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Organizational Agility within the Context of Environmental Challenges: Assessing the Mediating Effect of Sustainable Prices Procurement

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Abstract: *Due to environmental degradation, the growing concern of green project performance has become the new marketable demand in the field of project management. Organizational agility as an emerging trend yields sustainability to attain the desired environmental goals and helps to adopt green practices like green procurement. This study empirically checked the direct and indirect impact of organizational agility (customer, partnering, and operational agility) on green project performance, and to understand the mediating role of green procurement between them in relation to the institutional theory, a quantitative analysis was performed. A total of 204 valid responses from construction industry employees in Pakistan were received in 2022 and PLS-SEM statistical analysis was carried out. The results showed a significant impact of organizational agility on green procurement, partial mediation of customer and operational agility, and complete mediation of partnering agility with green project performance. We know that customer and operational agility do have a significant direct impact on green project performance. Additionally, partnering agility did not show any direct relation with green project performance. Organizational agility can and does contribute towards green project performance and green procurement. Based on these findings, it is recommended that researchers study organizational agility and green procurement further in diverse sectors of each country, and with a larger audience. Also, in the context of developing countries, procurement needs more support, and project managers are advised to strengthen agility and its different dimensions.*

Keywords: green procurement, green projects, customer agility, partnering agility, operational agility, sustainability, organizational agility, project performance; environmental challenges.
JEL Classification: D23, I23, I31, J5, E24, K13.

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INTRODUCTION

To adopt green procurement, a project team must make major decisions during the initial stages of the project life cycle and must adapt green sourcing strategies (Bohari et al., 2017). In similar contexts, researchers (Felipe et al., 2016; Tabesh et al., 2016) claim that organizational agility is the most vital strategy to recognize environmental transition as it helps in reshaping the priorities of project teams while creating new business processes, strategies, and resource sets. Besides, due to its agile nature, it can help to understand the market demands in a more systematic manner, which can enable project managers to adopt green practices such as green procurement and improve the green performance of projects (Tabesh et al., 2016). Alqudah et al. (2020) explore how the integration of lean, agile, resilient, and green (LARG) paradigms can enhance supply chain capabilities, sustainability, and performance. The study creates a comprehensive model for examining the direct and indirect effects of these paradigms on supply chain performance. Lean paradigms prioritize waste elimination and efficiency, agile paradigms prioritize market responsiveness, green paradigms strive to reduce environmental impact, and resilience paradigms address disruption recovery. The paper emphasizes that while each of these paradigms contributes to supply chain performance, their combined implementation can result in significant improvements in capabilities and sustainability. Furthermore, the study suggests that product complexity influences the effectiveness of these paradigms, adding another level of complexity to their implementation. The authors advocate for additional empirical research to validate the proposed model and investigate the intricate relationships between these paradigms.

In the global and international markets, the concept of green procurement to achieve green performance has been emerging and gaining attention, but in developing countries, it is a new area of exploration which needs in-depth studies (Yee et al., 2021). As such, scholars have analyzed organizational agility as the driver of sustainability and its effectiveness with different labels in operational businesses, like the adoption of green innovation, and green product development (Shahzad et al., 2020). However, in the field of project management, the concept of organizational agility as the driving force behind the adoption of green procurement and achieving green project performance is a new abstraction and requires further investigation (Asogwa et al., 2021). To understand organizational agility in detail the study used the model by Sambamurthy et al. (2003), where agility is divided into further three dimensions namely Customer Agility (CA), Partnering Agility (PA), and Operational Agility (OA). To abridge the contextual and empirical gap, the study investigates the research question of "*what is the direct and indirect impact of each dimension of organizational agility on the green project performance through green procurement, and how green procurement solely impacts green project performance*?".

This research serves several purposes. First, it helps in understating the prominence of adopting green procurement in the local context, and it elaborates on the emerging concept of organizational agility and the impact of each dimension on the green project performance. The result of this study enhances the literature and highlights the imperativeness of agility, green procurement, and the green performance of projects. Consequently, such knowledge, coupled with effective coaching practices, can help project managers understand the value of adapting agility while making crucial decisions and help the construction industry to improve green project performance through the implementation of "operational agility", "customer agility", and "partnering agility" (Mujtaba, 2008). Also, the study shows the importance of decisions regarding procurement as it holds a strong impact on the project performance; adapting green procurement can integrate sustainability in every process of the project and help to gain a competitive edge (Ruparathna & Hewage, 2015).

LITERATURE REVIEW

The performance of construction projects is assumed to be the strength of a growing economy around the world (Albtoush et al., 2022). Typically, performance is measured against cost, quality, and time (Bohari et al., 2017). However, due to the rising environmental issues, the green performance of projects has become the hottest demand in the market (Bohari et al., 2017). Recently, many researchers have used green performance of projects as a performance criterion in their papers. According to Alqadami et al. (2020) and Pham and Pham (2021), while evaluating the performance of projects, Green Project Performance (GPP) and the concept of sustainability must be considered as imperative values (Aimkij et al., 2013; Cavico & Mujtaba, 2016a). Therefore, GPP becomes an important indicator of project performance measurement.

Moreover, the rising demands for sustainable management practices (Khan & Hinterhuber, 2024; Cavico & Mujtaba, 2016b) and development have also allured project managers to focus on the green performance of the projects (Maltzman & Shirley, 2010). Project management procurement is one of the crucial and preliminary decisions, which can shape the sustainable nature of the projects (Arsawan et al., 2022). According to scholars (Coggburn, 2004; Bohari et al., 2017), if the project team adopts green procurement, it can lead the project toward sustainability, which will help the managers to achieve the green performance of projects by reducing toxic industrial emissions such as greenhouse gas.

Green Project Performance

Green project performance is the measure of a project's environmental impact during the planning, execution, and disposal. Specifically, in construction projects, it is the quantity of resourcesused by a project throughout its life cycle and the extent to which its materials can be recycled or re-utilized (Environmental Performance of Buildings, 2020). Its purpose is to reduce climate change, global warming, disposal of waste, water management, control pollution levels, and avoid natural resource exhaustion. The cost and design performance of the project also come under this umbrella of green performance, along with the satisfaction of the customer or project client regarding their reputation or green image in the mind of society (Hussin et al., 2013).

Three major aspects are of concern when measuring the green performance of a project: social, environmental, and economic. These aspects are also known as the triple-bottom-line assessment of the project (Shelbourn et al., 2006). Environmental performance aims to reduce the lethal impacts arising from toxic gas emissions, climate change, pollution, landfill waste, and many more such issues. Whereas the social performance of the project is related to the reputation of the project and its client in the mind of society, economic performance is related to the design of the project and the cost related to it (Hussin et al., 2013). In construction projects, there are certain factors that are used to analyze the green performance of projects, like consumption of material, source of material, transport, waste processing, durability, useability, and recyclable material (Environmental Performance of Buildings, 2020). For the current study to better understand the concept of green project performance, it is analyzed through the reduction in energy consumption, greenhouse gas emission, landfill waste, and material use.

Green Procurement

Procurement, which is also known as purchasing, is the process by which a project team acquires raw materials, components, products, services, and/or other needed resources to execute their projects in a timely manner (Acquah et al., 2021). Conventional purchasing primarily considers three criteria consisting of cost, quality, and delivery (Acquah et al., 2021), whereas Green procurement is often interchangeably used as environmental purchasing and is considered one of the other important purchasing criteria (Yook et al., 2017; Khan, et al., 2018).

Min and Galle (2001) defined environmental purchasing as eco-conscious purchasing focusing on less waste and recycling. Today, academia and industry consider the concept of green procurement as a tool to reduce climate change and global warming and to avoid natural resource exhaustion. Green procurement (GrP) may also include the selection of environmentally concerned contractors (Srinivas, n.d.). In fact, adopting GrP has become compulsory for projectized firms and is not an option anymore.

In literature, green procurement, green purchasing, sustainable procurement, and "environmental purchasing" (Coggburn, 2004) have been used interchangeably due to different applications and local contexts (Hughes & Laryea, 2013). For this paper, these terms are limited to only green procurement. Moreover, in this paper, green procurement is analyzed using the criteria of purchasing eco-labeled products, reduction of packaging material, suppliers with ISO 14001 certification, and low energy consumption to achieve environmental objectives.

Organizational Agility

Agility is an organizational mechanism, which means that change can be sensed and rapidly responded to (Zhou et al., 2018). Though agility is considered a factor that is driven by the stakeholders (Christofi et al., 2013),

recent literature supports the fact that it is solely the very capability and responsibility of a firm to stay up to date (Bouguerra et al., 2021). According to Talcott Parsons (1970), the organization is a complex system that struggles for balance with the external environment, whereas agility is a strategy, which holds promise for balance.

Similarly, from institutional theory's perspective, for survival, a project team needs to adopt/adapt and must conform to the external environment (John & Brian, 1970). Besides, organizational agility is considered a measure of a project team's capacity to adapt quickly and efficiently to the changes in the business environment (Lu & Ramamurthy, 2011). Sambamurthy et al. (2003) argue that those projects that have developed agility should be better positioned to engage in more competitive and complex action to achieve the desired objectives. To understand agility, it is further divided into various dimensions, and this study follows Sambamurthy et al. (2003) model to conceptualize the concept of organizational agility, where agility has three dimensions: operational, customer, and partnering agility.

Operational agility is the firm's ability to adapt to market opportunities with greater flexibility. It helps accomplish offerings with greater speed and more reliability (Akhtar et al., 2018).

Secondly, customer agility is the aspect of developing new ways to quickly adopt/adapt to the changing customer demands and quickly respond to them (Roberts & Grover, 2012). Finally, partnering agility refers to accomplishing greater knowledge and skills and the ability to innovate offerings and ways to manage organizational structures with the help of partners (Liu et al., 2016).

The dynamic capability perspective recognizes that there are specific organizational abilities that are central to shifting and changing resources to better fit a firm's changing environment (Teece et al., 1997). Originally conceived as flexibility in product development for time-to-market, on-demand manufacturing, and multiple product variants based on market analysis, agility now encompasses the involvement of clients, sales personnel, and consumers for the collection of essential information required for product development. There exist a couple of definitions of agility which state that one of the right definitions of agility is the management and utilization of knowledge on a just-in-time and moral basis to remain sustainable (U-tantada et al., 2019; Cavico & Mujtaba, 2016a; Dove, 1999). This is what makes it possible for firms to realign and sustain competitiveness internally. It is well established that agility is a dynamic capability that enables organizations to capitalize on changes in the environment and stakeholders and act effectively and quickly (Kuo et al., 2017; Chen et al., 2018; Gyemang & Emeagwali, 2020). Enterprise agility also comprises sensing abilities as well as responsiveness with a balance between the two (Verma et al., 2017). Organizational agility can also be described as the purposeful and precise creation of responses in volatile contexts to mobilize change swiftly and to identify opportunities and anticipate them, especially in the areas of innovation and learning (Felipe et al., 2016). There are several frameworks for building agility in organizations (Harraf et al., 2015; Baskarada & Koronios, 2018). Agility as a concept originated in manufacturing with Nagel and Dove (1991) at the Iacocca Institute, which reported the earliest work on the idea. For organizations, agility is the capability to learn the changes swiftly and translate them into the way they process information to exploit them in advance of adversaries. Scholars have proposed that agility results from the synergy among three capabilities: customer agility, partnering agility, and operational agility (Sambamurthy et al., 2003). Some past research has focused on defining the elements of organizational flexibility and agility, examining factors, tactics, processes, and consequences for firms' overseas performance (Heilmann et al., 2020; Schuh et al., 2018). Therefore, organizational agility can be described as the purposeful development of the capacity to act, responsively and proficiently to changes of environment, client, stakeholder, and other related parties. This capability also involves internal needs to learn and develop innovative competencies as requested.

Organizational agility is examined by Sun et al. (2022) in the context of sustainable manufacturing practices in emerging economies, with a particular focus on the role and impact of green procurement as a mediator and big data as a moderator. Sun et al. (2022) surveyed 461 participants from the manufacturing sector and employed structural equation modeling (SEM) to examine whether operational, customer, and partnering agility increases sustainable manufacturing. Additionally, green procurement is an appropriate connection between these agility types and sustainable manufacturing. This study also analyzed whether big data is a strong moderator between green procurement and sustainable manufacturing practices, meaning that big data reinforces this relationship even further. These goals stress the significance of the simultaneous adoption of green procurement and big data analytics to increase the potential of organizational agility approaches as related to sustainable manufacturing goals.

Hypothesis Development and Research Model

Organizational Agility and Green Procurement

Organizational agility is the main dynamic capability of a project team (Teece, 2007) that enables it to sense the variability in the market and to take suitable actions. Therefore, the recent emerging trend of focusing on green performance of projects requires strategic actions and agility can help the project team to adopt eco-friendly activities like green procurement (Marhraoui & El Manouar, 2017). The three dimensions of organizational agility act differently towards green procurement.

Operational agility is regarded as the cost-efficient competence of a project manager and their team to adapt to the opportunities in their operations to gain a competitive edge (Sambamurthy et al., 2003). Besides, it can better manage complex environmental practices and help the firm in adopting green procurement (Bouguerra et al., 2021). As the primary source of environmental needs, customer agility refers to a collaboration with consumers in researching and taking advantage of potential areas of innovation (Wu et al., 2012). So, agility is a project manager's ability to adapt quickly to the changes in client demand and create chances for a better strategic response.

Customer agility may also help project managers in introducing green procurement (Roberts & Grover, 2012). Environmental-conscious customers can go to the extent where they refuse to buy further services if their eco-conscious demands are not fulfilled (Varnäs et al., 2009; Zeng et al., 2011). Firms have established social responsibility measures to solve pollution problems and enhance productivity (Costantini et al., 2017; Cai & Li, 2018). Additionally, because of the increasingly growing awareness of the population, businesses are creating products that have more recyclable and biodegradable materials (Fernando et al., 2019; Ch'ng et al., 2021). Hence, it is observed that an increasing expansion of new environmental knowledge and eco-innovations based on the published research and articles (Díaz-García et al., 2015; Pacheco et al., 2018; Salim et al., 2019). With increased firm commitment to environmental sustainability arrangements, there is an enhanced generation of new environmental knowledge and eco-innovations. Moreover, companies and organization properties and external characteristics govern the construction, sharing and engagement of environmental understanding and eco-innovation (Albers et al., 2018; Michaelis et al., 2018). Environmental knowledge plays a significant role in profitably introducing sustainable innovations. It captures a wide cross-section of ideas and practices that have to do with the environment and its impact or implications. Many scholars have engaged in developing knowledge on eco-innovation and sustainable development and environmental management (Díaz-García et al., 2015; Pacheco et al., 2018; Salim et al., 2019). Academicians and professionals have become interested in the strategies and tools to enhance sustainable practices in various fields to establish a world with a more responsible, top-notch business environment.

Partnering agility is the capability of a project team to make a relationship with their strategic partners to achieve long-term relationships and exploit opportunities through ethical means that can be sustained over time (Reischl et al., 2010; Reischl et al., 2009; Senathip et al., 2017). Supplier integration enables them and their suppliers to work together by exchanging information and making joint decisions (Shou et al., 2018). Since the evolving and emerging trends are demanding organizations to perform sustainably, partnering agility can come in handy by introducing green procurement as a key environmental practice (Galeazzo et al., 2021). Also, according to Marhraoui (2017), if a project is agile, it has better options to become environmentally friendly and can perform sustainably by adopting green practices, which include green purchasing (Bohari et al., 2017). Thus, based on previous literature, we can say that organizational agility can lead toward the adoption of green procurement and hypothesize that:

H1: Operational agility has a significant impact on green procurement.

H2: Customer agility has a significant impact on green procurement.

H3: Partnering agility has a significant impact on green procurement.

Organizational Agility and Green Project Performance

For a project to be successful, its team must be agile and able to quickly and efficiently adjust to changes in the external environment (Felipe et al., 2016). Conceptually, a project team's responsiveness to market

possibilities is more likely to be successful if it scores highly on both its sensing and reacting skills (Roberts & Grover, 2012). Agile teams have a balanced mechanism, so they can easily comply with environmental issues by implementing eco-friendly solutions (Sarker et al., 2009).

Operational agility is regarded as the competence of a projectized firm to adapt the opportunity in its operations to gain a competitive edge (Sambamurthy et al., 2003). In the same way, customer agility is an ability to adapt quickly to changes in client demands while creating chances for it to take a competitive edge (Roberts & Grover, 2012). Partnering agility is a project team's capability to make relationships with its strategic partners to achieve long-term relationships and exploit opportunities. Yildiz and Aykanat's (2021) research focuses on the mediating effect of organizational innovation on strategic agility and firm performance.

This study involved 216 firms, which were selected from the Sakarya Organized Industrial Zone in Turkey. The study's hypotheses were tested using structural equation analysis. Based on the research, there is a positive relationship between the level of strategic agility and firm performance, where organizational innovation acts as a mediator. The focus of the study was on the fast-changing environment and strategic management of change and support the argumentation that innovation enhances performance by introducing changes within the firm that can respond to market shifts and create new capabilities.

According to Lee and Yang (2014), agile teams can outperform others and easily create their own operational niche, enhancing new opportunities. Moreover, Roberts and Grover (2012) state the significance of customer agility on projects' green performance. Projects with high partnering agility tend to get better market opportunities by using their partner's expertise (Liu et al., 2016); for example, supplier integration enables project teams and suppliers to work together by exchanging information and making joint decisions, thereby enabling the implementation of green innovations (Shou et al., 2018). Also, Ravichandran (2018) claims that agility has a strong influence on the performance of firms. It helps to deliver the desired outcomes to the customers based on all dimensions of agility and what can be achieved through it; thus, it can be claimed that in the case of green project performance, agility may help to attain it (Sajdak, 2015). Therefore, by looking at previous studies, we can say that organizational agility can help in achieving green project performance and hypothesize that:

H4: Operational agility has a significant impact on green project performance.

H5: Customer agility has a significant impact on green project performance.

H6: Partnering agility has a significant impact on green project performance.

The Link between Green Procurement and Green Project Performance

Generally, in projects, procurement is the most significant contributing factor to their performance, where the adoption of green procurement holds the obligation of eco-friendliness (Carter & Jennings, 2001). The performance of projects is affected by procurement decisions that are made with recyclable, reused, or previously recycled materials in mind (Sarkis, 2003). Moreover, adopting green procurement not only improves the environmental performance of projects, but also costs can be minimized, by reducing unintentional environmental emissions and waste material (Carter et al., 2000); as a result, the project teams' ability to execute can be enhanced, and chances of achieving green performance can be increased (Pullman et al., 2009). Augustine Anane's (2020) study concludes that green procurement influences the performance of organizations in a positive way and that supplier engagement enhances it. Some factors that hinder green procurement are top management support, inadequate staff cooperation, top management knowledge, and costs. However, the study highlights the benefits of green procurement in enhancing efficiency and decreasing liabilities while achieving a competitive edge. This research suggests that there is a need to increase awareness of sustainable procurement and design appropriate policies especially, in developing countries.

It is evident that when a project team adopts or adapts to green procurement, it means they need to comply with environmental factors and must focus on improving the green performance of projects, such as reducing waste, energy, and water consumption (Bohari et al., 2017). In the context of Pakistan as a developing country, according to the EPI 2022 ranking, the green performance of Pakistan is very drastic and lies at 176 out of 180 countries (Martin et al., 2022). The concept of adopting green procurement and attaining green performance in developed countries has been considered quite fruitful. This evolving trend is now influencing developing

countries to improve their green performance. It focuses on implementing eco-friendly practices like green procurement, which can influence the green performance of projects, thereby leading towards a sustainable triple bottom line (Alqadami et al., 2020). Therefore, by looking at previous studies, green procurement has a strong linkage with green project performance, and we hypothesize that:

H7: Green procurement has a significant impact on green project performance.

Organizational Agility and the Mediating Role of Green Procurement

Agility is the capability of the projectized organization to remain flexible while renewing itself without compromising its effectiveness (Haider & Kayani, 2020).

As a result, environmental issues may be better understood through a project manager's knowledge of external changes and capacity to make internal modifications to adapt to such changes (Rabal-Conesa et al., 2021).

To attain operational excellence (Ibrahim et al., 2020) and competitiveness, firms need to adjust to the external environment (Dubey et al., 2015).

In response to both internal and external pressures, operational agility can better manage complex environmental practices (Bouguerra et al., 2021). Nowadays, customers' concerns about environmental practices have been examined in several studies (Zhu & Sarkis, 2004; Lee & Klassen, 2008).

As the primary source of environmental needs, customer agility refers to a company's collaboration with consumers in researching and taking advantage of potential areas of innovation (Sambamurthy et al., 2003; Wu et al., 2012).

Moreover, partnership and supplier integration enable organizations and suppliers to work together by exchanging information and making joint decisions (Shou et al., 2018).

Tooranloo et al. (2018) describe why today's organizations require supply chain improvement to be effective and environmentally sensitive. They consider seven factors and thirty-seven indicators for measuring the agility level of green supply chains (GSC). They noted that firms' quest to enhance the sustainability of their production means that one must minimize environmental impacts as much as increase production efficiency to remain viable in the market. The study also stresses the need for adaptation and the adoption of agile practices in an organization's GSC to be prepared to adapt to market conditions and reduce cost while enhancing professional competence to enable sustainability and competitiveness.

In another study, Rabal-Conesa et al. (2021) affirmed that internal and external environmental awareness affects green products market success.

The study spotlighted the fact that external knowledge has a direct influence on eco-innovation while the internal knowledge increases the degree of this impact.

Thus, it can be concluded that agile practices should incorporate both types of knowledge to maximize the effect of green product development.

According to Lee and Yang (2014), agile organizations can outshine others by creating an ecological niche and enhancing new opportunities.

Firms can easily embrace a sustainable culture by adopting green practices, whereas in project management, the key green practice includes green purchasing/procurement (Bohari et al., 2017).

Ravichandran (2018) claims that in any dimension, agility has a strong influence on the adoption of environmental practices like GrP. The environmental side holds promise for sustainability by reducing toxic industrial emissions like greenhouse gas, and it can lead towards the accomplishment of GPP (Coggburn, 2004).

In accordance with previous studies, we can say that green procurement can mediate the relationship between all dimensions of agility and green project performance and hypothesize that:

H8: Green procurement mediates the relationship between operational agility and green project performance.

H9: Green procurement mediates the relationship between customer agility and green project performance.

H10: Green procurement mediates the relationship between partnering agility and green project performance.

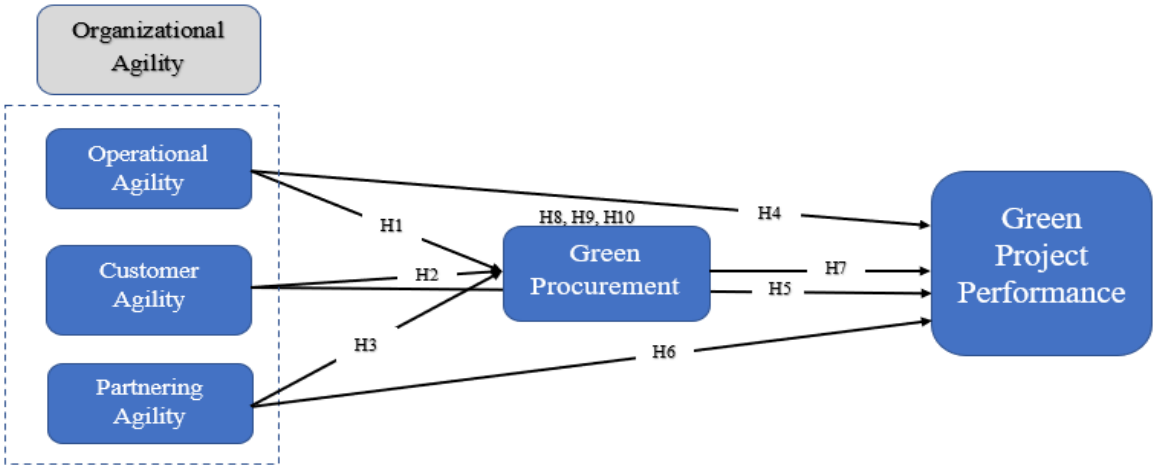

Figure 1. Conceptual Model for the Study

Source: created by the authors using Smart PLS software.

METHODOLOGY

Measurement

The instrument for operational agility (OA) is adapted from Akhtar et al. (2018), customer agility (CA) is adapted from Roberts and Grover (2012), partnering agility (PA) is adapted from Liu et al. (2016). Instruments for green procurement (GrP) are adapted from the work of Carter and Jennings (2004) as well as Wu et al. (2012). Finally, the instrument for the dependent variable, green project performance (GPP), is adapted from Pham and Pham (2021). The items are included in Table A 1 of the Appendix.

In our research, the targeted populations are construction industries of Pakistan which are using the go green approach and have adequate knowledge about strategic procurement procedures. To keep the study limited, the targeted sample was those informants who occupy a strategic position in the procurement department and their subordinates.

Data

The instrument used to collect data for this study was an online survey. We restricted the study specifically to those informants who occupy strategic position in the procurement department and their subordinates. Convenience techniques were used to find the respondents. Moreover, the survey was shared with participants through mail and via social media such as LinkedIn. To search specific professionals' jobs, the terms "procurement manager", "category manager", "environment officer and sustainability" were the keywords to search for professionals on LinkedIn.

A "Google form" was used for a survey, which consisted of two types of data. The first set of data was related to demographics and limited to two questions. The rest of the questionnaire consisted of questions used to perform quantitative analyses. The 5-point Likert scale was used, with 1 as Strongly Disagree to 5 as Strongly Agree. A PLS-SEM analysis was performed on the data collected through the software "Smart PLS 4.0".

The online survey was kept open for responses from 2 July 2022 to 25 August 2022. A total of 232 responses were received. After screening and filtering out the invalid and incomplete responses, 204 were left, on which further analysis was performed. The demographic analysis of the results shows that most of the responses were received from category managers (19.1%) followed by the employees (17.6%) and head of services procurement (11.8%) as shown in

Moreover, most of the respondents have work experience between 1-5 years (42.2%) followed by 6-10 years of experience (39.7%).

The demographic frequencies in detail can be seen in Table 1.

Table 1. Demographic Data

Experience	Frequency	Percent	Cumulative Percent
Less than 1 Year	15	7.4	7.4
between 1-5 Years	86	42.2	49.5
between 6-10 Years	81	39.7	89.2
Above 10 Years	16	7.8	97.1
Prefer not to say	6	2.9	100.0
Designation	**Frequency**	**Percent**	**Cumulative Percentage**
Chief Procurement Officer	10	4.9	4.9
Head of Material/Inventory control	20	9.8	14.7
Head of Services Procurement	32	15.7	30.4
Procurement Manager	24	11.8	42.2
Category manager (CRM, Design & PR)	39	19.1	61.3
Supervisor	6	2.9	81.9
Employee	36	17.6	78.9
Other	37	18.1	100.0
Total	204	100.0	

Source: created by the authors using Smart PLS software.

RESULTS

Measurement Model

For analysis, an iteration of 500 was performed using the PLS Algorithm in SMART PLS 4.0 software on the proposed model. As the instruments were adapted, the first Confirmatory Factor Analysis (CFA) was performed using Smart PLS 4.0. The purpose of performing CFA is to validate that items should reflect their respective constructs (Orçan, 2018; Crede & Harms, 2019). The values > 0.5 represent an acceptable range of items, whereas > 0.7 represent a good outer loading effect. As suggested by Hair et al. (2013), to enhance the strength of the model and paths, items that had factor loadings < 0.60 were removed.

In Table 2, it is seen that no factor loading value is less than 0.60, so no item was removed. This result can also be observed in Figure 2.

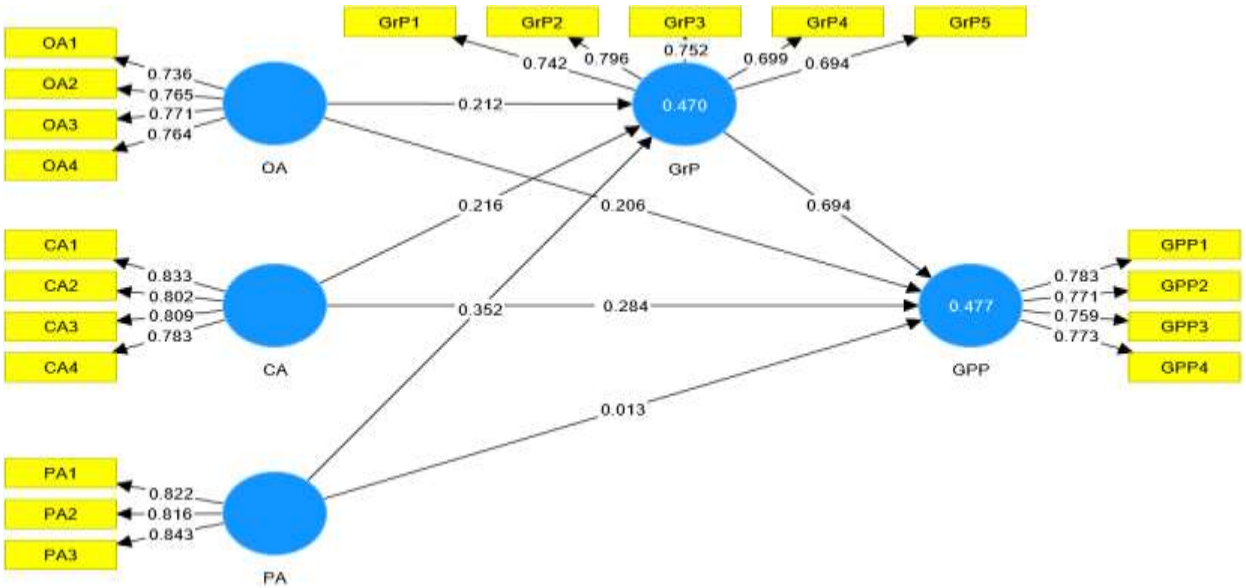

Figure 2. Measurement Model

Source: created by the authors using Smart PLS software.
Note: OA - organizational agility, CA - customer agility, PA - partnering agility, GrP - green procurement, GPP - green project performance.

The reliability of data was analyzed using Cronbach's alpha (CA) and composite reliability (CR) values. From Table 2, values of composite reliability of the construct meet the criterion that is ≥ 0.60, likewise, Cronbach's Alpha values were within range i.e., 0.75-0.823 which indicates the reliability of the overall model.

Table 2. Cronbach's Alpha, Composite Reliability, Average Variance Extracted, and Factor Loadings

Items	Indicator	FLs	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
OA	OA1	0.736	0.755	0.845	0.577
	OA2	0.765			
	OA3	0.771			
	OA4	0.764			
CA	CA1	0.833	0.823	0.882	0.652
	CA2	0.802			
	CA3	0.809			
	CA4	0.783			
PA	PA1	0.822	0.770	0.867	0.684
	PA2	0.816			
	PA3	0.843			
GrP	GrP1	0.742	0.790	0.856	0.544
	GrP2	0.796			
	GrP3	0.752			
	GrP4	0.699			
	GrP5	0.694			
GPP	GPP1	0.783	0.776	0.855	0.595
	GPP2	0.771			
	GPP3	0.759			
	GPP4	0.773			

Source: created by the authors using Smart PLS software.
Notes: OA - organizational agility, CA - customer agility, PA - partnering agility, GrP - green procurement, GPP - green project performance, FLs - factor loadings, CA - Cronbach alpha, CR - composite reliability, AVE - average variance extracted.

Discriminant Validity

The heterotrait-monotrait (HTMT) ratio was used to establish the discriminant validity of the constructs. The results for HTMT are presented in Table 3 which indicates that the model achieves discriminant validity since HTMT ratios are < 0.90 (Henseler et al., 2014).

Table 3. Heterotrait-Monotrait Ratio (HTMT)

	CA	CoP	CuP	GP	GPP	GrP	OA	PA
CA								
CoP	0.081							
CuP	0.17	0.77						
GP	0.157	0.841	0.858					
GPP	0.307	0.215	0.142	0.102				
GrP	0.69	0.126	0.176	0.149	0.844			
OA	0.846	0.145	0.117	0.149	0.542	0.754		
PA	0.783	0.146	0.198	0.231	0.512	0.793	0.854	

Source: created by the authors using Smart PLS software.
Note: OA - organizational agility, PA - partnering agility, CA - customer agility, CuP - customer pressure, CoP - competitors' pressure, GP - governmental pressure, GrP - green procurement, GPP - green project performance.

The Fornell-Larcker criterion is another way to establish the discriminant validity. According to the Fornell-Larcker criterion, if the square root of the average variance extracted (AVE) in the diagonal values is greater than the values below them, then the construct develops the discriminant validity (Fornell & Larcker, 1981). Table 4 shows that the model withholds discriminant validity.

Table 4. Fornell-Larcker Criterion

	CA	CoP	CuP	GP	GPP	GrP	OA	PA
CA	0.807							
CoP	0.027	0.825						
CuP	0.147	0.613	0.791					
GP	0.135	0.665	0.705	0.757				
GPP	0.265	0.169	0.114	0.062	0.772			
GrP	0.578	0.096	0.146	0.121	0.66	0.738		
OA	0.669	0.096	0.086	0.095	0.432	0.587	0.759	
PA	0.631	0.11	0.158	0.182	0.404	0.627	0.655	0.827

Source: created by the authors using Smart PLS software.
Note: OA - organizational agility, PA - partnering agility, CA - customer agility, CuP - customer pressure, CoP - competitors' pressure, GP - governmental pressure, GrP - green procurement, GPP - green project performance.

Structural Model

SMART-PLS assesses the structural model for the study to determine the whole model's capability and to predict targeted constructs. So, the structural model was assessed through the variance explained through independent variables (R^2), the level of effect size (F^2), and the predictive relevance (Q^2). Additionally, the internal VIF was assessed, which should be less than 5.0 (Zaman et al., 2023b). The T-statistic was used to assess the coefficient path among the constructs of the structure, which should be more than 1.96 through 5,000 bootstrap samples (Khwaja et al., 2020b). In addition, the VIF, which falls in the acceptable range, defined the scale measurement. Moreover, the common bias method (CBM) was not applied in the analysis, as VIFs' values attained were less than the cut-off values, i.e. 3.3 (Capurro et al., 2018).

Model Fitness Test

For the conformity of the hypothesized model, a fitness test is used to test the goodness of fit. Whereas the SMSR is the absolute measure of fit, if SMSR = 0, the model is a perfect fit and if it is less than 0.08, the model is a good fit. Similarly, root mean square residual covariance (RMStheta) was used to check the goodness of fit. A value less than 0.12 means that the model is considered well fit (Henseler, et al., 2014). Table 5 shows that the values are within the threshold and the model is good for fit.

Table 5. Model Fitness

Criterion	Value
SMSR	0.071
RMStheta	0.115

Table 6 shows the results for the path coefficient.

Table 6. Path Coefficient Test

Direct Hypothesis	Beta	T Statistics	P-Value	Decision
H1: OA -> GrP	0.212	2.778	0.005	Significant
H2: CA -> GrP	0.216	2.218	0.027	Significant
H3: PA -> GrP	0.352	4.683	0	Significant
H4: OA -> GPP	0.206	2.631	0.009	Significant
H5: CA -> GPP	0.284	3.005	0.003	Significant
H6: PA -> GPP	0.013	0.176	0.861	Insignificant
H7: GrP -> GPP	0.694	8.641	0	Significant

Source: created by the authors using Smart PLS software.
Notes: OA - organizational agility, CA - customer agility, PA - partnering agility, GrP - green procurement, GPP - green project performance.

As per the proposed study, H1, H2, and H3 evaluate the significance of OA, CA, and PA on GrP, respectively. The resulting values (β=0.212, t= 2.778, p=0.005), (β=0.216, t= 2.218, p=0.027), and (β=0.352, t= 4.683, p<0.001) show that the impact of OA, CA, and PA was found to be significant on GrP, respectively. Similarly, H4, H5, and H6 evaluate the significance of OA, CA, and PA on GPP, respectively. The resulting values (β=0.206, t= 2.631, p=0.009), (β=0.284, t= 05, p=0.003), and (β=0.013, t= 0.176, p=0.861) show that

impact of OA and CA was found to be significant on GrP, while the impact of PA on GPP was insignificant respectively. Furthermore, H7 evaluates the significance of GrP on GPP. The resulting values (β=0.694, t= 8.641, p<0.001) show that the impact of GrP was found to be significant on GPP.

For structural model, as shown in Figure 3, beta (β), t-, and p-values were used to check the significance of the model. The beta value should be greater than 0.1, the t-value of respected hypothesis should be greater than 1.96, and the p-value should be less than 0.05.

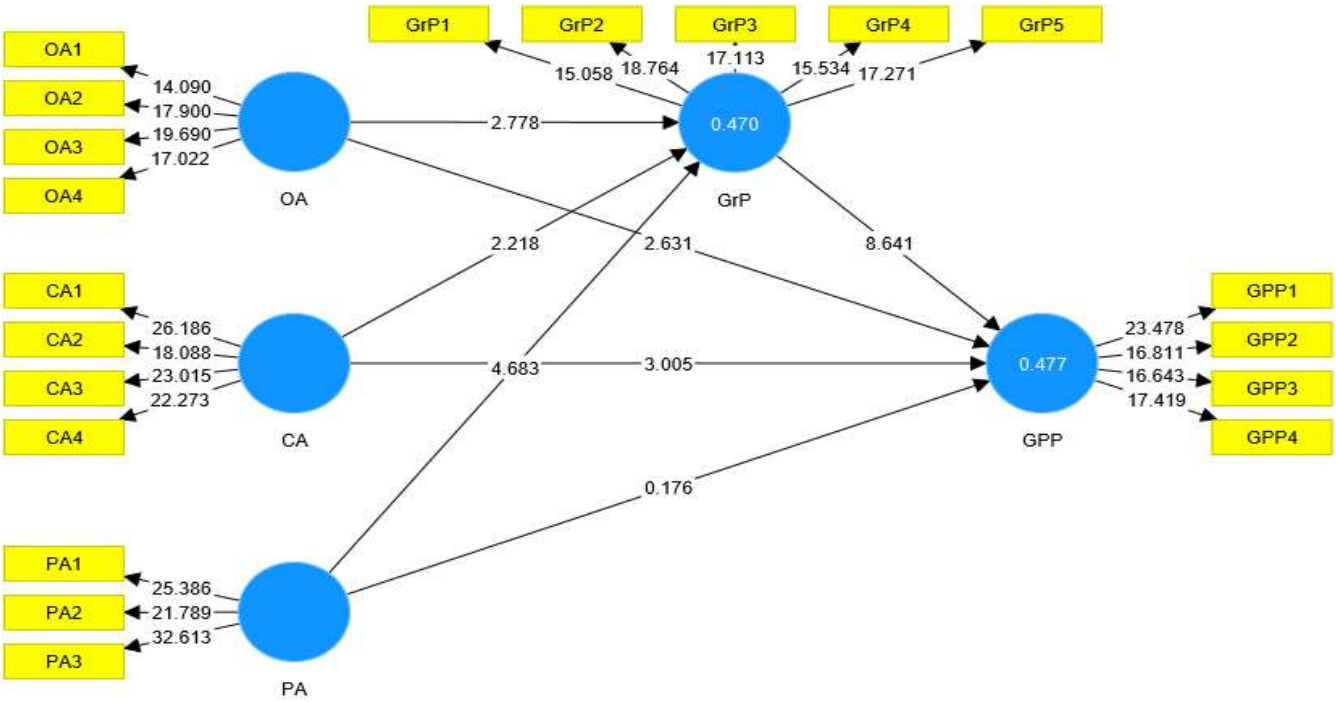

Figure 3. Structural Model

Source: created by the authors using Smart PLS software.
Note: OA - organizational agility, CA - customer agility, PA - partnering agility, GrP - green procurement, GPP - green project performance.

Mediation Analysis

Mediation analysis was conducted in Smart PLS using bootstrapping. The results from the Specific Indirect Effect describe the mediating role of the construct, whether it is significant or insignificant. In combination with the direct effect, it can also be described whether the mediation holds a complete mediation, partial mediation, or no mediation effect. The mediation analysis was conducted to check the mediating role of GrP between independent and dependent variables, as shown in Table 7.

Table 7. Specific Indirect Effect

Mediated Hypothesis	Beta	T Statistics	P Value	Decision
H8: OA -> GrP -> GPP	0.147	2.560	0.011	Significant
H9: CA -> GrP -> GPP	0.150	2.066	0.039	Significant
H10: PA -> GrP -> GPP	0.244	4.232	0.000	Significant

Source: created by the authors using Smart PLS software.
Notes: OA - organizational agility, CA - customer agility, PA - partnering agility, GrP - green procurement, GPP - green project performance.

H8 evaluates whether the GrP creates a link between OA and GPP. The results show that there is a significant impact (β=0.147, t = 2.560 p=0.011). To check whether this relation holds a complete or partial mediation, the direct relationship between OA and GPP was checked and found significant. Hence, partial mediation is observed. H9 evaluates whether the GrP creates a link between CA and GPP. The results show that there is a significant impact (β=0.150, t = 2.066, p=0.039). To check whether this relation holds a complete or

partial mediation, the direct relationship between CA and GPP was checked and found significant. Hence, partial mediation is observed. H10 evaluates whether the GrP creates a link between PA and GPP. The results show that there is a significant impact (β=0.244, t = 4.232, p<0.001). To check whether this relation holds complete or partial mediation, the direct relationship between OA and GPP was checked and found insignificant. Hence, complete mediation is observed. The results showed that GrP mediates the effect of organizational agility on green project performance.

DISCUSSION

To answer our research question, this study combined to find the impact of organizational agility on green project performance with the mediating role of green procurement, where organizational agility was further divided into three dimensions namely operational agility, customer agility, and partnering agility.

The results after performing the analysis show a 47.7% variation in green project performance confirming that organizational agility and green procurement have a strong impact on green project performance, which is consistent with previous findings (Alqadami et al., 2020). This study also provides insight into how green procurement is influenced by organizational agility. The results of PLS-SEM analysis show a 47.0% variation in green procurement caused due to organizational agility. This confirms that H1, H2, and H3 are supported, which is in alignment with previous studies (Galeazzo et al., 2021).

The results of this study provide insight into the direct and indirect impact of organizational agility on green project performance. Our findings show that customer and operational agility has a significant direct impact on green project performance, which is consistent with previous studies (Roberts & Grover, 2012; Bouguerra et al., 2021). Partnering agility has no direct relation with green project performance, which contradicts some of the previous literature (Galeazzo et al., 2021). This can be due to a lack of direct interest from partners in the project itself. For example, suppliers acting as partners only have an interest in what they are supplying and do not have a direct influence on the project but only through a procurement process.

Since the impact of partnering agility on green project performance is insignificant, the indirect impact through the mediation of GrP was analyzed. It came out to be significant, which means it holds strong and complete mediation. On the contrary, both customer and operational agility have a direct link with GPP and through the mediation of GrP which is why both hold partial mediation.

The results of our findings confirmed that organizational agility contributes greatly towards green project performance and green procurement. It helps project managers in the construction industry to understand the imperativeness and the value of agility for the betterment of projects and their performance. Also, it highlights the idea of enduring green procurement at the initial stages of the project lifecycle, since it is at this moment that the project team must make crucial decisions, which can have a very strong influence on the green performance of projects. Furthermore, the concept of environmental consideration is highlighted in this study.

CONCLUSIONS

Environmental degradation is a worldwide problem, and construction sectors appear to be one of the main contributors to such dilapidation. These environmental issues are becoming major threats to construction projects and to society. For the mitigation of toxic environmental impact, green procurement holds strong hope. Besides, procurement plays a vital role in the execution of projects. While there are diverse external and internal factors, a firm can implement green and sustainable approaches that can lead towards the green performance of various projects. Addressing environmental degradation problems, the current model was proposed, and this study was conducted to investigate the direct and indirect impact of organizational agility on green project performance with the mediation of green procurement. The results of the study confirmed that organizational agility contributes greatly towards green project performance and green procurement.

This study adds to the body of knowledge of project management and environmental management. The findings of this study help managers in the construction industry to improve green project performance through the implementation of “operational agility”, “customer agility”, and “partnering agility”. The successful implementation of such initiatives will help construction firms to reduce the negative environmental impact of their projects while gaining and maintaining a competitive advantage in the market.

The findings of this study advance the literature on project management, green procurement, and the imperativeness of agility. Relevant literature was scarce on the direct and indirect effects of organizational agility

toward green procurement and green project performance. Moreover, this model is supported by institutional theory, which states that there is a need for reevaluation in firms to stabilize their position and practices in the emerging and dynamic environment through the implementation of agility. This study reveals that organizational agility is the influencing factor for the performance of green projects and the implementation of green procurement.

Practically, this study highlights the importance of organizational agility in the implementation of green procurement and green project performance. The findings of this study confirm that organizational agility influences green procurement and green project performance within Pakistan. For industries to achieve green project performance, they must withhold green procurement. The industries are strictly recommended for procuring eco-label and environmentally friendly products. The procurement department of each organization should require suppliers to have ISO 14001 certification and to seek low energy consumption.

Furthermore, the findings guide managers in construction industries to shift their focus to organizational agility. Managers should consider the value of operational agility in routine work while getting timely insights from customers regarding demands and shifting trends. At the same time, partners also need to be recognized and prioritized as suppliers to enhance the performance of projects and green procurement in the project. Such practices and conditions will allow firms to gain and maintain a competitive advantage in the industry.

For future studies, we offer some recommendations. A comparison between different countries is a good research project to measure different behaviors of an organization's agility and procuring methods. For the data analysis, it is recommended to use a greater sample size to get an adequate result for the project's success. Furthermore, researchers should consider industries other than construction, such as telecom, power, textile, and information technology. This study has only discussed the three dimensions of organizational agility; so future research should consider further dimensions of agility to check their direct or indirect impact on green project performance. Studies can also be conducted by measuring the impact on green project performance dimensions separately. These can be "environmental performance", "social performance", and "economic performance". This study applied only a quantitative approach; so future studies can be conducted using a mixed-method approach.

Author Contributions

Conceptualization: N. A., J. A. and N. A.; data curation: N. A., J. A., B. G. M., and N. A.; formal analysis: N. A., J. A., B. G. M., and N. A.; funding acquisition: N. A. and J. A.; investigation: N. A.; methodology: N. A. and J. A.; project administration: N. A., J. A., and N. A; resources: N. A., J. A., and N. A.; software: N. A., J. A., B. G. M., and N. A.; supervision: N. A., J. A., and N. A.; validation: N. A., J. A., B. G. M., and N. A.; visualization: N. A., J. A., B. G. M., and N. A.; writing-original draft preparation: N. A. and J. A.; writing-review and editing: N. A., J. A., B. G. M., and N. A.

Conflicts of Interest

Authors declare no conflict of interest.

Data Availability Statement

Not applicable.

Informed Consent Statement

The authors have obtained and maintained written informed consent from all subjects involved in the study.

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APPENDIX A: Questionnaire

Section 1. Individual Demographics

1. Designation

□ Chief Procurement Officer □ Head of Material/Inventory control □ Head of Services procurement

□ Procurement Manager □ Category manager (CRM, Design & PR)

□ Supervisor □ Employee □ Other: _____

2. Years of working in a project environment

□ Less than 1 Year □ Between 1-5 Years □ Between 6-10 Years

□ Above 10 Years □ Prefer not to say

Section 2. ITEMs

Table A 1 Items

Id#	Construct	Item	Adapted From
OA1	*Operational Agility*	The reliability of our offerings [i.e., services and products] has increased.	Akhtar, Khan, Tarba, and Jayawickrama (2018)
OA2		We accomplish greater speed in delivering our offerings.	
OA3		We have greater flexibility in our offerings to adopt market changes.	
OA4		We are very quick to adopt market opportunities.	
CA1	*Customer Agility*	We attempt to develop new ways of looking at customers and their needs.	Roberts and Grover (2012)
CA2		When we identify a new customer need, we are quick to respond to it.	
CA3		We quickly implement our planned activities regarding customers.	
CA4		We quickly react to fundamental changes regarding our customers.	
PA1	*Partnering Agility*	When we partner, employees accomplish greater soft skills required to manage customer encounters.	Liu, Yang, Qu, and Liu (2016)
PA2		Working with partners gives us the ability to innovate our service offerings technologically.	

Section 2. ITEMs

Table A 1 (cont.) Items

Id#	Construct	Item	Adapted From
PA3		Working with partners brings about new ways of managing organizational structures and partnerships.	
GrP1	*Green Procurement*	Our organizations' purchasing eco-labeled products.	Carter and Jennings, (2004), Wu, Ding, and Chen (2012)
GrP2		Our organization cooperates with suppliers for environmental objectives.	
GrP3		Our organization enforced Supplier's ISO 14001 certification.	
GrP4		Our purchasing department actively contributes to the reduction of packaging material.	
GrP5		Our purchasing department seeks suppliers with low energy consumption.	
GPP1	*Green Project Performance*	We were able to reduce energy consumption.	Pham and Pham (2021)
GPP2		We were able to reduce greenhouse gas emissions.	
GPP3		We were able to reduce landfill waste.	
GPP4		We were able to reduce material use.	

Source: created by the authors.
Notes: OA - organizational agility, CA - customer agility, PA - partnering agility, GrP - green procurement, GPP - green project performance.