Conceptualizing Environmental Corporate Competencies: A Semantic Analysis

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Abstract

The article proposes a new definition of environmental competencies that facilitates the incidence of the organization in the development of people, which will show the reduction of the harmful impact on the environment, sustainable competitive advantages, and better performance in the medium and long term because of an increasingly competent staff from an environmental point of view. In its elaboration, methods and techniques such as bibliographic review, induction-deduction, analysis-synthesis, and mathematics were used, making it possible to carry out an epistemological and semantic analysis of the state of the art of environmental competencies. Subsequently, by employing Ward's method and the squared Euclidean distance, with the standardized variable, we obtained, as a result, the confirmation of groups that assume the highest-scoring variables, namely: observable behavior, motivations, sustainable business culture, green skills, environmental values, environmental knowledge and environmental performance; and the elaboration of a definition of environmental competences.

Keywords
Environmental Competencies; Sustainability; Human Resources; Sustainable Competitive Advantages.

1. Introduction

The accelerated increase in environmental problems is mainly caused by the inability of human beings to respect the environment. Subramanian et al. (2015) emphasizes that about 40% of environmental problems have been caused by human activities, behaviors, and forms of production and consumption. The above ideas assert that organizations play a significant role in protecting the environment. For this, they rely on international standards, among which stand out those of the International Organization for Standardization (ISO), which states: "the organization shall determine the necessary competence of persons performing work under its control that affects its environmental performance and its ability to meet its legal and other requirements" (ISO 14001, 2015, p. 10).

Most green behaviors in the workplace focus on additional function behaviors and individual rather than collective behaviors (Francoeur et al., 2019). On the other hand, Harrach (2020) posits that companies can help their employees to behave more sustainably in the workplace through appropriate offers of sustainable consumption or developing conditions for sustainable engagement. This could be done, for example, by releasing employees from their formal work duties for a certain period to develop new sustainability initiatives such as corporate volunteering programs.

In order to prepare human resources to solve environmental problems, a conceptualization of environmental concepts is proposed where attitudes, aptitudes, and values of people are integrated as essential factors to develop such competencies. The Royal Spanish Academy Dictionary states that the term concept comes from the Latin conceptus, which is described as an idea that forms the understanding. It is a thought expressed through words, i.e., mental images captured or retained in the mind that explain or summarize experiences, and reasoning, which emerge from the interaction with our environment.

It can be stated that the concept is formed constructively, which is a modification of the inductive way, and its use in the formation of concepts to be defined or explained makes it possible, together with the use of productive methods (Partial or heuristic search), that the new object is correctly assimilated and understood by the subjects. The formulation of a concept must place an action in the companies towards the search for talents capable of directing a culture directed to respect the environment as a condition and not only as a situation. In this process of inquiry, it was found that at the educational level: "*Competence is understood in terms of capabilities, 'being able to' and in which knowledge, attitudes, values, skills, emotions, and motivations are combined to respond to the demands of a responsible and sustainable society that contributes to the transformation of its environment*" (Arenas et al., 2016, p. 707).

Concerning this type of competencies, Dzhengiz and Niesten (2019) state that environmental competencies favor development at the organizational level and how environmental capabilities can help in the fast-paced business environment. Differences in environmental regulations between countries largely support challenges in managing environmental competencies. According to Chan, Li and Zhang (2013), the Emissions Trading System of the European Union, every day impacts the negative increase on the environment concerning the increase in average material costs.

On the other hand, Dechezleprêtre and Sato (2017) find evidence that differences in environmental stringency between countries induce significant differences in pollution abatement costs. In nine countries in Europe, North America, and Asia, the share of manufacturing capital expenditure allocated to pollution abatement in 2000 ranged from 1 percent (Taiwan) to 5 percent (Canada).

In recent years, as noted in Zhong and Peng (2022), the Chinese economy has maintained rapid growth but has also caused serious environmental pollution problems. Dong et al. (2020) assert that environmental innovation is an innovative way to reduce the impact of the environment. In this sense, Katsikeas et al. (2016) state that organizations engage in environmental activities with a solid indicator of environmental performance, which aims to reduce the negative impact of their activities on the environment. Therefore, it is necessary to influence the diagnosis of environmental impacts and formulate a plan of measures that has its expression in a program of environmental investments in the short, medium, and long term.

Many authors Vecino (2012), Pedersen (1999), Subramanian et al. (2016), Torres et al. (2016), Ull,M (2014), Lopez (2001) and Steele (1980) associate environmental competencies as a fundamental role of the entrepreneurial system, sustained by valuable tools to build capacities, knowledge, skills, in the sense of promoting the knowledge of environmental sciences (Nascimento et al. 2018). This is how the competencies join the requirements arising from

environmental education to meet the demands of a critical and reflective society on the political, technological, and economic implications.

The cognitive propensity of environmental knowledge does not strongly influence ecological behavior but is seen by many as a necessary precondition. Therefore, the authors of this article consider that the conceptualization of environmental competencies would influence the search for talents in organizations capable of leading a culture aimed at respecting the environment as a condition and not only as a situation.

This reality leads to the following questions: can organizations define what they want their employees to be like from an environmental point of view, what environmental competencies and attitudes are desired, and which are the most important depending on the type of work being performed? To answer them, the question remains: how to conceptualize corporate environmental competencies?

This study allows conceptualizing a new definition of environmental competencies, which facilitates the incidence of the organization in the development of people, represented through descriptive and significant analysis and the selection of variables through the application of the thematic analysis (Scavarda et al. 2020).

2. Materials and Methods

The dialectical materialism method was used to emphasize the contradictory and, at the same time, the developmental character of the relationships of the components of the object of research, and the analysis-synthesis method was used to logically examine the problem to be investigated through the review of the literature and specialized documentation, the analysis of the theoretical and practical knowledge of the specialists consulted, and the interpretation of the results of the processing of the information obtained.

The historical and logical analysis allowed the recognition of the chronological development of the subject of study, while induction-deduction favored the theoretical analysis and the interpretation of the evolution of the concept of environmental competencies. Analyses of the current research were conducted to obtain knowledge that could be used to construct the concept of environmental competencies and propose an algorithm for its construction.

The functional structural systemic method was applied to form a system of components that model environmental competencies in organizations, together with the decomposition of the elements that integrate it and establish the variables of greater incidence and their interrelation with a systemic approach. In addition, the results were quantified and validated through the SPSS (Statistical Package for the Social Sciences) for Windows, version 26.0, and with the analysis of social networks using network indicators with the Ucinet vs. 2.41 software.

To continue in this section and meet the research question, an algorithm methodology was employed to propose a new definition of environmental competencies, where each of the stages is briefly described, highlighting the key resources and these results will be shown in section 3 (Figure 1).

1. Information sources were identified (Redalyc, Scielo, Dialnet, ScienceDirect, Latindex, Springer, Dimensions, and Scopus databases), to analyze the behavior of the definition of environmental competence, using as a search strategy the English equivalent of the expression "environmental competence" (Environmental Competencies);
2. Considering the aforementioned databases, we proceeded to semantically analyze families of terms on science, technology, medicine, social sciences, arts and humanities, associated with the definition of environmental competencies.
3. For the compilation and processing of the data, Microsoft Excel software was used (spreadsheet or electronic tabulator type program that, with numbers organized in a grid, allows from simple operations to complex statistical calculations), for the elaboration of other tables and graphs), and ToolInf (analysis tool developed by the BioMundi Consultancy of Cuba, which allows the homogenization and counting of data and the preparation of matrices);
4. The data of the matrix made up of authors and variables were normalized using the software IBM SPSS Statistics Version 26, taking into account indicators for decision making.
5. Considering the files obtained, they were taken to the Ucinet software and NetDraw was used for the elaboration of the networks with the purpose of identifying the most influential authors and variables in the conceptualization of environmental competence.

6. The networks obtained were analyzed through the defined indicators, which allowed mapping, visualization, and analysis of social matrices.
7. The units of analysis were classified into homogeneous groups in such a way that the units belonging to one of the groups or clusters were the most similar among themselves.
8. The most representative variables were determined by forming more compact clusters of equal size. Finally, the results obtained were analyzed.
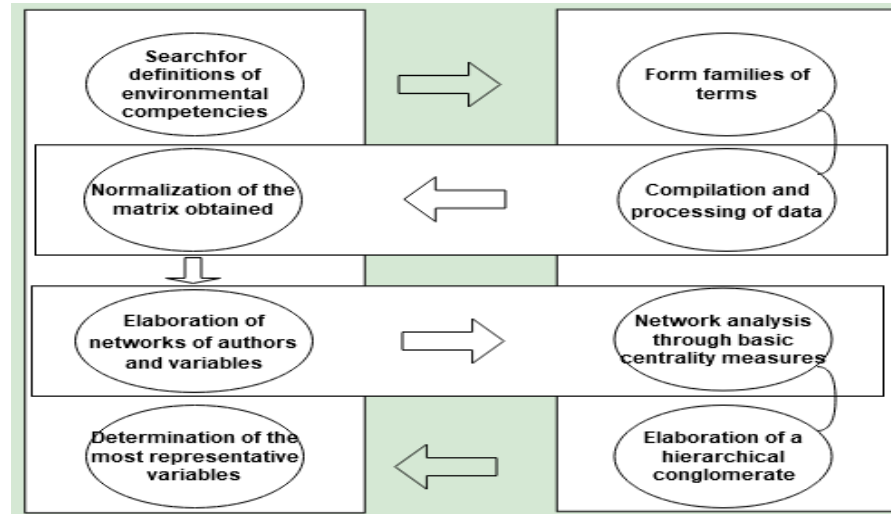

Figure.1 Algorithm methodology

3. Results and Discussion

The environmental issue has been professionalized, and the aim is for people to develop attitudes and skills to contribute to the conservation and sustainable use of natural and energy resources and the prevention, mitigation, and solution of environmental problems. Therefore, competencies in the labor framework have crossed all the barriers related to the position (Machado et al. 2021). In addition, the conditions of environmental concern everyone regardless of the position or hierarchical level occupied in the organization. Thus, the competencies join the requirements of environmental education to recognize the demands of a critical and reflective society on the political, technological, and economic implications of the environmental dynamics, the search for a change in the lifestyle of individuals that contributes to generating fair, equitable and responsible societies with the environment and with others. In order to achieve the proposed objective, an algorithm was followed, consisting of eight steps that are explained in section 2. In the first step there was the search for definitions of environmental competencies in journals indexed in recognized databases such as Redalyc, Scielo, Dialnet, ScienceDirect, Latindex, Springer, Elsevier, Dimensions, and Scopus. A total of 14 definitions were selected from authors from different countries (Table 1).

Table 1. Definitions of environmental competencies according to different authors

No.	Author	Definition
1.	Blanco (2019)	Environmental competencies are the set of observable individuals and/or collective behaviors that promote, favor and ensure a sustainable business culture of respect for the environment regardless of the company to which it belongs (p.122).
2.	Subramanian et al. (2015)	People's green competencies are the underlying traits and personality dimensions of individuals received in their formative stages on the dominant green behavior of their immediate social groups, such as parents, relations, and friends (p.5).
3.	Torres et al. (2016)	Green talent is those people who have a behavior with the environment, who demonstrate with their way of acting that they are capable of integrating knowledge with different areas to preserve nature (p.432).

4.	Mora (2015)	It provides the means to achieve a holistic understanding of complex problems and, on the other hand, facilitates the acquisition of skills necessary to learn and manage the complexity of the phenomena that relate to society and nature (p.194).
5.	García (2015)	It is not about the skills, abilities, and knowledge that the environmental officer must acquire. Only the gaps that allow for the construction of these competencies are discussed (p.160).
6.	ISO 14001 (2015)	The necessary competence of persons performing work under their control affects their environmental performance and their ability to meet legal and other requirements (p.11).
7.	Ull (2014)	Cognitive, procedural, attitudinal and relational, related to knowledge, know-how and know-how to be, when they relate concepts, theories or laws with techniques and practices that make available attitudes, values, and motivations to solve a problem encouraging participation and transformation of their environment. (p.49).
8.	De Zubiría (2013)	The subjects must develop abilities or skills to perform their profession efficiently, leaving aside some capabilities that individuals have developed throughout their lives (p.12).
9.	Nussbaum (2012)	Capabilities refer to what individuals are capable of doing and being, whose capacity "refers to the alternative combinations of functioning that are feasible (p.251).
10.	Vecino (2012)	It is a set of observable individuals and/or collective behaviors that promote, favor, and ensure a sustainable corporate culture of respect for the environment regardless of the company to which it belongs (p.55).
11.	Fraijo et al. (2010)	Green capabilities consist of two key elements, i.e., environmental knowledge and environmental skills, which must be employed following society's ecological requirement (p.230).
12.	López (2003)	They are achieved through the progression in stages, in the development of environmental values from environmental awareness, as the recognition of the existence of the environmental problem; environmental responsibility, as the awareness of participation; and environmental competence, as the ability to propose solutions (p.204).
13.	Pedersen (1999)	The capabilities consist of (1) resource conservation, practice skills, and outdoor skills as the part of environmental skills, (2) conscientiousness as the part of an individual's attitude, style and awareness, and (3) knowledge, as well as a way to seek and develop environmental knowledge (p.305).
14.	Steele (1980)	Green capabilities are the ability of people to relate to the immediate environment in a way that is constructive and reflective of immense enthusiasm (p.226).

The authors mentioned above show in their definitions an approach oriented towards respect for the environment, which encourages observable individual and/or collective behaviors that promote, favor and ensure a sustainable corporate culture aimed at the ability to comply with legal requirements. On the other hand, they defend the relevance of the environmental issue as a critical pillar to achieving sustainability in the organizational context and all spheres of society (Caiado et al. 2017; Caiado et al. 2022).

In the second step, through semantic analysis, families of terms were formed, and 13 variables associated with the definition of environmental competencies were identified: (V1), observable behaviors, (V2) green capabilities, (V3) green talent, (V4) skills, (V5) environmental performance, (V6) motivations, (V7) efficient, (V8) sustainable business culture, (V9) ecological requirement, (V10) knowledge, (V11) green skills, (V12) environmental values, (V13) environmental knowledge (Table 2).

Table 2. Keywords in the definitions of environmental competencies

Variables	Phrases or families of terms	Variables chosen according to the context
V1	Observable behaviors, individual, collective, sustainable business culture	Observable behaviors
V2	Green capabilities, knowledge, skills, awareness, and behavior that pertain to the environment	Green capabilities
V3	Green talent, preserving nature	Green talent
V4	Skills, abilities and knowledge	Skills

V5	Environmental performance	Environmental performance
V6	Cognitive, procedural, attitudinal, relational, attitudes, values, motivations, transforming their environment	Motivations
V7	Efficient	Efficient
V8	A sustainable business culture of respect for the environment	Sustainable business culture
V9	Environmental knowledge and environmental skills, ecological requirement demanded by society	Ecological requirement
V10	Knowledge with the aspects of the surrounding world	Know-how
V11	Green skills, environmental perception and attitudes	Green skills
V12	Environmental values, environmental awareness, environmental problem, environmental responsibility	Environmental values
V13	Environmental knowledge	Environmental knowledge

As can be seen, the term "green employee" was not considered since Ciocirlan (2016) states that "this concept, although frequently used, is obscure" (p.2).

In the third step, with the application of the Toolinf Tool, a binary matrix was constructed to relate the authors with the presence of the associated variables (Table 3).

Table 3. Variables identified in each of the analyzed definitions of environmental competences

Authors	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
Blanco (2019)	1	0	0	0	0	1	0	1	0	0	0	0	0
Subramanian et al. (2015)	1	1	0	1	0	0	0	0	0	0	1	0	1
Torres et al. (2016)	1	1	1	1	0	0	0	0	0	0	0	0	1
Mora (2015)	1	0	0	0	0	0	1	0	0	1	0	0	0
ISO 14001(2015)	0	1	0	0	1	0	0	0	1	1	0	0	0
García (2015)	0	0	0	1	0	0	0	1	0	1	0	0	1
Ull 2014)	0	0	0	1	0	0	0	0	1	1	0	1	1
De Zubiría (2013)	0	1	0	1	1	0	1	0	0	0	0	0	0
Nussbaum (2012)	0	0	0	0	1	0	1	0	0	1	0	0	1
Vecino (2012)	1	1	0	1	0	1	0	1	0	1	0	0	0
Fraijo et al. (2010)	0	1	0	1	0	0	0	0	1	0	0	0	1
López (2003)	1	1	0	0	0	1	0	0	0	0	0	1	1
Pedersen (1999)	0	1	0	1	0	1	0	0	0	1	0	1	1
Steele (1980)	0	1	0	0	0	1	0	0	0	1	0	1	1

In the fourth step, the binary matrix was normalized, considering the distance correlation analysis indicators and the Jaccard measure, converting the two-factor matrix to the one-factor matrix (Table 4), using the IBM SPSS Statistics Version 26 program.

Table 4. Distance correlation analysis

	Blanco (2019)	Subramanian et al.	Torres et al.	Mora (2015)	ISO 14001	García (2015)	Ull (2014)	De Zubiría	Nussbaum (2012)	Vecino (2012)	Fraijo et al. (2010)	López (2003)	Pedersen (1999)	Steele (1980)
Blanco (2019)	0.000	33.326	42.267	20.69	33.26	20.52	39.052	33.35	27.566	33.85	11.486	33.352	21.594	28.15
Subramanian et al. (2015)	33.32	0.000	29.059	31.63	36.59	29.16	33.443	28.91	22.130	36.01	29.440	20.143	40.670	30.31
Torres et al. (2016)	42.26	29.059	0.000	40.57	45.54	38.11	42.385	37.85	31.071	44.95	38.381	29.085	49.612	39.25
Mora (2015)	20.69	31.630	40.571	0.000	23.96	25.48	29.756	20.256	18.269	13.15	24.583	31.656	16.641	18.85
ISO 14001 (2015)	33.26	36.599	45.540	23.96	0.000	29.28	22.156	19.086	14.469	19.58	29.552	16.456	23.071	13.88
García (2015)	20.52	29.168	38.110	25.48	29.28	0.000	18.525	29.194	14.811	21.09	16.641	20.425	33.352	15.39
Ull (2014)	39.05	33.443	42.385	29.75	22.15	18.52	0.000	33.469	19.086	25.37	35.166	13.300	37.627	19.67
De Zubiría, (2013)	33.35	28.913	37.854	20.25	19.08	29.19	33.469	0.000	22.156	15.87	29.466	20.169	11.758	21.57
Nussbaum. (2012)	33.85	36.014	44.956	13.15	19.58	21.09	25.371	15.871	0.000	13.88	37.737	27.271	12.256	5.700
Vecino (2012)	11.48	29.440	38.381	24.58	29.55	16.64	35.166	29.466	23.852	0.000	37.737	29.466	33.081	32.03
Fraijo et al. (2010)	33.35	20.143	29.085	31.65	16.45	20.42	13.300	20.169	13.386	27.27	0.000	29.466	31.927	21.57
López (2003)	28.15	30.314	39.256	18.85	13.88	15.39	19.671	21.571	8.185	5.700	32.037	0.000	17.956	21.571
Pedersen (1999)	33.08	28.015	36.956	31.92	28.12	20.69	13.571	28.041	13.658	27.54	21.594	19.271	0.000	21.84
Steele (1980)	29.19	31.901	40.842	28.04	24.24	24.58	17.458	31.927	9.771	23.65	25.481	23.158	27.769	0.000

In the fifth step, to identify the most influential authors and variables in the conceptualization of environmental competencies, the normalized binary matrix was processed in the Ucinet software (Version 2.41) and the NetDraw complement, obtaining a network of relationships between authors and variables (Figure 2).
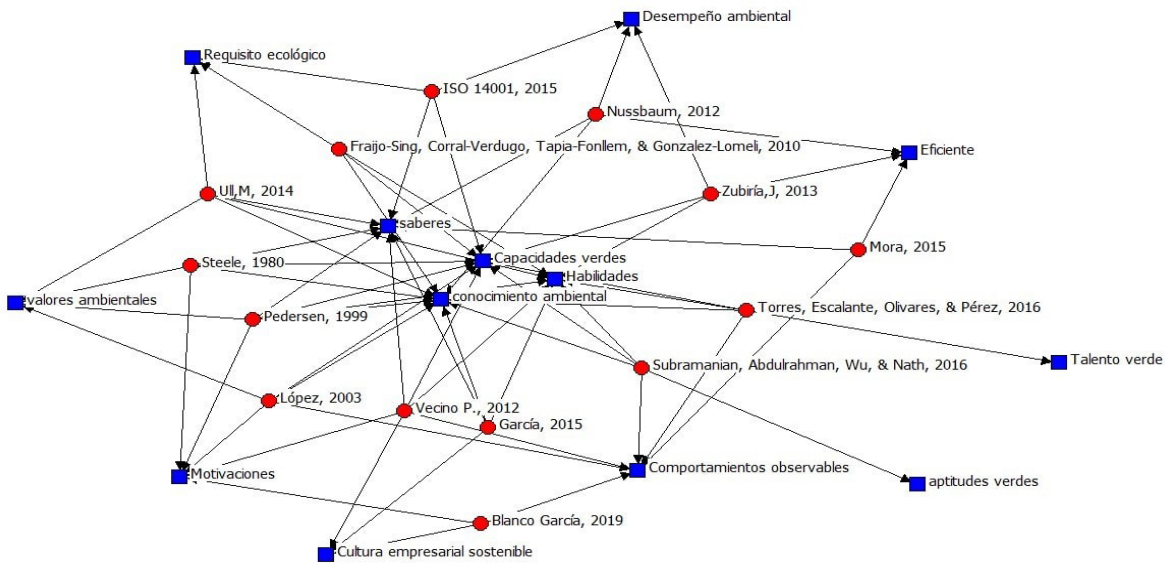
Figure 2. Network obtained using Ucinet 2.41 and NetDraw 2.38 software of the relationship between the variables
and authors of the definitions studied

In the sixth step, with the analysis of the network through the basic measures of rank centrality and degree of intermediation, it was obtained that the most influential authors are: Steele (1980), Pedersen (1999), Lopez (2003), Vecino (2012), Ull (2014), Subramanian et al. (2015), Torres et al. (2016) and the variables: (V2) green capabilities, (V4) skills, (V13) environmental knowledge, (V1) observable behaviors, (V6) motivations, (V10) knowledge: Table 5 and 6 confirm this idea.

Table 5. Summary of the authors' analysis of the studied definitions

ID	Degree	Betweenness	Closeness	Harmonic Closeness	Eigenvector	2-Local Eigenvector
Vecino (2012)	6	29.89	97	17.083	0.242	44
Pedersen (1999)	6	21.936	95	17.333	0.296	52
Subramanian et al. (2015)	5	27.523	99	16.417	0.218	39
Torres et al. (2016)	5	37.861	99	16.417	0.214	38
Ull (2014)	5	17.954	101	16.167	0.22	39
López (2003)	5	17.944	97	16.667	0.224	40
Steele (1980)	5	15.582	97	16.667	0.248	44
ISO 14001 (2015)	4	13.037	103	15.5	0.155	30
García (2015)	4	15.421	101	15.75	0.187	34
De Zubiría (2013)	4	16.558	103	15.5	0.143	28
Nussbaum (2012)	4	16.193	101	15.75	0.16	33
Fraijo et al. (2010)	4	9.839	105	15.25	0.197	35
Blanco (2019)	3	5.507	119	13.2	0.08	16
Mora (2015)	3	9.148	107	14.583	0.098	20

Table 6. Summary of the analysis of the most influential variables in the definitions studied

InternalID	ID	Degree	Betweenness	Closeness	Harmonic Closeness	Eigenvector	2-Local Eigenvector
2	(V2) green capabilities	12	5,4	25	12	0,352	96
4	(V4) skills	12	5,4	25	12	0,352	96
13	(V13) environmental knowledge	12	5,4	25	12	0,352	96
1	(V1) observable behaviors	10	2,8	27	11	0,307	85
6	(V6) motivations	10	2,083	27	11	0,316	88
10	(V10) knowledge	10	1,85	27	11	0,318	89
5	(V5) environmental performance	7	0,367	30	9,5	0,24	69
7	(V7) efficient	7	0,167	30	9,5	0,25	73
12	(V12) environmental values	7	0,367	30	9,5	0,246	72
8	(V8) sustainable business culture	6	0	31	9	0,223	66
9	(V9) ecological requirement	6	0,167	31	9	0,208	60
11	(V11) green skills	5	0	32	8,5	0,188	56
3	(V3) green talent	4	0	33	8	0,152	46

In the seventh step, a hierarchical conglomerate was elaborated with the objective of grouping authors and variables, trying to achieve maximum homogeneity in each group and the most significant difference between them. Employing the IBM SPSS Statistics program (Version 26) using Ward's method and the squared Euclidean distance, with the variable standardized and a cut-off at level 15 %, the existence of three groups was delimited (Figure 3).

The analysis made it possible to determine the variables necessary for the definition of environmental competence by grouping them into three clusters. The first group is made up of 30.7% of the variables, in the order (V6) motivations, (V12) environmental values, (V8) sustainable business culture, and (V10) knowledge, which have the most significant impact among the other variables analyzed. The second group is made up of 30.7% of the variables, comprising the attributes inherent to the following aspects (V2) green capabilities, (V4) skills, (V1) observable behaviors, and (V3) green talent, which represent the lowest values of representativeness. Finally, the third group is formed by 23.1% of the variables, considering (V13) environmental knowledge, (V9) ecological requirement, and (V11) green capabilities, it is concluded that it is the second group with the greatest similarity concerning those analyzed.
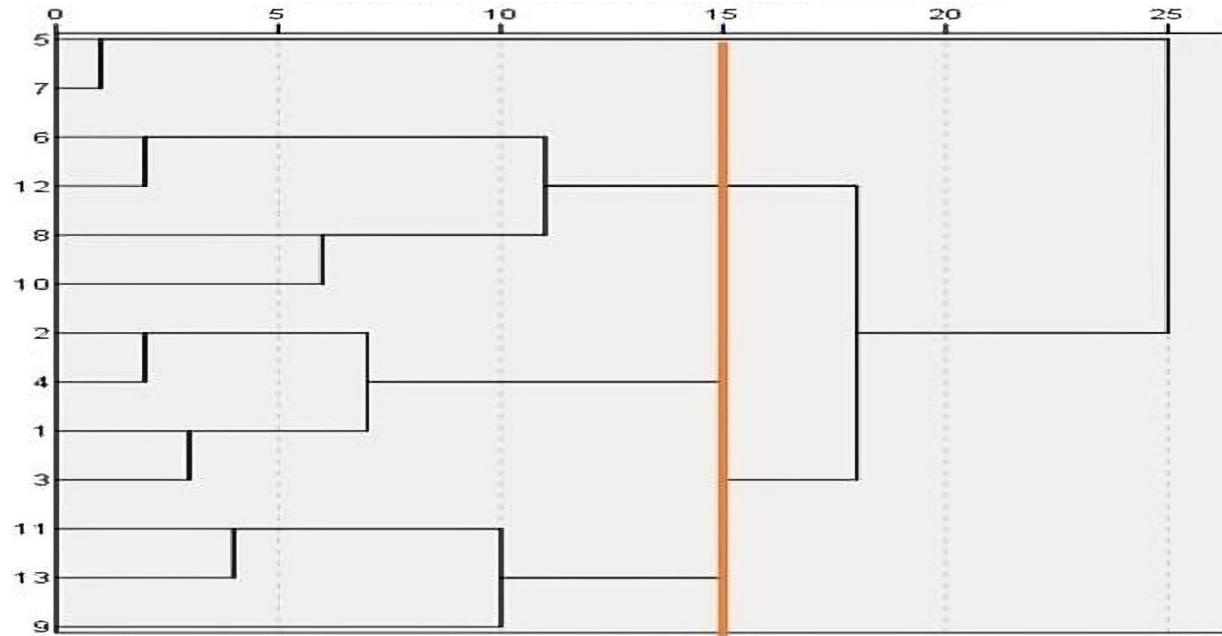
Figure 3. Cluster analysis of environmental competency definitions

According to the results shown in the dendrogram, it can be inferred that at the mean distance of 20%, there are three clusters, the two of greater magnitude refer to the authors of greater similarity, grouped as follows: The first group is represented by the authors Pedersen (1999), Steele (1980), Lopez (2003), Blanco (2019), Vecino (2012) and the variables motivation, observable behavior, and sustainable entrepreneurial culture. The second group consists of Subramanian (2015), Torres et al. (2016), Ull (2014), Fraijo et al. (2010), Garcia (2015), and the variables green skills, environmental values, and environmental knowledge. The third group is composed of Mora (2015), Nussbaum (2012), ISO 14001 (2015), De Zubiría (2013) and is characterized by the variable environmental performance. (Figure 4).
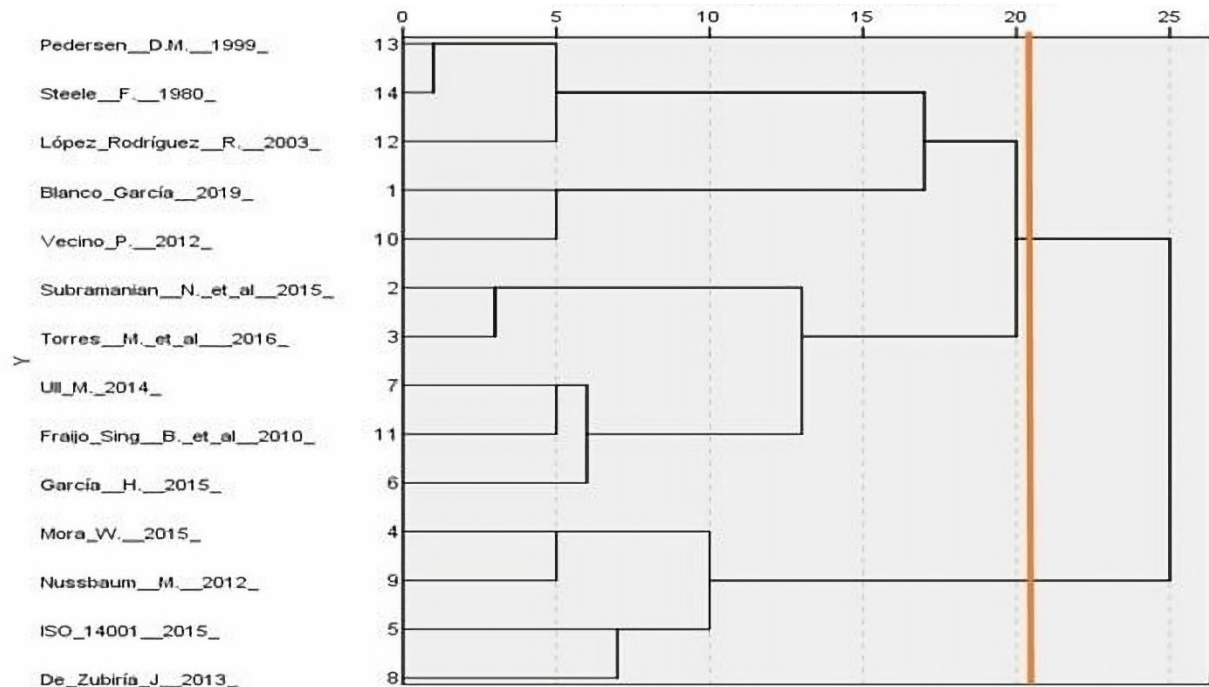

Figure 4. Cluster analysis of the definitions of environmental competencies

In the eighth step, to reinforce the determination of the most representative variables in the definitions, Ward's method (Ward, 1963) was used, according to Eszergár-Kiss and Caesar (2017), where it is achieved to unite the elements in clusters so that the variance within the clusters is minimized, from the average report obtained, three groups of higher scoring variables are generated (Table 7): the first with three variables (V1 observable behavior, V6 motivations and V8 sustainable entrepreneurial culture), the second with three variables (V11 green skills, V12 environmental values and V13 environmental knowledge) and the third group with one variable (V5 environmental performance). The definition of environmental competencies is constructed with the identification of these most representative variables.

Table 7. Average Report

Cluster	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
1	0.73	-0.38	-0.23	0.48	-0.66	0.60	-0.50	2.25	-0.50	0.27	-0.33	-0.50	-0.73
2	0.39	0.60	0.50	0.16	-0.66	0.60	-0.50	-0.42	-0.50	-0.38	0.72	0.69	0.66
3	-0.45	-0.25	-0.23	-0.24	0.60	-0.54	0.45	-0.42	0.45	0.14	-0.33	-0.26	-0.18

The analysis of the above definitions is adapted to the characteristics of each country; however, the authors of this research consider it important to define environmental competencies as: the set of green skills (environmental knowledge, skills to protect and conserve ecosystems, intelligence to ensure sustainability and an integral environmental culture) and behavior favorable to eco-systemic sustainability based on values, motivations, feelings and beliefs among others, qualities that guarantee the willingness of people to preserve a favorable environment for the life of future generations, from their correct work performance in the organization.

5. Conclusion

Environmental competencies constitute a valuable tool to create people's capacities, knowledge, and skills that favor their environmental performance to face current changes. The analysis of the theoretical principles provides a significant perspective towards a transformation in the process of management by competency that favors the improvement of environmental competencies in organizations for a socially responsible performance towards the environment.

Inquiring into the definition of environmental competencies was the result of a theoretical reflection and the use and application of tools to build a new definition that will help organizations meet their objectives and goals and increase their competitiveness and business efficiency from an environmental perspective.

This study still has some limitations. First, the scope of the research has a current tendency to correspond to certain databases, which were examined from previous studies; however, the addition of available literature in books and conferences may yield a diversified view on definitions. Second, the studies can be expanded by examining the new definition of environmental competencies from the perspective of organizational for the environment and environmental values, which would improve the conceptual elaboration. Third, in the selection of variables, there may be other factors that influence environmental competencies, and their consideration may not be exhaustive. For future work, the temporal scope of the study will be expanded, and more representative variables will be selected to refine the current study.

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