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Assessment of the effects of knowledge management on the performance of the Moroccan public and semi-public sectors: An empirical analysis

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Abstract

In the context of the transformation of the Moroccan public sector, especially in terms of digitalization and human capital development, the objective of this study is to evaluate the effect of knowledge management on knowledge quality and organizational performance. To achieve this, a conceptual model has been adopted that establishes linear relationships between performance, knowledge quality, and knowledge management. The estimation and validation of the model were carried out by administering a questionnaire to a sample of 70 individuals and employing a structural equation model with the PLS approach to analysis the collected data. The study's findings suggest that there is a positive relationship between knowledge quality and performance, as well as a favourable association between knowledge management and knowledge quality. However, regarding the moderating and mediating effects, the study did not find evidence to support the notion that knowledge management plays a mediating or moderating role in the relationship between knowledge quality and performance. Performance is explained by 45.8% through knowledge management and knowledge quality, while knowledge quality is explained by 51% through knowledge management. These results emphasize the importance of public authorities intensifying their efforts to make knowledge management a value-generating factor.

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1. Introduction

Understanding work processes and procedures and the fluidity of information and know-how transmission between functions and generations is critical to both customer satisfaction and the performance of public and semi-public organisations. The poor quality of information, departures, and mobility of employees are factors that may hinder the continuity of public service and potentially lead to a loss of knowledge and cessation of activity. The changes and reforms in public organisations have intensified in recent years as a result of the digitalisation of processes driven by customer requirements and technological advancements. Indeed, various initiatives to encourage retirement have been implemented, resulting in the significant departure of experienced professionals. This situation has caused a loss of knowledge, prompting some organisations to re-engage departing staff on fixed-term contracts to ensure continuity of operation and regain lost knowledge.

Furthermore, the performance of public and semi-public organisations depends on the availability of reliable knowledge in a timely manner for processing and decision-making. Therefore, knowledge management appears as a factor with a positive impact on performance (Nuel, Peace, & Ifechi, 2023). This paper aims to determine

the impact of knowledge management on organisational performance in the Moroccan public and semi-public sectors. Therefore, the problem consists of assessing the effect of knowledge management on both knowledge quality and organisational performance, as well as determining the moderating and mediating effects of knowledge management on the relationship between knowledge quality and organisational performance.

Based on an exploratory qualitative study, a survey was conducted among a sample of individuals operating in the Moroccan public and semi-public sectors. This research defines items that measure three latent variables: knowledge quality, knowledge management, and performance. The study utilizes PLS (partial last square) structural equation models to assess the causal links between these variables. This work comprises several key components, namely the literature review, methodology, empirical results, discussion, and conclusion.

2. Review of the Literature

Knowledge is a concept that is often associated with two other concepts, namely, data and information. The literature addressing knowledge recognizes these three concepts as distinct, despite their similarities and interdependencies. According to Thierauf (1999), data refers to unprocessed and unorganised raw facts and figures, while information represents processed and organised data used for a specific objective. Darling (1996) defines knowledge as the intangible asset of an organisation that encompasses experience, management style, and culture.

Through his pyramid-structured model, which outlines the transformations and evolutionary phases of data leading to wisdom, Ackoff (1989) illustrates the distinction between these three ideas. Ermine, Moradi, and Brunel (2012) state that data processing creates information, processing and using information leads to knowledge, and processing knowledge results in wisdom.

Several researchers, including Davenport and Marchand (1999) and Greiner, Böhmann, and Krcmar (2007), classify knowledge into two categories:

- Tacit knowledge: This type of knowledge is represented by people's experiences and is not formally documented, as a person's integral knowledge cannot be separated, stored, or shared.
- Explicit knowledge: This knowledge is easily captured, codified, stored, and distributed.

Moreover, knowledge is derived from two main sources:

- Information is processed and stored within information systems and paper documentation.
- Knowledge resides within employees in the form of expertise, competence, and feedback.

In assessing the effects of knowledge management on performance, this study considers the process as a wealth-generating factor that manifests through increased productivity or innovation.

According to Hibbard (1997), knowledge management is the process of capturing the collective expertise of the organisation and sharing it among different entities based on their specific needs. The sources of collective expertise can include databases, physical documents, or the intellectual capital of individuals, and distributing this knowledge to various entities aims to enhance productivity and contribute to value creation.

Siadat, Aryan, and Mohammadi (2014) and Davenport and Prusak (1998) define four main components of knowledge management. These components include the values and beliefs of the organisation's members regarding information and knowledge, the processes involved in acquiring information and knowledge, the organisation's policies that promote knowledge sharing, and the information system used to support knowledge management activities.

The field of knowledge management in public organisations has been explored by several researchers, such as Mc Evoy, Ragab, and Arisha (2019) and Laihonen and Kokko (2023).

Public sector performance and knowledge management have been studied by various researchers, such as Basso, Freitas, Teixeira, and Oliveira (2020), who reviewed 20 articles on the subject and found that knowledge management practices in the public sector have significantly increased organizational performance, leading to greater efficiency and productivity.

In the literature, several studies have shown that knowledge management positively impacts organisational performance. Examples include the research conducted by Bagnoli and Vedovato (2014) and Payal, Ahmed, and Debnath (2019). To assess the effects of knowledge management on organisational performance in the Moroccan public and semi-public sectors, this study uses structural equation models. According to Roussel (2005), these models make it possible to simultaneously analyse the linear effects that connect multiple independent and dependent latent variables, the analysis of joint effects on multiple dependent variables, and the testing of construct validity, item validity, and attitude scales, among other aspects.

The estimation of the parameters is done using the PLS method. This type of model is commonly employed in management science research, as highlighted by Davcik (2014), not only in marketing and human resources but also in other disciplines. Examples of studies using PLS include Buonocore and Russo (2013), Segoro and Limakrisna (2020), and Habachi, Nouira, Malainine, and Hajaji (2022).

Regarding the relationship between knowledge and performance, several studies have used structural equation models (SEM). Examples include the research conducted by Mustapa and Mahmood (2016), Payal et al. (2019), and Namdarian, Sajedinejad, and Bahanesteh (2020). For the Moroccan public sector, several studies have been conducted, such as those by Bennani and Guedira (2014) and Boussenna and El Kharraz (2020).

This study contributes to existing research by analysing the direct effect of knowledge management and knowledge quality on organisational performance and the impact of effective knowledge management on the relationship between knowledge quality and organisational performance.

The measurement of knowledge quality includes the following latent variables:

- Quality of the information system.
- Quality of information.
- Internal communication.
- Sharing of tacit knowledge
- Succession planning.

Knowledge management is defined by the following components:

- Knowledge acquisition.
- Knowledge storage.
- Knowledge sharing.
- Knowledge use.
- Knowledge culture.
- Knowledge leadership.
- Information technology.

Organisational performance is a variable consisting of four dimensions:

- Quality of services.
- Performance of personnel.
- Customer satisfaction.
- Financial performance.

Based on these considerations, the study proposes the following hypotheses:

H_1: *Knowledge quality has a positive effect on organisational performance.*

H_2: *Knowledge management has a positive effect on knowledge quality.*

H_3: *Knowledge management has a positive effect on organisational performance.*

H_4: *Knowledge management mediates the relationship between knowledge quality and performance.*

H_5: *Knowledge management moderates the relationship between knowledge quality and performance.*

The conceptual model for this study is presented in Figure 1.

3. Methodology

3.1. Choice of Method

The objective of this paper is to assess the direct and indirect effects of knowledge management on performance. For this purpose, three latent variables have been defined, which are knowledge quality (KQ), knowledge management (KM), and organisational performance (OP).

The relationship between these variables is modelled by structural equation models. The approach involves defining the variables and their corresponding items, identifying the internal and external models, specifying the related equations, estimating the parameters of the models using the chosen method, and finally, assessing the validity of the models. The parameters of the models can be estimated using various methods, with the most commonly used methods in management sciences being the Lisrel (Linear Structural Relationships) method and the PLS (Partial Least Square) method. The distinction between these two methods is primarily theoretical. The Lisrel method is based on the analysis of covariance and ordinary least square, while the PLS method is based on variance and partial least square.

In this paper, the models are estimated using the second approach developed by Wold (1973), Wold (1980a), and Wold (1980b). This choice of approach is justified by two main factors:

- An empirical study can be conducted with a small sample size. According to Chin and Newsted (1999), the sample size can be as small as 53 for large populations and 24 for medium populations. Several studies have suggested that the sample size should be at least ten times the number of latent variables in the largest internal model or ten times the number of measurement variables in the largest measurement model. Therefore, the first option will be used for this study.
- There is no requirement for the normality of variables. The chosen approach does not assume a normal distribution of variables, making it suitable for analyzing data that may not follow a normal distribution.

3.2. Presentation of Structural Equation Models

The variables used in structural equation models can be categorised into two types: observed variables and latent variables. These variables contribute to the construction of two distinct types of models: measurement models and structural models.

Measurement models establish the relationships between latent variables and observed variables. They define how the latent variables manifest themselves through the observed variables. On the other hand,

structural models establish the relationships between the latent variables themselves. These models capture the underlying connections and interactions between the latent variables. Overall, these two types of models work together to provide a comprehensive understanding of the relationships and influences among the observed and latent variables in a structural equation model.

3.2.1. The Outer Model

Measurement models can be categorized into two types: reflective or formative. For this research, the reflective measurement is used. In this type of model, the relationship between the measurement variable and its associated latent variable is defined by a simple linear regression. The mathematical formulation is as follows:

Let X_{k_i} and L_k represent the measurement variable and its associated latent variable, respectively. Here, i is the index of each observed variable associated with the latent variable L_k: the relationship between them can be expressed as:

$$X_{k_i} = m_{k_i} L_k + \varepsilon_{k_i}$$

The variables in the model must meet the following conditions:

- The variables ε_{k_i} and L_k are independent ($\text{Cov}(\varepsilon_{k_i}, L_k) = 0$), , $\forall$ and $\forall\, i$.
- The variables ε_{i_j} are independent ($\text{Cov}(\varepsilon_{k_i}, \varepsilon_{m_l}) = 0$) ,$\forall\ (k, i) \neq (m, l)$).

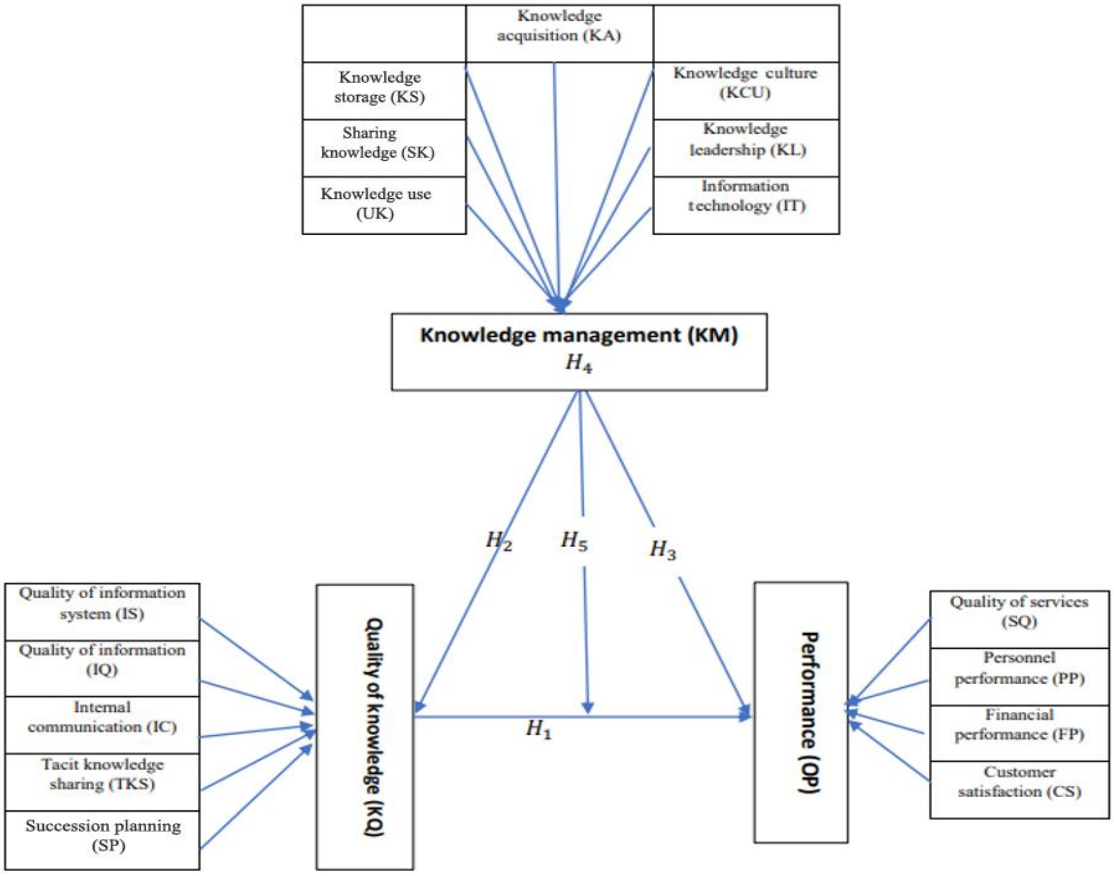

Figure 1. Conceptual model.

3.2.2. Inner Models (Structural Models)

The inner model represents the relationships between latent variables using linear equations, defined as follows:

Let $i = 1, .., n_k$, the number of latent variables L_i exogenous factors in relation to L_k.

$$L_k = \sum_{i=1}^{n_k} \beta_{k_i} L_i + \eta_k$$

The variables in the model must meet the following conditions:

- The variables L_i and η_k are independent ($\text{Cov}(\eta_k, L_i) = 0$) , $\forall\, i \neq k$.
- The variables η_k and ε_{k_i} are independent ($\text{Cov}(\eta_k, \varepsilon_{k_i}) = 0$) $\forall\, k = 1, , \cdots h$ with h number of latent variables in conceptual model and $\forall\, i = 1,2, \cdots n_k$.

3.3. Estimation of the Variable L_k

The estimation of the latent variable L_k can be performed using either the inner model or the outer model. The estimator $\boldsymbol{Y_k}$ of the latent variable L_k in the external model is defined by Tenenhaus (1999) as follows :

$$\boldsymbol{Y_k} \propto \mp X_k w_k = \sum_{i=1}^{p_k} X_{k_i} w_{k_i}$$

Here, $\propto$ indicates that the left-hand term is equal to the right-hand standardized term, and $\pm$ represents the ambiguity of the sign. The sign is chosen in such a way that the estimator $\boldsymbol{Y_k}$ will have the maximum positive correlation with the columns of X_k. The coefficients w_k are called "external weights".

The estimation of $\boldsymbol{Z_k}$ by the internal model is defined by Tenenhaus (1999) as follows :

$$\boldsymbol{Z_k} \propto \sum_{i/i\neq k, \beta_{k_i}\neq 0} a_{k_i} \boldsymbol{Y_i}$$

Lohmöller (1989) defines three methods for estimating the internal weight matrix A = (a_{k_i}) which are:

1. Centroid for which the coefficients a_{k_i} are expressed as:

$$a_{k_i} = sgn(r_{k_i}) \text{ with } r_{ki} \text{ is the correlation between } Y_i \text{ and } Y_k$$

2. Factorial for which the coefficients a_{k_i} are expressed as:

$$a_{k_i} = cov\,(Y_i, Y_k)$$

3. Structural for which the coefficients a_{k_i} are expressed as:

$$a_{k_i} = \begin{cases} \beta_{k_i} \text{ if } L_i \text{ is an explicative variable of } L_k \\ cor(Y_k, Y_i) \text{ if } L_k \text{is an explicative variable } L_i \end{cases}$$

The external weights w_{ki} are then actualised using two methods described by Jakobowicz (2007):

- Method A: The coefficients represent the correlation between X_{k_i} and Z_k, and are written as :

$$w_{k_i} = \frac{1}{Z_k{}'Z_k} X_k' Z_k = cov(X_k, Z_k)$$

- Method B: the coefficients are calculated as:

$$w_k = (X_k{}'X_k)^{-1} X_k{}'Z_k$$

With $w_k' X_k{}' X_k w_k = N(number\ of\ observations)$

For the choice of method, Tenenhaus (1999) and Lohmöller (1989) associate Method A with the reflective model and Method B with the formative model.

3.4. The Validity of Measurement Models

In this step, both the direct and indirect effects must be assessed. The evaluation criteria used in this study are those defined by Hair et al. (2014):

The first step involves using three indicators, which are Cronbach's Alpha, CR, and AVE.

- Cronbach Alpha: This coefficient measures the correlation between items. According to Hair, Hult, Ringle, Sarstedt, and Thiele (2017), each item should have a value greater than 0.70.
- Composite reliability (CR): This measure, proposed by Jöreskog (1971), indicates the level of reliability. Hair et al. (2021) state that a high level of reliability corresponds to a high value of the CR. Therefore, the model is considered "acceptable" for an exploratory study if the CR value is between 0.6 and 0.7 and "satisfactory to good" if this value is higher than 0.7.
- Average Extracted Variance (AVE): Fornell and Larcker (1981), assesses proposed this measure to evaluate convergent and divergent validity. According to Wynne W Chin (1998) and Höck and Ringle (2006), the AVE of each variable must be greater than 0.5 and higher than the cross-loadings of the other variables. If the AVE is less than 0.5, the model is considered invalid because, in this case, the variance explained is less than the variance of the model error.

The second step focuses on construct validity using the criteria of Fornell and Larcker (1981) and the cross-loadings:

- Discriminant validity: According to Hair, Hult, Ringle, and Sarstedt (2014), the construct under study should share more variance with its items than with the other constructs. This validity is verified using the criteria of Fornell and Larcker (1981).
- Convergent validity: Hair et al. (2014) state that convergent validity is verified if the loadings of each item on its construct are greater than the cross-loadings on the other constructs.

3.5. The Validity of the Structural Model

In this step, the direct effect is assessed via the criteria of Hair et al. (2014), and the indirect effect is assessed through the bootstrapping resampling technique. The evaluation criteria used in this study are those defined by Hair et al. (2014):

- Path Coefficients:

These coefficients represent the hypothetical relationships between the constructs. To assess the quality of these relationships, Henseler et al. (2014) introduced a T-statistic, which should exceed critical values of 1.64 and 1.96, corresponding to probability thresholds of 0.1 and 0.05, respectively, as recommended by Hair et al. (2014).

- R^2:

Croutsche (2002) presents three situations for the model depending on the threshold of R^2. Specifically, R^2 is higher than 0.1, the prediction of the model is considered significant. If R^2 falls between 0.05 and 0.1, the prediction is considered tangential. However, if R^2 is less than 0.05, the prediction is considered insignificant. The value of R^2 makes it possible to assess the contribution of each explanatory variable to the prediction of the dependent variable.

- Effect Size (f^2):

The f^2 statistic is defined by Chin (1998) as :

$$f^2 = \frac{R^2_{Included} - R^2_{Excluded}}{1 - R^2_{Included}}$$

Cohen (1988), Chin (1998), and Hair et al. (2014) state that the effects can be classified as small, medium, or large depending on the values of f^2 such as 0.02, 0.15 and 0.35.

- Q^2 of Stone-Geisser:

The structural model associated with the latent variable L_k is defined as follows:

$$L_k = \sum_{j=1}^{p_k} \beta_{k_j} L_j + \eta_k$$

Let $Y_i, i = 1,..,p_k$ be the estimators of $L_i, , i = 1,..,p_k$ and Y_k is the estimator of L_k.

The predictor of Y_k can be expressed as a function of Y_i, as follows:

$$pred\ (Y_k) = \sum_{i=1}^{n_k} \hat{\beta}_{k_i} Y_i$$

with $\hat{\beta}_{k_i}$ is the estimator of β_{k_i}

Let X_{k_j}, where j=1,..., p_k, be the observed variables of L_j, and $x_{k_{ij}}$et $\overline{x_{kJ}}$ respectively represent the observations and the average of the observations of the variable X_{k_j}.

The sum of squares of the errors, noted E, is defined by the following formula:

$$E = \sum_{j=1}^{p_k} \sum_{i=1}^{N} \left(x_{k_{ij}} - \overline{x_{kJ}} - \beta^*_{kj} pred(Y_j) \right)^2$$

The sum of squares, noted S, is defined by the following formula:

$$S = \sum_{j=1}^{p_k} \sum_{i=1}^{N} \left(x_{k_{ij}} - \overline{x_{kJ}} \right)^2$$

The Q^2 coefficient is defined by the following formula:

$$Q^2 = 1 - \frac{E}{S}$$

According to Fernandes (2012), if $Q_k^2 > 0$, the model has predictive validity. However, Tenenhaus (1999) considers that if $Q_k^2 < 0$, the model is not acceptable.

- GoF Index (Goodness-of-fit):

The GoF measure as defined by Henseler and Sarstedt (2013), is used to assess the overall validation of the model. It represents the geometric mean of both AVE and R^2 of the endogenous variables:

$$GoF = \sqrt{\overline{AVE} \times \overline{R^2}}$$

According to Wetzels, Odekerken-Schröder, and Van Oppen (2009), if GoF is greater than 0.25, the overall validation is considered medium and if GoF is greater than 0.36, the overall validation is considered very broad.

3.6. The Mediation of a Latent Variable

Let L_i, L_m, and L_k be three latent variables. Suppose that L_i influences the variable L_k.

The variable L_m has a mediation effect on the relationship between L_i and L_k if it absorbs the effect of the variable L_i on the variable L_k.

To assess the mediation effect of the variable (L_m), Preacher and Hayes (2008) propose two conditions to be met:

- The direct and indirect relationships between the three variables must be significant. Total effects and specific indirect effects serve as indicators of these relationships.

- The Bootstrap Confidence Interval should not include zero.

3.7. The Moderating Role of a Latent Variable

The moderating role is defined by the existence of a variable L_m which modulates the influence of a variable L_i on a variable L_k, by impacting the nature, direction and/or strength of this influence, as stated by Borau, El Akremi, Elgaaïed-Gambier, Hamdi-Kidar, and Ranchoux (2015).

The evaluation of the moderating role of a latent variable L_m on the relationship between the latent variable L_i and the latent variable L_k, is determined by the path coefficient β and the T-statistics. In order to affirm the moderating role of the latent variable L_m, the p-value must be less than 0.05.

3.8. Definition of Constructs and Items

The constructs and items are defined based on the literature review. The items can be found in Appendix 2: Constructs and items, while the constructs are presented as follows:

For knowledge quality, this research includes the following constructs:

- Information system quality (IS): This construct has been used by researchers such as Ghorbani and Khanachah (2020), who integrated IT systems as a component of knowledge management, and Hayati, Mulyani, Sukarsa, and Winarningsih (2021), who assessed the impact of information system quality on the performance of university organisations.
- Information quality (IQ): This construct was used by DeLone and McLean (1992) in their model of information system success, and Hayati et al. (2021) also used it as a component of the information system to study its impact on the performance of university organisations.
- Internal Communication (IC): Internal communication has been used as a latent variable in several studies. For example, Sjöberg and Madsen (2014) used it to understand leadership, information and knowledge sharing, and inter-functionality within the organisation. Neto, da Silva, and Ferreira (2018) demonstrated that internal communication has an impact on performance, while Qin and Men (2022) examined its influence on employees' psychological well-being.
- Tacit knowledge sharing (employees) (TKS): This construct has been studied by researchers such as Smith, De Beer, and Mason (2015), who investigated the relationship between structural social capital and the theory of reasoned action and individuals' intention to share tacit knowledge. Novitasari, Haque, Supriatna, Asbari, and Purwanto (2021) examined the effect of charismatic leadership on intrinsic motivation and tacit knowledge sharing.
- Succession plans (SP): This construct has been addressed in various studies, including those conducted by conducted by Renuka and Marath (2021) and Ahmadzadeh and Mehdizadeh Ashrafi (2022).

The measurement of knowledge quality (KQ) as a latent variable is made on the basis of the most widespread values of the constructs that constitute it. This study uses the mode of responses from the items of the latent variables that form the knowledge quality construct.

For knowledge management, this research uses the following constructs:

- Knowledge acquisition (KA): This construct has been used in previous studies, such as Solano Rodríguez (2017), who tested several hypotheses, including the positive relationship between knowledge acquisition and company performance. Adaileh, Alrawashdeh, Elrehail, and Aladayleh (2020) demonstrated that knowledge acquisition does not support performance, while Presutti, Cappiello, and Johanson (2022) explored the direct and indirect effects of structural, cognitive, and relational social capital on innovation, including the mediating role of market and technology knowledge acquisition.
- Knowledge storage (KS): Badadwa, Soundararajan, and Al-Manasir (2020) employed this construct to study the relationship between knowledge creation, knowledge organisation, knowledge storage, knowledge sharing, information technology, and firm performance. Namdarian et al. (2020) investigated the role of knowledge management in business enterprises.
- Sharing knowledge (SK): Researchers like Siregar and Aryusmar (2023) who looked at the connection between willingness to share knowledge and willingness to use knowledge management tools used the concept of sharing knowledge (SK). Basso et al. (2020) studied the relationships between knowledge sharing, intellectual capital, absorptive capacity, innovation, and organisational performance.
- Knowledge Use (KU): This construct was used by Tasmin, Che Rusuli, Takala, and Norazlin (2012) to define the knowledge management latent variable, while Ode and Ayavoo (2020) investigated the mediation of knowledge application on the relationship between knowledge management practices and firm innovation.
- Knowledge Culture Unit (KCU): Various studies have used this construct, including Namdarian et al. (2020) and Bharadwaj (2000). The latter studied the impact of knowledge management capabilities on the effectiveness of knowledge management in Indian organisations.

- Knowledge leadership (KL): This construct has been used by various studies, such as Feili, Besharat, Chitsaz, and Abbasi (2018), who explored the impact of different leadership styles on the successful implementation of knowledge management in organisations. Al-Husseini, El Beltagi, and Moizer (2021) investigated the relationship between transformational leadership, knowledge sharing, and product innovation.
- Information technology (IT): Qammach (2016) studied the mediating role of knowledge sharing in the relationship between information technology capability, information technology support, and innovation. Namdarian et al. (2020) also employed this construct in their research.

These constructs are derived from the work of the respective researchers mentioned, providing a solid foundation for the measurement of knowledge management in this research.

The measurement of the latent variable knowledge management (KM) is also conducted based on the mode of responses from the items that constitute knowledge management variables.

For organisational performance (OP), this research uses the following constructs:

- Service quality (SQ): This construct has been used in previous studies, such as Khammarnia, Shahsavani, Shahrakipour, and Barfar (2015), who analysed the relationship between knowledge management, employee performance, and service quality in hospitals. Bellizzib, Allenan, Ebolib, Forcinitib, and Mazzullab (2020) also studied the effects of latent factors on the assessment of service quality in an Italian peripheral airport.
- Personnel performance (job performance, employee productivity) (PP): This construct was used by Juera (2020), who investigated the relationship between organisational citizenship, corporate social responsibility, human resource management, and job performance as an endogenous variable. Alsheikh et al. (2021) examined the effect of psychological empowerment and knowledge sharing on the job performance of employees in the Islamic banking sector in Jordan.
- Customer satisfaction (CS): This construct has been used by several researchers as a component of performance, such as Pérez-Campdesuñer, Ruiz-de la Peña, García-Vidal, Sánchez-Rodríguez, and Martínez-Vivar (2019), who analysed the impact of variables related to innovation management in organisations, considering customer satisfaction as a factor of innovation. Arshad Khan and Alhumoudi (2022) studied the performance of online banking and the mediating effect of customer satisfaction.
- Financial performance (FP): Gholami, Asli, Nazari-Shirkouhi, and Noruzy (2013) investigated the influence of knowledge management practices on organisational performance, while Mollaalizadeh, Shiarbahadori, and Mahmoodirad (2021) studied the factors that influence the financial performance of Gulf petrochemical companies.

The measurement of the latent variable organisational performance (OP) is also conducted based on the mode of responses from the items that constitute the performance construct.

4. Empirical Results

The empirical study is based on a sample of 70 respondents from different public organisations. The distribution by sector is presented in Table 1.

Table 1. Distribution by sector.

Sector	Number	%
Public administration	8	11.4%
Agriculture	4	5.7%
Craft industry	1	1.4%
Insurance and provident funds	2	2.9%
Banking and financial market	7	10.0%
Economic and social development	2	2.9%
Education	11	15.7%
Interior and territorial protection	5	7.1%
Justice	6	8.6%
Trade and industry	11	15.7%
Health	3	4.3%
Tourism	3	4.3%
Transport and logistics	7	10.0%
Total	70	100%

The survey is conducted among people with varying levels of education. The percentage of women is 25.71%. The distribution by level of education is presented in Table 2.

Table 2. Distribution by education level.

Education level	Number	%
Bac	3	4.29%
Licence (Bac+3 and 4)	8	11.43%
Bac + 5 (Master + ENGINEER..., etc.)	40	57.14%
Doctorate	19	27.14%
Total	70	100%

4.1. Evaluation of Measurement Models

Figure 2 shows the measurement models, structural models, item loadings, path coefficient values, and correlation coefficients that were found by using the SmartPLS software to analyse the data.

Figure 2. Measurement models, item loads and coefficient values.

The validity of the measurement models is assessed using Cronbach alpha, composite reliability, and average variance extracted (AVE). Based on these criteria, the latent variables "Knowledge Culture (KCU)" and " Knowledge Use (KU)" as well as the items "IQ3" and "IQ4" were eliminated from the model. This decision was made because these constructs did not demonstrate discriminant validity, and both items had an AVE value lower than 0.5. The values of the three indicators of discriminant validity of the constructs of the selected model are presented in Table 3.

Table 3 shows that the AVE values are greater than 0.5 and that both Cronbach's alpha and the composite reliability values are greater than 0.7. This suggests that the selected constructs meet the statistical conditions for reliability of the selected items and that the measurement scales are statistically valid.

The R^2 values of the latent variables “knowledge quality”, "knowledge management" and "organisational performance" show that the variable "knowledge quality" is 51%, which can be explained by the variable "knowledge management", while the variable " organisational performance" is 45.8%, which can be explained by the variables "knowledge management" and "knowledge quality".

Fornell and Larcker (1981) criterion is used to assess the discriminant validity of all constructs. The results of this analysis are presented in Table 4.

Table 3. Discriminant validity of constructs.

Constructs	Cronbach alpha	CR	AVE
CS	0.9126	0.958	0.9193
FP	0.8958	0.9504	0.9056
IC	0.8888	0.9235	0.7518
IQ	0.9299	0.966	0.9343
IS	0.9207	0.9355	0.646
KA	0.7444	0.8542	0.6616
KS	0.8932	0.9336	0.8242
KL	0.7683	0.8654	0.6823
PP	0.9612	0.9809	0.9626
TSK	0.9376	0.9601	0.8892
SK	0.9279	0.9488	0.8228
SP	0.901	0.9309	0.7713
SQ	0.9209	0.9619	0.9265
IT	0.7906	0.9046	0.8258

Table 4 provides evidence confirming the discriminant validity of all constructs in the model, as per criteria proposed by Fornell and Larcker (1981). This is supported by the fact that the average extracted variance (AVE) of the three constructs is greater than the square of the correlations between these constructs and the other latent variables in the model.

Table 1 in Appendix 1, which displays the cross-loadings and GOF, further confirms the discriminant validity of all latent variables. It can be observed that the variables do not exhibit overlap and demonstrate a stronger association with their own respective items compared to those of other latent variables.

4.2. Evaluation of the Structural Model

The empirical results regarding the direct effects obtained from the bootstrap analysis and the hypothesis tests evaluating the structural models are presented in Figure 3. The path coefficients reveal the following:

- The hypothesis H_1 is validated, which means that knowledge quality has a positive effect on organisational performance with a value of the T-statistic equal to 2.175, which is greater than the critical value of 1.96 (for a probability of 0.05).
- The hypothesis H_2 is validated, signifying that knowledge management has a positive effect on knowledge quality with a value of the T-statistic value equal to 11.1873, surpassing the critical value of 1.96 (for a probability of 0.05).
- The hypothesis H_3 is validated, indicating that knowledge management has a positive effect on organisational performance with a value of the T-statistic value equal to 2, 1374, exceeding the critical value of 1.96 (for a probability of 0.05).

Table 4. Criteria of Fornell and Larcker (Discriminant validity).

Constructs	CS	FP	IC	IQ	IS	KA	KS	KL	PP	TKS	SK	SP	SQ	IT
CS	0.9588													
FP	0.777	0.9516												
IC	0.5648	0.5708	0.867											
IQ	0.4085	0.4438	0.7176	0.9665										
IS	0.3237	0.4035	0.6113	0.7313	0.8037									
KA	0.5407	0.5473	0.5471	0.3393	0.3296	0.8134								
KS	0.5374	0.5971	0.7879	0.6792	0.5537	0.647	0.9079							
KL	0.5174	0.5338	0.6843	0.5985	0.5784	0.5645	0.7221	0.826						
PP	0.7171	0.7874	0.6377	0.445	0.474	0.5408	0.5961	0.5486	0.9811					
TKS	0.3752	0.3518	0.5885	0.4975	0.3931	0.6067	0.661	0.5693	0.3339	0.9429				
SK	0.5644	0.5987	0.7726	0.6726	0.6203	0.6425	0.8101	0.7277	0.625	0.5318	0.9071			
SP	0.4195	0.4946	0.7628	0.7815	0.723	0.5058	0.713	0.7284	0.5606	0.5453	0.6924	0.8782		
SQ	0.6748	0.787	0.69	0.5712	0.5311	0.5171	0.6669	0.6328	0.849	0.4778	0.6933	0.596	0.9626	
IT	0.4064	0.4499	0.4873	0.4359	0.4889	0.4389	0.4575	0.3609	0.3843	0.3601	0.4793	0.4308	0.4657	0.9087

Figure 3. Direct relationships resulting from the bootstrap.

The path coefficients (β) of the relationships linking the latent variables and the statistical tests are presented in Table 5.

Table 5. The β and statistical tests.

Hypothesis	β	Standard deviation	T-value	P-value	Decision
H_1: $KQ -> PF$	0.3533	0.1624	2.175	0.030	Accepted
H_2: $KM -> QK$	0.7143	0.0638	11.1873	0.0000	Accepted
H_3 : $KM -> PF$	0.3779	0.1768	2.1374	0.033	Accepted

The endogenous variables in this study are "knowledge quality" and " organisational performance", while the exogenous variables are "knowledge management" for the first variable and "knowledge quality" and "knowledge management" for the second variable. Table 6 represents the R^2 coefficient for each structural model as well as the qualification of the model based on Wynne W Chin (1998) criteria.

Table 6. The values of R^2.

Constructs	Explanatory variables	R^2	Result
KQ	MK	0.510	The model is significant (Moderate)
OP	KQ and KM	0.458	The model is significant (Moderate)

The values of f^2 show that each exogenous variable explains the corresponding endogenous variable. However, the effect size varies: the effect on the relationship between "KM" and "OP" is moderate, as is the effect on the relationship between "KQ" and "PF", while it is significant for the relationship between "KQ" and "KM". The empirical results are presented in Table 7.

Table 7. The values of f^2.

Constructs	QK	OP	Result
MQ		0.1128	Moderate effect
MK	1.0418	0.1291	Large effect between KM and KQ and moderate between MK and OP

The values of the co-efficient Q^2 are greater than zero, specifically 0.486 for knowledge quality and 0.363 for organisational performance, which means that the model is predictive.

Table 2 in Appendix 1 presents the results of the calculation of the GoF index, which has a value equal to 0.704. This indicates that the overall PLS validity of the model is sufficiently large.

4.3. The Mediation Effect of the Knowledge Management Variable

The empirical results show that "knowledge quality", "knowledge management," and "organisational performance" have a significant indirect relationship, with a p-value of 0.028, which is below the critical threshold of 0.05.

The Table 8 below summarizes the results of the significance test for the indirect relationship between the three variables.

Table 8. Specific indirect effects.

Constructs	β	Standard deviation	T-value	P-value
$KQ -> KM -> OP$	0.259	0.122	2.208	0.028

The total effects in all 3 relationships are significant, with $p< 0.05$. The value of the β coefficient, the T-statistic, and the p-value for each relationship are presented in Table 9.

Table 9. Total effects.

Constructs	β	Standard deviation	T-value	P-value	Decision
$KM -> OP$	0.3779	0.3666	0.1733	0.029	Significant
$KQ -> KM$	0.7143	0.713	0.0639	0.000	Significant
$KQ -> OP$	0.6232	0.6205	0.0961	0.000	Significant

The last step of Preacher and Hayes (2008) is to calculate the lower and upper levers. However, the second condition is not verified since the lower lever (LL) is equal to (-0.007) and the upper lever (UL) is equal to (0.4756), as presented in Table 10, both crossing zero.

Table 10. Lower lever and upper lever.

$KQ -> KM$	$KM -> OP$	Indirect effects	Standard deviation	T	LL	UL
0.7143	0.3779	0.259	0.122	2.208	-0.007	0.4756

Consequently, the hypothesis H_4 is rejected, and the study cannot conclude that "knowledge management" has a significant mediating role between "knowledge quality" and "organisational performance".

4.4. The Moderating Effect of Knowledge Management

Empirical tests have rejected the existence of a moderation effect of the variable "knowledge management" since the p-value is equal to 0.585, which is greater than 0.05. As a result, the H_5 hypothesis is rejected. Table 11 presents the results of the tests.

Table 11. Moderating effect.

Moderating effect	β	Standard deviation	T-value	P-value
$KM \rightarrow OP$	-0.041	0.076	0.547	0.585

5. Discussion

For the design of the model, the study showed that two main components of "knowledge management", which are "knowledge culture" and "knowledge use," do not meet the criteria for discriminant validity. Additionally, two items concerning the variable "information quality" whose AVE value is lower than 0.5.

Furthermore, the results of this study show that "knowledge management" has a positive effect on "knowledge quality" and "organisational performance", and the models linking "knowledge management" and these two variables demonstrate predictive capability.

On the other hand, the R^2 correlation shows that performance is only partially explained by "knowledge quality" and "knowledge management", accounting for 45.8% of the variance, while "knowledge management" explains "knowledge quality" to a greater extent at 51%.

For the effect of the variable "knowledge management" on the relationship between "knowledge quality" and "organisational performance", the study showed the absence of a mediating and moderating role. Specifically, for mediation, the variable "knowledge management" did not satisfy the second condition proposed by Preacher and Hayes (2008). Additionally, the statistical tests showed the absence of any effect of the variable "knowledge management" on the relationship between "knowledge quality" and "organisational performance".

6. Conclusion

This study focuses on examining the process of knowledge management as a generator of value. Specifically, it evaluates the effects of knowledge management on knowledge quality and organisational performance. The latter is defined by four latent variables: customer satisfaction, financial performance, staff performance, and service quality. Based on these objectives, five hypotheses were proposed, concerning the positive effects of knowledge management on knowledge quality and organisational performance, the positive effect of knowledge quality on organisational performance, and the mediating and moderating roles of knowledge management in the relationship between knowledge quality and organisational performance.

The findings of the study show a positive effect of the knowledge management process on both knowledge quality and organisational performance. However, it deduces that there is no evidence of mediation or moderation effects in the relationship between knowledge quality and organisational performance. As a result, the study suggests that knowledge management is not a value-generating factor in Moroccan public and semi-public organisations.

The process of determining the items and latent variables for constructing the model is informed by a comprehensive examination of the current body of scholarly research. It is important to acknowledge that the ideas of "knowledge culture" and "knowledge use" lack validation, indicating their absence within the knowledge management practises of public companies.

In conclusion, it is imperative for Moroccan public organisations to dedicate their efforts towards augmenting the capacity for value creation within the realm of knowledge management. The attainment of these goals can be accomplished by placing emphasis on two primary objectives: cultivating a robust "culture of knowledge" and facilitating the efficient "utilisation of knowledge" within the organisational context.

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Appendix 1. Cross-loading and GOF.

Table 1. Discriminant validity - cross loading.

Construct	CS	FP	IC	IQ	IS	KA	KS	KL	PP	TKS	SK	SP	SQ	IT
CS1	0.954	0.7536	0.5368	0.3851	0.2922	0.559	0.5664	0.5274	0.6499	0.3843	0.5681	0.4471	0.6371	0.3983
CS2	0.9636	0.7378	0.546	0.3977	0.3268	0.4826	0.47	0.4685	0.7215	0.3381	0.5175	0.3624	0.6562	0.3822
FP1	0.7463	0.9489	0.5055	0.3733	0.3573	0.5247	0.5245	0.5153	0.739	0.3329	0.5032	0.4632	0.6859	0.4172
FP2	0.733	0.9543	0.579	0.4688	0.4094	0.5173	0.6096	0.5012	0.7591	0.3366	0.6329	0.4778	0.8087	0.4385
IC1	0.5073	0.4945	0.9272	0.6719	0.5615	0.5216	0.692	0.5911	0.5572	0.5565	0.7101	0.698	0.6415	0.4794
IC2	0.4926	0.5656	0.8738	0.5644	0.5725	0.4872	0.6649	0.4988	0.6708	0.4371	0.6728	0.6048	0.6391	0.4963
IC3	0.5594	0.5315	0.8718	0.6179	0.5319	0.5194	0.7161	0.7308	0.5465	0.5784	0.6359	0.7231	0.6389	0.3593
IC4	0.3872	0.3745	0.7897	0.6404	0.446	0.3551	0.6598	0.5466	0.4237	0.4642	0.6645	0.6159	0.4573	0.3491
IQ1	0.3851	0.3782	0.6518	0.9622	0.6728	0.2718	0.5849	0.5435	0.3715	0.4381	0.5758	0.7325	0.4956	0.3899
IQ2	0.4036	0.4738	0.7308	0.9709	0.7371	0.3775	0.7197	0.6095	0.4819	0.5188	0.7158	0.776	0.6021	0.4491
IS1	0.3267	0.366	0.3779	0.4531	0.7462	0.2972	0.3616	0.4152	0.4089	0.2169	0.4923	0.4556	0.3779	0.3967
IS2	0.2589	0.3238	0.4151	0.5576	0.7406	0.3192	0.468	0.4961	0.2721	0.2626	0.5636	0.5007	0.3574	0.375
IS3	0.2464	0.3715	0.5918	0.6174	0.8383	0.2978	0.4746	0.597	0.4508	0.3624	0.5773	0.7375	0.5286	0.4536
IS4	0.3297	0.4055	0.5459	0.6541	0.923	0.2662	0.4857	0.5032	0.5053	0.3268	0.5783	0.6745	0.5543	0.4638
IS5	0.2679	0.3327	0.4427	0.594	0.7408	0.1855	0.4187	0.3447	0.3343	0.2621	0.3892	0.546	0.4122	0.4571
IS6	0.254	0.2937	0.4393	0.5276	0.8278	0.2497	0.4028	0.4898	0.3172	0.3555	0.4358	0.5118	0.3738	0.3404
IS7	0.2645	0.3452	0.52	0.6489	0.8298	0.1941	0.4557	0.3861	0.397	0.3418	0.4587	0.5686	0.4739	0.3755
IS8	0.1482	0.1547	0.5494	0.6128	0.7651	0.3246	0.4758	0.4714	0.3325	0.3734	0.4836	0.5944	0.2919	0.275
AC1	0.3512	0.3882	0.481	0.2484	0.2835	0.7854	0.5394	0.4421	0.3783	0.5018	0.5359	0.4306	0.3708	0.1467
AC2	0.5163	0.5346	0.4602	0.2609	0.3264	0.8455	0.501	0.5086	0.5844	0.4504	0.5466	0.4805	0.4835	0.5378
AC3	0.4593	0.4144	0.3853	0.3227	0.1873	0.808	0.5356	0.4246	0.3561	0.5273	0.4795	0.3143	0.4095	0.4072
KS1	0.4989	0.5662	0.7864	0.6891	0.5896	0.5947	0.9384	0.7104	0.6015	0.5573	0.813	0.7546	0.6603	0.4417
KS2	0.5391	0.5634	0.6259	0.5096	0.3361	0.6157	0.8777	0.5728	0.4493	0.636	0.6199	0.5196	0.5579	0.4062
KS3	0.4315	0.4987	0.7234	0.6386	0.5631	0.5564	0.9065	0.6748	0.5623	0.6165	0.7604	0.6505	0.5923	0.397
LK1	0.5605	0.5774	0.7102	0.5293	0.5012	0.5026	0.6677	0.8634	0.6097	0.5297	0.677	0.6476	0.6699	0.3801
LK2	0.5336	0.4592	0.5187	0.4541	0.4708	0.4858	0.5747	0.8419	0.4321	0.408	0.6192	0.5758	0.475	0.2788
LK3	0.1305	0.2414	0.4312	0.5014	0.4616	0.402	0.5343	0.7699	0.2723	0.469	0.4867	0.5788	0.3865	0.2139

Construct	CS	FP	IC	IQ	IS	KA	KS	KL	PP	TKS	SK	SP	SQ	IT
PP1	0.7315	0.7787	0.6385	0.4333	0.4501	0.5433	0.593	0.5335	0.981	0.333	0.6136	0.5178	0.8285	0.3878
PP2	0.6758	0.7665	0.613	0.4399	0.48	0.518	0.5768	0.5431	0.9813	0.3222	0.6128	0.5821	0.8375	0.3663
STK1	0.3629	0.32	0.4906	0.4211	0.3344	0.5124	0.5495	0.5154	0.2712	0.9368	0.4319	0.4319	0.3902	0.3343
STK2	0.3891	0.379	0.6317	0.5397	0.3963	0.5989	0.6866	0.6021	0.3415	0.9658	0.5621	0.5855	0.5001	0.3609
STK3	0.307	0.2909	0.5309	0.4365	0.3771	0.5993	0.6233	0.4854	0.3266	0.9257	0.5	0.5129	0.4529	0.3215
SHK1	0.5415	0.541	0.7533	0.6142	0.6574	0.5972	0.7803	0.7082	0.599	0.5709	0.9144	0.6903	0.6482	0.4341
SHK2	0.53	0.5609	0.6897	0.57	0.5299	0.5895	0.7606	0.6749	0.6329	0.5215	0.9123	0.6166	0.6886	0.421
SHK3	0.4659	0.5359	0.6315	0.5849	0.4898	0.5721	0.6323	0.5606	0.4907	0.3511	0.8511	0.5422	0.5013	0.4309
SHK4	0.5078	0.5396	0.7206	0.668	0.5621	0.5761	0.7549	0.6847	0.5411	0.4686	0.9478	0.6511	0.6633	0.4549
SP1	0.3077	0.4072	0.6832	0.7322	0.6358	0.4388	0.6214	0.6147	0.4623	0.4522	0.6212	0.9103	0.5047	0.4371
SP2	0.1956	0.3169	0.5473	0.6295	0.659	0.3944	0.5485	0.6153	0.3924	0.4004	0.5355	0.8854	0.4026	0.2606
SP3	0.4216	0.4596	0.6761	0.6375	0.6001	0.4626	0.6187	0.6312	0.505	0.412	0.6238	0.8522	0.5271	0.3409
SP4	0.5258	0.5383	0.7581	0.7387	0.6438	0.4744	0.7043	0.6903	0.595	0.6352	0.6432	0.8637	0.6426	0.463
SQ1	0.6296	0.7626	0.6764	0.5876	0.5288	0.4674	0.624	0.5804	0.8085	0.4252	0.6707	0.5665	0.9655	0.4792
SQ2	0.6713	0.7522	0.651	0.5091	0.4923	0.5306	0.6615	0.6403	0.8269	0.4976	0.664	0.5815	0.9596	0.4151
TI1	0.2718	0.3136	0.4491	0.3164	0.4349	0.3053	0.3354	0.3115	0.323	0.2912	0.3796	0.3714	0.3876	0.8923
TI2	0.4524	0.4901	0.4387	0.4642	0.4534	0.4787	0.4845	0.3427	0.3722	0.3583	0.4839	0.4094	0.4544	0.9249

Table 2. GOF calculation.

Construct	*AVE*	R^2
CS	0.5225	0.9193
FP	0.6653	0.9056
IC	0.5813	0.7518
IQ	0.6086	0.9343
IS	0.6291	0.646
KA	0.4652	0.6616
KS	0.7287	0.8242
KL	0.6817	0.6823
PP	0.8201	0.9626
TKS	0.2947	0.8892
SK	0.7926	0.8228
SP	0.6436	0.7713
SQ	0.814	0.9265
IT	0.1682	0.8258
The average	0.6229	0.8169

$$GoF = \sqrt{\overline{H^2} \times \overline{R^2}} = 0.704$$

Appendix 2. Constructs and items.

Table 1. Definition of items.

	Construct	Items	Code items
Knowledge quality	Information system quality (IS)	The information provided by the Information system is reliable (error-free).	IS1
		The information provided by the Information system is exhaustive (complete)	IS2
		The information provided by Information system is pertinent (appropriate to the work).	IS3
		The information provided by the Information system quality is accurate.	IS4
		The information provided by the Information system is available (accessible).	IS5
		The information provided by the Information system is actualised (updated).	IS6
		The information provided by the Information system is immediate (provided in real time).	IS7
		The information provided by the Information system is in an appropriate format and can be used directly.	IS8
	Information quality (IQ)	The databases are permanently made reliable.	IQ1
		The databases are periodically made more reliable.	IQ2
	Internal Communication (IC)	The internal communication of your organisation is effective.	IC1
		The internal communication of your organisation allows reliable information to be shared.	IC2
		The internal communication of your organisation allows information to be shared in a timely manner (in real time).	IC3
		The internal communication covers all internal activities.	IC4
	Tacit knowledge sharing (Employees)(TKS)	Your organisation encourages the sharing of tacit knowledge	STK1
		the culture of your organisation promotes the sharing of tacit knowledge	STK2
		your organisation's employees accept the sharing of their tacit knowledge	STK3
	Succession plans (SP)	The management of departures and the succession plan in your organisation allows you to maintain the reliability of the knowledge	SP1
		The mobility management and succession plan in your organisation allows you to maintain the reliability of knowledge.	SP2
		The professional support in your organisation allows for the availability of information.	SP3

	Construct	Items	Code items
		Internal training in your organisation allows for the transmission of reliable information.	SP4
Knowledge management	Knowledge acquisition (KA)	Your organisation recruits new expertise as a source of new knowledge.	AC1
		Your organisation organises external training to acquire new knowledge.	AC2
		Your organisation builds relationships with knowledge providers (consultancy firms, etc.).	AC3
	Knowledge storage (KS)	Databases of good working practices, lessons learned, competences and lists of experts are regularly updated.	KS1
		Written documentation of lessons learned, training manuals, good working practices and articles is produced.	KS2
		Information systems and knowledge stored in the systems are constantly updated	KS3
	Knowledge sharing (SK)	Your organisation exchanges knowledge between employees in order to achieve objectives with little time and effort.	SHK1
		Your organisation encourages the sharing of information and knowledge between team members and different units.	SHK2
		Your organisation encourages workers to participate in project teams with internal and external experts.	SHK3
		Your organisation has a culture of promoting knowledge sharing	SHK4
	Knowledge use (KU)	Your organisation manages different sources and types of knowledge effectively.	UK1
		Your organisation uses available knowledge to improve the services provided to its clients.	UK2
		Your organisation applies available knowledge to improve its performance.	UK3
	Knowledge Culture (KCU)	Your organisation's culture encourages trust and knowledge sharing.	KCU1
		All levels of your organisation are committed to promoting knowledge sharing.	KCU2
		In your organisation, knowledge hoarding is not a power	KCU3
	Knowledge leadership (KL)	Knowledge management is a strategic focus for your organisation.	LK1
		Your organisation has a policy for protecting its knowledge (e.g. copyright, patent, knowledge management, knowledge security).	LK2
		Your organisation allocates financial resources to knowledge management innovations.	LK3
	Information technology (IT)	Your organisation has the necessary IT structures (e.g. internet, intranet, website) to facilitate knowledge management.	IT1
		Your organisation's employees are technologically equipped (access to the internet, intranet and an e-mail address in the organisation...).	IT2
Organisational performance	Service quality (SQ)	Knowledge management in your organisation improves service quality.	SQ1
		Knowledge quality in your organisation improves service quality.	SQ2
	Personnel performance (PP)	Knowledge management in your organisation improves staff performance.	PP1
		Knowledge quality in your organisation improves staff performance.	PP2
	Customer satisfaction (CS)	Knowledge management in your organisation increases customer satisfaction.	CS1
		Knowledge quality in your organisation increases customer satisfaction.	CS2
	Financial performance (FP)	Knowledge management in your organisation improves financial performance.	FP1
		Knowledge quality in your organisation improves financial performance.	FP2