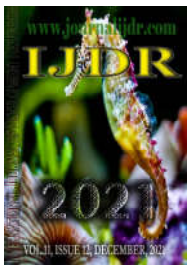
ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 11, Issue, 12, pp. 52963-52968, December, 2021
https://doi.org/10.37118/ijdr.23631.12.2021



RESEARCH ARTICLE OPEN ACCESS

SUSTAINABILITY IN THE CONTEXT OF SUPERMARKETS: AN ANALYSIS OF TWO RETAIL NETWORKS IN BRAZIL

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ARTICLE INFO

Article History:
Received 11th September, 2021
Received in revised form
18th October, 2021
Accepted 04th November, 2021
Published online 30th December, 2021

Key Words:

Management Practices; Environmental Knowledge, Market Orientation; Value Generation, Sustainability.

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ABSTRACT

Sustainability has become an extremely important factor for organizations, affecting the actions of companies, which are gradually changing their policies to reduce the damage caused by their activities and bring benefits to society and the planet. Thus, this research aims to analyze the relationship between waste and waste management practices and the generation of value and sustainable competitive advantage in the supermarket environment, through a study of two retail chains, operating in the Federal District, im Brazil, whose data were collected by a survey and analyzed with the support of statistical software, in order to test the proposed hypotheses. The results show that supermarkets that adopt environmental management practices are better seen in the market and that subjective environmental knowledge influences waste and waste management practices and the generation of sustainable value and competitive advantage, while objective environmental knowledge and market orientation does not influence these variables. As a main contribution, this research advances in studies that deal with sustainability in the context of medium-sized retail supermarkets.

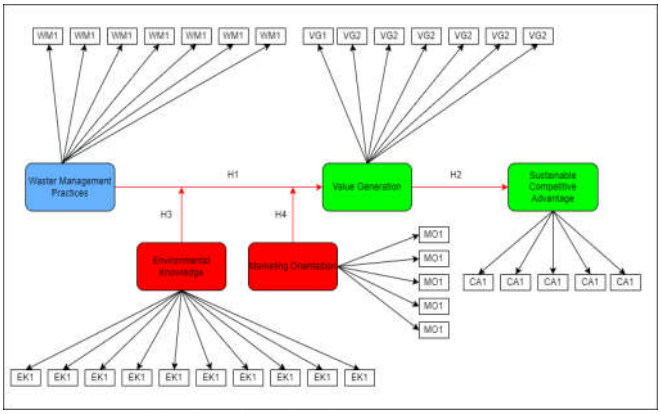
Citation: ***Alano Nogueira Matias, Alonso Luiz Pereira and Tarcísio Sant'Anna.*** "Sustainability in the context of supermarkets: an analysis of two retail networks in Brazil*", International Journal of Development Research*, 11, (12), 52963-52968.

INTRODUCTION

From different points of view, it appears that there is ample room for organizations to advance in their policies aimed at sustainability. Of course, plans and practices need to be realistic in relation to the company's characteristics, such as the business to business (B2B) or business to consumer (B2C) type of operation. In general, it is considered that actions aimed at sustainability in a context of interorganizational relationship (B2B) have less appeal in the midst of companies marketing strategies and this relative obfuscation has repercussions on the timid development of approaches and tools to assess the reality of this area (Kapitan; Kennedy; Berth, 2018). And the more complex and/or multifaceted the retail segment in question (due to size, geographic context, applied legislation and interorganizational relationship), the greater the existing research gaps tend to be. There is an emphasis of research on these issues in terms of prioritizing two extremes: large multinational retailers or small niche supermarket chains (Colla, 2018; Sparks, 2018). Large supermarket chains have the advantage of scale to establish programs for the sustainable management of this waste. Small networks of sustainable niches, on the other hand, are inserted differently in their respective chains, paying attention to these problems in an anticipated and innovative way (Goebel *et al*., 2018).

What is seen, therefore, is a gap with regard to medium-sized supermarkets. The investigation of this work, in addition to studying the average retail, studies the retailer's practices, and their relationship with the generation of value with the moderating variables worked in the conceptual model (Reade, 2017; Reinartz, Wiegand,&Imschloss, 2019; Çankaya, & Sezen, 2018). It is identified as opportune to analyze the relationship between waste management practices and the generation of value and sustainable competitive advantage in the context of supermarkets. The central point translates into an effort to advance on the following question: what are the interrelationships between waste management practices in value generation and sustainability performance in the context of retail supermarkets and their value chain? In order to seek an answer to this problem, this study aims to analyze the relationships between waste management practices and the generation of value and sustainable competitive advantage in the context of medium-sized retail supermarkets in the Federal District, in Brazil, having as object of analysis two supermarket chains. In this sense, two main research fronts were identified that focus on retail constraints and restrictions in the context of food systems: pre-consumption and post-consumption (Dorward, 2012; Chen *et al*., 2017). The latter constitutes the predominant focus of this study, aimed at analyzing these constraints

and restrictions in two medium-sized supermarket chains in the Federal District, in Brazil, a region that leads the economic and human development rankings, despite the center-peripheral disparities as happens in several other metropolises. Little is known about the relationship between environmental knowledge and market orientation with sustainable management practices and value creation, as these are actions to ensure high business performance. On the other hand, these gaps show a window of opportunity for companies to contribute even more significantly to governance schemes and dissemination of sustainable practices. This active engagement of companies in the wake of sustainable development goals will allow successful organizations to differentiate themselves from their competitors and create space for sustainable innovations in their business processes and stakeholder relationships (Van Zanten, & Van Tulder, 2018). Considering this whole range of conditions, the following research hypotheses were raised: H1- The more comprehensive and effective the waste management practices of retail supermarkets, the greater will be the generation of value. H2 - The generation of value is positively related to sustainable competitive advantage. H3- The retailer's environmental knowledge moderates the relationship between waste management practices and the generation of value in the production chain, in such a way that greater (lesser) knowledge by the retailer will increase (decrease) the strength of the relationship. H4 suggests that market orientation moderates the relationship between waste management practices and value generation in the production chain, in such a way that a higher (lower) market orientation will increase (decrease) strength of the relationship, however, by the tests performed by this model, the relationship does not generate significance. Considering the hypotheses raised, waste management practices are an independent variable that influences the generation of value (H1) that influences sustainable competitive advantage (H2), while environmental knowledge (H3) and market orientation (H4) are moderating variables of waste and waste management practices and value creation. Figure 1 presents the theoretical model composing the four research hypotheses presented.



Source: Prepared by the authors (2021).

Figure 1. Proposed hypothesis model

MATERIALS AND METHODS

The method used in the research was based on Structural Equation Modeling (SEM), adopting a survey in the research, a method that can be developed in different ways and using various instruments (Hair *et al*., 2009). In addition to the cross-section, structured in-person questionnaires were applied to collect data on the research sample. In this sense, the questionnaire, based on constructs and definitions, was applied directly to respondents linked to two medium-sized retail chains in the Federal District. The sample is made up of strategic-level owners, managers and employees. The research instrument was structured using a set of items, consisting of a 5-point Likert scale. To verify the constructs defined in Chart 2, the scale ranged from 1 "totally disagree", "occasionally", "rarely", "never" and "not important" to 5 "totally agree", "very often", " very important" and "almost always true" (Gonçalves-Dias *et al*., 2009; Foxall, & Hackett, 1992). Before starting data collection for the study, a pre-test was carried out, which aims to identify possible flaws in the questionnaire, such as redundant or confusing questions, inconsistent or complex questions and questions with difficult language, according to Malhotra (2012). Even when applied to a small sample of respondents, pretesting can help eliminate potential problems. In addition to the constructs, the questionnaire applied measured the sociodemographic aspects of the sample, such as: gender, age, education and professional experience. The access and awareness of actors to the terms of the research were improved by the approach made to the research instrument presented to retailers. The collection period took place between the months of June and October 2021, resulting in 234 completed forms. Taking into account the treatment of data, Exploratory Factor Analysis (EFA) was used to reduce the number of variables and group them into constructs. In addition, the substitute variable criterion is adopted for each construct, being the variable with the highest factor loading, as it has the greatest explanatory power (Hair *et al*., 2009).

RESULTS

Preliminary data processing helps to identify what is not apparent, because in this type of analysis, hidden effects are easy to go unnoticed (HAIR *et al*., 2009). Before moving on to refine the data, such as Missing Datas and Outliers, some adjustments were made to the database. The first step then was to structure all the data from the questionnaire respondents. For each respondent, an ID was created, an identification code that differentiates each respondent in the questionnaire. Then, some tabulations were made. As each construct was linked to a group of questions, and for each question an identification code was given, thus creating a caption for the question. In cleaning the data, we sought to identify univariate and multivariate outliers and missing data, resulting in the elimination of 7 forms. In addition to eliminating the questionnaires, the treatment was also carried out with the disregard of unanswered items. Data analysis was performed using SPSS® 0 software (Statistical Packege for Social Sciences), version 24.0 for Windows® and AMOS® TM 18 (Analysis of Moment Structures) software coupled to SPSS®. After making these necessary adjustments, a multivariate assessment that calculates the Mahalanobis distance (D2) is used to identify outliers. According to Hair *et al*. (2009), when researchers need to objectively measure the multidimensional position of each observation in relation to a common point, the Mahalanobis metric (D2) can be used. Therefore, two multivariate analyzes are performed: the first analyzes all measurement variables, thus creating the MAH_1 variable. In the second analysis (MAH_C) the degree of freedom of the regression is considered, according to the number of variables under study. According to Hair *et al*. (2009), for atypical observations of large samples, it is recommended to consider values greater than D2 / gl = 3 or 4. Therefore, according to the Mahalanobis analyses, respondents with ID 6, 16, 145 and 165 were considered outliers. After excluding outliers, the valid sample now has 227 respondents. The characterization questions (gender, age, education and experience in the company) were applied to obtain the general profile of the sample. According to respondents, from the total sample, 115 respondents were men and 112 were women. The age range of most respondents was between 21 and 30 years old, as shown in Table 1.

Table 1. Age group of respondents

AGE		
Description	N	%
Under 20	8	3.5
Between 21 and 30	141	62.1
Between 31 and 40	52	22.9
Between 41 and 50	22	9.7
Over 50	2	0.9
Not declared	2	0.9
TOTAL	227	100.0

Font: Data research (2021).

Another characterization issue was related to the level of education of the respondents in the sample. According to the responses, most respondents have completed high school, as seen in Table 2.

Table 2. Respondents' level of education

Degree of education		
Description	**N**	**%**
Elementary School	23	10.1
High School	140	61.7
Incomplete Superior Education	33	14.5
Complete Superior Education	25	11.0
Not declared	6	2.6
Total	**227**	**100.0**

Font: Data research (2021).

The last question in the characterization questionnaire was related to the respondents' experience, that is, how long they had been working in the company. The answers can be seen in Table 3.

Table 3. Experience in the company of respondents

EXPERIENCE		
Description	**N**	**%**
01 to 04 years	139	61.2
05 to 09 years	45	19.8
10 to 20 years	16	7.0
More than 20 years	12	5.3
Not declared	15	6.6
Total	**227**	**100.0**

Font: Data research (2021).

Another factor analyzed was whether there was a difference between the analyzed networks (Group 0 and Group 1). Through this test, it was possible to verify whether the fact that the respondent is part of Group 0 or Group 1 would have an influence on the responses obtained. The results can be seen in Table 4.

Then, descriptive analysis was carried out, which is an activity that aims to present qualitative aspects of the research, and show the characteristics of the variables in each construct, in addition to showing how they behave in the study. Thus, the Waste and Waste Management Practices (PG) construct was measured through 8 questions focused on environmental management actions carried out within the company. The questions were about agreement and frequency, and the answers ranged from “totally agree” to “totally disagree” and from “very often” to “never”. Through the analysis of this construct, Table 5 was developed containing the mean, median, standard deviation and the minimum (of 1) and maximum (of 5) for each question. The next construct measured was Value Generation (GV), through questions 8 to 14. The questions were related to the company's search for ways to expand learning in the adoption of sustainability practices. The answers were related to agreement, frequency and veracity, ranging from “totally agree” and “totally disagree”, “very often” to “never” and “almost always true” to “almost always false”. Through the analysis of this construct, Table 6 was developed, containing the mean, median, standard deviation and the minimum (of 1) and maximum (of 5) for each question.

The next construct measured was Market Orientation (OM), through questions 15 to 19. The questions were focused on how the company behaved in the market and its actions. The answers were related to agreement and frequency, ranging from “totally agree” to “totally disagree” and “very often” to “never”. Through the analysis of this construct, Table 7 was developed, containing the mean, median, standard deviation and the minimum (of 1) and maximum (of 5) for each question. Another construct measured was Objective Environmental Knowledge, through questions 20 to 24. For each question of this construct there was only one correct answer, and these answers were transformed into a single variable, by summing the correct answers, considering zero for the wrong answers and one for the correct answer. The respondent who was not right at all got a grade of zero, and the one who got all the questions in the construct right got a grade of five. Through the analysis of this construct, Table 8 was developed containing the mean, median, standard deviation and the minimum (of 0) and maximum (of 5). The next construct measured was the Sustainable Competitive Advantage (CA), through questions 25 to 29. The questions were focused on the company's concern with its social and environmental responsibilities. The answers were related to agreement and frequency, ranging from “totally agree” to “totally disagree” and “very often” to “never”. Through the analysis of this construct, Table 9 was developed, containing the mean, median, standard deviation and the minimum (of 1) and maximum (of 5) for each question. The last construct measured by the questionnaire was Subjective Environmental Knowledge, through questions 30 to 34. The questions were subjective, that is, the respondent made a self-assessment of their environmental knowledge, through agreement responses, ranging from “agree “totally” to “totally disagree”. Through the analysis of this construct, Table 10 was developed, containing the mean, median, standard deviation and the minimum (of 1) and maximum (of 5) for each question. To study the model, three measures were used: Cronbach's Alpha, Composite Reliability and Discriminant Validity. Cronbach's Alpha is used to analyze simple reliability with values greater than 0.70. Composite reliability (CR) is used to verify the internal consistency of the set of variables, reaching a value greater than 0.70. The extracted variance (EV) is used to explain how much the total variance of each variable is used to compose the assessment of the construct, considering values above 0.50 (HAIR *et al*., 2009). The number of respondents, except for the outliers, was 227. Table 11 shows the values of the measures studied for each construct. As the variables WM1, WM2, WM5, WM6, VG5, VG6, SEK5, MO1, CA1 and CA2 had factor loadings below 0.60, they were excluded. After data purification, Table 12 was obtained.

Therefore, it is observed that, after refining the data, Cronbach's Alpha increased in all cases, except for the Subjective Environmental Knowledge construct, which was at 0.694 and rose to 0.691. The Composite Reliability measure, after refinement, was higher for the Waste and Waste Management Practices and Value Generation constructs, and lower for the other two constructs. As for the Extracted Variance, after refinement, it was higher for all analyzed constructs. Next, the structural model was tested using the moderators Market Orientation, Objective Environmental Knowledge and Subjective Environmental Knowledge, and the dependent variables Waste Management Practices and Value Generation. The database with 227 respondents was considered, removing the outliers. Through the tests, It is worth noting here that this model was structred after the purification shown in Table 12. Accoring to the data that were obtained, the R2 of the GV variable was 0.499, which means that the linear model explains 49.99% of the variance of the dependent variable from the regressors (independent variables) included in that linear model. Regarding the variable VC, R2 was 0.584, or 58.40%. Another analysis performed was in relation to the so-called control variables.

This test allows analyzing whether the variables sex, age, work experience and education have an influence on the responses obtained within the construct. For the significance test, the criterion is $p<0.05$. The first hypothesis proposed a relationship between PG and GV. Through the significance test, it was observed that the individual who observes that the supermarket company adopts waste and waste management practices are better seen by consumers, in a way that generates value in the market chain. For the analysis of moderators, the variables SEK, OEKand MO were used to divide the sample into two groups (median split). According to the analyzes carried out, it is observed that the variable SEK (Subjective Environmental Knowledge) has significance ($p=0.008<0.05$) on the VG and WM variables, showing that this has a moderating effect. The OEK (Objective Environmental Knowledge) is not significant ($p=0.372>0.05$), showing that this independent variable has no moderating effect on the WM and VG variables. Market Orientation, on the other hand, has a higher significance value ($p=0.468>0.05$), showing that this variable does not have a moderating effect on the dependent variables. This relationship can be seen in Table 13.

Table 4. Relationships between the supermarket chains analyzed

ANOVA - Groups Nets									
Variable	Group	N	Medium	Standard Deviation	Error	95% confidence interval for the mean		f	Sig
						Inferior limit	Superior Limit		
WM	Group 0	95	3.4552	0.76021	0.07800	3.3003	3.6100	0.429	0.513
	Group 1	132	3.5271	0.85434	0.07436	3.3800	3.6742		
VG	Group 0	95	3.2589	0.95377	0.09785	3.0647	3.4532	1.503	0.221
	Group 1	132	3.4310	1.10307	0.09601	3.2411	3.6210		
SEK	Group 0	95	2.9802	0.87012	0.08927	2.8029	3.1574	1.511	0.220
	Group 1	132	3.1324	0.95478	0.08310	2.9680	3.2968		
OEK	Group 0	95	2.3474	1.07948	0.11075	2.1275	2.5673	2.120	0.147
	Group 1	132	2.1364	1.07556	0.09362	1.9512	2.3216		
MO	Group 0	95	3.7597	0.75536	0.07750	3.6059	3.9136	0.817	0.367
	Group 1	132	3.8598	0.86892	0.07563	3.7102	4.0095		
CA	Group 0	95	3.7304	0.75373	0.07733	3.5768	3.8839	0.283	0.595
	Group 1	132	3.7917	0.92432	0.08045	3.6326	3.9509		

Font: Data research (2021).

Table 5. Descriptive analysis of the waste management practices construct

DESCRIPTIVE STATISTICS					
Variable	Mean	Median	Standard Deviation	Minimum	Maximum
MP1	3.48	3.48	1.16	1.00	5.00
MP2	3.43	4.00	1.30	1.00	5.00
MP3	3.69	4.00	1.13	1.00	5.00
MP4	3.57	4.00	1.08	1.00	5.00
MP5	3.50	4.00	1.36	1.00	5.00
MP6	3.26	3.00	1.21	1.00	5.00
MP7	3.48	3.00	1.22	1.00	5.00

Font: Data research (2021).

Table 6. Descriptive analysis of the value generation construct

DESCRIPTIVE STATISTICS					
Variable	Mean	Median	Standard Deviation	Minimum	Maximum
VG1	3.48	4.00	1.38	1.00	5.00
VG2	3.35	3.00	1.29	1.00	5.00
VG3	3.28	3.00	1.36	1.00	5.00
VG4	3.19	3.00	1.23	1.00	5.00
VG5	3.50	4.00	1.21	1.00	5.00
VG6	2.64	3.00	1.29	1.00	5.00
VG7	3.49	4.00	1.15	1.00	5.00

Font: Data research (2021).

Table 7. Descriptive analysis of the market orientation construct

DESCRIPTIVE STATISTICS					
Variable	Mean	Median	Standard Deviation	Minimum	Maximum
MO1	3.34	3.00	1.26	1.00	5.00
MO2	3.70	4.00	1.11	1.00	5.00
MO3	3.80	4.00	1.11	1.00	5.00
MO4	3.91	4.00	1.29	1.00	5.00
MO5	3.86	4.00	1.05	1.00	5.00

Font: Data research (2021).

Table 8. Descriptive analysis of the objective environmental knowledge construct

DESCRIPTIVE STATISTICS					
Variable	Mean	Median	Standard Deviation	Minimum	Maximum
OEK	2.22	2.00	1.08	0.00	5.00

Font: Data research (2021).

Table 9. Descriptive analysis of the sustainable competitive advantage construct

DESCRIPTIVE STATISTICS					
Variable	**Mean**	**Median**	**Standard Deviation**	**Minimum**	**Maximum**
CA1	3.81	4.00	1.07	1.00	5.00
CA2	2.98	3.00	1.28	1.00	5.00
CA3	3.68	4.00	1.15	1.00	5.00
CA4	3.71	4.00	1.15	1.00	5.00
CA5	3.86	4.00	1.09	1.00	5.00

Font: Data research (2021).

Table 10. Descriptive analysis of the subjective environmental knowledge construct

DESCRIPTIVE STATISTICS					
Variable	Mean	Median	Standard Deviation	Minimum	Maximum
SEK1	3.44	3.00	1.16	1.00	5.00
SEK2	3.24	3.00	1.34	1.00	5.00
SEK3	2.46	2.00	1.39	1.00	5.00
SEK4	3.14	3.00	1.21	1.00	5.00
SEK5	3.94	4.00	1.08	1.00	5.00

Font: Data research (2021).

Table 11. Measures analyzed before purification

Construct	N	Cronbah Alpha	composite reliability	extracted variance
Waste management practice	7	0.751	0.762	0.324
Value Generation	7	0.831	0.842	0.459
Subjective environmental knowledge	5	0.694	0.7	0.324
Market orientation	5	0.703	0.714	0.34

Font: Data research (2021).

Table 12. Measurements after data refinement

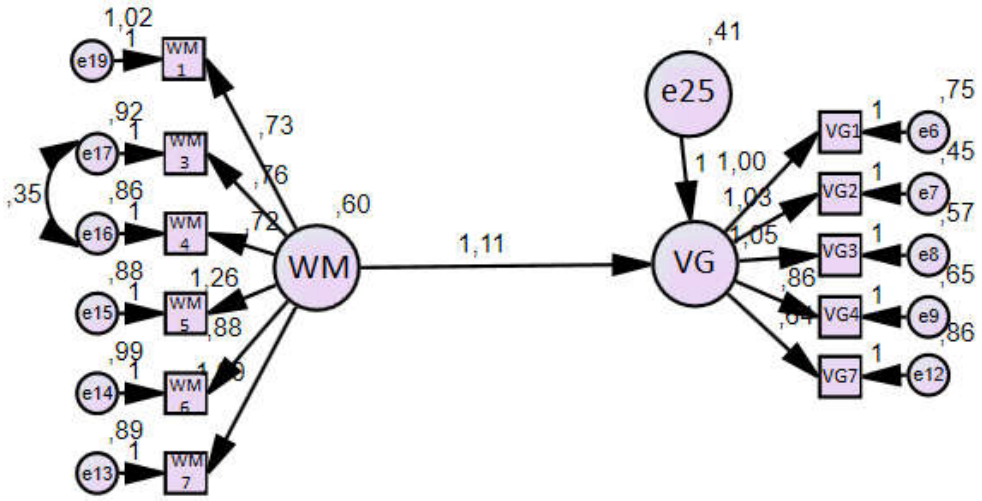
Construct	N	Cronbah Alpha	composite reliability	extracted variance
Waste management practice	3	0.708	0.720	0.467
Value Generation	5	0.872	0.875	0.586
Subjective environmental knowledge	4	0.691	0.696	0.365
Market orientation	4	0.691	0.702	0.377
Competitive Advantage	3	0.755	0.762	0.520

Font: Data research (2021).

Table 13. Relationships of moderators with variables

Relations	ß (high)	ß (low)	Meaning
(WM VG) SEK	1.211***	0.303***	0.008 (p<0.05)
(WM VG) OEK	0.601**	1.170	0.372 (p>0.05)
(WM VG) MO	0.160	0.426	0.468 (p>0.05)

*** Level of significance p<0.001 ** Level of significance p<0.01
* Level of significance p<0.05 Font: Data research (2021).



Font: Elaborated by the authors (2021).

Figure 2. Structural research model with variables

Analyzing the hypotheses proposed by the research, it is observed that H1 shows that the more comprehensive and effective the waste and waste management practices of retail supermarkets, the greater will be the generation of value, according to the significance tests applied. H2 indicates that the retailer's environmental knowledge moderates the relationship between waste and waste management practices and the generation of value in the production chain, in such a way that greater (lesser) knowledge by the retailer will increase (decrease) the strength of the relationship, and this hypothesis is true according to the tested model. H3 indicates that the retailer's environmental knowledge moderates the relationship between waste and waste management practices and the generation of value in the production chain, in such a way that greater (lesser) knowledge by the retailer will increase (decrease) the strength of the relationship, and this hypothesis is not true, according to the tested model, as it does not generate significance. H4 suggests that market orientation moderates the relationship between waste and waste management practices and value generation in the production chain, in such a way that a higher (lower) market orientation will increase (decrease) strength of the relationship, however, by the tests performed by this model, the relationship does not generate significance.

DISCUSSION

This study aimed to analyze the relationship between waste management practices and the generation of value in medium-sized retail supermarkets (Reade, 2017; Reinartz, Wiegand, & Imschloss, 2019; Çankaya, & Sezen, 2018), supported by moderating variables environmental knowledge and market orientation defined in the proposed model of hypotheses (Figure 1). The research question investigated is aimed at understanding the interrelationships between waste and waste management practices in the generation of value and, consequently, in sustainability in the context of medium-sized retail supermarkets and their value chain. The applied methodology proved to be relevant to meet the proposed research objective, as well as in the investigation of the research problem, focusing on Structural Equation Modeling (SEM) and on the analysis of applied survey data, according to Hair *et al*. (2009). The proposed model of hypotheses (Figure 1) for analyzing the relationships between the constructs is an important contribution of the research to the analysis of sustainability in the value chain, as it helps in the identification of management and waste practices and their relationship with the generation of value and sustainability of the value chain, as well as the influence of environmental knowledge and market orientation in the relationship between the variables. The positive correlations found between the constructs contained in the structural model (Figure 2) are an important managerial contribution for medium-sized supermarket retail chains, as they have managerial implications, in which the recommendation for the use of a set of drivers is highlighted strategic (EK and MO), as a way to achieve strategic objectives (WM, VG and CA) to obtain greater competitive advantage and, consequently, a better position in the value chain. This research is limited to the study of two medium-sized retail supermarket chains in a homogeneous region, therefore, it is suggested comparative studies in different regions and the inclusion of regional economic factors as moderators of the relationships between the constructs, as well as the survey and tests of new hypotheses that can bring theoretical and managerial contributions with studies on sustainability in the value chain of medium-sized retail supermarkets, a segment that is still little studied.

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