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ORIGINAL ARTICLE

Management of the environmental management for the sustainable development of public and private companies in the Piura region, Peru

Gestión de la gerencia ambiental para el desarrollo sostenible de empresas públicas y privadas en la región de Piura, Perú

Gestão da gestão ambiental para o desenvolvimento sustentável de empresas públicas e privadas na região de Piura, Peru

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ORIGINAL ARTICLE

KEYWORDS

Sustainable development, management, environmental

ABSTRACT. Goal. Demonstrate how the management of systemic environmental management contributes to the growth of sustainable development in small and medium-sized companies in the public and private sectors in the Piura region. **Material and method.** This work was carried out under the deductive hypothetical paradigm, of a basic substantive type, and transversal correlational design. The study was made up of 159 managers and administrators of the entities mentioned. The survey technique was applied through questionnaires that comprised the dimensions of 1) personal

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management, medium business, small business

domain, 2) mental models, 3) continuous learning and shared vision, 4) systemic thinking. While the methodology was used, the Chi-Square analysis problem was established to establish the association levels based on the analysis of dichotomous contingency tables. **Results.** It was determined that it exists for the dimensions: personal domain, mental models, continuous learning and shared vision and systemic thinking of a chi-cuadrada of 31,196, 40,789,51,078, and 38,330, as they turned out to be larger than the chi-cuadrado tabulate the criticism, for so much so, there is a high degree of a significant relationship between the dimensions with the management of the systemic environmental manager. **Conclusion.** There is a high degree of correlation between the management of systemic environmental management and the increase in sustainable development.

PALABRAS CLAVE

Desarrollo sostenible, gestión, gerencia ambiental, mediana empresa, pequeña empresa

RESUMEN. Objetivo. Demostrar cómo la gestión de gerencia ambiental sistémico contribuye al incremento del desarrollo sostenible en pequeñas y medianas empresas del sector público y privado en región Piura. **Materiales y método.** Este trabajo se realizó bajo el paradigma hipotético deductivo, de tipo sustantiva básica y de diseño correlacional transversal. La muestra estuvo constituida por 159 entre gerentes y administradores de las entidades mencionadas. Se aplicó la técnica de encuestas a través de cuestionarios que comprendía las dimensiones de 1) dominio personal, 2) modelos mentales, 3) aprendizaje continuo y visión compartida, 4) pensamiento sistémico. En cuanto a metodología se empleó la prueba de análisis de Chi-Cuadrado con el fin de establecer los niveles de asociación a partir del análisis de tablas de contingencias dicotómicas. **Resultados**. Se determinó que existe para las dimensiones: dominio personal, modelos mentales, aprendizaje continuo y visión compartida y pensamiento sistémico una chi-cuadrada de 31.196, 40.789,51.078 y 38.330, las cuales resultaron ser mayores que la chi-cuadrado tabular o crítica, por lo tanto, existe un alto grado de relación significativa entre las dimensiones con la gestión del gerente ambiental sistémico. **Conclusión**. Existe un alto grado de correlación entre la gestión de gerencia ambiental sistémica con el incremento del desarrollo sostenible.

PALAVRAS-CHAVE

Desenvolvimento sustentável, gestão, gestão ambiental, médias empresas, pequenas empresas

RESUMO. Objetivo. Demonstrar como a gestão da gestão ambiental sistêmica contribui para o aumento do desenvolvimento sustentável em pequenas e médias empresas do setor público e privado da região de Piura. **Materiais e método.** Este trabalho foi realizado sob o paradigma hipotético dedutivo, de tipo substantivo básico e de desenho correlacional cruzado. A amostra foi composta por 159 gerentes e administradores das entidades mencionadas. A técnica de pesquisa foi aplicada por meio de questionários que incluíram as dimensões de 1) domínio pessoal, 2) modelos mentais, 3) aprendizagem contínua e visão compartilhada, 4) pensamento sistêmico. Quanto à metodologia, foi utilizado o teste de análise Qui-Quadrado para estabelecer os níveis de associação a partir da análise de tabelas de contingência dicotômicas. **Resultados.** Foi determinado que existe um qui-quadrado de 31.196, 40.789,51.078 e 38.330 para as dimensões: domínio pessoal, modelos mentais, aprendizagem contínua e visão compartilhada e pensamento sistêmico, que acabou sendo maior que o qui-quadrado tabular ou crítico, portanto, há um alto grau de relação significativa entre as dimensões e a gestão do gestor ambiental sistêmico. **Conclusão.** Existe um alto grau de correlação entre a gestão da gestão ambiental sistêmica com o aumento do desenvolvimento sustentável.

1. INTRODUCTION

Until 2020, small and medium-sized companies in the Piura region do not have managers with world-class systemic management capacity with mental and / or personal capabilities, called soft skills (Vásquez et al., 2010), thus creating a problem Increasingly due to the lack of this type of skills in managers of organizations such as small and medium-sized companies, resulting as

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consequences in some cases, the definitive closure of these companies as mentioned (Gómez et al., 2015).

At present, in this globalized world, a new paradigm in understanding and a new concept of intelligence and knowledge at the organizational level is being proposed (Thannhuber et al., 2017). It is important that these organizations learn to generate knowledge that allows them to adequately face the challenges that a dynamic and changing environment imposes on them (Woiceshyn, 2009).

In a dynamic world, transnational companies' suppliers continually receive knowledge that allows them to enter global value chains (Olea-Miranda et al., 2016); on the other hand, there is a high degree of coincidence between the concept and the approach that companies have in knowledge management (Moreno & Torres, 2010). Future knowledge consciously acquired, created, and disseminated through a variety of methods (Pouru et al., 2019).

Lendzion (2015) also mentions that knowledge focused on the development of appropriate employee behavior and supporting the development of information technology and learning processes. Studies carried out have determined that a very high risk between management in the risk of knowledge and the performance of the organization (Durst et al., 2019). Another very important situation that must be considered is the degree of participation of workers within these organizations, since all their members have decision-making authority (Salas-Arbeláez et al., 2017). Studies carried out provide empirical evidence that relates knowledge management with the results that a sample of small and medium Andalusian exporting companies obtain in foreign markets (Armario et al., 2009)

Carro-Suárez et al. (2017) conclude that it is necessary to develop strategies so that the dimensions of sustainability are considered as substantive axes within the business culture. Sustainability managers from different sectors are increasingly looking for new ways to advance such transformations (Contreras-Pacheco et al., 2017), as conventional management seems inadequate to address complex sustainability challenges, such as climate change (Lahtinen & Yrjölä, 2019).

Thus, managerial management has different problems that are influencing it, such as the management styles that are presented in the managers and administrators of these organizations (Nutt, 1986), to which are added other problems such as identification and acceptance of the same by the components of the organization (Paul et al., 2004), perhaps influencing this problem is what is known as the lack of preparation, management and updated knowledge that must be handled in terms of driving of human resources (Vásquez et al., 2010).

Therefore, in this study it has been considered as an objective to demonstrate how the management of systemic environmental management contributes to the increase of sustainable development in small and medium-sized companies in the Piura region.

2. METHOD AND MATERIALS

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Objective

Determine if there is a relationship between the styles of systemic environmental management management with sustainable development in small and medium-sized enterprises in the Piura - Peru region.

Type, design, and technique

The research corresponds to a quantitative approach, descriptive and explanatory level. The technique that was used for the processing and analysis of data was the registration, the observation, the surveys, the documentary analysis, and the interviews; and as instruments the bibliographic files, observation files, questionnaire, documentary analysis guides and interview guides were used.

Study variables

Management of environmental management and sustainable development.

Population and sample

We worked with a population of 850 managers and administrators of small and medium-sized companies in the Piura region. Simple random sampling was applied with a 95% confidence level and a 5% margin of error, obtaining a sample made up of 159 managers and administrators.

Instruments

The main instrument for obtaining data was the Management Questionnaire for environmental management for sustainable development, which was worked under the theoretical assumptions of Quinta de Discipline de Senge (1990) which was structured in four components: 1) The situations that influence the manager of environmental management and its relationship with the personal domain in decision making. 2) The characteristics of the manager of environmental management and his relationship with mental models concerning the business sector. 3) The management style of systemic environmental management and its relationship with continuous learning and shared vision of the business sector. 4) The type of management of systemic environmental management and its relationship with the systemic thinking of the business sector.

For the precision of data collection, 18 items were formulated based on the characteristics of each component. The validity of the items was justified according to the bibliographic base and the reliability was 0.82 in the Cronbach's alpha coefficient.

The other instruments (bibliographic files, observation files, questionnaire, documentary analysis guides and interview guides) served as a complement for the explanation and argumentation of the results.

Hypothesis testing

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Analytical processing was used, establishing that if the distribution of the chi-square obtained from the table or critical value is greater than the calculated chi-square (x2), then the null hypothesis (H_0) was accepted, otherwise it is rejected the null hypothesis and the alternative hypothesis (H_1) is accepted.

3. RESULTS

3.1. The situations that influence the management of environmental management and its relationship with personal control in decision-making.

To the question: Which of the situations is the one that most influences the manager?

To this question, due to the results obtained, they make it clear that 40% consider that one of the situations that most influences the manager is that of the personal value system and 8% mention, what are the environmental pressures in organizations. The important thing about this result is, in the importance given to it at a managerial level, personal value systems, which coincides with what was mentioned by Thierauf et al. (1977). Another important situation to highlight is regarding the pressures related to environmental management, contributing little or nothing to the sustainable development of these organizations, being contradictory with what Alfonso et al. (2011) in their study, which determines that environmental management in an organization is a relevant factor. However, the studies carried out by Bolívar (2011) conclude that leadership competencies strengthen the relationship between environmental practices and sustainable performance.

To the question: Do you usually make premature decisions and are they generally correct?

In this question, 28% indicate that they almost always occur, and 16% that they always occur, thus totaling 44%. These results indicate that it is not being considered that, in conditions of uncertainty and environmental complexity, biases and heuristics can be an effective and efficient guide for decision making (Busenitz & Barney, 1997), which makes it clear that it is It is necessary to analyze the decisions to be made, in order to avoid subsequent implications in the companies as mentioned (Woiceshyn, 2009), since personal control directly and indirectly influences the performance of the members of the organization.

Table 1. Situation influencing the manager against premature decisions at the business level.

	Premature decision making					Total
	Always	Usually	Sometimes	Rarely	Never	
Personal value system	34 (20.2075)	16 (17.8302)	4 (9.9057)	4 (7.1321)	5 (7.9245)	**63**
Trust subordinates	5 (14.4340)	17 (12.7358)	8 (7.0755)	7 (5.0943)	8 (5.6604)	**45**
Expectations about the boss	8 (12.5094)	10 (11.0377)	10 (6.1321)	6 (4.4151)	5 (4.9057)	**39**
Environmental pressures in the organization	4 (3.8491)	2 (3.3962)	3 (1.8868)	1 (1.3585)	2 (1.5094)	**12**

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Total	**51**	**45**	**25**	**18**	**20**	**159**

Fuente: Elaboración con datos obtenidos de encuesta.

Table 1 of dichotomous contingencies indicates the expected frequency with the real frequencies obtained from the survey data. The first is calculated as an example as follows: (51 x 63) / 159 = 20.2075. The expected frequencies of the other cells are obtained by multiplying the respective marginal totals and then dividing by the total which is 159. To test the research hypothesis, it was carried out by comparing the chi-square obtained analytically with the chi - tabular square or critical value, resulting in this case that 31,196> 21,026; Therefore, it is concluded in the acceptance of the research hypothesis and the null hypothesis Ho is rejected, establishing as a result that the situations that influence environmental managerial management if they are related to personal domain in decision-making.

3.2. The characteristics of the manager of environmental management and its relationship with mental models concerning the business sector.

To the question: What characteristic should a sustainable development manager have?

In this regard, the data show us by 49% that the manager of the business sector must have humility as the main characteristic to serve others, 8% in which they must exploit the initiatives of the staff and finally the remaining 5%, in which must be tolerant. In conclusion, humility must be the fundamental characteristic in managers who develop in industrial activity, since they work with human resources at their disposal to which they have to orient and guide them towards the intended objective (Ye et al., 2020), from now on the manager of this type of company must stop being the center of attention, move away from his ego and think about the needs of his people, in terms of growth and development (Ahuja et al., 2019) and help them as noted above to achieve the objectives; instead earning the power of respect, gratitude and admiration from the followers, generating a true long-term commitment. Escandón and Hurtado (2014) mention that an integrated model must be built, which allows small and medium companies to insert sustainability into their activities in a holistic, feasible and controllable way, resulting in a competitive advantage.

To the question: Do you deeply analyze a problem concerning the company?

As we can see in the statistical part, the problems concerning the company are always analyzed (40%); however, others consider that this occurs sometimes (19%) and almost never (16%). This information found implies that the problematic part of the organizations must be analyzed (Testa et al., 2020), due to the external and internal environment, the constant variation in prices, uncertainty, tariffs, and other problems that are incidents at the level. business (Jaime & Rojas, 2016); however, the remaining 35% do not deeply analyze the problems related to managerial activity. This result, because what is referred to by Gordon (1961), who developed a technique to stimulate the solution of creative problems in companies from a technical point of view, is not being considered.

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Table 2. Characteristics of the manager of the systemic environmental management against the situational analysis of the companies

	Analyze the systems				Total
	Always	Usually	Sometimes	Rarely	
Have the formal power	3 (9.1132)	6 (5.6415)	6 (4.4843)	8 (3.7610)	**23**
Server management	6 (15.0566)	10 (9.3208)	13 (7.4088)	9 (6.2138)	**38**
Humility to serve	45 (30.9057)	19 (19.1321)	8 (15.2075)	6 (12.7547)	**78**
Exploit staff initiatives	8 (4.7547)	2 (2.9434)	1 (2.3396)	1 (1.9623)	**12**
be tolerant	1 (3.1698)	2 (1.9623)	3 (1.5597)	2 (1.3082)	**8**
Total	**63**	**39**	**31**	**26**	**159**

Source: Elaboration with data obtained from survey

To test the research hypothesis, it was carried out by comparing the analytically obtained chi-square with the tabular or critical chi-square, resulting in this case that 40,739> 21,026; Therefore, it is concluded in the acceptance of the research hypothesis and the null hypothesis Ho is rejected, establishing as a result that the characteristics of environmental managerial management, if it is related to the mental models concerning the business sector.

3.3. The management style of systemic environmental management and its relationship with continuous learning and shared vision of the business sector.

To the question: Which of the styles of environmental managerial management is the most appropriate to be applied in the business sector?

In this question, it is found that one of the most appropriate management styles to be applied in the business sector is that where managers combine, both those who lean towards tasks and employees (56%); and those that are directed towards the employees (19%) are those whose objective is to ensure that the tasks are fulfilled in a satisfactory way. This result is related to what is mentioned in their administration book by (Stoner et al., 1996). Also, it can be highlighted that it is increasingly recognized that knowledge can be the source of competitive advantage of an organization, which is also evident, that it is through learning, and innovation that organizations achieve their goals (García -Morales et al., 2007).

To the question: Is the company currently developing new products?

In this regard, it is found that 64% affirmatively refer, that is to say that new products are being developed among the companies, especially if the latest agreements reached in terms of tariffs between Peru and the United States are taken into account (Chong & Srebot, 2020); Of course, there are also 36% who are not very optimistic, but circumstances require that currently in a sector as important as textiles, new products be developed due to the market opportunities that demand it.

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Table 3. Management Styles of systemic environmental management against continuous learning and shared business vision

	They develop new products		Total
	Si	No	
Task orientation	12	28	**40**
	(25.4088)	(14.5912)	
Employee orientation	11	19	**30**
	(19.0566)	(10.9434)	
Combination of both	78	11	**89**
	(56.5346)	(32.4654)	
Total	**101**	**58**	**159**

Source: Prepared with data obtained from the survey.

To test the research hypothesis, it was carried out by comparing the analytically obtained chi-square with the tabular or critical chi-square, resulting in this case that 51,078> 5,991; Therefore, it is concluded, in the acceptance of the research hypothesis and rejecting the null hypothesis Ho, concluding that the management style of systemic environmental management is related to continuous learning and shared vision of the business sector.

3.4. The type of management of the systemic environmental management influences the systemic thinking of the business sector.

To the question: Which of the types of management is the most appropriate in companies?

When appreciating the information referring to the types of management, most appropriate in companies, we find that 34% of managers and administrators consider the democratic, and 7% to let do, to let go. Interpreting this information, it is found that effectively, the democratic management style is the most important in organizations, since communication is maintained with the main resource that is human (Barbosa & Ayala, 2014), however, it is convenient that This democratic management style is nuanced with the autocratic, in terms of demands and verticality, which at a certain moment must exist, the former prevailing.

To the question: When a product is presented, is it subjected to experimentation or quality tests?

63% indicate that generally experimentation tests are given, which is quite significant, but not the remaining 37%, who show an aptitude contrary to the previous ones. The demands and competitiveness require this experimentation to take place permanently in organizations (Escandón & Hurtado, 2014). Data obtained determine that learning from business experiments at the forefront of innovation can help develop ideas or concepts that can promote the circular economy (Aminoff & Pihlajamaa, 2020). Studies carried out establish that the conceptual framework allows managers to introspectively investigate their own mental models and, therefore, review their meaning and use in social networks (Pérez de Miguel & Bárcena, 2010). Other studies illustrate how BDA's digital companies help consumer goods companies to test new products before their market launch and innovate (Mariani & Fosso Wamba, 2020).

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Table 4. Types of managerial management against new products that are subjected to experiments or quality control.

	New products are subjected to experiments or quality control					
	Always	Usually	Sometimes	Rarely	Always	Total
Autocratic	24 (16.6415)	8 (11.8868)	2 (5.7736)	16 (13.9245)	4 (5.7736)	**54**
Bureaucratic	9 (13.2516)	19 (9.4654)	5 (4.5975)	4 (11.0881)	6 (4.5975)	**43**
Democratic	15 (15.7170)	6 (11.2264)	6 (5.4528)	19 (13.1509)	5 (5.4528)	**51**
Let do, let through	1 (3.3899)	2 (2.4214)	4 (1.1761)	2 (2.8365)	2 (1.1761)	**11**
Total	**49**	**35**	**17**	**41**	**17**	**159**

Fuente: Elaboración con datos obtenidos de encuesta.

To test the research hypothesis, it was carried out, by comparing the chi-square obtained from the table or critique, with the chi-square obtained analytically, resulting in this case that 38,330> 1,026; Therefore, it is concluded in the acceptance of the research hypothesis and rejecting the null hypothesis Ho, establishing as a result that the type of management of the systemic environmental management is related to the systemic thinking of the business sector.

4. DISCUSSION

The research was developed with the objective of determining the degree of association that exists between the characteristics of systemic managerial management, with the increase in sustainable development in small and medium-sized companies in the Piura Region. This research is based on the development of the concept of learning organization "learning organization", of an organization that is characterized by the constant encouragement of its members, to increase their capacities, that is, to learn as mentioned (Senge, 1990). For this reason, managerial management, not being well consolidated with respect to organizations, is in crisis, which is manifested in the haste of decisions and in many cases the stress generated and tends to be more directive in management of the companies.

Studies conducted by Duque et al. (2017) establishes that emotional intelligence represented in emotional skills such as personal mastery positively influences job skills, for this reason the results concluded that 31.196> 21.0196, which indicates that there is a high degree of relationship, given that the comparison from the calculated chi-square, it turned out to be greater than the tabular or critical chi-square; reason why it was concluded, that it must be understood that managerial management has to be a person with a broad personal domain. Selznick (1957) considers that conceptual skill, such as the ability to represent oneself in the mind, manipulate and relate ideas, as the real key to management, on the other hand, according to the study carried out by Cao et al. (2020), concludes that descriptions of how people acquire viable mental models and how shared mental models contribute to the performance of teams working on creative projects. For this reason, the results concluded that 40,739> 21,026, which indicates that there is a high degree of relationship, since the comparison of the calculated chi-square turned out to be greater

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than the tabular or critical chi-square; therefore, it was concluded that the characteristics of environmental managerial management are related to the analysis of mental models concerning the business sector.

The results obtained in the research, carried out by Johnson (2017), show that certain internal capacities, including the support of top management, the shared vision, and the space for learning, provide the necessary infrastructure to develop knowledge on environmental issues and related to sustainability in small and medium-sized enterprises. Studies by Scherer et al. (2016), mentions that companies can use data as a third layer to add value, in addition to the product and service layers, for this reason the results concluded that 51,078> 5,991, which indicates that there is a high degree relationship, given that the comparison of the calculated chi-square turned out to be greater than the tabular or critical chi-square; reason for which it was concluded that the management style of systemic environmental management is related to continuous learning and shared vision of the business sector.

Andreeva and Kianto (2012) mention in their study that the knowledge asset dynamics value map (KAVDM) offers a holistic view of the mechanisms based on how knowledge assets are translated into organizational value. Therefore, it was concluded that since the calculated chi-square (38,330) is greater than the critical or tabular chi-square (21,026), resulting in a considerable degree of relationship between the studied variables, and concluding that the type of systemic environmental managerial management if it is related to the systemic thinking of the business sector.

5. CONCLUSION

The situations that influence systemic environmental managerial management are related to personal control in decision-making in small and medium-sized companies in the Piura region, on the other hand, the characteristics of systemic environmental managerial management influence the analysis of the mental models concerning the business sector; The styles of systemic environmental managerial management also influence the continuous learning and shared vision of the business sector, and the type of systemic environmental managerial management influence the systemic thinking of the business sector. Obtaining these objectives was able to demonstrate that the management of systemic environmental management does contribute to the increase of sustainable development in small and medium-sized companies in the Piura region.

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Miguel Alburqueque: conceptualización, curación de datos, análisis formal, adquisición de fondos, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & amp; edición.

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Carlos Marchena: conceptualización, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & amp; edición.

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