GREEN DYNAMIC CAPABILITIES IN TOURISM: AN INTEGRATIVE CONCEPTUAL MODEL FOR SUSTAINABLE COMPETITIVE ADVANTAGE

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Abstract

Purpose – This study aims to contribute to the development of scientific knowledge in Green Dynamic Capabilities (GDC) and Environmental Sustainability, a recent and little explored topic in the literature. The research was carried out to propose an integrative conceptual model of GDC, which can be used by organizations as a guideline in the implementation of these capabilities.
Methodology/Design/Approach – The research was carried out through a content analysis of the Sustainability Reports of all the European companies reported in the Eikon database. The choice of categories was based on Teece's (2007) approach, which divides Dynamic Capabilities into three dimensions: sensing, seizing, and transforming.
Findings – The research concluded that organizations are concerned with developing and implementing GDC in their activities and are willing to invest time and resources to reap the benefits of GDC. The results obtained from the research allowed the development of an integrative conceptual model of GDC.
Originality – This study is one of the first to explore the concept of Green Dynamic Capabilities and its application in organizations. The development of an integrative conceptual model of GDC is a valuable contribution to the literature, as it provides a framework for understanding and implementing these capabilities.
Keywords Sustainability Reports; Resource Integration; Sustainable Competitive Advantage; Environmental Management; Organizational Capabilities.

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INTRODUCTION

In recent years, there has been a marked increase in environmental consciousness among consumers. Eurobarometer data from 2022 reveals that a significant majority (78%) of European consumers perceive climate change as a pressing issue. Furthermore, a study by the Capgemini Research Institute (2020) indicates that 66% of consumers factor the environmental impact of products and services into their purchasing decisions. This heightened environmental awareness presents a substantial opportunity for organizations capable of aligning their structures and strategies with these evolving consumer expectations. Within this context, Green Dynamic Capabilities (GDCs) have emerged as a pivotal concept in the realm of strategic management and sustainable development.

The term GDC is rooted in the theory of Dynamic Capabilities, initially proposed by Teece et al. (1997). Chen and Chang (2012) further developed this concept, defining GDCs as the organizational capacity to leverage existing resources and knowledge to adapt and innovate in response to environmental challenges. GDCs empower organizations to modify their skills and processes, facilitating the creation of sustainable products and services. In an era characterized by escalating environmental concerns and a growing consumer demand for sustainable offerings, organizations must embrace adaptation and innovation to maintain their competitive edge. GDCs have thus become indispensable for strategic management and sustainable development, enabling organizations to effectively navigate the complex landscape of environmental challenges and opportunities.

While existing research has explored the theoretical foundations of GDCs and their potential impact on organizational performance, there remains a gap in understanding how these capabilities are operationalized in practice. This study aims to bridge this gap by delving into the practical implementation of GDCs, drawing insights from real-world examples to provide a more profound understanding of how organizations can effectively leverage these capabilities for sustainable competitive advantage. As Hart (1995) emphasizes, the successful integration of environmental considerations into core business strategies necessitates a profound understanding of how GDCs are operationalized. Moreover, Aragón-Correa and Sharma (2003) highlight the importance of investigating the specific practices and processes through which organizations develop and deploy GDCs to achieve environmental sustainability and superior performance.

Although the development of these capabilities brings many advantages to organizations, their implementation is not always easy. There is often internal resistance to change from employees and even managers who see environmental sustainability as an additional cost and not an opportunity. Furthermore, the rapid evolution of environmental issues requires organizations to be constantly updated on regulations, technologies and best practices (Levinthal & March, 1993). This implies a significant investment of resources and time, particularly in monitoring systems and training programs that train and raise awareness among employees about environmental issues.

The development and implementation of these capabilities can generate numerous benefits for organizations, such as reducing operational costs, retaining and attracting new customers and strengthening organizational reputation. However, it is a very expensive process and requires a large investment of both resources and time. Therefore, it is of utmost importance that organizations have guidelines that tell them what they must do to overcome the obstacles presented and how they can explore these capabilities to convert this environmental awareness into an opportunity. Therefore, this study intends to contribute to the development of scientific knowledge through the following objectives: (i) Contribute to the development of knowledge in the areas of GDC and Environmental Sustainability; (ii) Propose an integrative conceptual model of GDC; (iii) Propose guidelines for organizations - Based on the results obtained from the research, suggest guidelines that organizations can apply in their activities.

1. THEORETICAL FRAMEWORK

The literature review was conducted through a comprehensive search of scholarly databases, including Web of Science and Scopus. The search terms encompassed "Dynamic Capabilities", "Green Dynamic Capabilities", and "Environmental Sustainability." The inclusion criteria encompassed peer-reviewed articles and books published in English between 2000 and 2023. Studies focusing on specific Dynamic Capabilities approaches (e.g. marketing, knowledge management, international) without an environmental sustainability context were excluded. This systematic approach ensured the selection of relevant and high-quality literature to inform the theoretical framework and research gap identification.

1.1. Dynamic capabilities

During the 1990s an awareness developed that understands the importance of internal resources in differentiating company performance. According to Grant (2010), "The growing emphasis on the role of resources and capabilities as a basis for strategy is the result of two factors. First, as companies' industrial environments became more unstable, internal resources and capabilities, rather than external market focus, began to be seen as a safer basis for formulating strategy. Second, it has become increasingly evident that competitive advantage, not industry attractiveness, is the primary source of superior results (profits). In an environment characterized by increasing competitiveness, globalization, dynamism and volatility, RBV is an approach that seeks to explain how organizations can sustain competitive advantages in an increasingly uncertain scenario (Costa et al., 2024). It was in the 1950s that the foundations of this theory were created with the work of Penrose (1959). This economist was one of the pioneers in conceiving the company as a set of assets, capabilities and competencies that are combined to generate value. In his work " The Theory of the Growth of the Firm ", the author was the first to mention the importance of resources in obtaining the company's competitive advantage, questioning the traditional economic view of company growth.

The term VBR was created by Wernerfelt (1984), largely responsible for developing the theory. According to the author, organizations are a set of unique resources and capabilities that cannot be easily copied or acquired by competitors. A company's efficiency depends on the combination of these resources and capabilities, which can generate synergy and competitive advantage. After the work of Wernerfelt (1984), other researchers followed in his footsteps, contributing to the systematization of the theory (Barney 1991; Grant, 2010; Peteraf & Barney, 2003). Although this theory is the result of the work of several academics, author Jay Barney is generally recognized as the first to formalize the theory in literature into a theoretical framework.

Teece et al. (1997), argue that in highly volatile markets, Resource-Based Theory loses its applicability, since obtaining and maintaining competitive advantages, in contexts of rapid change, is only achieved through the development of dynamic capabilities. According to this approach, obtaining competitive advantage depends on the interconnection of the company's resources and skills with market changes and demands (Teece et al., 1997).

Teece et al., (1997) define CD as the company's ability to integrate, build and reconfigure internal and external competencies to face rapid changes in the environment". Additionally, the author argues that this concept can be divided into three dimensions: the ability to detect and shape opportunities and threats (sensing), seize opportunities (seizing) and maintain competitiveness by improving, combining, protecting and, when necessary, reconfiguring intangible assets and tangible aspects of the organization (transforming).

1.2. Environmental Sustainability

In 1987, the World Commission on Environment and Development presented for the first time the concept of Sustainability: "Development that meets the needs felt in the present, without compromising the ability of future generations to meet their own needs, means enabling people, now and in the future, achieve a satisfactory level of social and economic development and human and cultural achievement, while making reasonable use of the earth's resources and preserving species and natural habitats" (UN, 1987) .

According to Braccini & Margherita (2018), sustainability is a multidimensional concept that encompasses economic, social and environmental aspects. According to them, environmental sustainability is a principle that aims to ensure that companies operate in a way that does not deplete natural resources or cause damage to the environment. To achieve this, companies must use renewable resources, reduce waste, recycle and produce emissions that do not affect the ozone layer.

1.3. Green Dynamic Capabilities

Green Dynamic Capabilities theory is an approach that combines Dynamic Capabilities theory with the concept of Environmental Sustainability. Chen and Chang (2012) developed the concept of Green Dynamic Capabilities (GDC) to describe the competencies that allow organizations to respond to environmental challenges. According to them, GDC can be defined as "the ability of organizations to use their existing resources and knowledge to modify and develop organizational skills that allow them to adapt to environmental changes/challenges and develop new sustainable products and services. The development of these capabilities requires the integration, creation and reconfiguration of internal and external resources that have an impact on the organization's environmental performance (Qiu et al. 2020). Following this line of thought, it is possible to state that, for the development/implementation of GDC, it is essential that organizations promote an organizational culture that is aware of environmental issues. This cultural mentality drives employees to adopt a more proactive and innovative stance in the search for new solutions to the environmental challenges that arise (Wang et al., 2017).

Teece (2007) argues that the concept of CD can be divided into 3 dimensions: sensing, seizing and transformation. Given that GDC theory is an extension of CD theory, which can also be divided into the same three areas (Mousavi et al. 2018).

Sensing, as defined by Teece (2007), represents the organization's ability to identify and interpret relevant information from the external environment, both quantitative and qualitative. This capability involves collecting, interpreting and using data about the market, consumer trends, technological changes, regulations and other factors that may impact the organization (Dias & Lages, 2021). The sensing capability can be considered the basis for other dynamic capabilities, since without a precise understanding of the competitive environment, an organization is unable to take advantage of opportunities that create value (seizing) or make necessary strategic adjustments (transforming). Furthermore, this ability allows organizations to be proactive rather than reactive in relation to changes in the external environment, since, by anticipating future trends and events, they can develop more effective strategies and avoid being surprised by changes in the market.

For Teece (2007), seizing represents the organization's ability to explore opportunities that arise in the market. These derive from consumer behavioral changes, technological innovations, regulatory changes or gaps identified in the products or services offered by competitors (Patrício et al., 2022). For an organization to effectively take advantage of opportunities, it is essential that it has a clear and well-defined strategic vision. This way, when an opportunity is identified, the organization can carry out a quick and accurate assessment of its value and potential, quickly deciding whether it is worth exploring, that is, whether it is aligned with the organization's strategy. Furthermore, it is crucial that they have a flexible and agile organizational structure, as opportunities arise and disappear very quickly. In a more theoretical context, the concept of seizing is seen by Teece (2007) as an extension of the concept of sensing, complementing it by ensuring that detected opportunities are transformed into actions that boost the organization's growth and competitiveness.

Organizations that can identify and take advantage of market opportunities can obtain a competitive advantage (Wang & Ahmed, 2007). However, to maintain this advantage over the long term, organizations need to be able to adapt their resources as the business environment changes. (Lin & Wu, 2014). In this context, the concept of transforming emerges, that is, the ability of organizations to maintain competitiveness through the improvement, combination, protection and, when necessary, reconfiguration of their intangible and tangible assets (Teece, 2007). In other words, organizations, to remain competitive and prosper in an ever-changing business environment, need to have an agile and flexible organizational structure.

The growing consumer demand for more sustainable products/services requires organizations to adapt their products/services, making them more eco-friendly. In scientific literature, this adaptation is called Green Innovation. According to Wong et al., 2012, this occurs when there is an improvement in products or processes, using more sustainable technologies in production stages that would otherwise have negative impacts on the environment. This Innovation is made possible through the implementation of several organizational practices, such as choosing more sustainable raw materials, reducing the use of materials in the product design process and developing products based on eco-design principles (Chan et al., 2016). GDCs, according to Barreto (2010), play a fundamental role in this process, as they enable organizations to develop, expand or adapt their resource base according to market needs and consumer demands.

Although this topic is still very recent, there are some studies demonstrate the positive relationship between GDC and Green Innovation. In the study "Dynamic capabilities and green innovation: Evidence from European firms", the authors investigated the relationship between GDC and Green Innovation, based on a sample of 150 European companies from various sectors. The data obtained from the research revealed that there is a positive relationship between GDC and Green Innovation, mainly between the transforming capacity. Organizations that had the ability to restructure their processes and developed an agile and adaptable organizational culture responded more quickly to environmental demands and anticipated market trends more quickly, thus ensuring a sustainable competitive position. Although the study highlights the ability to transforming, it was also concluded that the sensing capabilities It is seizing have a positive impact on Green Innovation. Organizations that can identify market trends/changes and the ability to redirect their resources to explore these opportunities are better positioned to implement green innovation in their products/services.

In short, GDCs are essential for the development of more sustainable products and processes. Companies that can identify market opportunities, mobilize their resources effectively and continuously adapt are best positioned to implement sustainable practices and maintain competitiveness.

GDCs boost the entrepreneurial and innovative spirit of organizations, helping them adapt and reconfigure market changes (Teece, 2007). However, having GDC does not in itself guarantee a competitive advantage, it is also necessary to know how to use them to reconfigure resources, in order to remain relevant and competitive in a constantly changing environment, where markets emerge, converge, diversify, evolve and disappear (Teece et al., 2016). In dynamic environments, the ability to quickly reconfigure resources to correct organizational misalignments and respond to new business opportunities is a critical factor in the success of organizations (Girod & Whittington, 2017). These organizational changes occur, mainly when stakeholders pressure organizations to adopt Green Innovation practices in their products and services.

Although there is little research on the topic, the GDC theory can help explain part of the differential performance of organizations (Wang et al., 2015), although it is unlikely that they alone guarantee the organization's performance (Zahra et al., 2006). Some authors argue that DC cannot explain performance, but rather changes in it (Laaksonen & Peltoniemi, 2018). Following this trend, many academics suggest that CDs should be observed for the changes they cause in the organization's resource base (Eisenhardt & Martin, 2000; Teece, 2007; Zahra et al., 2006). The real impact on performance depends firstly on the quality of the ordinary capacity (basic capacity that allows the organization to operate and provide its products or services) that the DC changed (Zahra et al., 2006); and secondly, the alignment of these capabilities with the demands of the external environment (Helfat et al., 2007). In other words, CDs can contribute to increased performance if they improve a capability that is essential for the organization's success and if they are aligned with market demands.

In short, there is some controversy about the true impact of GDC on company performance. Although there is a group of researchers who argue that CD cannot explain performance, but rather the changes that occur in it, there is research that suggests that GDC positively influences the performance of organizations through Green Innovation.

Currently, organizations are under pressure to adopt more sustainable organizational practices, not only to comply with environmental regulations, but also to remain competitive in a market increasingly driven by environmental responsibility. However, the GDC development and implementation process is full of challenges and obstacles, which are often difficult to overcome.

1. Complexity of the environment

Environmental and market changes are inherently uncertain, making it difficult to predict what capabilities will be needed in the future (Eisenhardt & Martin, 2000). Authors such as Teece (2007) reinforce this idea, stating that uncertainty and environmental volatility make it difficult to predict and adapt to future changes. This requires a flexible and adaptive approach in building GDC, that is, organizations need to constantly monitor and interpret environmental changes to develop effective Dynamic Capabilities.

2. Lack of Understanding and Awareness:

According to Teece et al (2007), one of the main challenges lies in the lack of understanding and awareness about the strategic importance of green dynamic capabilities (GDC) within organizations. Sustainability is often seen as an additional cost or a constraint on growth, rather than as an opportunity that prevents organizations from investing in building the capabilities needed to deal with environmental challenges proactively and effectively.

3. Internal resistance to change

Often, for GDC to develop, it is necessary for significant changes to occur in organizational culture, processes and practices. The implementation of more sustainable practices often requires a change of mentality within organizations, that is, they cannot only focus on maximizing profit, they also have to take responsibility for the social and environmental impacts of their operations, and try to minimize them (Hart, 1995). This cultural transformation is a complex and time-consuming process, as there is a possibility that employees may feel insecure about the changes implemented and may not initially understand the long-term benefits.

4. High Investment

The implementation of green dynamic capabilities generally involves high initial costs, resulting from the need to acquire new technologies, train employees, restructure processes and develop more sustainable products and services. These costs can be a significant obstacle especially for small and medium-sized enterprises (SMEs) that have limited resources (Zhu et al., 2008). Additionally, the fact that the benefits of implementing GDCs may take time to appear may discourage organizations from investing, especially those that focus on short-term results.

5. Environmental Legislation and Regulations

The rapid evolution of environmental issues requires organizations to be constantly updated on regulations, technologies and best practices (Levinthal & March, 1993) . This implies a significant investment of resources and time, particularly in monitoring systems and training programs that train and raise awareness among employees about environmental issues. Zahra et al. (2006), argue that organizations need to develop learning capabilities to be able to subsequently develop effective GDC. According to them, organizations need to create learning systems that promote the acquisition, interpretation and dissemination of environmental knowledge to develop effective GDC.

Despite the obstacles described in the previous chapter, organizations that develop GDC are better positioned to thrive in an ever-changing business environment and respond to society's growing expectations for environmental responsibility.

1. Sustainable innovation

According to Teece (2007), organizations that develop GDC are better able to develop more efficient and ecological products, services and processes, through the continuous adaptation and reconfiguration of internal resources. Hart (1997) corroborates this view, stating that GDC allows organizations to satisfy market demands for more sustainable practices, developing new products, processes and technologies that add value to consumers.

2. Reputation and Legitimacy

In scientific literature, several authors, such as Deephouse (1999) and Porter and Kramer (2006), address the relationship between the implementation of responsible environmental practices and gaining the trust of consumers and investors. Deephouse (1999) argues that organizations that adopt responsible environmental practices are perceived as more trustworthy by consumers and investors, which, in turn, can contribute to increasing their reputation. Following the same line of thought, Porter & Kramer (2006) argue that environmental responsibility is not only a moral duty, but also a source of competitive advantage. According to the authors, consumers are more aware and demanding and, consequently, are more likely to choose organizations that demonstrate that they are committed to reducing their environmental impact. The results obtained in the European Consumer Payment Report (Kajdi, 2022). are aligned with the theoretical points presented, as they indicate that 54% of European consumers do not purchase products/services from organizations with a poor environmental reputation. Also in this research, it was concluded that 61% of consumers stated that they would immediately stop purchasing products/services from organizations that proved to be unethical, both environmentally and socially.

3. Operational efficiency

In an increasingly competitive business environment, operational efficiency is fundamental to the long-term success of an organization. According to Porter (1985), operational efficiency is one of the fundamental pillars for obtaining competitive advantage, as it enables organizations to offer products and services more effectively and economically than their competitors. This efficiency is achieved by optimizing processes, improving productivity, reducing production time and implementing practices that aim to maximize the use of material, human and financial resources. In this context, the implementation of GDC emerges as a strategic differentiator, providing an improvement in the organization's operational efficiency and sustainability. The adoption of organizational practices and initiatives that encourage employees to behave more responsibly, contribute to reducing the consumption of energy, water and waste and, consequently, the associated costs. At the same time, the implementation of monitoring systems and energy-efficient technologies also contributes to optimizing the use of resources and energy efficiency.

4. Customer attraction and retention

Consumers' growing environmental awareness is leading to an increase in demand for more sustainable products and services. A study carried out by the consultancy Deloitte (2022), concluded that in March 2022, approximately half of global consumers (49%) said they had purchased at least one sustainable product in the last four weeks. Of these 49%, a third said they had paid a significantly higher amount compared to a traditional alternative. These data obtained in the market study are in line with existing scientific literature. According to Tran et al., (2022), consumers have the perception that by purchasing products/services from sustainable organizations, they are contributing to a better future. Therefore, a credible brand image committed to environmental sustainability can act as a powerful magnet for new consumers (Hart, 1995), especially for younger generations, who tend to choose products and services from organizations that share their values. environmental.

2. METHODOLOGY

2.1. Sample and data collection

This study employed an exploratory research design to investigate the operationalization of GDCs within the European tourism industry. The primary data source for this research was Sustainability Reports obtained from the Refinitiv Eikon database. This database was chosen due to its established use in sustainability research and its comprehensive coverage of company information, including financial reports, news, and market data, providing a holistic view of corporate sustainability performance (Paolone et al., 2022). The sample for this study encompassed all European tourism firms with available Sustainability Reports in the Eikon database as of December 2022.

To ensure transparency and replicability, this study employed a systematic approach to data collection and analysis. A comprehensive search was conducted within the Refinitiv Eikon database, focusing on all the Sustainability Reports published in 2022 by European companies operating in all the tourism categories available in the database, namely Betting and Online Gaming, Catering, Hotel, and Mobility and Transport sectors. The selection of these sectors was purposeful, aiming to capture a diverse range of industries with varying degrees of environmental impact and sustainability initiatives. The final sample consisted of 33 Sustainability Reports, chosen based on their completeness and relevance to the research objectives. A detailed breakdown of the sample distribution across sectors is presented in Table 1. As shown in the table 1, 52% of the companies analyzed belong to the Online Gaming and Betting sector, 30% to the Catering sector, 12% to the Hospitality sector and 9% to the Mobility and transport sector.

Table 1: **Sample of the reports from Eikon database**

Sector	Frequency	Percentage (%)
Online games and betting	17	52%
Catering and similar establishments	10	30%
Hospitality	4	12%
Mobility and transport	3	9%

A rigorous content analysis was conducted on the collected Sustainability Reports. This method facilitated the systematic categorization and quantification of qualitative data, enabling a deeper understanding of the practical implementation of GDCs. The categorization process was guided by Teece's (2007) framework, which delineates Dynamic Capabilities into three core dimensions: sensing, seizing, and transforming. To enhance transparency and replicability, keywords were meticulously selected to represent each dimension, drawing upon existing literature and theoretical underpinnings. The frequency and context of these keywords within the reports were analyzed to identify specific practices and initiatives that exemplify the operationalization of GDCs within the European tourism industry.

2.2. Data Analysis procedures

Content analysis was employed to analyze the sustainability reports, facilitating the transformation of qualitative information into quantifiable data through the application of systematic categorization rules. This methodology enables the synthesis and comparison of data, contributing to its growing popularity in tourism research (Camprubí & Coromina, 2016). The categorization was guided by Teece's (2007) framework, which delineates Dynamic Capabilities into three dimensions: sensing, seizing, and transforming. In alignment with this framework and existing literature, keywords were meticulously selected to represent and amplify each dimension. For sensing capacity, two categories were chosen: Adoption of more sustainable technologies and implementation of more sustainable organizational practices. As mentioned, consumers have the perception that by purchasing products/services from sustainable organizations, they are contributing to a better future. In this context, an image committed to environmental sustainability can act as a powerful magnet for new consumers (Hart, 1995), especially for younger generations, who tend to choose products and services from organizations that share their environmental values. That said, the adoption of more sustainable technologies and practices demonstrates the sensing capacity in practice, as it shows that organizations recognize the importance of having more sustainable behaviors and that they have identified an opportunity to reduce their energy consumption and strengthen their reputation in the eyes of consumers.

3. RESULTS AND DISCUSSION

The integrative conceptual model presented in this section is the culmination of a two-pronged approach: a comprehensive literature review and an exploratory content analysis of sustainability reports. The literature review served as the theoretical foundation, identifying key dimensions and constructs associated with Green Dynamic Capabilities (GDCs). These theoretical insights were then operationalized through the content analysis, where specific practices and initiatives mentioned in the sustainability reports were mapped onto the GDC dimensions. This iterative process allowed for the synthesis of theoretical concepts with empirical observations, resulting in a model that reflects both the scholarly understanding of GDCs and their real-world manifestations within the European tourism industry.

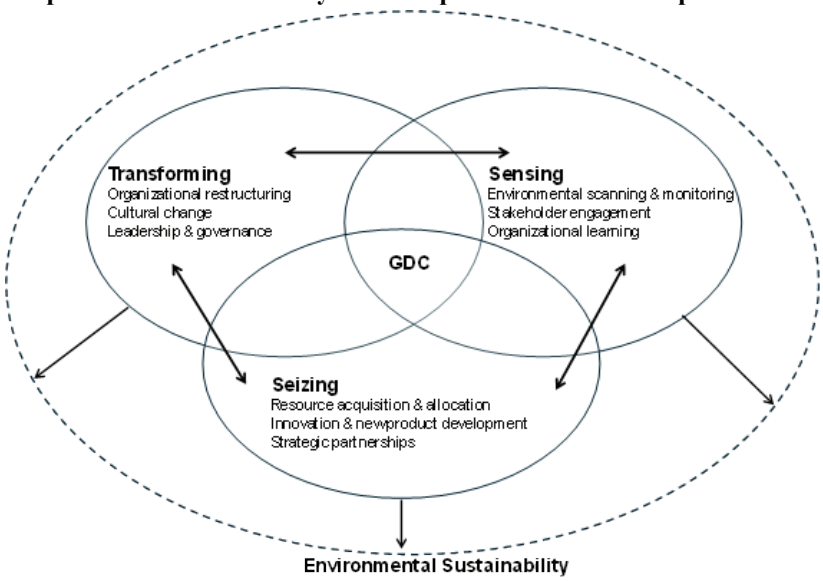
The model presented (table 2) demonstrates the results obtained from the investigation carried out on the sustainability reports of the organizations under study. The 3 dimensions of the GDC concept are represented in the first column and in the 2nd the respective keywords that were used in the content analysis of the reports. In the 3rd column it is possible to observe the results obtained from the research, that is, the main actions that organizations are implementing for each category.

Table 2: **Integrative model for GDC in the hospitality and tourism industry**

Sensig	More sustainable technologies	Energy/temperature control systems. LED lights with motion sensors.
	More sustainable organizational practices	Recycling and reuse of waste; Videoconference meetings; Hybrid work model
Seizing	Development of *eco-friendly products*	Integration of sustainable energy solutions into production processes; Use of recyclable and/or biodegradable materials; Preference for certified and local ingredients;
	Investment in training programs	Promotion of learning and environmental awareness initiatives (conducting lectures and workshops); Providing online content and courses to your employees;
Transforming	Organizational culture	Promotion of sustainable and responsible behaviors among employees; Collecting feedback from employees.
	Strategic partnerships	Association with environmentally responsible initiatives and partners; Request for consultancy services
	Organizational transparency	Annual disclosure of the ESG Report (Environmental*, Social and Governance)*
	Organizational monitoring	Request for audit services
	Organizational restructuring	Investment in monitoring systems; Periodic monitoring of main suppliers Periodic meetings of the Sustainability Committee Creation of Multidisciplinary Committees

The integrative conceptual model depicted in figure 1 illustrates the dynamic interplay of the three core dimensions of Green Dynamic Capabilities—sensing, seizing, and transforming—in fostering environmental sustainability within the European tourism industry. The sensing dimension involves actively scanning the external environment, engaging with stakeholders, and fostering organizational learning to identify emerging environmental trends and challenges. The seizing dimension focuses on mobilizing resources, pursuing innovation, and forming strategic partnerships to capitalize on identified opportunities and address environmental concerns. Finally, the transforming dimension entails organizational restructuring, cultural change, and strong leadership to embed sustainability into the core of the business strategy and operations (Dias & Renato, 2017). The synergistic interaction of these three dimensions enables organizations to proactively respond to environmental dynamics, develop and implement sustainable solutions, and ultimately achieve a competitive advantage while contributing to a greener future.

Figure 1: **Integrative Conceptual Model of Green Dynamic Capabilities in the European Tourism Industry**



1. Sensing Dimension

The first line of the table highlights the categories used to study the sensing capacity in research and the results obtained from that same research.

More sustainable technologies. In the investigation, it was observed a great concern among organizations in reducing their energy consumption, through the implementation of intelligent energy and temperature control systems and the installation of LED lights with sensors in their buildings. For instance, several hotel chains in the sample have reported significant energy savings after retrofitting their properties with these technologies, demonstrating a tangible outcome of their sensing and response to environmental concerns and economic pressures.

The implementation of these technologies (column 3) demonstrates that organizations recognize the importance of having more sustainable behaviors and that they have identified an opportunity to reduce their energy consumption and project their commitment to environmental sustainability outwards. According to the literature, consumers, especially younger generations, tend to choose products and services from organizations that share their environmental values (Laroche et al., 2001). The implementation of energy-efficient technologies, such as intelligent energy and temperature control systems and LED lights with motion sensors, showcases a proactive approach to resource conservation and cost reduction.

Sustainable organizational practices. In line with Hart's (1995) assertion that a strong environmental reputation attracts consumers, the study reveals that organizations are actively cultivating a positive image through sustainable practices. Integrating recycling, reuse, and reduced single-use plastics showcases their commitment to environmental sustainability, thereby enhancing their reputation. Additionally, the adoption of videoconferencing for meetings and hybrid work models demonstrates a dual focus on cost reduction and environmental impact mitigation, aligning with Teece's (2007) "sensing" concept, as organizations identify opportunities to reduce costs and meet evolving employee preferences for work-life balance. The adoption of practices like waste recycling, reuse programs, and the reduction of single-use plastics reflects a growing awareness of the environmental impact of operations. An example is a leading online gaming company that implemented a comprehensive waste management program, resulting in a substantial decrease in landfill waste and a positive shift in employee attitudes towards sustainability.

2. Seizing Dimension

The 2nd line of the table highlights the categories used to study the ability to seizing in the investigation and the results obtained from that same research.

Development of eco-friendly products. In response to the growing consumer demand for eco-friendly products, organizations are actively demonstrating their commitment to environmental sustainability. The research reveals that they are not only developing new products with reduced environmental impact but also adapting existing products and processes. This is achieved by integrating sustainable energy solutions into production, utilizing recyclable and biodegradable materials, and prioritizing certified, local ingredients, reflecting a proactive approach to Green Innovation, aligning with consumer preferences for environmentally responsible products (Dias et al., 2021).

The integration of sustainable energy solutions into production processes and the use of recyclable and biodegradable materials exemplify a proactive response to the increasing demand for eco-friendly products. A case in point is a catering company that revamped its packaging materials, replacing plastic with compostable alternatives, thereby enhancing its appeal to environmentally conscious consumers.

Investment in training programs. In alignment with the research of Zahra et al. (2006), which emphasizes the importance of developing learning capacity for effective Green Dynamic Capability (GDC) implementation, this study reveals that organizations are actively investing in employee training and development to address environmental challenges. This is evident in the growing prevalence of lectures and workshops on environmental sustainability, fostering knowledge exchange and critical thinking among employees. Moreover, the increasing investment in online training platforms demonstrates a proactive approach to leveraging technological advancements to ensure employees stay informed and updated on evolving environmental issues. The provision of training programs, workshops, and online courses on environmental sustainability highlights a commitment to empowering employees with the knowledge and skills necessary to contribute to the organization's green initiatives. A prominent hotel chain in the sample reported a significant increase in employee-led sustainability projects after implementing a comprehensive training program, showcasing the transformative potential of such investments.

3. Transforming Dimension

The third line of the table highlights the categories used to study the ability to transforming in the investigation and the results obtained from that same research (3rd column).

Organizational culture. The research underscores the importance organizations place on engaging employees in cultural change as a cornerstone of successful Green Dynamic Capability (GDC) implementation. Organizations are actively fostering sustainable behaviors among employees, including waste management, resource conservation, and eco-friendly commuting options like videoconferencing and carpooling.

Furthermore, the study reveals a growing recognition of the value of employee feedback in refining environmental sustainability practices. This approach not only motivates employees but also empowers them to proactively contribute to a more sustainable work environment. By cultivating a culture that values employee input, organizations tap into a diverse range of knowledge and perspectives, facilitating the identification of improvement opportunities.

The emphasis on cultural transformation aligns with the literature, which posits that a shift in organizational culture is essential for successful GDC adoption (Wang et al., 2017). While such transformations can be met with resistance due to employee apprehension and a lack of immediate understanding of long-term benefits, the research findings demonstrate that organizations are actively addressing these challenges. By fostering a sustainability-oriented mindset among employees and integrating them into the change process, organizations are effectively mitigating resistance and fostering a deeper understanding of GDC initiatives. The cultural shift not only embeds environmental sustainability into the organizational identity but also enhances the organization's adaptability and long-term competitiveness, reflecting the "transforming" capability in action.

The promotion of sustainable behaviors among employees, such as waste reduction and eco-friendly commuting options, underscores a cultural shift towards environmental responsibility. A leading online betting company successfully fostered a culture of sustainability by implementing a reward system for employees who actively contribute to green initiatives, demonstrating the effectiveness of incentivizing behavioral change.

Strategic partnerships. The research reveals that organizations are strategically forming partnerships to advance their environmental sustainability goals. A notable trend is the increasing reliance on consultancy services for carbon emission calculation, monitoring, and the development of comprehensive sustainability strategies. This reflects a proactive approach to developing Green Dynamic Capabilities (GDCs), as these consultants provide valuable expertise and insights into industry-specific trends and challenges. Moreover, these partnerships can enhance the "seizing" capability by enabling organizations to swiftly identify and capitalize on opportunities.

Additionally, organizations are actively associating themselves with environmentally responsible initiatives and partners, such as UNESCO, the United Nations Pact, and the Zero Carbon Forum. This alignment with established sustainability frameworks reinforces their commitment to responsible practices. Furthermore, there's a growing emphasis on selecting suppliers who share similar environmental values, aiming to minimize the environmental impact across the entire supply chain.

These strategic partnerships align with the theoretical perspectives of Deephouse (1999) and Porter and Kramer (2006), who emphasize the link between environmental responsibility and enhanced reputation and competitive advantage. By demonstrating a commitment to sustainability through partnerships, organizations can build trust with consumers and investors, ultimately strengthening their market position, through the reconfiguration of resources exemplifies the "transforming" capability, as organizations adapt to meet evolving market demands and secure long-term competitiveness.

Collaborations with organizations like UNESCO and the United Nations Global Compact demonstrate a commitment to aligning with established sustainability frameworks and best practices. A notable example is a transport company that partnered with a local environmental NGO to develop a reforestation project, showcasing the potential for synergistic partnerships to create shared value.

Organizational transparency. The study reveals a growing recognition among organizations of the importance of transparent communication regarding their environmental performance. This shift towards greater transparency is driven by increasing social pressure for responsible environmental practices, prompting organizations to adopt a more open and accountable approach to their environmental impact. By disclosing accurate and accessible information, organizations can foster stronger relationships with stakeholders and attract environmentally conscious consumers. Notably, the research found that several organizations published their first Sustainability Report in the year under study (2022), aiming to inform stakeholders about their environmental progress and long-term objectives. This increased dissemination of sustainability reports reflects a broader trend towards transparent communication, encompassing not only financial performance but also the social and environmental impacts of operations. This practice aligns with the theoretical framework of Porter and Kramer (2006), which emphasizes the correlation between responsible environmental practices and the establishment of a positive market reputation.

To further enhance the credibility of their sustainability reports, most organizations engage external audit services to ensure impartiality in the assessment. As such, they not only fulfill an ethical obligation but also bolsters the credibility and trustworthiness of organizations that undergo such scrutiny.

Several organizations in the sample have established formal channels for gathering employee feedback on sustainability initiatives. This practice not only fosters a sense of ownership and engagement but also provides valuable insights for continuous improvement. For example, a hotel chain implemented an employee suggestion box specifically for sustainability ideas, leading to the adoption of several innovative practices that enhanced both environmental performance and guest satisfaction.

Organizational monitoring. The research highlights a growing emphasis on organizational control to ensure efficient resource allocation, goal attainment, and proactive risk mitigation. This is evident in the increasing investment in advanced monitoring systems to track energy, water, gas consumption, and carbon emissions. Such systems provide a robust foundation for formulating and implementing effective reduction strategies, showcasing the "transforming" capability of organizations as they reconfigure assets for data-driven decision-making.

Furthermore, the study reveals a trend towards regular audits of key suppliers to ensure compliance with sustainability standards outlined in the organization's Supplier Code of Conduct. These audits not only mitigate risks associated with supplier practices but also project a commitment to social and environmental responsibility, bolstering the organization's reputation.

Additionally, the research identifies a growing practice of frequent meetings by sustainability committees to assess progress and make necessary adjustments to short-term objectives. This proactive approach to monitoring and adaptation further exemplifies the "transforming" capability.

The adoption of advanced monitoring systems for tracking energy, water, and gas consumption, as well as carbon emissions, enables organizations to collect real-time data and make informed decisions to optimize resource use and reduce environmental impact. A catering company implemented a smart energy management system that resulted in significant cost savings and a reduction in greenhouse gas emissions, highlighting the tangible benefits of such investments.

Organizational restructuring. To conclude, at a structural level, the study observed a strong tendency for organizations to create Committees, made up of employees from various areas (finance, operations, human resources, marketing, among others), with the function of defining and implementing the Sustainability Strategy in the organization. This diversity of knowledge and perspectives enriches the analysis of environmental, social and economic impacts and, consequently, strengthens the ability of organizations to adapt and respond to changes in the business environment.

The creation of these Committees is a tangible example of how organizations are applying the capacity to transforming their activities, that is, demonstrating that they are restructuring their structure, to make it more agile and flexible. Cooperation between employees from different areas makes organizations more proactive and better prepared to respond to possible changes in the business environment, as this diversity of perspectives and knowledge encourages a faster and more flexible response to constantly changing market demands.

The establishment of cross-functional sustainability committees, comprising members from various departments, fosters collaboration and knowledge sharing across the organization. An example is a hotel chain that formed a sustainability committee with representatives from operations, marketing, and human resources, leading to the development of a holistic sustainability strategy that integrated environmental, social, and economic considerations.

CONCLUSION

This study sought to determine whether organizations are actively applying the concept of Green Dynamic Capabilities (GDCs) as defined by Chen and Chang (2012). The authors posit that GDCs involve leveraging existing resources and knowledge to adapt organizational skills, thereby addressing environmental challenges and fostering the development of sustainable products and services. The research findings affirm that organizations are indeed prioritizing the development and implementation of GDCs.

Evidence from the study reveals a clear commitment by organizations to invest in GDCs over the medium to long term, recognizing the multifaceted benefits they offer. This commitment is exemplified by substantial investments in advanced energy and temperature monitoring and control systems, enabling organizations to optimize consumption and minimize environmental impact. Additionally, a growing trend of seeking external consultancy services for developing and implementing sustainability strategies underscores the recognition of GDCs' strategic importance. These consultants bring specialized expertise and knowledge, aiding organizations in identifying sector-specific trends and challenges while providing actionable insights to capitalize on emerging opportunities.

Furthermore, the research highlights a significant emphasis on investing in employees through workshops, lectures, and online courses focused on environmental sustainability. These initiatives foster knowledge sharing, raise awareness, and empower employees to integrate sustainable practices into their daily routines. The accessibility of online content ensures continuous learning and adaptation to evolving environmental issues.

The study also underscores the increasing consumer preference, particularly among younger generations, for organizations demonstrating environmental responsibility and minimizing their ecological footprint. A 2022 Deloitte study revealed that a substantial portion of global consumers actively seek sustainable products, often willing to pay a premium for them.

Theoretical contributions

The investigation reveals that organizations are actively integrating environmental sustainability into their core strategies and operations. This is evidenced by their adoption of organizational practices that not only enhance their public image but also

demonstrate a genuine commitment to environmental responsibility. Notably, organizations are forging strategic partnerships and aligning themselves with environmentally conscious institutions, signalling a broader industry shift towards sustainability. Furthermore, the study highlights a notable increase in transparency regarding environmental impact. All 33 companies analyzed proactively publish annual sustainability reports, detailing their progress and future goals in this domain. This practice aligns with the theoretical framework proposed by Porter and Kramer (2006), emphasizing the link between transparent environmental practices and the cultivation of trust among consumers and investors. The widespread use of external audit services further reinforces the credibility and impartiality of these reports.

Responding to the growing consumer demand for sustainable products and services, as evidenced by studies like the European Consumer Payment Report (2022) and GlobeScan (2021), organizations are integrating renewable energy into their production processes, utilizing recyclable and biodegradable materials, and prioritizing certified, low-impact ingredients.

Finally, the formation of multidisciplinary committees dedicated to sustainability strategy formulation and implementation showcases the transformative capacity of organizations. These committees, comprising members from diverse departments, exemplify a structural shift towards agility and adaptability, enabling a more comprehensive and effective response to emerging environmental challenges.

Practical Implications

From the research carried out on the 33 sustainability reports, conclusions were obtained that not only corroborate the existing literature, but also offer valuable new insights into the topic. These findings can help managers make more informed decisions and implement more effective actions towards environmental sustainability.

Throughout the research, it was highlighted that consumers are increasingly demanding and prefer to purchase products/ services from organizations that have a credible image and are committed to sustainability. That said, if organizations have the capacity to adopt some of the practices mentioned in the conceptual model (point 4), this growing environmental awareness can be converted into an opportunity. The association with environmentally responsible initiatives and partners, the annual disclosure of the ESG report and the carrying out of regular audits of the main suppliers, are actions that organizations can adopt and that can project a credible image abroad and committed to sustainability. For these actions to be materialized into an opportunity, there must be collective work, particularly from the Marketing Department. Through clear, attractive and impactful communication, whether on the company's official website or in advertising campaigns, the Marketing Department must present actions and practices in a way that arouses interest and engagement of the consumer.

Consumers' environmental awareness is leading to an increase in demand for more sustainable products and services. Taking this scenario into account, organizations' R&D Departments must focus their time and resources on developing more environmentally friendly products that meet consumer demands and needs. To achieve this, the R&D department can, for example, integrate sustainable energy solutions into production processes, use recyclable and/or biodegradable materials in products and choose, whenever possible, certified and local ingredients.

At the top management level, it is concluded that the creation of multidisciplinary Committees focused solely on the development and implementation of the Sustainability Strategy, can be an added value for organizations. This diversity of knowledge and perspectives enriches the analysis of environmental, social and economic impacts and, consequently, strengthens the ability of organizations to adapt and respond to changes in the environmental context. At the same time, this cooperation between different areas also helps to strengthen and promote an organizational culture that is more aware of environmental issues.

Finally, throughout the investigation it became evident the importance of organizations investing in monitoring systems that control their consumption of energy, water, etc. and that provide accurate and updated information about the status of the objectives, that is, whether the defined objectives are being achieved or whether they need adjustments. For this control to be more effective, it is suggested that the Sustainability Committee meets regularly throughout the year, to review what was done during the period, and if necessary, adjust and redefine certain short-term objectives.

Implementing the GDC Model: A Managerial Roadmap

The proposed GDC model offers a strategic roadmap for managers seeking to integrate environmental sustainability into their organizations. To implement the model effectively, managers should first conduct a thorough assessment of their current capabilities across the three dimensions - sensing, seizing, and transforming. This involves evaluating their environmental scanning and monitoring practices, resource allocation strategies, innovation processes, organizational structures, and cultural norms. Based on this assessment, managers can identify areas for improvement and develop targeted action plans. For instance, if the sensing dimension is weak, investing in environmental monitoring systems and fostering stakeholder engagement can enhance the organization's ability to identify emerging trends and challenges. Similarly, if the seizing dimension needs strengthening, allocating resources to research and development and forming strategic partnerships can facilitate the development and implementation of sustainable solutions. Finally, if the transforming dimension requires attention, initiatives such as leadership development programs, cultural change workshops, and organizational restructuring can embed sustainability into the core of the business.

Addressing Sectoral and Regional Differences

While the proposed GDC model provides a general framework, its implementation may vary across different sectors and regions. For instance, the specific environmental challenges and opportunities faced by a hotel chain will differ from those of an online gaming company. Similarly, regulatory frameworks and consumer expectations regarding sustainability can vary across different regions. Therefore, managers need to adapt the model to their specific context, considering the unique characteristics of their industry and region, involving tailoring the GDC dimensions and their sub-components to address specific environmental concerns, leverage regional resources and expertise, and comply with local regulations.

Limitations and future research

This study's main theme was GDC, a concept still little explored in the literature. Therefore, the present investigation contributes to the amplification of existing knowledge and created opportunities for future investigations.

Firstly, it is important to consider that the sample used in the investigation is small (n=33) and only consists of European companies in the Betting and Online Gaming, Catering, Hotel and Mobility and Transport sectors. In order to increase the representativeness of the results obtained, it is suggested that in future research, a larger and more diverse sample be used, made up of companies from different geographic origins and areas of activity.

The content analysis method has some limitations, namely the fact that the choice of categories depends on the researcher. That said, the use of categories different from those used in this study in future research could bring new perspectives and valuable insights into the topic under study.

Finally, it is also important to note that the choice of categories was based on the little existing scientific literature. However, since the topic of environmental sustainability and CD is of great relevance in current times, it is expected that there will be more and more research and information on these topics. Therefore, any future research will have access to a greater range of information, and consequently a more solid base that allows a more careful and effective choice of categories.

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