COF in the relationship between motivational factors and KSI.

Hair Jr. et al. (2009) have argued that PLS-PM is appropriate to the model proposed in this investigation and has the advantage (in relation to the multiple regression analysis of the SPSS) of allowing the simultaneous analysis of the relationships (paths) between the variables (Hair Jr. et al., 2009). In addition to reliability, convergent validity, and discriminating validity, the model allows the bootstrapping test in SmartPLS with the option "individual changes", which presents Student t-values for each standardised coefficient (path coefficients). When the values of t are higher than 1.96, the coefficients are significant at the level of 5%. The reliability of internal consistency can be obtained by Cronbach's alpha, composite reliability (CR), and R^2 . In the context of SEM and PLS-PM, CR is a more appropriate measure than Cronbach's alpha and meets the adopted criteria proposed by Hair Jr. et al. (2009; i.e., greater than 0.7).

4. Results

4.1. ANOVA – comparison of indicators – objective 1 [H_0]

Table 1 presents the correlation matrix, the means, the respective significances (p-values), and the composite reliability (CR) values of the latent variables. The values above the main diagonal refer to the sample obtained in Brazil and the values below the main diagonal refer to the sample obtained in Japan. Except for the latent FSA variable, for all variables

the values of the means were significant at the level of 1%. The Brazilian managers attributed a higher value than did the Japanese managers to ARR (6.57), SSW (5.30), COF (6.54), FGA (5.32), knowledge sharing with colleagues (6.13) and KSI (6.65). Only for AER (5.97) were the averages of Japanese managers higher than those of Brazilian managers. The FSA means for Brazilian (5.43) and Japanese (5.56) managers were considered equivalent.

4.2. Hypothesis analysis – objective 2 (hypotheses H₁, H₂, and H₃)

4.2.1. Analysis of the measurement

Figures 2 and 3 are the models with independent variables. The model shows how employees’ ARR, AER, and SSW influence KSI. This refers to hypotheses H_{1a}, H_{2a}, and H_{3a} for Brazil, and H_{1b}, H_{2b}, and H_{3b} for Japan. Figure 2 shows that only ARR was

significant at the 1% level to explain KSI and with the adjusted coefficient (R²) equal to 0.173, when considering the sample of Brazilian managers. Figure 3, which reflects the model with the data from Japanese managers, illustrates that SSW and ARR are the two variables that contribute most to explaining KSI, resulting in an adjusted R² equal to 0.548.

Table 2 presents the factor loadings and structural coefficients related to the models performed with the responses from employees in Brazil and Japan. The p-values were obtained using smart-PLS 3.0 bootstrapping, by multigroup analysis in 2,500 samples (Hair et al.). It can be noted that for the indicator KSI13 – I will make an effort to share knowledge with my colleagues – the p-value for the comparison between the factor loadings related to Brazil (0.664) and Japan (0.924) was significantly different at the level of 1%. The structural coefficient of COF was also considered significantly different at the 1% level.

Table 1. Correlation matrix means, p-values, and Cronbach’s alpha.

VARIABLES	BRAZIL						
	ARR	AER	SSW	COF	FGA	FSA	KSI
J ARR – Anticipated reciprocal relationship		0.239	0.373	0.353	0.224	0.199	0.344
A AER – Anticipated extrinsic reward	0.741		0.373	0.082	0.177	0.214	0.127
P SSW – Sense of self-worth	0.485	0.493		0.283	0.179	0.377	0.305
A COF – Cultural organisational factors	0.669	0.572	0.357		0.226	0.325	0.492
N FGA – Face gaining	0.598	0.516	0.423	0.447		0.542	0.154
FSA – Face saving	0.672	0.558	0.441	0.738	0.543		0.187
KSI – Knowledge sharing intention	0.619	0.633	0.412	0.546	0.414	0.591	
Mean Brazil	6.57	5.21	5.30	6.54	5.32	5.43	6.65
Mean Japan	5.52	5.97	3.54	5.88	4.92	5.56	5.70
p-value	0.006	0.000	0.016	0.000	0.000	0.304	0.000
CR – Brazil	0.854	0.820	0.823	0.813	0.773	0.719	0.833
CR – Japan	0.846	0.881	0.841	0.840	0.674	0.795	0.927

Note: KSI, Knowledge sharing intention; Composite reliability (CR) used instead of Cronbach’s alpha because, when using PLS-PM, this statistic is better than Cronbach’s alpha. (Hair JR et al., 2009)

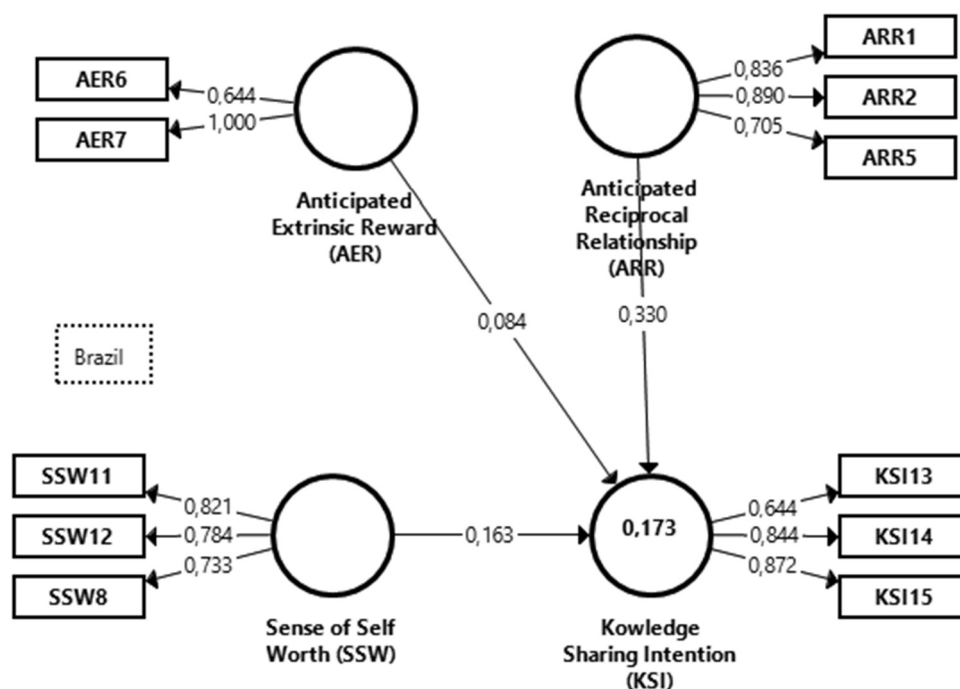


Figure 2. Motivational factors and knowledge sharing intention model (Brazil).

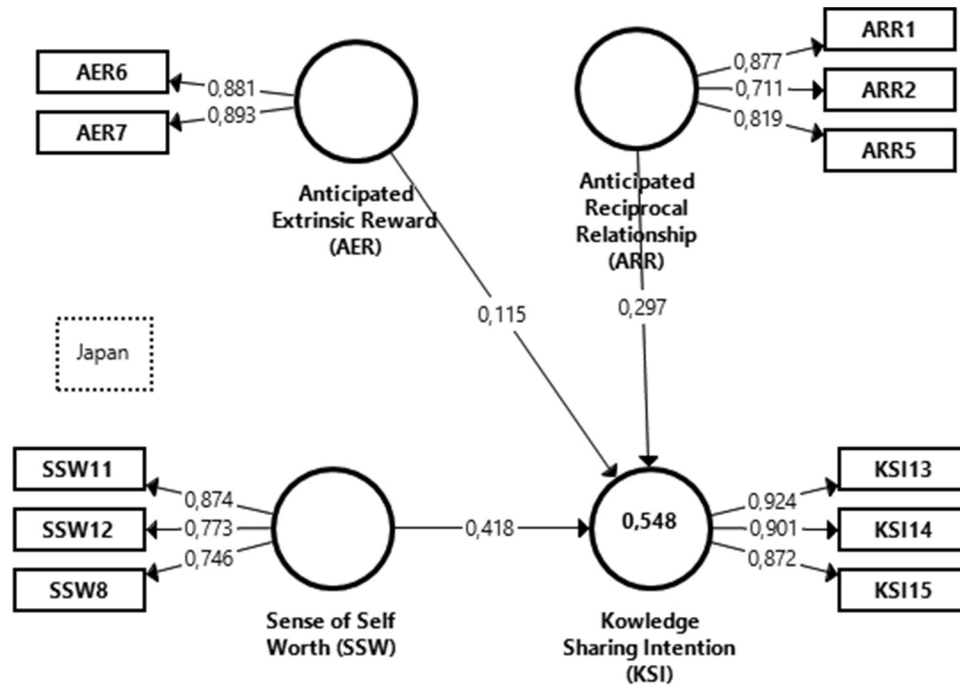


Figure 3. Motivational factors and knowledge sharing intention model (Japan).

This finding reveals that, although the major part of the factor loadings could be considered equivalent when comparing the Japanese and Brazilian models, the effect on the R² coefficient of KSI is different at a level of significance of 1% (Table 1). The R²

coefficient associated with the model of Japanese managers (0.548) is higher than that for the model of Brazilian managers (adjusted 0.173), which means that the motivational factors related to the evaluations of Brazilian managers have a lower effect on KSI

Table 2. Factor loadings – Brazil and Japan.

INDEPENDENT VARIABLES	Japan	Brazil	p-value
Anticipated reciprocal relationship (Bock et al., 2005)	0.297	0.330	0.830
ARR1 My knowledge sharing would strengthen the ties between existing members in the organisation and myself.	0.877	0.836	0.853
ARR2 My knowledge sharing would get me well acquainted with new members in the organisation.	0.711	0.890	0.068
ARR3 My knowledge sharing would expand the scope of my association with other members in the organisation		Excluded	
ARR4 My knowledge sharing would draw smooth cooperation from outstanding members in the future		Excluded	
ARR5 My knowledge sharing would create strong relationships with members who have common interests in the organisation.	0.819	0.705	0.403
Anticipated extrinsic rewards (Bock et al., 2005)	0.115	0.084	0.888
AER6 I will receive monetary rewards in return for my knowledge sharing.	0.881	0.644	0.580
AER7 I will receive additional points for promotion in return for my knowledge sharing.	0.893	1.000	0.277
Sense of self-worth (Bock et al., 2005)	0.418	0.163	0.095
SSW8 My knowledge sharing would help other members in the organisation solve problems.	0.746	0.733	0.917
SSW9 My knowledge sharing would create new business opportunities for the organisation		Excluded	
SSW10 My knowledge sharing would improve work process in the organisation		Excluded	
SSW11 My knowledge sharing would increase productivity in the organisation	0.874	0.821	0.882
SSW12 My knowledge sharing would help the organisation achieve its performance objectives.	0.773	0.784	0.730
KSI (Ryu et al., 2003)	–	–	–
KSI13 I will make an effort to share knowledge with my colleagues.	0.924	0.644	0.000
KSI14 I intend to share knowledge with my colleagues when they ask.	0.901	0.844	0.588
KSI15 I will share knowledge with my colleagues.	0.872	0.872	0.868
R ² adjusted	0.548	0.173	0.006
Face gaining (Hong & Muniz Jr., 2022)	-0.009	0.130	0.368
FG24 Sharing knowledge with my colleagues will make me gain face.	0.436	0.999	0.188
FG25 I would like to share my knowledge in public, because it will make me gain face.	0.943	0.546	0.148
Face saving (Cheung et al. 2001)	0.169	-0.143	0.064
FS21 I pay a lot of attention to how others see me.	0.806	0.750	0.950
FS22 I am usually very particular about the way I dress because I do not want others to look down on me.	0.818	0.470	0.287
FS23 I feel a loss of face when others turn down my favours.	0.620	0.795	0.435
Cultural organisational factors (Hong & Muniz Jr., 2022)	0.005	0.558	0.001
COF16 Brazilian/Japanese society is composed of personal cultural factors, net		Excluded	
COF17 I enjoy life that includes human concern and kindness.	0.767	0.564	0.177
COF18 Personal relationships are an important resource in career development.	0.632	0.741	0.326
COF19 People should get on with each other harmoniously.	0.820	0.752	0.595
COF20 I will try to build a good relationship with my colleagues and supervisors.	0.787	0.816	0.699

Note: Factor loadings significant at 1% level. P-values refer to the Brazil Japan multigroup comparison by PLS-PM; Indicators ARR3, ARR4, SSW9, COF16, and SSW10 were excluded from structural model because of low factor loadings. Bold values are structural coefficients between latent variables and KSI

compared to the R² coefficient related to the evaluations of Japanese managers.

Cross-loaded analyses related to Brazil and Japan (not presented due to lack of space) identified that all are smaller than the factor loadings associated with each dimension, revealing discriminant validity.

4.2.2. Analysis of the structural models

Table 3 presents the discriminant validity and reliability statistics for Brazil and Japan. Correlation coefficients between latent variables were below the square root of the AVE, which confirms the discriminant validity and reliability of the data from both Brazil and Japan (Fornell & Larcker, 1981).

4.2.3. Hierarchical model analysis – objective 3 (hypotheses H₄, H₅, and H₆)

Table 4 presents two models. Model 1 refers to the relationship between exogenous variables ARR, AER, and SSW and the endogenous variable KSI. Model 2 includes the variables COF, FGA, and

FSA as moderator variables, in addition to those presented in Model 1, but without considering interactions. The results shown in Table 4 indicate that the moderating variables in the model without interactions for Japanese managers are not significant at the 5% level, and the R² coefficient did not change. For the model using the sample of Brazilian managers, however, we identified that COF were significant at 5% level, and the R² adjusted coefficient changed from 0.173 to 0.412.

When using three variables (Model 1) for motivational factors, the R² adjusted coefficient in the sample of Japanese respondents was 0.548 and for Brazilians, 0.173. By incorporating the three variables of cultural factors (Model 2), the R² coefficients explaining KSI increased only for the sample of Brazilian managers, going from 0.173 to 0.412. For the sample of Japanese managers, none of the three moderating variables was considered significant in the model; however, for the Brazilian managers, the cultural variable orientations factors had a structural coefficient of 0.558 and significance at the level of 1%.

Table 3. Discriminant validity and reliability – Brazil and Japan.

Brazil	ARR	AER	SSW	COF	FGA	FSA	KSI
ARR	0.814						
AER	0.253	0.840					
SSW	0.434	0.280	0.780				
COF	0.394	0.099	0.298	0.725			
FGA	0.277	0.181	0.129	0.321	0.805		
FSA	0.211	0.186	0.254	0.413	0.518	0.687	
KSI	0.359	0.126	0.292	0.605	0.229	0.182	0.793
AVE (>0.5)	0.663	0.705	0.609	0.525	0.649	0.472 ⁽¹⁾	0.629
CR (>0.7)	0.854	0.820	0.823	0.813	0.773	0.719	0.833
f ²	0.021	0.005	0.007	0.369	0.023	0.028	–
Japan	1	2	3	4	5	6	7
(1) ARR	0.805						
(2) AER	0.764	0.887					
(3) SSW	0.664	0.691	0.802				
(4) COF	0.680	0.566	0.581	0.755			
(5) FGA	0.599	0.612	0.561	0.527	0.735		
(6) FSA	0.653	0.565	0.584	0.730	0.590	0.753	
(7) KSI	0.664	0.632	0.695	0.554	0.503	0.593	0.899
AVE (>0.5)	0.648	0.787	0.639	0.570	0.540	0.567	0.808
CR (>0.7)	0.846	0.881	0.841	0.840	0.674	0.795	0.927
f ²	0.036	0.000	0.145	0.000	0.000	0.026	–

Note: Values on the diagonal are the square roots of the AVEs. CR, composite reliability; AVE, average variance extracted; AER, anticipated extrinsic rewards; ARR, anticipated reciprocal relationship; COF, cultural organisational factors; FGA, face gaining; FSA, face saving; KSI, knowledge-sharing intention; SSW, sense of self-worth.

Table 4. Results of the models analysed.

VARIABLES	Model 1		Model 2	
	Japan	Brazil	Japan	Brazil
Independent variables				
Anticipated reciprocal relationship (Brazil [H _{1a}], Japan [H _{1b}])	0.297 (**)	0.330 (**)	0.223	0.127
Extrinsic reward relationship (Brazil [H _{2a}], Japan [H _{2b}])	0.115	0.084	0.111	0.057
Sense of self-worth [H _{3a}], Japan [H _{3b}])	0.418 (**)	0.163	0.374 (**)	0.067
Cultural organisational factors	–	–	0.005	0.558 (**)
Face gaining	–	–	–0.009	0.130
Face saving	–	–	0.169	–0.143
R ²	0.560 (0.548)	0.203 (0.173)	0.576 (0.551)	0.455 (0.412)

Note: **Structural coefficient significance at the 5% level of significance between Brazil and Japan.

4.2.4 Interaction analysis.

Table 5 refers to the final model involving the moderating variables and their interactions with the sample data of Brazilian managers. The interactions between the following variables were considered significant at the 10% level: (a) COF and ARR; (b) FGA and SSW; and (c) FSA and ARR. The f^2 effects for these three interactions and the direct effects were considered strong. Figures 4a–c represent the interaction effects.

Figure 4a shows that high FSA provokes a positive effect on KSI when explained by ARR. However, for low FSA, there is no change in the effect of ARR on KSI. If FSA is low, knowledge sharing can occur independently of ARR. Figure 4b shows that, for high culture scores, ARR does not influence KSI. For low culture scores, ARR has a positive effect on KSI. When there is no interaction with culture, ARR is important for KSI to occur, but if culture is high, KSI can occur independently of ARR. Figure 4c shows that the higher the FGA, the more SSW causes a positive effect on KSI. As FGA decreases, SSW has a negative effect on KSI. Even if someone has high SSW but low FGA, the impact on knowledge sharing will be negative.

Table 6 refers to the final model involving the moderating variables and their interactions with the sample data of the Japanese managers. It is noted that only the interaction between cultural organisational factors (COF) and the sense of self-worth (SSW) was considered significant at the level of 10% and with a strong effect f^2 .

Figure 5 illustrates that both high and low values for cultural factors contribute positively to increasing SKI as the SSW also increases. However, this relationship is stronger when the values for cultural factors are higher.

5. Discussion

This study investigated the moderating effect of cultural factors on the relationship between motivational factors represented by anticipated reciprocal relationship (ARR) anticipated reward relationship (AER), sense of self-worth (SSW), and knowledge sharing intention (KSI), considering a cross cultural analysis evolving samples of Brazilian and Japanese managers and supervisors from the Toyota company in Brazil and Japan.

Table 5. Results with interactions – Brazil.

VARIABLES AND INTERACTIONS	Coefficient	p-value	f^2	Collinearity	CR	AVE
AER	0.047	0.662	0.004	1.283	0.905	0.826
ARR	0.175	0.091	0.051	1.470	0.854	0.663
COF × ARR	-0.256	0.030	0.123	1.613	0.935	0.549
COF	0.556	0.000	0.455	1.655	0.813	0.525
FGA × SSW	0.188	0.069	0.053	1.510	0.878	0.547
FSA × AER	-0.160	0.162	0.037	1.095	0.422	0.201
FSA × ARR	0.177	0.087	0.065	1.280	0.039	0.155
FSA × SSW	-0.189	0.102	0.068	1.213	0.429	0.205
FGA	-0.069	0.536	0.007	1.715	0.881	0.788
FSA	-0.049	0.658	0.003	1.764	0.763	0.519
KSI	-	-	-	-	0.836	0.631
SSW	0.007	0.949	0.000	1.472	0.824	0.609

Note: CR, composite reliability; AVE, average variance extracted; AER, anticipated extrinsic rewards; ARR, anticipated reciprocal relationship; COF, cultural organisational factors; FGA, face gaining; FSA, face saving; KSI, knowledge-sharing intention; SSW, sense of self-worth. R^2 adjusted including interactions (0.528). Moderation effects: Weak = 0.005, Medium = 0.010, Strong = 0.025; Direct effects: Weak = 0.020, Medium = 0.150, Strong = 0.350.

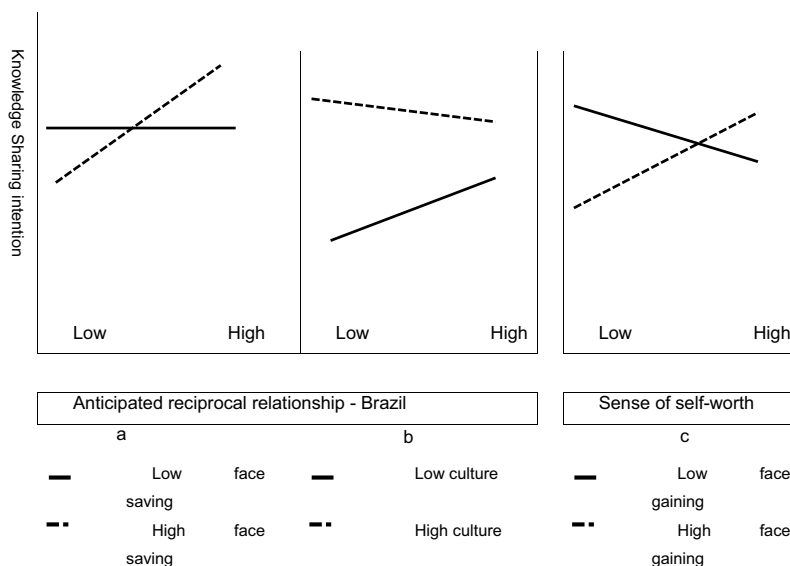


Figure 4. Interaction effects – Brazil.

Table 6. Results with interactions – Japan.

VARIABLES AND INTERACTIONS	Coefficient	p-value	f ²	Collinearity	CR	AVE
AER	0.050	0.593	0.002	3.103	0.881	0.787
ARR	0.189	0.036	0.027	3.501	0.846	0.648
COF × SSW	-0.181	0.069	0.079	1.494	0.464	0.197
COF	0.021	0.824	0.000	2.719	0.842	0.573
FGA × ARR	0.113	0.220	0.021	1.890	0.821	0.459
FGA × SSW	-0.141	0.152	0.034	2.111	0.438	0.246
FGA	-0.035	0.714	0.002	1.786	0.715	0.556
FSA	0.195	0.031	0.032	3.143	0.795	0.565
KSI	-	-	-	-	0.927	0.808
SSW	0.411	0.000	0.190	2.397	0.844	0.644

Note: CR, composite reliability; AVE, average variance extracted; AER, anticipated extrinsic rewards; ARR, anticipated reciprocal relationship; COF, cultural organisational factors; FGA, face gaining; FSA, face saving; KSI, knowledge-sharing intention; SSW, sense of self-worth. R² Adjusted = 0.595. The most common measure of effect size in tests of moderation is f² (Aiken et al., 2012) which equals the unique variance explained by the interaction term divided by sum of the error and interaction variances. Cohen., (1988) has suggested that f² effect sizes of 0.02, 0.15, and 0.35 can be termed *small*, *medium*, and *large*, respectively. However, Aguinis et al. (2005) has shown that the average effect size in tests of moderation is only 0.009. Perhaps a more realistic standard for effect sizes might be 0.005, 0.01, and 0.025 for *small*, *medium*, and *large*, respectively.



Figure 5. Interaction effects – Japan.

Three types of variables were analysed in the research model. The first type referred to the motivational factors ARR, AER, and SSW, which were introduced into the model as independent variables. The second type, introduced in the model cultural factors as moderating variables: organisational culture (COF), face gaining (FGA), and face saving (FSA). The third type is the dependent variable related to KSI.

The first hypothesis (H₀) was confirmed. The average of most of the indicators associated with the sample for managers located in Brazil were higher than the means of these indicators for managers located in Japan. For Brazilian managers, ARR, SSW, COF, knowledge sharing with colleagues, and KSI are more

evident than for the average assigned values assigned by Japanese managers. These results suggest that the sample of Brazilian managers have a greater propensity for KSI than Toyota managers in Japan. However, for the AER relationship, Japanese managers attributed an average value higher than that of Brazilian managers. This result is consistent with literature that point national culture is suggested to be the greatest of all moderators (Hui et al., 2015; Teixeira et al., 2019).

The concept of reward is understood differently in the organisational cultures of these two countries. Reward comes through the growth of the company based on the contribution of their employees at Japanese Toyota. Brazilian Toyota applies an employee performance appraisal process that includes additional annual financial rewards for knowledge sharing and for suggested and/or implemented improvements. In this sense, while the Japanese employee understands his reward under the holistic organisational context, the Brazilian employee has a tendency to seek individual extrinsic gains.

The second hypothesis required evaluating the model that related the three independent variables with the dependent variable (KSI), considering the two groups of managers separately. For the Brazilian managers, only the ARR variable was considered significant at the level of 1% to explain KSI. The adjusted R² coefficient was only 0.173, reflecting a key feature of Brazilian *jeitinho* that leads to equality and positive reciprocity, which may favour KSI (Rodriguez et al., 2021; Torres et al., 2015).

For the same model, applied to the Japanese managers, the independent variables ARR and SSW were significant at the level of 1%, with an adjusted R² coefficient equal to 0.548 – that is, about three times higher than the coefficient for the Brazilian manager model. Japanese companies value collaboration and the synergy of individuals to achieve common goals (Den Hoff & De Ridder, 2004) all people feel that they are an indispensable part of the team (Christopher,

1984) favouring learning and knowledge sharing (Biazzo & Panizzolo, 2000). These results differ from those of Ding et al. (2017), who found that AER and SSW were significant to explain KSI.

By incorporating the three moderating variables without interactions into the model, the three independent variables in the first analysis were shown not to be significant at the level of 5%, but the COF variable associated with moderation was significant at the level of 1%, which contributes to increasing the R^2 coefficient from 0.173 to 0.412 – about 2.4 times higher than when the model involved only the three initial independent variables. For the model related to the sample of Japanese managers, only the independent variable SSW remained significant at the level of 5%, but this did not translate into improvement of the R^2 coefficient. These results for the Japanese and Brazilian samples differed from those of Ding et al. (2017), who found that all moderating variables affected KSI.

The third hypothesis involved the incorporation of the interactions between the three independent variables with the three moderating variables. For the sample with the Brazilian managers, the interactions between $ARR \times COF$, $ARR \times FSA$, and $SSW \times FGA$ were considered significant at the 10% level. This resulted in an increase in the R^2 coefficient; in the previous model it was 0.412 and, with the interactions considered, it increased to 0.528. These significant interactions can be explained by the characteristics of Brazilian society with a typical way of solving problems (*jeitinho*) and collectivism that influence its integration, social practice and the country's organisational culture (Pereira et al., 2013; Silva, 2003). For these three interactions, the effect was considered strong because they were greater than 0.025 (Baron & Kenny, 1986). The interaction between $ARR \times COF$ produced the greatest f^2 effect on the dependent variable (0.123). Part of this effect was due to the strength of the COF variable, whose effect value is 0.455, because the structural coefficient was equal to 0.556.

For the sample of Japanese managers, only the interaction between $SSW \times COF$ was considered significant at the 10% level, with an effect on the dependent variable considered strong (0.027). This interaction was significant because the independent variable contributed to the explanation of the dependent variable, given that its effect on the model (f^2) was the strongest (0.190).

This result can be explained by the importance given by the Japanese to issues of hierarchy, harmony and respect as key elements of their organisational culture (Christopher, 1984) which according to various authors constitute the basis of KSI (Hong & Muniz Jr., 2022; Muniz Jr., et al., 2019) and which in the case of Japanese culture contributes to the improved self-image, recognition/ reputation and sense of self-esteem (Wang & Hou, 2015). These

results differ from those found by Ding et al. (2017), because they identified five significant interactions: $COF (guanxi) \times ARR$; $COF (guanxi) \times SSW$; $FGA \times SSW$; $FSA \times ARR$; and $FSA \times SSW$. Compared with Brazilian sample, three of these interactions were the same, but for the Japanese sample only the interaction between COF and SSW was significant.

6. Conclusion

This study discussed the relationship between psychological motivation factors (ARR, AER and SSW), cultural organisational factors (COF, FGA and FSA), and the intention to share knowledge. We applied the research model of Ding et al. (2017) using a quantitative study conducted with industrial leaders of the Toyota corporation in the Brazilian and Japanese context, shedding new light on the potential cultural influences that impact this relationship. The study also explored the psychological motivation factors, organisational culture and national culture using different referents, seeking to understand how these variables may promote knowledge sharing intention.

This research also fills some gaps in the literature, indicated in Section 1, by analysing: a) the motivating factors that influence the intention to share knowledge by examining the work context, b) the relationships between psychological motivating factors, organisational culture, and knowledge sharing through multivariate statistical analysis, and c) knowledge management in different cultures. The study finally advanced the analysis of psychological motivations and organisational cultural issues that favour or hinder KS in Japan and Brazil, offering organisations guidelines to implement this knowledge with their Human Resources.

The insertion of the three moderating variables without the effect of the interaction does not cause changes in the R^2 coefficient when referring to the sample of Japanese managers. However, for the sample of Brazilian managers, there is a strong effect on the R^2 coefficient, due to the impact of COF on the equation. For the sample of Japanese managers, only one of the interactions was considered significant, which changed the coefficient of determination from 0.551 to 0.595. For the sample of Brazilian managers, three interactions were considered significant at the 10% level which allowed a change in the R^2 adjusted coefficient from an initial value of 0.173 to 0.528 (three times higher). It can therefore be concluded that, for Brazilian managers, it is relevant to consider the effect of interactions between motivational factors and COF when evaluating KSI. For Japanese managers, however, the most important thing is that there is ARR and SSW within the organisational context.

6.1. Contributions, limitations, and future research

6.1.1. Contributions for theory

From a theoretical perspective, our study contributes to the literature in the following ways. First, the current study adds new understanding to cross-cultural study evolving Brazilians and Japanese managers with the objective to identify COF, FGA, and FSA as moderators variables when consider the relationship between KSI and individual motivational factors. Specifically, the study delineates a particular phenomenon focused on the TPS, which is supposed to be similar independent of industrial plant location. We adapted the protocol developed by Ding et al. (2017) and instead of using a hierarchical model, we used SEM. Our study allowed comparison of the views of Japanese and Brazilian managers regarding KSI when, at the same time, relating this perception with motivation and cultural factors. The results indicate that, using the independent variables related to motivation factors, only ARR was significant in the Brazilian sample. But, after the inclusion of moderating variables in the model, without interactions, this effect disappeared and the moderating variable COF, alone, contributed to explaining KSI, amplifying the R^2 three times. For the Japanese sample, ARR and SSW were considered significant in the model with only independent variables; after including the moderating variables without interactions, none of the variables was significant in the model, and the R^2 coefficient did not change.

6.1.2. Implications for practice

The TPS requires employee engagement and KSI to support continuous improvement (*kaizen*). The TPS requires horizontal and vertical alignment, workers' ability to assimilate and apply knowledge to achieve outcomes (absorptive capacity), and to mitigate workers' intentional attempts to conceal knowledge (i.e., knowledge hiding); both influence performance, job satisfaction, and competitiveness. We presented empirical evidence supporting how KSI may be handled in the TPS context, which included COF related to the Toyota Brazilian and Japanese plants. For instance, we have shown that ARR is a relevant aspect in both countries. In addition, in the Japanese cultural context, SSW has a relevant influence on KSI, while in Brazil, cultural factors influence knowledge sharing. These findings may guide how managers can incentivise industrial employees to share their knowledge and work with other co-workers. The findings align pure lean thinking (TPS) and human resource actions to support worker knowledge sharing through, for example, activities to support training, communication, and incentives.

This paper contributes towards the understanding of knowledge management in assembly lines and it brings positive consequences for managers who must understand the employee perspective to achieve successful practical implementations. Also it offers a pragmatic guideline for how to assess and develop a favourable context to encourage knowledge conversion processes and sharing in industrial plants.

6.1.3. Limitations and future research

This study has some limitations. First, we used the scales following the research developed by Ding et al. (2017), but the scale for FGA has only two indicators, while three is the desirable minimum number of indicators when using SEM. Future studies could improve the scale for this variable by the insertion of at least two more indicators. Second, as our study was cross cultural and our interest was evaluating whether the answers of Brazilian and Japanese managers and supervisors differed, we needed to compare exactly the same indicators for the seven variables in the model. After running the structural model, we identified that some of the variables (see, Table 1) had a low factor loading, and we decided to exclude them in the model. We determined that this exclusion did not imply modification to the variable, because the model was reflective. Third, our dependent variable was KSI rather than actual knowledge sharing. The indicators of KSI do not necessarily represent actual desire to share knowledge. Future studies could therefore consider this question and try to develop indicators that measure knowledge shared effectively. Future studies can replicate this study in different contexts and cultures, and include blue-collar perspective comparisons.

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