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Articles scientists

La gestión del conocimiento y su relación con el empoderamiento de las mujeres universitarias

Knowledge management and its relation to the empowerment of women university students

Gestão do conhecimento e sua relação com o empoderamento das mulheres universitárias

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Resumen

El objetivo de esta investigación fue analizar la relación entre la gestión del conocimiento y el empoderamiento en mujeres universitarias, explorando los indicadores clave que los vinculan y evaluando el impacto de la maternidad como factor moderador. Las participantes fueron 262 mujeres estudiantes de Ingeniería Industrial en el Instituto Tecnológico de Aguascalientes. La investigación de tipo cuantitativa, no experimental, transversal y correlacional, se llevó a cabo mediante la aplicación virtual de un cuestionario con escala de Likert aplicado de manera virtual. Los datos fueron analizados con SPSS mediante pruebas de normalidad (Shapiro-Wilk), homogeneidad de varianza (Levene), correlación de Pearson y un modelo de regresión lineal múltiple. Los resultados mostraron una correlación positiva y significativa entre la gestión del conocimiento y el empoderamiento (R=0.430). El modelo de regresión explicó el 22.3% de la varianza del empoderamiento, identificando a la gestión del conocimiento como el predictor más relevante (Beta=0.432), seguido por la maternidad como predictor secundario (Beta=0.196). Se concluye que la gestión del conocimiento fomenta el liderazgo, la autonomía y las habilidades críticas en las mujeres universitarias, constituyéndose como un factor esencial para su empoderamiento. La maternidad, aunque influyente, puede limitar el acceso a procesos de empoderamiento, lo que subraya la necesidad de políticas institucionales inclusivas que equilibren responsabilidades personales y desarrollo académico.

Palabras clave: gestión del conocimiento; empoderamiento femenino; maternidad; estudiante universitaria.

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Abstract

The objective of this research was to analyze the relationship between knowledge management and empowerment among university women, exploring the key indicators that link them and evaluating the impact of motherhood as a moderating factor. The participants were 262 female students of Industrial Engineering at the Instituto Tecnológico de Aguascalientes. The quantitative, non-experimental, cross-sectional, and correlational study was conducted through the virtual administration of Likert scale questionnaire. Data were analyzed using SPSS through normality tests (Shapiro-Wilk), homogeneity of variance (Levene), Pearson correlation and a multiple linear regression model. The results showed a positive and significant correlation between knowledge management and empowerment (R=0.430). The regression model explained 22.3% of the variance in empowerment, identifying knowledge management as the most relevant predictor (Beta=0.432), followed by motherhood as a secondary predictor (Beta=0.196). It is concluded that knowledge management fosters leadership, autonomy and critical thinking skills among university women, making it an essential factor in their empowerment. Motherhood, although influential, may hinder such access, underscoring the need for inclusive institutional policies that balance personal responsibilities with academic development.

Keywords: knowledge management; women's participation; motherhood; university student.

Resumo

O objetivo desta pesquisa foi analisar a relação entre gestão do conhecimento e empoderamento entre mulheres universitárias, explorando os principais indicadores que os vinculam e avaliando o impacto da maternidade como fator moderador. As participantes foram 262 estudantes de Engenharia Industrial do Instituto Tecnológico de Aguascalientes. A pesquisa quantitativa, não experimental, transversal e correlacional foi realizada por meio da aplicação virtual de um questionário em escala Likert. Os dados foram analisados com SPSS usando testes de normalidade (Shapiro-Wilk), homogeneidade de variância (Levene), correlação de Pearson e um modelo de regressão linear múltipla. Os resultados mostraram uma correlação positiva e significativa entre gestão do conhecimento e empoderamento (R=0,430). O modelo de regressão explicou 22,3% da variância do empoderamento, identificando a gestão do conhecimento como o preditor mais relevante (Beta=0,432),

seguido pela maternidade como preditor secundário (Beta=0,196). Conclui-se que a gestão do conhecimento fomenta a liderança, a autonomia e as habilidades críticas nas mulheres universitárias, constituindo-se em fator essencial para seu empoderamento. A maternidade, embora influente, pode limitar o acesso a processos de empoderamento, ressaltando a necessidade de políticas institucionais inclusivas que equilibrem as responsabilidades pessoais e o desenvolvimento acadêmico.

Palavras-chave: gestão do conhecimento; empoderamento feminino; maternidade; estudante universitário.

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Introduction

Over the years, universities have played an important role in the development of society (Chankseliani and McCowan, 2021; Chatterton, 2000). Nowadays, the role of universities is being reconsidered to meet the new demands of today's society (Moscardini, Strachan, and Vlasova, 2022). Currently, the university is perceived as a means to create social networks among academic and professional peers, a place to foster respect and inclusion, as well as to increase self-esteem in each of its students through socialization (Appleby et al., 2022). In this context, higher education institutions are positioned as key agents for the promotion of knowledge management and female empowerment, by offering spaces that favor academic, personal, and professional development.

To illustrate these arguments, it is possible to look back at the history of women and their participation in higher education, considered today as a reflection of social and cultural evolution (Du, Xiao & Zhao, 2021). In the Middle Ages, women did not have the opportunity to access university studies, since higher education was exclusively for men, specifically those of high social class. Only women from aristocratic families could receive private education from their homes (Heward, 1996). However, in the 19th century, a turning point was experienced in some European and North American universities with the flourishing of feminist movements. By 1836, the University of London agreed that women could take exams, although this did not allow them to access a university degree (Hufton, 1983).

Burstyn (1973) describes how, between the 1870s and 1900s in England, opponents of women's higher education began to explain how mental strain affected the female reproductive system. These opponents were free to write powerful descriptions of the gynecological dangers that awaited university women. However, by 1878, despite such

ideologies, the University of London awarded the first undergraduate degree to a woman, paving the way for women to enter higher education (McWilliams, 2013).

By the 20th century, a change was evident through the increase in women's participation in higher education; in some European countries, they were able to access graduate and doctoral studies (Ruano, 2022). In the Americas, in the United States, the Higher Education Act of 1965 and the Equal Educational Opportunities Act of 1972 were essential in ensuring equal access to higher education for women. Currently, according to the United Nations Educational, Scientific and Cultural Organization (UNESCO), in 2020, 53% of higher and postgraduate education graduates were women.

Regarding access to higher education, it is closely related to knowledge management, as a fundamental piece for personal, professional and social development, as well as for the advancement of society towards a more innovative and sustainable future (Quarchioni, Paternostro and Trovarelli, 2022; Kim and Celis, 2021). Thanks to these processes, many women have managed to reach their full potential, develop critical skills, acquire specialized knowledge and improve their quality of life (Hernández and Atayde, 2021). It can be noted that higher education and knowledge generation processes remain closely linked and mutually reinforce each other (UNDP, 2022). Authors such as Escorcia and Barros (2020) assure that, while higher education provides the necessary foundations and tools for adequate knowledge management, its effective use allows the acquired skills to be shared and used for the common good.

Nowadays, knowledge management is defined as a multidisciplinary process that involves generating, storing, sharing and managing the knowledge of an organization and/or society to achieve its objectives (Mirafzal, Wadhera and Stal-Le, 2023), achieving innovation and solving specific problems through the optimal use of explicit and tacit knowledge (Garrick and Chan, 2017). Therefore, knowledge management can be generated from a combination of motivation, perseverance, desire for improvement and creativity; encouraging people to share experiences, learning and good practices (Shafait et al., 2021a; Shafait et al., 2021b; Sokół and Figurska, 2021).

Female empowerment is a term coined at the World Conference on Women in Beijing in 1995 to refer to the increase in women's participation in decision-making processes and access to power (Liu, 2021). Today, the United Nations (UN) defines it as women's access to full participation in all sectors and at all levels of economic activity (UN, 2011). Thus, it can currently be said that knowledge management through higher education

can contribute significantly to female empowerment (Al- Husseini , El Beltagi and Moizer , 2021; Setini et al., 2020).

This relationship has been observed in some research, which highlights how education and access to knowledge transform the lives of many women, allowing them to play more active roles in society (Dill and Zambrana, 2020). This translates into an improvement in their skills and competencies, fostering female leadership, generating support and mentoring networks, promoting inclusive research, and improving their position in political influence (Valerio, 2022). As representatives of a large part of the world's population, women can play crucial roles in the economy, family, and society, allowing them to be included and empowered at all levels of decision-making and action (Gil and de Samaniego, 2022).

Based on this state-of-the-art on knowledge management and women's empowerment, we need to address the following questions: How does knowledge management influence women's empowerment in the context of universities? Does motherhood influence access to and use of knowledge management for the empowerment of university women? Therefore, this research had two specific objectives:

1. To evaluate the influence of knowledge management on the empowerment of university women.
2. Explore the relationship between knowledge management and empowerment by analyzing key indicators associated with both constructs.

Materials and methods

The design of this research was quantitative, non-experimental, cross-sectional, and correlational, as the objective was to analyze the relationship between knowledge management and the empowerment of university women without manipulating the variables and through timely data collection at a single point in time.

Participants

The participants were university students of the Bachelor's Degree in Industrial Engineering at the Instituto Tecnológico de Aguascalientes. Participants in this research were selected from a finite sample using simple random sampling, ensuring that each individual in the target population had the same probability of being selected (Noor, Tajik, & Golzar, 2022;

Kapasa & Sakyi, 2020). The selected participants were informed about the purpose of the research and the use of the information collected. The confidentiality and privacy of their responses were guaranteed to protect their identity.

Tools

For data collection, a virtual survey was developed as a measuring instrument with fifty-one questions and response options on a Likert scale with values ranging from one to five. On this scale, 1 represented "Strongly disagree," 2 "Disagree," 3 "Indifferent," 4 "Agree," and 5 "Strongly agree." The questionnaire was validated through expert judgment and was specifically designed for this research, although it was based on categories and theoretical approaches previously established in studies on empowerment, knowledge management, and social innovation.

The survey was organized into the following sections:

- Personal data (3 questions)
- Assessment of female empowerment (33 items)
- Knowledge management (7 items)
- Social innovation (8 items)

The application was launched on March 8, 2024, as part of the educational activities commemorating International Women's Day. For practical purposes bliss survey was conducted virtually using the platform Online Surveys ®

Procedure

The study area was the state of Aguascalientes, Mexico, which has a population of 1,425,607 inhabitants, of which 728,924 are women (INEGI, 2020). In the third quarter of 2021, the state had 650,144 economically active people.

For the sample size, statistics from DATA México were considered, which mention that in 2022 the Technological Institute of Aguascalientes had 1,738 students enrolled in the Bachelor's degree in Industrial Engineering, where 826 (47.5%) were women. Therefore, the sample size calculation was performed manually based on a finite population (Bodory et al., 2020).

To calculate the sample size in a finite population, the following formula was used:

$$n = \frac{N \cdot Z^2 \cdot p \cdot (1-p)}{E^2 \cdot (N-1) + Z^2 \cdot p \cdot (1-p)}$$

Where:

n is the sample size

N is the population size

Z is the value of Z corresponding to the desired confidence level

p is the expected proportion of the population that has the characteristic of interest

E is the margin of error

Considering the information from DATA Mexico (2022), with a total population (*N*) of 826 female students, a confidence level of 95% (*Z* = 1.96), an expected proportion *p* = 0.5 (due to ignorance of the real value), and a margin of error of *E* = 0.05, the formula was applied as follows:

$$\frac{826 \cdot 1.96^2 \cdot 0.5 \cdot (1-0.5)}{0.05^2 \cdot (826-1) + 1.96^2 \cdot 0.5 \cdot (1-0.5)} = 262.44$$

Since the sample size must be expressed as a whole number, the value obtained was rounded to the nearest number, obtaining a final sample of 262 participants.

It was considered that the reliability and validity of the different sections of a questionnaire could be evaluated in a specific (pilot) study with a smaller sample (Hernández and Velasco, 2000). Thus, during the development of this research, the measurement instrument was previously administered on February 27, 2024, to five university women.

Analysis of the information

Once the information was collected, a statistical analysis was performed using the SPSS® program (Statistical Package for Social Sciences) version 27. First, a normality test was applied using the Shapiro-Wilk statistic to confirm the distribution of the data (Shapiro and Wilk, 1965) and the homogeneity of variances was verified (Brown and Forsythe, 1974). Both assumptions were satisfied, which allowed continue with the analysis statistics. Subsequently, the Pearson correlation test was applied in order to observe the linear relationship between the study variables (Pearson, 1895).

Next, a multiple linear regression model was created to analyze the joint effect of multiple predictor variables on a dependent variable, and the obtained coefficients were evaluated to interpret the magnitude and direction of these relationships (Montgomery et al.,

2012). An analysis of variance (ANOVA) associated with the multiple linear regression was also performed to evaluate the overall significance of the model and its explanatory capacity (Fisher, 1925). In addition to normality and homogeneity of variances, compliance with other essential assumptions for regression was verified, such as linearity, independence of errors, and homoscedasticity, which validated the relevance of the model used.

Results

Personal results

After the virtual application of the surveys, the sociodemographic information of the participants was analyzed, the results of which are presented in Table 1.

Table 1. Descriptive statistics of personal data

Feature		
Age		
	n	%
18 – 25 years old	249	95.03%
26 – 30 years old	10	3.82%
More than 30 years	3	1.15%
Total	262	100%
Marital status		
Single woman	246	93.89%
Married	5	1.91%
Free union	9	3.44%
Divorcee	2	0.76%
Total	262	100%
Maternity		
Childless	246	93.89%
With children	16	6.11%
Total	262	100%

Source: Own elaboration

93.89% of those surveyed indicated they were single and had no children. This percentage overlap suggests a possible correlation between marital status and the decision to postpone or not become a mother, which could be influenced by factors such as access to higher education, professional development, or greater personal autonomy.

Correlation results between knowledge management and empowerment

Normality tests determine whether data conform to a normal distribution (Shapiro and Wilk, 1965). This research initially considered three variables: knowledge management, female empowerment, and social innovation. Normality tests were performed on the data obtained; the results are shown in the following table.

Table 2. Normality tests

Normality tests						
	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistical	gl	Next.	Statistical	gl	Next.
Empowerment female	.065	262	.200 *	.989	262	.575
Knowledge management	.107	262	.006	.981	262	.142
Social innovation	.102	262	.010	.969	262	.016
*. Lower limit of significance dear.						
a. Lilliefors significance correction						

Source: Own elaboration

Normal behavior was found in the variables female empowerment SW(262)= .989, p = .575 and knowledge management SW(262)= .981, p = .142, which show normal behavior according to the Shapiro-Wilk statistic. In contrast, the variable social innovation does not show normal behavior SW(262)= .969, p = .016. The inferences described were made considering a null hypothesis of normality from a significance level of p = .05.

The homogeneity of variances test, using the Levene statistic, allowed the null hypothesis of equality of variances to be verified (Brown and Forsythe, 1974). The homogeneity of variances tests were then performed on the data obtained; the results are shown in the following table.

Table 3. Tests for homogeneity of variances

Tests for homogeneity of variances					
		Levene's statistic	gl1	gl2	Next.
Empowerment female	It is based in the middle	.013	1	262	.908
Knowledge management	It is based in the middle	3.781	1	262	.055
Social innovation	It is based in the middle	1,200	1	262	.276

Source: Own elaboration

By evaluating another important assumption of the behavior of the data for each variable, it was possible to identify that both female empowerment Levene (1,100)= .013, p = .908, and knowledge management Levene (1,100)= 3.781, p = .055 and social innovation

Levene (1,100)= 1.200, p = .276 present homoscedasticity. The above could be concluded from a null hypothesis of equality of variances based on the mean of the variables from a reference p-value of .05.

Likewise, Pearson's correlation allows us to analyze the strength of the relationship between two continuous variables (Pearson, 1895). The Pearson correlation was performed on the data obtained; the results are shown in the following table.

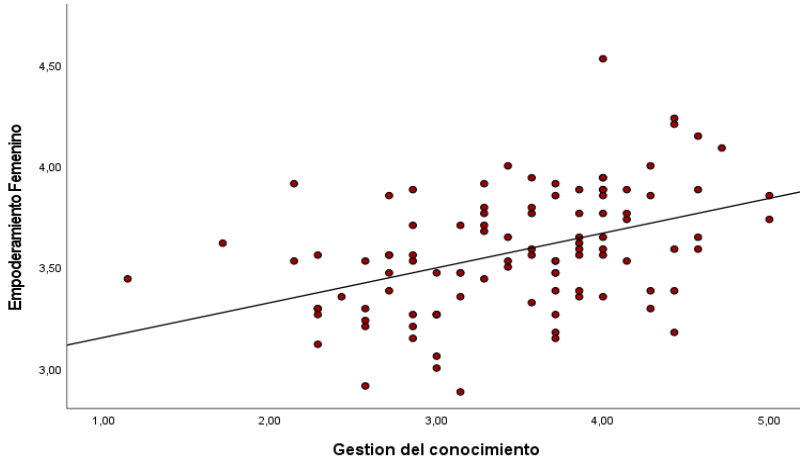
Table 4. Pearson correlation

Correlations				
		Empowerment female	Knowledge management	Social innovation
Empowerment female	Pearson correlation	1	.430 **	.068
	Sig. (bilateral)		.000	.492
	N	262	262	262
Knowledge management	Pearson correlation	.430 **	1	.097
	Sig. (bilateral)	.000		.330
	N	262	262	262
Social innovation	Pearson correlation	.068	.097	1
	Sig. (bilateral)	.492	.330	
	N	262	262	262
**. The correlation is significant in he level 0.01 (bilateral).				

Source: Own elaboration

By determining the variables that maintain normal behavior, it was possible to identify a positive and significant correlation between female empowerment and knowledge management according to the significant positive correlation (r = .430, p < .001) (Figure 1). Furthermore, it was found that social innovation bears no correlation with the aforementioned variables.

Figure 1. Scatter plot of female empowerment and knowledge management



Source: Own elaboration

Figure 1 shows a positive trend, indicating that greater knowledge management leads to greater female empowerment. This relationship between the two variables is supported by existing literature.

Correlation results between empowerment and motherhood

Considering the already existing and demonstrable relationship between knowledge management and empowerment, we sought to complement this relationship with an explanatory model using multiple linear regression with an additional variable: motherhood. The results are shown in the following table.

Table 5. Multiple linear regression model b

Model Summary [b]										
Model	R	R squared	R squared tight	Standard error of the estimate	Change statistics					Durbin-Watson
					Change in R squared	Change in F	gl1	gl2	Sig. Change in F	
1	.473 [a]	.223	.208	.26537	.223	14.376	2	259	.000	1966
a. Predictors: (Constant), Children, Knowledge Management										
b. Dependent variable: Empowerment Female										

Source: Own elaboration

The results obtained from the statistical analysis indicate that empowerment can be explained by knowledge management and motherhood in 22.3% of cases. This indicates that the model meets the Durbin-Watson assumption of independence of errors, which must be between 1.5 and 2.5. In this case, DW = 1.97, a value within the acceptable range (1.5-2.5), confirming independence of errors. An analysis of variance (ANOVA) was then performed, the results of which are shown in the following table.

Table 6. Analysis of Variance

ANOVA						
Model		Sum of squares	gl	Mean square	F	Next.
1	Regression	2.025	2	1.012	14.376	.000 [b]
	Residue	7.042	257	.070		
	Total	9.067	262			

Source: Own elaboration

According to the ANOVA associated with multiple linear regression, it was established that the proposed model based on the dependent variable and its predictors was significant $F(2,259) = 14.38$, $p < .001$. A coefficient analysis was then performed (Table 7).

Table 7. Coefficients

Coefficients [to]										
Model		Unstandardized coefficients		Coefficients standardized	t	Next.	95.0 % confidence interval		Collinearity Statistics	
		B	Standard error	Beta			Lower limit	Upper limit	Tolerance	VIF
1	(Constant)	2.495	.251		9.927	.000	1997	2.994		
	Knowledge management	.173	.035	.432	4.907	.000	.103	.243	1,000	1,000
	Maternity	.248	.112	.196	2.220	.029	.026	.469	1,000	1,000
a. Dependent variable: Empowerment										

Source: Own elaboration

The generated multiple linear regression model meets the criterion of the Variance Inflation Factor VIF with which, the absence of collinearity between the independent variables can be determined by being a value below 10, which in this case is VIF = 1. According to the coefficients of the model, it was also possible to determine that both knowledge management (p = .000) and motherhood (p = .0029) significantly explain the behavior of female empowerment through the following multiple linear regression function:

Female Empowerment = 2.495 + 0.173 * Knowledge Management + 0.248 * Motherhood

The above relationship is explained as follows: for each unit that scores knowledge management, empowerment will increase by an average of 0.173 points. In the case of the motherhood variable (with children = 1, without children = 2), it can be established that when changing from having children (1) to not having children (2), an average increase of 0.248 points in empowerment is observed. To determine which variables have the most weight within the model for the dependent variable, the standardized Beta coefficients indicate that knowledge management is the one that produces the greatest change in empowerment, starting with a Beta of 0.432, compared to the standardized Beta for motherhood, which is 0.196.

Discussion

The results of this research are consistent with various national and international statistics on motherhood and marital status among young women. In Mexico, data from the 2023 National Survey on Demographic Dynamics indicate that the single population represented 29.6% and those in common-law marriage represented 55%. They also indicate an average of 1.6 children per woman (INEGI, 2023).

On the other hand, among the countries of the Organization for Economic Cooperation and Development (OECD), Mexico ranks first in teenage pregnancies with a fertility rate of 77 births per 1,000 women between 15 and 19 years of age (INEGI, 2021). Specifically in the state of Aguascalientes, during 2022, statistics from the Ministry of Health recorded 97 births to girls under 14 years of age, 3,789 to women between 15 and 19 years of age, and 6,383 to women between 20 and 24 years of age; only 13.6% of underage mothers reported continuing their studies (ISSEA, 2022).

In contrast to these figures, the sociodemographic profile of the participants in the present study reveals a distinct trend: 93.98% identified themselves as single and childless. This figure is particularly significant, as it suggests a possible link between access to higher education and informed decision-making regarding motherhood and personal life plans.

In this context, the results obtained in this research demonstrate a significant relationship between knowledge management and empowerment, thus reaffirming what was stated in the introduction about the transformative role of higher education and its connection to knowledge transfer. According to authors such as Escorcia and Barros (2020), higher education provides the fundamental tools for managing knowledge effectively, while knowledge management amplifies individual capabilities, promoting collective well-being.

Several studies have suggested that women's empowerment can be significantly enhanced through strategies aimed at more inclusive and accessible knowledge management. Among the proposals identified in the literature are:

- The creation of intersectoral knowledge networks (Marín et al., 2021).
- The implementation of personalized digital learning platforms (Murtaza et al., 2022).
- The promotion of open science and access to data (Corrales et al., 2022; Singh et al., 2021).
- Strengthening feminist communities (Lokot, 2021; Matsick et al., 2021).
- Incentives for the production and dissemination of women's knowledge (Shahzad et al., 2021).
- Promoting knowledge transparency at the community level (Cvitanovic et al, 2021).
- The adoption of experience-based learning models and transformational leadership (Jing et al., 2022; Mahmud, 2022).

These theoretical approaches align with the findings of this research. The positive and

significant correlation between knowledge management and female empowerment reinforces the validity of the proposed model, demonstrating that adequate access to knowledge directly contributes to the development of critical skills, autonomy, and leadership among university women.

Likewise, the literature highlights that this multidisciplinary process that integrates motivation, creativity and desire for improvement (Jiang et al, 2022; Mirafzal, Wadhera and Stal -Le, 2023; Shafai et al., 2021), can have a positive impact on women by facilitating empowerment. This concept, coined at the World Conference on Women in Beijing (1995), is closely linked to the active participation of women in decision-making and leadership roles (Chance, 2022). The results obtained reaffirm this relationship, since the multiple linear regression model reveals that this practice oriented towards the management and application of knowledge significantly explains the development of capacities in women, with a greater impact than other variables considered.

Several studies support this assertion. In particular, effective knowledge management can provide women with greater opportunities to access information, training, and resources for their professional and personal development, as well as their empowerment. Furthermore, it is recognized that the family environment also influences the level of female empowerment (Gopinath and Chitra, 2020; Farag, 2020).

On the other hand, access to education is a crucial aspect for this correlation to exist. Wang and Noe (2010) highlight that knowledge management training through digital literacy and access to learning platforms contributes to the empowerment of women in secondary and upper secondary education. As Chuang (2021) asserts, access to information through ongoing training allows women to acquire new knowledge and skills. These studies support the results of this research, as the women surveyed stated that their participation in institutional training programs increased their professional confidence.

Consequently, several studies corroborate the correlation between knowledge management and empowerment from a labor perspective (Kumar, 2017). In fact, according to UN statistics (2021), in countries where investment is made in women's ongoing labor training and development, greater female participation in formal employment has been observed. Likewise, the International Labor Organization (ILO), through the Global Wage Report 2022-2023, states that women who have access to training in knowledge management programs are 20% more likely to advance to management positions compared to those who do not have such access (ILO, 2022). This suggests that knowledge management not only

contributes to the development of women's individual skills, but also promotes gender equity in organizations.

In a research conducted by Suchitra and Gopinath (2020), they studied the role of knowledge management in empowering women entrepreneurs in Tiruchirappalli , India. During the study, they surveyed 195 women entrepreneurs on topics of socioeconomic aspects, knowledge management, and empowerment. They concluded that socioeconomic factors influence knowledge management and maintain a notable impact on the process of women empowerment.

Similarly, Park (2016) asserts that, in Asian regions, women who participated in workshops and courses on knowledge management were able to create support networks and access financial resources more easily. Likewise, Saeid, Ali, and Jamshid (2022) identified a significant relationship between the knowledge management process and empowerment; asserting that empowerment has a positive impact on creativity and production (Setyaningrum, Kholid, and Susilo, 2023; Gupta, 2021).

On the other hand, Mahboub et al., (2023), highlight that women who effectively implement knowledge management can achieve higher levels of job satisfaction and organizational commitment. Thus, knowledge management through female leadership can be considered a fundamental resource for the competitiveness of the organization (Banmairuroy, Kritjaroen and Homsombat, 2022). For some time, research carried out by Davenport and Prusak (2000) argued that the ability to make informed decisions in the personal and work spheres constitutes a key indicator of female empowerment. According to these authors, effective knowledge management provides timely access to accurate and relevant information, which facilitates strategic decision-making. In this sense, the results of the present research suggest that women who use tools associated with this process have a greater ability to face complex situations and make critical decisions.

Despite the observed benefits, several barriers persist that limit the effectiveness of knowledge management in women's empowerment. Previous research by Hossain et al. (2022) and Petersen et al. (2022) has identified that cultural and structural obstacles, as well as the persistence of traditional gender roles within and outside organizations, significantly restrict women's active participation in processes of knowledge generation, access, and application. These barriers are particularly acute in the case of women with children, who face the demand to fulfill their family responsibilities and the difficulty of fully integrating into work and/or academic contexts.

In relation to these barriers, this research demonstrated that the motherhood variable also reflects how personal responsibilities can condition the access and use of knowledge. This coincides with the approaches of Dill and Zambrana (2020), who emphasize how access to knowledge transforms women's lives by allowing them to play more active roles in society. However, seen from another perspective, a possible interpretation discussed in the literature is that these results may coincide with those reported by Wang, Meister , and Gray (2013), who mention that knowledge management can indirectly influence the decision not to have children by providing women with the tools and resources necessary to make informed decisions about their personal and professional lives; without the social pressure to conform to traditional gender roles, including motherhood. Along these same lines, Madero et al. (2021) note that the lives of women who are mothers for the first time are temporarily intervened in their professional careers and lead to greater risk situations.

These findings are consistent with the results of Pérez et al. (2021), who, in a cross-sectional study conducted in Mexico, analyzed the relationship between risk factors, psychological resources, problematic behaviors, depressive symptoms, and self-harm behaviors in female university students with and without children. The results showed that female university students with children reported more risk factors than those without children.

Furthermore, the results of the social innovation variable, which did not show a significant correlation with the other variables in the study, suggest that the academic context may not be the primary space for the development of this dimension in relation to empowerment. This finding contrasts with what authors such as Garrick and Chan (2017) mention, who highlight the potential of social innovation in solving specific problems, leaving an area of opportunity for future research. This suggests that social innovation may require contexts that are not strictly academic to manifest.

Finally, this research reaffirms that universities are not only spaces for professional training, but also centers that promote respect, inclusion, and self-esteem, as various authors point out. Higher education and knowledge management, when acting together, not only contribute to the individual empowerment of women, but also drive social change towards a more equitable and inclusive society, fulfilling the role that universities have historically played in social development (Budur et al., 2024; Ibarra, Reyna, & Hernández, 2023; Quarchioni, Paternostro, & Trovarelli, 2022).

From this perspective, interpreting the results of this research confirms the relevance of knowledge management as a central factor in female empowerment, while highlighting the limitations and needs of specific groups, such as women with children, within the university setting. From this context, it can be determined that this research has important interdisciplinary implications by integrating approaches to knowledge management, gender equity, and higher education; the findings can guide educational institutions in the design of inclusive programs that promote equitable access to knowledge and the development of leadership skills. Together, these results reinforce the role of higher education as a key driver of social transformation, particularly for university women.

Conclusion

The findings confirm a significant relationship between knowledge management and empowerment, fulfilling the purpose of this research. In this regard, the Pearson correlation between both variables demonstrates a positive and significant relationship. This supports the objectives of evaluating both constructs, demonstrating that university students perceive that greater knowledge management is associated with a higher level of empowerment.

On the other hand, motherhood was identified as a relevant moderating factor in this process, as the low proportion of women with children (6.1%) reinforces the need to explore how this group may face additional limitations in accessing and utilizing knowledge, which could be conditioned by responsibilities associated with childcare and family life. This result directly responds to the second research question, demonstrating that university-educated women with children affect their level of empowerment.

Futures Lines of research

It is necessary to explore in greater depth how motherhood influences access to and use of knowledge management, as well as female empowerment at different educational levels, from high school to graduate school. It is important to consider the specificities of each academic context. It is pertinent to first examine the cultural and structural barriers that limit the effectiveness of knowledge management in female empowerment, especially in rural or vulnerable contexts.

Subsequently, it is important to analyze the implementation and evaluation of inclusive institutional strategies aimed at female students and mothers, which could provide evidence on how to balance their personal and academic roles. Finally, it is appropriate to conduct

longitudinal studies that evaluate the sustained impact of knowledge management on female empowerment, as well as international comparisons that identify common patterns and best practices in diverse sociocultural settings, contributing to the design of more effective and inclusive public policies.

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