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Validation of the K-Social-C questionnaire for measuring the Social Construction of Knowledge from Open Innovation in Social Innovation Laboratories*

Instrument Validation

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ABSTRACT

Knowledge and its construction are the basis of the information used in society to meet life's challenges. Social innovation laboratories are an alternative that uses the open innovation approach to co-create knowledge. This article presents the validation of the K-Social-C questionnaire that measures the processes of social construction of knowledge from the open innovation approach. The instrument is structured in 5 parts, the first two to collect demographic data and the following 3 involve the mentioned constructs to present in an objective way the measurement of the constructs and their variables established by the literature. Expert evaluation was used to determine through statistical techniques the Kendall concordance coefficient and the content validity coefficient that confirm that K-Social-C is a valid and reliable questionnaire. The results of the validation will continue to be consolidated with the application of the questionnaire in the various laboratories where it is used to collect data.

CCS CONCEPTS

• Social and professional topics • User characteristics • Cultural characteristics • General and reference • Cross-computing tools and techniques • Validation

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KEYWORDS

Open Innovation, Social Innovation Labs, Social Construction Knowledge, Open science, Instrument validation

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1. Context and motivation that drives the dissertation research

The Social Construction of Knowledge (SCK) is a variable that is measured as a system of activity where ideas are shared through the interaction and socialization of interdisciplinary groups that serve a common purpose [1]. The main study scenarios are the Social Innovation Laboratories (SIL) [2, 3], which are known as interdisciplinary collaborative experimentation scenarios where ideas, problems or needs of a society are addressed [4]. The main source of knowledge is the Open Innovation (OI) approach that promotes the participation of different areas of science and open access, which is a two-way process where knowledge flows from inside to outside and vice versa [5, 6, 7, 8]. The SCK is seen as a collaborative model in learning communities that emerge with individual interaction as actions to create ideas and build knowledge applicable in a real environment. Consequently, SIL are positioned as spaces for co-creation and co-production

where actors from the fourfold helix intervene: citizenship, business, academia and government [9, 10]. In short, they are communities that raise awareness of public and private participation in an open way through work teams that put their potential to use, exchange roles and generate ideas in collaboration [11].

One of the advantages of measuring the SCK is based on answering why success is achieved in a learning process and confirms the efficiency of the collaborative process in the spaces of experimentation and teaching, since the SCK is one of the aspects of the learning process [12]. On the other hand, the SIL are consolidated as open and autonomous since the main value is the exchange of knowledge that are practices of knowledge creation that is mediated by experts [13]. The OI uses the exchange of knowledge through resources that come from the participants who are supported by expert managers before groups, government or universities [14] as responsible for creating calls and spaces for the creation of initiatives tested in real environments. In 2020, in Finland, studies were carried out to determine the sources for people to carry out academic activities in and out of formal settings [15]. On the other hand, in the same year, in Russia, research was carried out that measures and confirms that improvisation is an aspect that motivates urban spaces to experiment with laboratories where experience and science manage to create knowledge on diverse topics, not only on politics and urbanism [16]. In the previous studies, it was reported that the way in which the entire population is listened to is the factor that allows the SCK to consolidate itself with the OI from practices that make new knowledge emerge, which are disseminated with open access and develop technological, social and cultural innovation [17].

To support this study, documents were reviewed in which the reliability of data collection instruments is designed, validated, and measured, but it was found that, in the flexibility of OI, the characteristics and needs of knowledge should be considered to be enriched by application in real environments [18]. Breunig, Aas and Hydle demonstrated that areas of opportunity are generated in the SCK even when end users have participated in the process [19], challenges come from the changing environment and are known at the time of implementing the laboratories to address needs or problems, when the results of a scenario are scaled from local to global [20]. Therefore, the social implications of innovation have to be determined through the assessment of the final products of the laboratories by the context and the format through which knowledge is shared [21]. The aim of this study is the validation of the K-Social-C questionnaire that measures the SCK of the SIL work teams from the OI approach.

The K-Social-C questionnaire is the quantitative instrument of a mixed survey. To expose the results of the validation of the questionnaire is a way of sharing the knowledge that is constructed so that the organizers of laboratories have a reliable tool to measure the processes of social construction of knowledge from the approach of the open innovation with its categories and indicators that arise from the review of specialized literature in design of instruments, as well as in the own constructs that are measured in the questionnaire K-Social-C. In the present document, the constructs that motivate to design an instrument that measures the constructs in a real environment are exposed. Afterwards, it is deepened with a literature review in order to conceptualize the constructs to be measured, as well as to argue about the coefficient of agreement and the validation of content as processes of validation of quantitative instruments. We dedicate a space to present the instrument, and it is also explained why the expert judges who validated the questionnaire were chosen. The objectives and the research method have a specific section that includes the design and the population of the research. The research results are organized according to the techniques used to validate the K-Social-C questionnaire. A discussion is included in the light of the revised theory, to close with the section on the most significant conclusions of this paper.

2. State of the art

2.1 Social Innovation Labs, Social Construction Knowledge and Open Innovation

In the SIL, it is analyzed if the participants come from the quadruple helix: citizen, academy, government or company. In the laboratories, the characteristics of the interdisciplinary groups are also determined in order to analyze which areas of science participate collaboratively in flexible and open spaces [22]. The exchange of ideas and role-playing through interaction are aspects analyzed to determine how innovative and creative ideas that arise from the exchange of knowledge are developed [23]. The participation must be active so that the human potential finds the opportunities for action of the knowledge that is produced and that will be applied in real environments [24]. In the SIL we work with open access digital platforms [25], as well as with resources from public and private organizations [26]. The main value of knowledge is that it attends or solves a problem, so it determines the degree of thinking to create solutions [27]. The studies reviewed state that the SCK is developed throughout the laboratory and depends on the experience of the participants of each interdisciplinary group for each project to which it was called and on the guidance of specialists.

The SCK is an activity that takes place in formal and informal spaces where a teaching action is carried out or where people interact to generate ideas and build an argument [28]. Cantoral [29] mentions that the SCK is a human activity from a sociocultural perspective and that identifying it, as well as evaluating it, depends on the sources and origin of knowledge. In this sense, Jara-Roa, Ramírez-Montoya, Cabezas and Deus [30] affirm that one of the predictors for achieving learning is the SCK. To give meaning to the valuation of knowledge, authors such as Silva [31] manage to define a model of knowledge construction by determining four stages which are

socialization, externalization, combination, and internalization, and in each stage a type of knowledge can be observed to be considered as socially or group-constructed [32, 33].

Within the framework of the SCK, synonyms have been addressed such as the case of collective construction of knowledge that is carried out through reflective actions where citizens participate in training processes, consolidating responsibility, ethics and decision-making to improve the environment around them [34]. This is how we can consider some of the aspects mentioned in this paragraph in order to measure the SCK.

The OI approach is an aspect that has been determined as an observable and measurable variable in SCK processes in SIL. One of the indicators of the OI that is measured is that the participants of the SIL come from the contexts contemplated in the quadruple helix; this is how the final users have participation in the production of a prototype that will be successful since it will have to be tested before its final application considering the knowledge that comes from diverse sources as new ideas generating new products, services or objects [35]. Here it should be noted that the contexts of the quadruple helix are: science represented by schools, the economy that brings private enterprise into play, politics that comes from the government, and civil society as the citizen who is the end user [36]. Based on the above, we observe the use of diverse sources and resources that provide SIL participants with the exchange of knowledge through collaborative processes, which take place as a form of organizational learning, in scenarios where knowledge is mobilized through experimentation [37].

2.2 Concordance Coefficient

Documentary measurement instruments must have two fundamental qualities, validity and reliability. The purpose of validity is to guarantee that the instrument designed to collect information actually measures what it is intended to measure; in the words of Rosado [38], Valenzuela-González and Flores-Fahara [39], validity consists of being able to measure what it is intended to measure. For this reason, it is important to consider the need to develop Table 1 with its own specifications. On the other hand, Cea [40], Valenzuela-Gonzalez, Ramirez-Montoya and Alfaro-Rivera [41] emphasize that the researcher must check if the chosen indicators really "indicate" what is intended, that is, if they "measure" correctly the meaning given to the theoretical concept under consideration.

To analyze the significance of Kendall's concordance coefficient [42], Table 1 presents the aspects to be considered:

Table 1: Meaning of the Kendall Concordance Coefficient

Coefficient	Scale of the data	Information that provides	Hypothesis	Rejection of H0 and interpretation
Coefficient of Kendall's concordance **W**	Ordinal scale	The degree of concordance between various ranges of **n** objects or individuals. Applicable to studies interjection or reliability try	**H0**: The ranges are independent, not consistent **H1**: There is significant agreement between the ranges	**H0** is rejected when the observed value exceeds the critical value (with a **α** of 0.05). The SPSS indicates the significance level, and when it is lower than 0.05, the **H0** is rejected and it is concluded that there is significant agreement between the ranges assigned by the judges. In addition, the strength of the concordance is interpreted, which increases when **W** approaches **1**.

As for the concordance, or agreements between judges or validators, there are several methods to obtain the index or coefficient; among others, there is the Kappa, Fleiss and Kendall method. The Kappa coefficient was initially developed for 2 x 2 contingency tables, and was later extended for R x R symmetric contingency tables (R represents any number of categories or scores), as well as for any number of objects (items) and judges or validators; there is an extended version of Kappa for n objects or items, m judges and k scores [43], which generates an asymmetric contingency table.

The Kappa coefficient constitutes an intra-judge reliability estimator [43, 44, 45] and requires that judges' judgments or scores refer to the same objects (items) or subjects (persons). To interpret this coefficient, López de Ullibarri and Pita-Fernández [46] present the following empirical criteria: values under 0.20 indicate poor concordance; values between 0.21 and 0.40 indicate weak concordance strength; between 0.41 and 0.60, moderate concordance; from 0.61 to 0.80, good concordance; and between 0.81 and 1, very good concordance.

Kendall's coefficient of agreement is useful when we have **K** rankings and it is necessary to determine the association between them; this measure is convenient in reliability studies among judges or among tests and it also has application in studies of groupings of variables [47]. In other words, Kendall's coefficient of agreement (**W**) measures the degree of agreement between a group of elements (**K**) and a group of characteristics (**n**). It is appropriate to determine the degree of agreement among several judges, or the association between three or more variables.

2.3 Content validation

As mentioned earlier, the procedures described to obtain the concordance coefficient leave a gap since they do not measure content validity; given this need, Hernández-Nieto [45] analyzed all these procedures, from which a new coefficient emerged that allows the magnitude and relevance of content validity to be measured and evaluated quantitatively

(CVC: Content Validity Coefficient), based on the concordance between judges.

This author redefines the concept of content validity in terms of the proportional relationship between hypothetical perfect, true, or expected validity (e.g., all judges agree to assign the maximum value of the scale to each of the items, with some error for random variation) and empirical or observed validity (e.g., judges agree to a lesser or greater degree to assign certain values relatively on the scale, with some error for random variability).

Based on this redefinition, Hernández-Nieto argues that content validity must answer the following question What proportion of hypothetical perfect or expected validity is observed in empirical or observed validity? To answer this question, he considers that it is necessary to determine three fundamental events:

1. Whether there is agreement or consistency among the judges (a form of reliability of the experts' judgments with respect to each of the items).
2. If this correlation or consistency is observed at the top of the evaluation scale used by the judges.
3. If the agreement or consistency corresponds to at least 80% of the range of the scale used (Scale Range) [45].

Consequently, Hernández-Nieto defines the total Content Validity Coefficient (CVCt) as the average product of the content validity coefficient of each item, which has been corrected by random agreement among judges [45]. To obtain this coefficient the author created the following equation:

$$CVCt = \frac{\sum CVCi}{N} = \sum\left[\left[\frac{\sum Xi/J}{Vmax}\right] - Pei\right]\left(\frac{1}{N}\right) \qquad \text{Pei} = (1/J)^{J}$$

Where:

CVCt = Total Content Validity Coefficient and agreement between judges or validators.

N = Total number of items in the data collection instrument.

∑Xi = Sum of the scores assigned by each judge J to each of the items i.

Vmax = Maximum value of the scale used by the judges.

Pei = Probability of error for each item (probability of random agreement between judges).

J = Number of judges assigning scores to each item.

2.4 Instrument to be validated

In Table 2, you can see the variables and indicators that were considered to build the K-Social-C questionnaire. Here it should be pointed out that the CSK construct has been divided into the variables Knowledge construction and Knowledge dissemination. We have used authors who have published between 2019 and 2020 information related to how the variables are measured and which are their indicators. The main justification for creating the K-Social-C questionnaire with the three constructs is that no authors or research reports that consider the SIL, the CSK and the OI were found in the literature.

Table 2: Operationalization of variables and indicators

Variables	Indicators	Theoretical
Social Innovation Laboratory	Quadruple helix participants	[23]
	Collaborate openly in interdisciplinary groups	[27, 48, 49]
	Solution to a problem with mentor support	[22, 50]
	Open spaces for experimentation	[27, 51]
	Areas served	[24, 26]
	Labs as a system to develop creative ideas	[48, 50]
Social construction of knowledge (knowledge construction)	Individual interaction to create ideas	[52, 53]
	Negotiation of the arguments	[34]
	Identify agreements	[54]
	Responsibility and ethics (new commitments)	[34, 55]
	Cognitive processes conceptual construction	[29, 54]
Social construction of knowledge (knowledge dissemination)	Applicable knowledge	[53]
	Final product (mobilization of knowledge)	[56]
	Socialization (knowledge flow)	[55]
	Combination (agreements, plenary)	[31]
	Opening of knowledge	[53, 57]
Open Innovation	Use of different sources -resources- of knowledge	[35, 58, 59]
	Product quality (new knowledge)	[60, 61]
	Networking	[59]
	Characteristics of open innovation	[62]
	Learning in formal and informal contexts	[29]

In Table 3 (https://doi.org/10.6084/m9.figshare.13076789.v1), you can see the items of the K-Social-C questionnaire, it has 5 sections, the first one is for the participants to agree to share personal information, the second one retrieves demographic data and the three following ones are built from the constructs: Social Innovation Labs (SIL); Social Construction of Knowledge (SCK) and, Open Innovation (OI).

3. Research objectives/goals

The K-Social-C Questionnaire was validated by expert judges, the Kendall Concordance Coefficient was determined and the Content Validity Coefficient was also obtained. The main objective of the questionnaire is to measure the processes of social construction of knowledge from the approach of open innovation in the social innovation laboratories.

4. Methods

4.1 Research design

From the analysis made to the Kappa and Kendall methods to obtain the coefficient of concordance or degree of agreement between the ranks assigned by a group of judges to three or more variables, it is concluded that these coefficients do not express content validity but the 3 with which the judges assigned those ranks. To obtain the Kendall concordance coefficient, the following equation is used:

$$W = \frac{S}{1/_{12\,K^2(N^3-N)}} \qquad S = \sum(R_j - \sum R_j/N)^2$$

Where:
W = Kendall's concordance coefficient.
S = Sum of squares of observed deviations from the mean of Rj.
K = Number of entities (objects, individuals) ordered.
1 / 12K2(N3-N) = Maximum possible sum of squared deviations; that is, the sum S that will occur when there is a perfect agreement between K ordinations.

4.2 Population and sample

The population of experts to whom the invitation was sent by e-mail, as well as the validating document was 18 researchers. The final sample that validated the K-Social-C questionnaire was 13 experts (Table 3) who were selected according to their graduate profile, as well as for their experience in educational research in innovation issues, creation of open resources, evaluation and psychometric processes, also experts in innovation laboratories. The validation of content by expert judgments seeks to have the instrument's evaluators confirm that the items have three main qualities: clarity, relevance, and correspondence [42, 45], as can be seen in Table 4.

Table 4: Validating instrument

		Qualities that must be possessed by the items or statements								
	Enter the name of the variable to be measured	Clarity, precision and coherence in the wording of the item			Relevance of the item in relation to the variable or dimension of the variable			Correspondence of the response alternatives with the item's approach		
Item number	*Affirmations*	Good	Regular	Deficient	Good	Regular	Deficient	Good	Regular	Deficient
1										
2										
3										
4										
5										
Comments										

The 13 validators are professionals with knowledge in the variables of the study (Innovation Laboratory, social construction of knowledge and open innovation); in addition, they have experience in research and are recognized by the scientific community because they have participated in congresses and have articles published in refereed scientific journals; they also have experience in measurement, evaluation and linguistics (Table 5: https://doi.org/10.6084/m9.figshare.13076795.v1).

4.3 Information collection and análisis

In order to carry out the expert evaluation, a review of the profiles of researchers who are related through the collaborative networks, as well as those who have participated in research projects with the authors of this study, was carried out. In Table 3, in the first column, the items that were validated were written with the corresponding numbering from 7 to 34. The 18 evaluators were sent by e-mail the Validator Instrument in an Excel file, with the following note:

> Instructions for filling the validating instrument (Table 4): *Dear Validator, I would like to thank you for validating the contents of the K-Social-C instrument I present below. In order to collect this information, a set of items was elaborated to measure the following variables: Type of Laboratories, Social Construction of Knowledge and Open Innovation. To carry out the content validation process of all items, please mark with X the verbal expression (Good or Regular or Deficient) that corresponds to the qualities that each one of the statements should have. NOTE: When you rate any statement as Good or Poor, in the row for observations, place the number that identifies it and the reason or reasons why you assigned that qualitative rating. Thank you very much for your support in this process of validating the content of all the instrument's statements.*

5. Results

To evaluate the significance of Kendall's concordance, the following system of statistical hypothesis was proposed:

H0: The average ranges assigned by the 13 validators are independent, not consistent.

H1: There is significant agreement between the average ranges assigned by the 13 validators.

Significance (Sig.) = 5% or 0,05.

Table 6: Average ranges assigned by the validators

Qualities of the items	Average range
Clarity, precision and coherence in the wording of the item	1,79
Relevance of the item in relation to the variable or dimension of the variable	2,18
Correspondence of the response alternatives with the item's approach.	2,02

Table 7: Test statistics

N	329
W for Kendall*	0,132
Chi-square	87,107
gl	2
Sig. asintotica	0,000

* Kendall's Concordance Coefficient

Table 8: Resumen del contraste de hipótesis

Null hypothesis	Test	Sig.	Decision

The ranks assigned by the 13 evaluators are independent, not consistent	Kendall's concordance coefficient for related samples	0,000	Reject the null hypothesis
Asymptotic significance is shown. The level of significance is 0,05			

The SPSS outputs are listed in Tables 6, 7 and 8, which are explained below. Table 6 shows that there are very few differences in the average ranges assigned by the validators. Table 7 shows that the agreement coefficient (W= 0.132) is statistically significant with $p < 0.05$; the results of these two tables allow us to conclude that there is significant agreement between the ranges assigned by the 13 validators, which is confirmed by the information in Table 8.

SPSS has already incorporated the equation, therefore, to obtain the concordance coefficient of the K-Social-C questionnaire of the 13 judges who validated the 26 items, version 23 was used; the validation was made taking into account the following qualities: clarity, precision and coherence in the item's writing; relevance of the item in relation to the innovation laboratory variables; social construction of knowledge and open innovation; and, the correspondence of the answer alternatives with the item's approach. In this sense, it should be mentioned that the Questionnaire consists of 34 items, but only 26 were validated since the remaining are demographic data that were not considered for any type of validation.

In order to apply the Hernández-Nieto methodology, the valuation given by the 13 validators to the 26 items was used, according to the qualities described for the calculation of the concordance and the scale used by this author: good (3), regular (2) and deficient (1); in addition, to improve the items, the comments given by each validator, in the space for observations, were taken into account when valuing the item as regular or deficient. Some validators recommended improvements in form and content to approximately 25% of the items; based on these recommendations, the questionnaire was improved.

When processing the valuation of the 13 validators with the described equation, the following results were obtained: CVCt = 0.926, with a P-error in each item of 3.3 X10-15. It is evident that the probability of random agreement between the validators is very small.

The CVCt index shows that the content validity and concordance among the 13 validators of the instrument is excellent, according to the criteria of Hernández-Nieto, established in the following scale:

a) Less than 0.60, unacceptable validity and concordance.
b) Equal or greater than 0.60 and less than 0.70, deficient validity and concordance.
c) Greater than 0.71 and less than 0.80, validity and concordance acceptable.
d) Greater than 0.80 and less than 0.90, good validity and concordance.
e) Greater than 0.90, excellent validity and concordance.

Table 9 illustrates the means and standard deviation of the 26 items validated by 13 professionals mentioned above with a scale of 3 values: good (3); regular (2) and deficient (1). The qualities considered to validate the items were the following: clarity, precision, and coherence in the item's wording; relevance of the item in relation to the variables, and correspondence of the response alternatives with the item's approach.

In terms of the clarity, precision and consistency with which the item was written, the average of the mean scores was 2.64 with a standard deviation of 0.158 points; the maximum mean is 2.92 and the minimum is 2.17 (Table 9).

Regarding the relevance of the item in relation to the variables, the average of the means is 2.92 and a variability of 0.085; the minimum and maximum means of the items is 2.69 and 3, respectively (Table 9).

Regarding the correspondence of the response alternatives with the item's approach, the mean and the standard deviation of the means were 2.80 and 0.115; the maximum mean reached in the items was 3 and the minimum was 2.54 points (Table 9).

Table 9: Averages and standard deviation of the 26 items

	Clarity, precision and coherence in the wording of the item			Relevance of the item in relation to the study variables			Correspondence of the response alternatives with the item's approach		
Items	Media	Standard Deviation	Judges	Media	Standard Deviation	Judges	Media	Standard Deviation	Judges
9	2.77	0.439	13	3.00	0.00	13	2.92	0.277	13
10	2.92	0.277	13	2.92	0.277	13	3.00	0.00	13
11	2.85	0.376	13	2.92	0.277	13	3.00	0.00	13
12	2.54	0.519	13	2.92	0.277	13	2.92	0.277	13
13	2.83	0.389	12	3	0	12	2.83	0.39	12
14	2.75	0.452	12	3.00	0.00	12	2.83	0.389	12
15	2.54	0.519	13	2.92	0.289	12	2.77	0.60	13
16	2.77	0.439	13	2.92	0.277	13	2.69	0.630	13
17	2.62	0.506	13	3	0	13	2.85	0.38	13
18	2.62	0.506	13	3.00	0.00	13	2.85	0.376	13
19	2.69	0.48	13	3	0	13	2.85	0.38	13
20	2.69	0.480	13	3.00	0.00	13	2.85	0.376	13
21	2.69	0.48	13	3	0	13	2.85	0.38	13
22	2.77	0.439	13	3.00	0.00	13	2.85	0.376	13
23	2.17	0.577	12	3	0	11	2.82	0.41	11
24	2.62	0.650	13	2.85	0.376	13	2.54	0.776	13
25	2.62	0.65	13	2.91	0.302	11	2.85	0.56	13

26	2.69	0.630	13	2.92	0.277	13	2.77	0.599	13
27	2.54	0.66	13	2.92	0.289	12	2.75	0.62	12
28	2.54	0.776	13	2.69	0.751	13	2.69	0.630	13
29	2.62	0.65	13	2.77	0.599	13	2.69	0.63	13
30	2.31	0.751	13	2.85	0.555	13	2.69	0.630	13
31	2.75	0.452	12	3	0	12	2.92	0.29	12
32	2.54	0.660	13	2.77	0.599	13	2.54	0.776	13
33	2.69	0.48	13	2.85	0.376	13	2.77	0.60	13
34	2.62	0.506	13	2.92	0.277	13	2.85	0.555	13

6. Discussion

The K-Social-C questionnaire was evaluated by 13 judges who determined that the items met the three qualities: 1) clarity, precision and coherence in the item's wording; 2) relevance of the item in relation to the study variables; and, 3) correspondence of the answer alternatives with the item's approach. We can see in Table 9 that the minimum mean score was 2.17; 2.69 and 2.54; on the other hand, the maximum mean score was 2.92; 3 and 3, respectively. Although there was no significant difference in the maximum mean score, if there was in the minimum mean score, these percentages were considered so that the items were enriched because the validation was carried out in a real environment, which potentiates their characteristics to determine the degree of social construction of knowledge from the open innovation approach [18]. In that sense, it was determined that the validation of the judges has benefited the soundness of the questionnaire to measure the established variables, mainly in the laboratories of social innovation or where experimental activities are carried out to solve society's problems.

The Concordance Coefficient was one of the aspects used for the reliable validation in the quantitative instruments, but a gap was found since it did not measure the content, so in the present questionnaire the Content Validity Coefficient was also determined. In this regard, the challenges come from the changing environment and are known at the time of implementing the instruments and also when the results of a validation of a specific scenario are intended to scale from local to global [20, 21]. As we can see in Table 1, when the Null Hypothesis is rejected, it is concluded that there is significant concordance between the ranges assigned by the judges, data that are confirmed by the information in Table 8, and SPSS shows that the Kendall concordance coefficient is significant among the ranges assigned by the 13 validators; in addition, the 26 items have excellent content validity, since the coefficient was higher than 0.90. Both the concordance coefficient and the content validity coefficient allow evidencing that the K-Social-C Questionnaire measures what it intends to measure, that is, a meaning to the theoretical concepts under consideration will be built.

This questionnaire will be a tool to measure at the same time the three variables exposed for the creation of the instrument: laboratories of social innovation, social construction of knowledge and open innovation. The literature consulted, which relates to the design of instruments similar to this questionnaire, found that the use of various sources and resources that provide participants, as well as the exchange of knowledge through collaborative processes that take place in scenarios where knowledge is mobilized through experimentation [30, 34, 37]. In Table 2, where the variables are operationalized with their indicators, we can see that they contain cross-cutting indicators that will be measured and analyzed from the three constructs, as for example the indicator "participant" is key in the creation of the interdisciplinary group, performs the process of knowledge construction and creates networks that allow the use of resources from different sources. K-Social-C is a complete instrument to measure three variables, it is validated by experts and the items were built considering the fundamental qualities of clarity, relevance and correspondence.

7. Conclussion

This document explains how the K-Social-C Questionnaire has been validated, which measures the social construction of knowledge from the approach of open innovation carried out in experimental scenarios such as social innovation laboratories. Through the Concordance Coefficient and the Content Validity Coefficient the judges were the key piece to determine the values that approve that the instrument fulfills the qualities of clarity, pertinence and correspondence, that is to say, it really measures what it is wanted to measure and it was constructed considering the characteristics that the literature presents as the main ways to quantify the indicators that lead to determine the degree of social construction of knowledge from the open innovation in social innovation laboratories, constructs that guide the structure of the questionnaire. For future studies it is recommended to determine the internal consistency and reliability of the results by calculating the exploratory factorial and the confirmatory factorial. In that same order of ideas, the present instrument will be part of a pilot project where data will be collected to determine the previous aspects.

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