



ARTICLE REVIEW



EFFECT OF SUPPLIER ENVIRONMENTAL DAMAGE ON ENVIRONMENTAL CONCERN AND GREEN PURCHASE DYNAMIC CAPABILITIES

EFEITO DO DANO AMBIENTAL DO FORNECEDOR NA PREOCUPAÇÃO AMBIENTAL E NAS CAPACIDADES DINÂMICAS DE COMPRAS VERDES

Vilmar Tondolo¹ | Larissa Oliveira de Otero² | Daniele Rodrigues Garcia³ | Flávio Régio Brambilla⁴ | Guilherme Lerch Lunardi⁵

¹ Professor Adjunto do Centro de Ciências Sócio-Organizacionais da Universidade Federal de Pelotas (UFPEL), Pelotas/RS, Brasil. <https://orcid.org/0000-0002-3116-2585>.

² Mestrado em Administração, Universidade Federal do Rio Grande (FURG), Porto Alegre/RS, Brasil. <https://orcid.org/0000-0002-3195-5999>.

³ Doutoranda em Administração, Universidade Federal do Rio Grande (FURG), Porto Alegre/RS, Brasil. <https://orcid.org/0000-0002-5016-3284>.

⁴ Professor Associado no PPGA Universidade de Santa Cruz do Sul (UNISC), Santa Cruz do Sul/RS, Brasil. <https://orcid.org/0000-0002-9398-7240>.

⁵ Professor Associado no PPGA Universidade Federal do Rio Grande (FURG), Porto Alegre/RS, Brasil. <https://orcid.org/0000-0003-3250-2796>.

Corresponding Author:

Vilmar Tondolo

E-mail: vagtondolo@ufpel.edu.br

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ABSTRACT

Purpose: Given the importance of sustainability in the supply chain, the aim of this study was to analyze the effect of supplier environmental damage on managers' perception of the need to develop Green Purchasing Dynamic Capabilities (GPDC), and whether this effect is mediated by environmental concern

Methodology/approach: This study employed a full-factorial vignette-based experiment. Participants were 267 US professionals with management experience. The hypotheses were tested through multiple regression analysis.

Originality/Relevance: This study is one of the first to analyze the role of management in decision-making on the development of GPDC, as well as analyzing the effect of the origin of environmental damage and the way in which the manager was inserted in the context of supplier selection.

Key findings: Responsibility for supplier selection did not show a direct effect on the need to develop GPDC. The controllability for the origin of the environmental damage does not moderate the effect of the responsibility for the selection of the supplier in the necessity of GPDC development. However, environmental concern mediates the effect of responsibility on the need for GPDC development.

Theoretical/methodological contributions: The findings motivated to elucidate how the external and internal aspects of the company in relation to the environmental damages of the supplier interact in the Dynamic Capabilities of Green Purchasing.

Keywords: Green purchasing; Dynamic capabilities; Sustainability; Supplier; Experiment.

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RESUMO (Estruturado)

Objetivo: Dada a importância da sustentabilidade na cadeia de suprimentos, o objetivo deste estudo foi analisar o efeito do dano ambiental do fornecedor na percepção dos gestores sobre a necessidade de desenvolver Capacidades Dinâmicas de Compras Verdes (GPDC), e se esse efeito é mediado pela preocupação ambiental.

Metodologia/abordagem: - Este estudo empregou um experimento baseado em vinheta do tipo fatorial. Os participantes foram 267 profissionais americanos com experiência em gestão. As hipóteses foram testadas por meio da análise de regressão múltipla.

Originalidade/Relevância: Este estudo é um dos primeiros a analisar o papel da gestão na tomada de decisão sobre o desenvolvimento de GPDC, bem como, analisa o efeito da origem do dano ambiental e a forma como gestor foi inserido no contexto da seleção do fornecedor.

Principais conclusões: A responsabilidade pela seleção do fornecedor não apresentou efeito direto na necessidade de desenvolver GPDC. A controlabilidade pela origem do dano ambiental não modera o efeito da responsabilidade pela seleção do fornecedor na necessidade de desenvolvimento de GPDC. Porém, a preocupação ambiental medeia o efeito da responsabilidade na necessidade de desenvolvimento de GPDC.

Contribuições teóricas/metodológicas: Os achados motivaram para elucidar como os aspectos externos e internos da empresa em relação aos danos ambientais do fornecedor interagem nas Capacidades Dinâmicas de Compra Verdes.

Palavras-chave: Compras Verdes; Capacidades Dinâmicas; Sustentabilidade; Fornecedor; Experimento

1 INTRODUCTION

In recent decades, environmental problems and the depletion of natural resources have forced civilization to focus on environmentally responsible consumption (Amoako, Dzogbenuku, Doe & Adjason, 2022) and to develop awareness that environmental protection is not just a task of organizations, but also their responsibility (De Lima Souza et al., 2020). Consequently, the competitive business environment has made organizations recognize that they can no longer neglect environmental issues (Mansoor et al., 2021).

Research and practice support the notion that there is an important influence exerted by external environmental pressure on companies (Tate et al., 2012). Previous research, for example Machado and da Costa Silva (2010) e Lima et al. (2012), point out that companies demonstrate their environmental concerns by adopting proactive environmental strategies and, in this way, establish a positive image and reputation due to the attention they pay to the

environment.

Companies need to integrate environmental management into the development of long-term strategies, recognize environmental goals, progress in environmental performance, and reduce the negative effect of daily environmental operations (Zhang et al., 2019). This is also true for small companies, which can increase their growth by developing these environmental capabilities (Andersén et al., 2020).

Shah and Soomro (2021) present findings that provide managers with guidelines for dealing with environmental and business issues, including environmental protection and management strategies, in addition to reducing adverse effects on the environment. Risk prevention, control, and information sharing with suppliers should be specially considered since the company's customers expect it to be responsible for the non-ecological behavior of its allies, should any damage occur (Hartmann & Moeller, 2014).

Spillan, McGinnis, Kara & Liu (2013) suggest that companies should not only adopt proactive environmental strategies but also restructure the management of activities in corporate practices, establishing levels of managerial responsibility that ensure the elimination of unsatisfactory suppliers, misaligned with the assumptions of internal environmental and external requirements of companies. Thus, companies must work together with others that share the same objective, in order to guarantee the achievement of environmental objectives in the supply chain (Andersén et al., 2020).

In this sense, Yook, Choi & Suresh (2018) point out that green purchasing capabilities are classified as operational and dynamic, which are related to the performance of green purchasing. As Preuss (2001) points out, the purchasing function is central to establishing a green supply chain. Although other studies on GPDC have been conducted in recent years, for example (Yook et al., 2018) analyzed the relationship of GPDC with environmental and economic performance, the role of management to explore green capabilities, remains an area of concern, somewhat neglected research in the literature (Andersén et al., 2020).

In view of this, this research is justified, firstly, by the fact that issues such as the effect of the supplier's environmental damage on environmental concerns and on the GPDC are still little explored. The central contribution of this study is to verify whether the responsibility for selecting a supplier involved in environmental damage is an antecedent of the need to develop GPDC. As Tondolo e Bitencourt (2014), highlight, the antecedents are the motivators of the development of Dynamic Capabilities, an essential aspect for the theoretical development of Dynamic Capabilities, and there are still gaps to be filled regarding the study of their antecedents (Gonzalez, 2022).

Second, this study assesses the moderation of Controllability over environmental damage in relation to the effect of Responsibility on the need to develop GPDC. Despite its importance in the analysis of supply interruptions, controllability has received limited attention in the literature on supply risk, especially regarding its effects on responses after these interruptions (Polyviou, Rungtusanatham & Kull, 2018).

Third, this study verifies the mediation of environmental concern in the effect of responsibility on the need to develop GPDC. Despite the various surveys carried out, there is still a lack of studies that verify the impact of engagement and environmental concern on investment decisions in green actions (Akhtar, 2022; Yadav & Pathak, 2016). For this, an experimental design was developed, which is useful to complement and deepen findings that would be more general in other methods, such as interviews and surveys (Bachrach & Bendoly, 2011).

This work is organized as follows: first, it includes the introductory part, delimiting the theme, the research problem, and the importance and justification of the study. Second, it presents the theoretical framework, third, the methodological procedures are explained. Fourth, the analysis of the results is presented, with the characterization of the sample and the analysis of the model. Fifth, the discussion of the results is presented, informing the theoretical and

managerial contributions. Sixth, the conclusions, identified limitations, and suggestions for future studies are presented. Finally, the references are presented.

2 THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

2.1 Green Purchasing and Dynamic Capabilities

Concerns about the environment have increased consumer interest in the green supply chain (Asif, Lau, Kakandala, Fan & Hurriyet, 2020; Taufique & Vaithianathan, 2018; Yook et al., 2018), influencing business practices carried out by companies (Andersén et al., 2020). In addition to environmental concerns, the focus has been placed on green purchasing due to the consequences of globalization and industrialization (Yee, Shaharudin, Ma, Zailani & Kanapathy, 2021).

Regulatory pressure was one of the main factors that motivated green purchases, as companies were driven to adopt green initiatives to ensure a continuous supply of green inputs to produce these products and prevent regulators from taking action for non-compliance (Foo, Kanapathy, Zailani & Shaharudin, 2019). Preuss (2001) points out that legislation related to the green supply chain may include the total prohibition of certain materials or processes, the stipulation of minimum characteristics of products or processes, or the requirement of documentation so that customers can judge the toxicity of a product. product and take appropriate precautions.

Green purchasing refers to the way in which innovations in supply chain management and industrial purchasing can be considered in an environmental context (Liu, Zhu & Seuring, 2017). It involves the process of finding environmentally friendly suppliers in the market (Asif et al., 2020), through extensive training, education, and guidance (Liu et al., 2017), contributing to the performance of companies (Tate et al., 2012).

To effectively implement green supply policies, collaboration between purchasing and supplying companies is crucial (Green, Morton & News, 1998). Tate et al. (2012) have identified both successful and unsuccessful initiatives in the green supply chain, emphasizing that the buyer-supplier relationship must shift from a control orientation to a collaboration orientation. This requires changes in processes and incentives. Integrating members of the green supply chain is challenging and difficult for competitors to replicate, but it improves environmental performance and competitiveness (Woo, Kim, Chung & Rho, 2016).

According to Liu et al. (2017) more coordination is necessary, particularly with suppliers, and building a positive relationship is essential. Green procurement practices foster high trust working relationships that promote mutual exchange of information and knowledge sharing (Yee et al., 2021). To create environmental awareness among the workforce, managers and organizational leaders must commit to the environmental protection mechanism (Mansoor et al., 2021) This mechanism can aid in the selection of suppliers that meet environmental standards and require suppliers to collaborate in protecting resources (Shah & Soomro, 2021).

In order to promote sustainable behavior, managers need to acquire the skills and capabilities to understand the expectations of stakeholders and customers (Hartmann & Moeller, 2014). Successful implementation of green strategies requires the deployment of specific capabilities, which necessitate the identification, utilization, and assimilation of internal and external resources to facilitate the entire supply chain (Yee et al., 2021; Yook et al., 2018). Selecting, developing, collaborating with, and evaluating suppliers, as well as creating value using available resources, are specific capabilities required for implementing green procurement practices (Foo et al., 2019).

As GPDC refer to the complex individual skills, assets, and knowledge applied in organizational practices that enable environmentally active companies to effectively organize their operational activities and resource utilization to achieve goals and objectives (Yee et al., 2021). To meet the demands of environmentally conscious customers, companies must leverage their green supply chain capabilities and act proactively (Dai, Cantor & Montabon, 2015). This entails collaborating with partners to benefit from the environmental strategy (Zhang et al., 2019).

For instance, buyers can increase their productivity by selecting suitable green suppliers with unique capabilities if they possess adequate knowledge about the environmental capabilities of suppliers (Woo et al., 2016). Nevertheless, having these capabilities may not necessarily result in the expected competitive outcome. Instead, realizing competitive advantages related to the environment relies on a company's ability to deploy and leverage the right capabilities effectively for specific green operating strategies (Liu et al., 2017).

Inadequate allocation and commitment to critical resources can result in a failure to develop green purchasing capabilities (Yee et al., 2021). This highlights the necessity to conduct further research on how companies can enhance their purchasing capabilities to positively impact their performance (Liu et al., 2017).

Green procurement capabilities can be divided into two categories: operational capabilities and dynamic capabilities (Yook et al., 2018). Dynamic capabilities enable companies to adapt to the evolving market by building and renewing their organizational resources and capabilities (Chen & Chang, 2013). These capabilities are geared towards strategic change and aligning the organization with the environment, serving as a critical success factor for both environmental and economic performance. This is because green purchasing necessitates a comprehensive purchasing system and dynamic involvement from both suppliers and purchasing companies (Yook et al., 2018).

2.2 Responsibility

The assignment of responsibility to individuals is based on observers' analysis of their connection to an event and the intended, committed, or foreseeable actions that led to positive or negative consequences (Munyon, Jenkins, Crook, Edwards & Harvey, 2019). Responsibility is used to describe the extent to which an individual or other person is responsible for some situation (Polyviou et al., 2018).

The responsibility of the company and, consequently, of the manager responsible for selecting suppliers, increases as external aspects are considered, such as regulations (Preuss, 2001) and pressure from customers (Carter & Carter, 1998). Thus, managers responsible for selecting suppliers need to build their capabilities to coordinate stakeholders, including suppliers, with a focus on sustainability and performance (Liu et al., 2017). Responsibility judgments impact the future intentions of the consumer (Munyon et al., 2019) and can lead to a higher expectation of recovery and lower customer satisfaction (Huang, 2008).

Responsibility assignments are intrinsically linked to emotional and behavioral reactions (Hartmann & Moeller, 2014). The stronger the assigned responsibility for an incident, the more intense the resulting emotional and behavioral reactions, leading to a direct assessment of culpability (Dunn, Jensen & Ralson, 2021). Responsibility is associated with past decisions and how their outcomes generated adverse effects (Polyviou et al., 2018). The degree of responsibility assigned increases significantly with the severity of the outcome and the degree of controllability (Hartmann & Moeller, 2014). Based on our understanding, the responsibility of selecting a supplier responsible for environmental damage can serve as a motivator or antecedent to developing GPDC. Therefore, we propose the following hypothesis:

H1: The need to develop GPDC is higher when the responsibility for supplier selection rests with the individual.

2.3 Controllability

Controllability is used to assess whether a circumstance or situation could have been avoided (Mir, Aloysius & Eckerd, 2017). It pertains to whether the causes of negative events were within an individual's control and whether they could have taken steps to prevent the negative outcome (Munyon et al., 2019). Controllability also reflects an entity's ability to carry out an intended action (Dunn et al., 2021), and whether a hypothetical situation is determined by chance or by human action (Polyviou et al., 2018).

This research will follow the concept that controllability refers to the degree to which an entity, such as a company or supplier, has control over a given event that triggered environmental damage. In this sense, when external factors such as natural disasters are considered, it can be concluded that the triggering event is beyond the company's control (Polyviou et al., 2018).

For instance, when the buyer perceives that the supplier's action was uncontrollable, they may not consider it a violation. However, if the buyer classifies the supplier's action as controllable, it may be seen as a renegade action (Mir et al., 2017) If the buyer does not take any action to mitigate the damage, the supplier may be considered negligent and held more responsible for any resulting occurrence (Munyon et al., 2019), which may increase the likelihood of the buyer substituting the supplier (Souza et al., 2022).

The degree of controllability over a given event plays a significant role in shaping judgments, and thereby determining the response of individuals to a particular situation (Mir et al., 2017). We acknowledge that the degree of controllability over environmental damage can have an impact on how responsibility affects the manager's perceived need to develop GPDC. Therefore, we propose the following hypothesis:

H2: Controllability over environmental damage moderates the effect of Responsibility on the need to develop GPDC.

2.4 Environmental Concern

Environmental concern refers to an individual's attitude towards environmental issues that may affect their behavior towards the environment (Paul, Modi & Patel, 2016; Prakash & Pathak, 2017; Souza et al., 2022; Tsarenko, Ferraro, Sands & MsLeod, 2013). Environmental concern has a positive influence on the decision to invest in green actions and is directly related to ecological knowledge (Akhtar, 2022; Joshi & Rahman, 2015; Severo, Guimarães & Dorion, 2018).

Environmental concern refers to an individual's awareness and recognition of environmental problems and the extent to which they are willing to take action to address them (Prakash & Pathak, 2017) It involves having pro-environmental attitudes and a willingness to contribute personally towards solving environmental issues (Akhtar, 2022; Jaiswal & Kant, 2018). Factors that contribute to environmental concern may include issues such as deforestation, insufficient waste management systems, and a lack of commitment to environmental preservation (Mansoor et al., 2021).

The concept of environmental concern is crucial for companies that have adopted green supply chain strategies (Joshi & Rahman, 2015). Companies with a positive attitude towards environmental protection are more likely to consider environmental factors and integrate green

initiatives into their objectives, maintaining their environmentally friendly status (Shah & Soomro, 2021) and extending their social and environmental awareness beyond their own boundaries (Sarkis & Dhavale, 2015).

The increasing consumer awareness and concern for products with environmental impacts (Foo et al., 2019) as well as the general environmental concern of society has led companies to adopt environmental management practices such as product remanufacturing and reverse logistics (Souza et al., 2022). Moreover, companies should align their human resource practices with the organization's overall environmental goals and initiatives (Mansoor et al., 2021).

Dynamic capabilities are a concept that implies that firms are not only competing based on their existing resources and capabilities, but also on their ability to develop and renew their organizational capabilities to adapt to the uncertain environment (Chen & Chang, 2013). As such, it is assumed that an organization's GPDC plays a crucial role in developing green supply behavior and improving environmental performance (Yook et al., 2018). In this way, we understand the manager's environmental concern as an internal organizational factor, with the potential to mediate responsibility for environmental damage with the need to develop GPDC. Therefore, we propose the following hypothesis:

H3: Environmental Concern mediates the effect of responsibility on the need to develop GPDC.

The theoretical model (Figure 1) was developed to depict the relationships between the proposed variables in the scenario of this study.

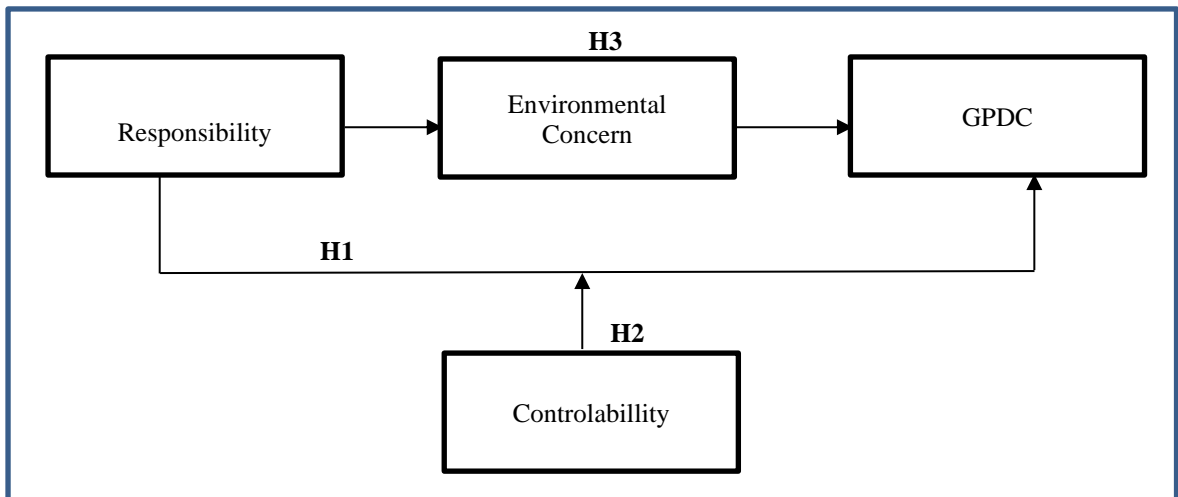


Figure 1: Theoretical Model

Source: Authors

3 METHOD

To achieve the research objectives, a 2x2 factorial-type vignette-based experiment was used. This procedure is considered appropriate for understanding how and why individuals, in this case managers, form their judgments and preferences when confronted with complex situations (Rungtusanatham et al., 2011). Participants were randomly assigned to one of four versions of the vignette using SurveyMonkey Inc.'s A/B test, ensuring that the experiment was conducted using a between-subjects approach to reduce the possibility of any demand effect occurring. The experiment's application sequence was organized as follows: reading the invitation and thanks, reading the common module, reading the respective vignette, and

completing the questionnaire with relevant and general questions. The vignette is included in the Appendix of this study.

The variables were operationalized as follows: the independent variables Responsibility and Controllability were manipulated at two levels through the vignette versions. Responsibility had two levels: someone else's responsibility or own responsibility for having selected the current supplier. The two levels of the independent moderating variable Controllability were environmental damage caused by nature or caused by the supplier. The mediator variable Environmental Concern was operationalized through three items adapted from Tsarenko et al. (2013). The dependent variable, GPDC, was operationalized through five items adapted from Yook et al. (2018) and presented in the appendix.

3.1 Experiment Procedures

To conduct the study, we utilized a vignette that was originally developed by Polyviou et al. (2018) and subsequently adapted and validated for the environmental context by Souza et al. (2022). The study involved American professionals with management experience who were recruited through the Prolific platform (www.prolific.co), resulting in a total of 274 participants. To ensure data quality, an attention test was administered in which participants were asked two questions about the vignette context. Seven participants did not respond correctly, and their responses were subsequently removed from the analysis, resulting in a final sample size of 267 participants.

To ensure the validity of the experiment, we tested the realism of the vignettes by asking participants to rate them on a 7-point Likert-type scale, with 1 indicating "strongly disagree" and 7 indicating "fully agree". The average rating for realism was 4.99, with a standard deviation of +/- 1.43, indicating that the experiment was perceived as realistic by the participants. Additionally, we conducted a manipulation verification to ensure that the participants understood the different levels of manipulation of the independent variables. The results of this verification were satisfactory, indicating that the participants correctly identified the respective levels of manipulation.

To verify the reliability of the constructs, the internal consistency measure was used. The Cronbach's Alpha found for Environmental Concern was 0.858. As for the construct GPDC, the value obtained was 0.852, indicating that the constructs are consistent in their measurement. Finally, the technique used in this research was the multiple linear regression analysis by the Process macro, with 5,000 subsamples, and 95% confidence interval, based on Hayes (2018).

4 RESULTS AND DISCUSSION

In this study, we collected data on gender and age to characterize the sample. Females represented slightly more than half of the participants (50.02%), while males represented 49.04%, and a small portion (0.4%) preferred not to disclose their gender. The average age of the participants was 37.3 years. Table 1 shows that Responsibility for selecting the supplier had a positive effect on GPDC, but the effect was not statistically significant ($b = 0.19$; $p > 0.05$), which does not support H1. It is important to note that the positive effect suggests that when the manager was responsible for selecting a supplier involved in the environmental damage, there may be a greater need to develop GPDC than when another manager was responsible for the selection.

Table1. Regression Results

Dependable Variables	Environmental Concern		GPDC	
	b	SE	b	SE
(Constant)	6.42***	0.34	2.39***	0.50
Control variables				
Gender	-0.01	0.01	0.01	0.01
Age	-0.26	0.15	0.21	0.14
Experimental variables				
Responsibility (R)	-0.29*	0.15	0.19	0.15
Controllability (C)	xx	xx	0.20	0.14
Interactions				
R X C	-xx	xx	-0.50	0.29
Mediator				
Environmental Concern	xx	xx	0.31***	0.06
R ²	0.0341		0.1131	
F-statistic	3.0940*		5.5258***	

Notas: Non-standard coefficients are reported. * p<0.05; ** p<0.01; ***p<0.001
Hayes (2018) model 5 initializing 5.000 subsamples N= 267.

Fonte: Research data (2023)

According to the results of the analysis examining the interaction between Responsibility and Controllability, it was found that Controllability did not moderate the effect of Responsibility on the need to develop GPDC (b = -0.50; p> 0.05), which does not support the hypothesis H2. However, it was observed that Controllability had a positive effect on the need to develop GPDC. Specifically, when the supplier could have avoided the environmental damage, the identification of the need to develop GPDC was greater compared to when the damage was caused by an uncontrollable event. It is important to note that this effect was not statistically significant (b = 0.20; p> 0.05).

The analysis reveals that Responsibility has an indirect effect on the need to develop GPDC, which is mediated by Environmental Concern. Specifically, the negative and significant effect of Responsibility on Environmental Concern (b = -0.29; p< 0.05) is followed by a positive and significant effect of Environmental Concern on the need to develop GPDC (b = 0.31; p< 0.001). These findings lend support to hypothesis H3, which posits that Environmental Concern acts as a mediator between responsibility and the need to develop GPDC. Additionally, it is noteworthy that the manager's perceived level of Environmental Concern tends to be greater when the responsibility for selecting the supplier linked to the environmental damage lies with someone else.

The research findings and hypotheses are summarized in Figure 2. The results indicate that the responsibility for selecting the supplier in the event of environmental damage has no direct impact on the supplier's need to develop GPDC. However, this effect is mediated by the level of environmental concern displayed by the purchasing company's manager. Additionally, the study reveals that controllability, which refers to whether the damage was caused by the supplier company or by natural factors, does not moderate the impact of supplier selection responsibility on the need for GPDC development.

Hypothesis	Supported	Not supported
H1: The need to develop GPDC is higher when the responsibility		x

for supplier selection rests with the individual.		
H2: Controllability over environmental damage moderates the effect of Responsibility on the need to develop GPDC.		x
H3: Environmental Concern mediates the effect of responsibility on the need to develop GPDC.	x	

Figure 2. Summary of hypothesis acceptance

Fonte: Research data

The present findings are in line with earlier research conducted by Polyviou et al. (2018), Souza et al. (2022), and Tondolo et al. (2021), which supports the conclusions of this study. Nevertheless, this study contributes new insights that are worth discussing. Firstly, the context of environmental damage was deemed appropriate for investigating the development of GPDC. Secondly, one of the premises of this study was that the responsibility for selecting a supplier involved in an environmental damage incident would act as a driving force for recognizing the need to develop GPDC.

According to the Dynamic Capabilities theory, motivators or antecedents are key stimuli that prompt companies to develop these capabilities (Tondolo & Bitencourt, 2014). This study's results suggest that supplier selection responsibility is an antecedent to the need for GPDC development, although not directly.

The finding that the effect of responsibility on the need for GPDC development is mediated by environmental concerns underscores the role of managers as decision-makers and agents of change within organizations. The results suggest that it is not so much about who selected the supplier, but rather that environmental damage involving the supplier occurred, prompting the need for a response. One such response is to develop the necessary skills to manage or prevent such incidents from happening. In this regard, the Dynamic Capabilities theory offers a valuable perspective for understanding how organizations continuously adapt to adversity, including environmental issues in the supply chain.

Similar to the lack of significance found with responsibility alone, the source of environmental damage involving the supplier also did not prove significant. Once again, whether the damage was caused by the supplier or by natural factors was not the key determinant in the need for GPDC development. The Manager's Environmental Concern remained a crucial factor, highlighting the central role of managers in driving changes and actions towards environmental sustainability.

The research findings contribute to the integration of managerial aspects, such as environmental concern, and emphasize the significance of Dynamic Capabilities as a driving force behind the development of organizational capabilities focused on sustainability. As noted by Tondolo et al. (no prelo), managers are more likely to adopt pro-environmental actions when their own characteristics and perceptions align with an attitude of environmental preservation. This is not to suggest that responsibility for supplier selection or the controllability of damage is insignificant. These factors are essential, as long as the company's internal attitude is mobilized towards the implementation of purchasing and the green supply chain.

As a managerial contribution, this study emphasizes the importance of fostering environmental awareness within organizations, irrespective of who was responsible and what caused the environmental damage. The action and the pursuit of developing capabilities that can bring about change depend on the attitudes of managers, which are shaped by their beliefs, perceptions, and approach to environmental issues.

5 CONCLUSION

The study examined the effect of supplier environmental damage on managers' perception of the need to develop GPDC, and whether this effect is mediated by environmental concern. To accomplish this, an experiment based on a 2x2 factorial vignette was conducted. The results revealed that responsibility for selecting a supplier involved in environmental damage does not have a direct effect on the perception of the need to develop GPDC.

Additionally, the study found that Controllability, i.e., whether the supplier's involvement in the environmental damage was caused by nature or by the supplier itself, does not influence the relationship between Responsibility and the need to develop GPDC. The most significant factor was the manager's Environmental Concern, which acted as a mediator between Responsibility and the need to develop GPDC.

Overall, the study's findings shed light on how both external and internal aspects of the company interact with GPDC in the context of supplier environmental damage. Specifically, the results suggest that Environmental Concern plays a significant role in mediating the relationship between supplier environmental damage and the need to develop GPDC. Additionally, the study revealed that internal aspects of the company, such as responsibility and environmental concern, were more influential than external aspects like controllability over environmental damage. These findings contribute to a better understanding of the complex dynamics involved in developing GPDC within organizations.

As a limitation, we highlight that the study analyzed only the environmental dimension of sustainability. The other dimensions, economic and environmental, are also worth mentioning. In this sense, a study is suggested to include economic and social aspects in the scenarios, with the objective of verifying whether the interaction of these aspects can, in some way, modify the findings of this research. Furthermore, the study was conducted in a specific cultural context, and the results may not be generalizable to other cultures or regions. Thus, it would be valuable to conduct similar studies in different cultural and institutional contexts to further validate the findings. Finally, the study focused on the role of managers in the development of GPDC, and did not explore the perspectives of other stakeholders, such as suppliers or customers. Future research could investigate the perceptions and actions of these stakeholders towards GPDC development in the context of environmental damage.

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Appendix. – Vignette and Variables

Vignette (Polyviou et al., 2018; Souza et al., 2022)

Common Module

Organization you work for: Reliable Digital.

Reliable Digital is a large US-based manufacturer of computer hard-disk drives. Reliable Digital has a long history in the electronics industry and is one of the leading manufacturers of hard-disk drives in the world.

Your role: You are the Director of Purchasing at Reliable Digital.

Your responsibilities include:

- developing and implementing sustainable purchasing strategies for materials,
- making recommendations to upper management about developing and contracting new sustainable suppliers,
- managing the material flow to maintain necessary inventories, and
- managing sustainable activities to develop relationships with suppliers.

Description of hard-disk drives:

Hard-disk drives comprise various components, including platters, substrate material, media layer, protective layer, read/write heads, spindle motor, hard-disk logic board, and drive bay. Of these components, the read/write heads are considered the most sophisticated ones, since they do the actual reading and writing on the disk platters. Since the heads are too small to be used without attaching them to a larger unit, they are mounted to special devices called head sliders, or simply sliders. Sliders support the heads and keep them at a consistent flying height above the disk.

Reliable Digital's sourcing strategy: Reliable Digital sources components for its hard-disk drives from domestic and international suppliers. It has developed a close relationship with one supplier of sliders, Thai Electronic. Thai Electronic supplies 40% of the sliders needed by Reliable Digital. It is located in an industrial park in Bang Pa-In, an area near Bangkok, Thailand.

Experimental-cues modules – Factorial 2 x 2

Controllability – nature-control

Disaster strikes: It is Thursday night at 10 pm. Your cell phone is ringing. As you answer, you hear loud voices and shouting in the background and finally someone speaks. It is Jao Chokdeer, the Director of Operations of Thai Electronic. Jao sounds frantic. He says to you: “We have a problem! A fire broke out at our factory in Bang Pa-In. The factory's main generator exploded. **It was struck by a lightning, causing a huge explosion in our electrical network. There is nothing we can do about it.** The factory is burning and the fire is spreading uncontrollably, including devastating the forest near the factory, causing immeasurable environmental damage. Several animals were consumed by the flames and ten of our employees died of suffocation.

Residents of the community surrounding the factory were removed because of the fire and intense smoke. Our equipment is burned and the inventory is damaged beyond usability.”

As the Director of Purchasing at Reliable Digital, you are tasked with resolving this situation.

Controllability – supplier-control

Disaster strikes: It is Thursday night at 10 pm. Your cell phone is ringing. As you answer, you hear loud voices and shouting in the background and finally someone speaks. It is Jao Chokdeer, the Director of Operations of Thai Electronic. Jao sounds frantic. He says to you: “We have a problem! A fire broke out at our factory in Bang Pa-In. The factory’s main generator exploded **due to incorrect handling and periodic maintenance failure**; it’s caused a huge explosion in our electrical network. The factory is burning and the fire is spreading uncontrollably, including devastating the forest near the factory, causing immeasurable environmental damage. Several animals were consumed by the flames and ten of our employees died of suffocation. Residents of the community surrounding the factory were removed because of the fire and intense smoke. Our equipment is burned and the inventory is damaged beyond usability.”

As the Director of Purchasing at Reliable Digital, you are tasked with resolving this situation.

Responsibility – someone else

“As you reflect on the situation, you recall that **your predecessor (not you)** had led the buying team that identified and evaluated Thai Electronic. Finally, **your predecessor (not you)** recommended to the upper management of Reliable Digital to work closely with Thai Electronic in sourcing sliders.

As a result of your predecessor's prior recommendation, Thai Electronic is Reliable Digital's primary slider supplier fulfilling about 40% of the sliders needed by Reliable Digital (the rest is sourced from six domestic and international suppliers, each supplying about 10% only).”

Responsibility - myself

“As you reflect on the situation, you recall that **you (not someone else)** had led the buying team that identified and evaluated Thai Electronic. Finally, **you (not someone else)** recommended to the upper management of Reliable Digital to work closely with Thai Electronic in sourcing sliders.

As a result of your prior recommendation, Thai Electronic is Reliable Digital's primary slider supplier fulfilling about 40% of the sliders needed by Reliable Digital (the rest is sourced from six domestic and international suppliers, each supplying about 10% only).”

Environmental concern (Tsarenko et al., 2013)

1. I am passionate about environmental protection issues.
2. I often think about how the condition of the environment can be improved.
3. Environmental problems are threatening our health.

GPDC – (Yook et al., 2018)

1. Your suppliers are capable of providing sustainable supplies and services.
2. Jobs of the people involved in the green purchasing with suppliers are clearly defined and organically organised.
3. Top management supports and are committed to green purchasing.
4. Trust between buyers and suppliers is high.
5. Cooperation for green purchasing among R&D, purchasing, manufacturing, marketing departments is high.