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The impact of organizational culture and total quality management on the relationship between green practices and sustainability performance

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Abstract

Purpose – This study aims to examine the direct and indirect effects of organizational culture (OC) and total quality management practices (TQMPs) on the relationship between green practices (GPs) and sustainability performance (SP) by using structural equation modeling (SEM) analysis.

Design/methodology/approach – This study proposed a conceptual research model of the relationships and formulated six hypotheses. This study used a structured questionnaire based on previous studies to collect relationship data to test these hypotheses, and 441 full-time managers from various US businesses responded. The complete and valid survey responses were then tested against the hypotheses using IBM SPSS Statistics and SEM-AMOS.

Findings – Results supported the relationships proposed in the research model. They indicated that a strong supporting OC and TQMPs might improve positive SP and GPs. Additionally, the more managers are aware of their companies' GPs, the more likely they will feel positive about the organization's SP.

Research limitations/implications – A larger sample size to ensure statistically minimum representation in several major industries would better validate the findings and help identify significant differences in industry-specific OCs, TQMPs, GPs and SPs. Similarly, ensuring a varied geographical representation (both within the USA and internationally) would help determine if the findings vary according to the respondent's location. Furthermore, collecting the data during Year 1 of the COVID-19 pandemic may have skewed the results. Thus, once the working environment has been normalized, the survey should be repeated to determine if the findings are valid post-pandemic.

Practical implications – The findings of this study provide important strategic guidance for managers who work to balance the implementation of corporate GPs and the triple bottom line dimensions of SP. For practitioners, the results showed that companies could accomplish both profitability and sustainability if they are willing to continuously pay attention to environmental issues and strategically invest in cost-efficient and eco-friendly initiatives.

Originality/value – To the best of the authors' knowledge, this research is one of the first to explore how OC and TQMPs, directly and indirectly, affect the relationship between GPs and the triple bottom line dimensions of SP. These results imply that OC and TQMPs have a significant indirect impact on the relationship between GPs and the SP dimensions.

Keywords Organizational culture, Sustainability performance, Total quality management, Green practices

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1. Introduction

Sustainability has been defined as "meeting the needs of the present generation without compromising the ability for future generations to meet their own needs" (Bergquist, 2017).

Sustainability is so critical to our global future that in 2015, the United Nations established 17 Sustainable Development Goals and an agenda for reaching these goals by 2030. These G-20 has embraced these goals, and in turn, the governments of those nations are urging their business communities to respond to these goals, especially Goals 7 (Affordable and Clean Energy), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation, and Infrastructure), 12 (Responsible Consumption and Production) and 13 (Climate Action). Furthermore, businesses are faced with increased customer awareness and changing demands while concerns about environmentally detrimental business practices steadily increase (Agyabeng-Mensah *et al.*, 2020). At the same time, businesses are facing increased pressure from stockholders to balance economic gain and environmentally-sound business decisions. As a result, businesses realize the need to protect the environment by implementing greener initiatives and increasing attention to sustainability issues. "Sustainable green practices" is now a phrase used in the boardroom by practitioners and management researchers, signaling its importance in the eyes of many stakeholders (Afum *et al.*, 2020; Agyabeng-Mensah *et al.*, 2020; Baah *et al.*, 2020, 2021; Fuzi *et al.*, 2020; Ghosh, 2017; Han and Huo, 2020; Huo *et al.*, 2019; Yacob *et al.*, 2019). To many businesses, sustainable green practices (GPs) fulfill the needs of stakeholders and offer a competitive advantage in the global market.

Sustainability is a concern not only for global corporations; companies of all sizes realize the importance of sustainability and are exploring business strategies to sustain their companies' longevity (Abbas and Sagan, 2019; Warren and Szostek, 2017). While some may be concerned that "going green" could be costly in the beginning, business decision-makers are seeing the long-term benefits that generate more significant savings and competitive advantages, including enhancing the image of a company, reducing waste and pollution and increasing production efficiency (Ghadimi *et al.*, 2021; Green *et al.*, 2019; Sahoo and Vijayvargy, 2021; Whitelock, 2019; Yang *et al.*, 2010; Yang and Zhang, 2017).

Although the impact of GPs and determinants of the success of GPs have been widely studied, findings are inconclusive due to mixed results on whether organizational culture (OC) and total quality management (TQM) practices directly or indirectly influence the relationship between GPs and sustainability performance (SP), and whether or not the effect(s) could lead to more successful company performance and greener results (Abbas and Sagsan, 2019; Ghadimi *et al.*, 2021; Khalil and Muneenam, 2021; Thanki and Thakkar, 2019; Wang, 2019). Although several studies attempt to draw the linkages between GPs and sustainable performance (Abdul-Rashid *et al.*, 2017; Acquah *et al.*, 2021; Agyabeng-Mensah *et al.*, 2020, 2021b; Rehman *et al.*, 2016; Zhan *et al.*, 2018), few of them, if any, address the dynamic nature of how OC and TQM practices affect sustainability success. To mitigate this research gap, this study expects to contribute to both theory and practice by addressing the following research questions:

RQ1. Do GPs, OC and total quality management practices (TQMPs) directly influence SP?

RQ2. Do OC and TQMPs indirectly influence SP through GPs?

The USA and other countries may exist in different institutional, legal, social, economic and cultural contexts regarding corporate sustainability. According to Wang (2019), corporate GPs research is in the initial stage, and this area requires more research. To better understand the complexity of GPs, this study focuses on the direct and indirect impact of GPs, OC and TQMPs on SP across a wide sample of companies in various industries throughout the USA.

The remaining sections are organized as follows: Section 2 comprises the literature review explaining the key constructs, underlying theory, hypotheses and model development. Section 3 outlines the methodology, and Section 4 details the results. Finally, we conclude the

study with a discussion of theoretical and practical implications, limitations and future research directions in Section 5.

2. Theoretical foundation and hypotheses development

2.1 Theoretical background

Environmental advocates have long criticized the corporate world and business leaders for environmental damages caused by economic growth and their failure to mitigate these issues. Instead, businesses focused on generating wealth through strong economic performance (Fuzi *et al.*, 2020; Gorane and Kant, 2017). Some researchers suggest economic growth cannot be the sole focus and that businesses should simultaneously preserve the natural environment and our society (Agyabeng-Mensah *et al.*, 2020; Carter and Rogers, 2008). Paulraj (2011) explained that paying attention to sustainability issues is essential for businesses to prosper in the current environment. Afum *et al.* (2020) concluded that organizational sustainability could help organizations capitalize on markets, gain first-mover advantage, help them establish better relationships and improve their reputation. In addition, by promoting sustainability, companies will gain a significant competitive advantage (Agyabeng-Mensah *et al.*, 2020; Baah *et al.*, 2020, 2021; Fuzi *et al.*, 2020; Hart, 1995).

Hart (1995) introduced a conceptual framework using a natural resource-based view (NRBV) that leverages an organization's internal and external natural resources to develop capabilities that can lead to strategic advantages over competitors to achieve long-term success. His three primary environmental strategies for this theory include (1) pollution prevention or minimization of the firm's environmental damage through the reduction of pollutants and waste, (2) product stewardship or minimization of the firm's costs over the life cycles of their products and (3) sustainable development or minimization of the firm's impact on the environment during development and growth. These NBRV strategies guided the operationalization of the GP construct in this study.

Previous research supporting this framework examined how TQMPs used by organizations can lead to waste elimination or reduction (Ghadimi *et al.*, 2021; Thanki and Thakkar, 2019). In a study of manufacturing small and medium-sized enterprises (SMEs) in Malaysia, Ghazilla *et al.* (2015) found that GPs resulted in extremely efficient systems and processes that reduced negative ecological impact. Afum *et al.* (2020) found in a similar study of SMEs in Ghana that the primary reason for the implementation of GPs was sustainability in industrial production. Implementing GPs was also the response within manufacturing and service industries when various stakeholders created significant pressure to address sustainability-related issues (Bai *et al.*, 2015; Rehman *et al.*, 2016). Actions taken included: reducing emissions and waste through production, reducing energy use or using eco-friendly energy, training managers regarding product stewardship and designing products innovatively with increased reusability and recyclability (Mitra and Datta, 2014). A sustainable development strategy helps organizations create competitive advantages by addressing environmental, social and economic concerns for long-term success relative to their competitors (Hart, 1995). GPs also present companies with more opportunities to balance their environmental, social and economic performances (Afum *et al.*, 2020); as such, GPs allow organizations to achieve organizational efficiency, improving financial performances and environmental effects (Agyabeng-Mensah *et al.*, 2020; Baah *et al.*, 2020, 2021).

In order to achieve such positive outcomes, an organization's culture must develop expectations that value sustainability, engage in progressive operations and supplier development and harness support from all employees, including those at top management levels (Gandhi *et al.*, 2018; Ghadimi *et al.*, 2021; Thanki and Thakkar, 2019; Wang, 2019). In line with the NRBV theory, this study aims to validate the links between GPs and sustainable

performances (environmental, social and economic dimensions) through the adoption of TQMPs and a green-supporting OC.

2.2 The relationship between green practices and sustainability performances

Multiple operations management researchers collectively define sustainable practices as the creation of manufactured goods and services using a series of processes that minimize the negative environmental impacts; conserve energy and natural resources; are safe for employees, communities and consumers; and are economically sound (Afum *et al.*, 2020; Agyabeng-Mensah *et al.*, 2020; Baah *et al.*, 2020, 2021; Han and Huo, 2020). The NRBV theory argues that firms pursue these sustainability strategies and practices to gain firm-specific resources/capabilities over their competitors (Hart, 1995). The NRBV theory further suggests that increasing the awareness of sustainable practices leads to improved overall business performance across industries. Conversely, diverse literature on implementing GPs suggest that changing business strategies often drive these initiatives (Choudhary and Sangwan, 2019; Feng *et al.*, 2018). These strategies drive innovation and improved performance, leading to increased competitive advantages. Afum *et al.* (2020) showed that the benefits of green initiatives are not only limited to cost savings but can also serve as a significant predecessor for enhancing environmental, social and economic performance that generates competitiveness. In this study, social performance (SoP), economic performance (EP) and environmental performance (En_P) are considered parts of the conceptual whole of SP.

Various studies have identified a positive link between green initiatives and sustainable performance (Zhu *et al.*, 2012; Omara *et al.*, 2019). Other scholars have shown that manufacturing firms employing sustainable practices have a positive track record of improved sustainable performance (Abdul-Rashed *et al.*, 2017; Afum *et al.*, 2020; Agyabeng-Mensah *et al.*, 2020; Baah *et al.*, 2020, 2021; Çankaya and Sezen, 2019). Hami *et al.* (2015) and Rehman *et al.* (2016) posited that manufacturing companies with GPs tended to enhance their sustainable performance. Subsequent studies provided evidence that this relationship was significant. In a Malaysian study, Abdul-Rashid *et al.* (2017) suggested that GPs, such as green manufacturing processes and sustainable end-of-life practices, have resulted in cost reduction, high-value product or material recovery and an improved work environment. Likewise, Afum *et al.* (2020) provided empirical evidence that GPS help Ghanian manufacturing firms achieve economic gains, environmental excellence and improved quality of life for employees and the community. In similar studies, Agyabeng *et al.* (2020) examined supply chain sustainability success using economic and finance-based indicators, and Longoni and Cagliano (2018) argued that environmental disclosure and GPs positively affect a firm's financial performance and environmental performance.

Drawing inferences from the aforementioned literature, we developed the following hypotheses:

H1. GPs have a significant positive effect on SP.

H1a. GPs have a significant positive effect on economic SP.

H1b. GPs have a significant positive effect on environmental SP.

H1c. GPs have a significant positive effect on social SP.

2.3 The relationship among organizational culture, green practices and sustainability performances

For this study, OC is defined as the collective values and expectations within an entity that leads members of the same organization to behave similarly. Some authors (Rashid and Aslam, 2012;

Wang, 2019) have shown that it is beneficial for managers and their employees to understand shared behaviors rooted in a culture of quality excellence. Using tools that enhance OC, such as team-building workshops, can help integrate regulations and standards into everyday operations while maintaining a high level of performance and productivity (Carvalho *et al.*, 2021; Valmohammadi and Roshanzamir, 2015) and help establish routines that link quality to performance (Ghadimi *et al.*, 2021; Polites and Karahanna, 2013). Several studies have shown that a high organizational commitment to product quality is essential to strengthening the firm's performance (Aboelmaged, 2018; Hofmann and Oldehaver, 2016). An OC that emphasizes performance measurement and quality management should ultimately lead to higher levels of organizational effectiveness (Ababneh, 2021). Aligning employee behaviors and the vision of business leaders and with organizational goals can achieve a more effective organization culture (Schmiedel *et al.*, 2013).

Malik and Blumenfeld (2012) examined the relationship between commitment to quality management systems, information sharing, continuous improvement and teamwork in Indian businesses. They found a positive connection between the integration of quality management practices and OC (Macht and Davis, 2018) and decided to further examine the relationship. They posited that organizational leaders ensuring standardized procedures are understood and applied uniformly can enhance enterprise culture, stimulate innovation and form positive habits, leading to reduced quality-related issues. When sustainability is a part of a company's core strategy, the culture that binds the employees together can significantly impact the success of sustainability initiatives (Gandhi *et al.*, 2018; Thanki and Thakkar, 2019; Wang, 2019). In their research, the authors discussed strategies to influence a quality-compliant culture. They recognized the importance of knowledge management, habit and organizational effectiveness and their link to OC. Just as OC is unique and difficult to duplicate, organizational knowledge is also unique and could be a useful tool to add value to the organization (Macht and Davis, 2018).

The above research shows that OC is a primary component impacting the success of GP implementation and that it has a substantial, direct influence on SP and an indirect influence on green practices such as the use of green technology and waste management initiatives (Fuzi *et al.*, 2020; Ghadimi *et al.*, 2021; Thanki and Thakkar, 2019). Consequently, we propose the following hypotheses:

H2. OC has a significant positive relationship with GPs.

H2a. OC has a significant positive effect on economic SP.

H2b. OC has a significant positive effect on environmental SP.

H2c. OC has a significant positive effect on social SP.

H3. OC has a significant positive relationship with GPs that indirectly affects SP.

H3a. OC has a significant positive relationship with GPs that indirectly affects economic performance.

H3b. OC has a significant positive relationship with GPs that indirectly affects environmental performance.

H3c. OC has a significant positive relationship with GPs that indirectly affects SoP.

2.4 The relationship between total quality management practices and sustainability performance

For this research, we define TQMP as organizational practices that improve product quality and customer experience through the involvement of all employees in the organization via a

process approach. These practices have roots in the integrative approach to customer satisfaction and a company's overall success (Kaur *et al.*, 2020). Furthermore, organizations constantly face intense pressure from competitors, and they must realize the need to incorporate sustainable approaches and quality assurance checks to reach higher levels of improvement and profitability (Jiménez-Jiménez *et al.*, 2020; Tavana *et al.*, 2020). Therefore, it is a logical continuation of TQM research to expand these practices into a concept that also includes sustainability, long-term survival and growth, especially in globalizing economies (Agyabeng-Mensah *et al.*, 2020; Bastas and Liyanage, 2018; Green *et al.*, 2019; Sahoo and Vijayvargy, 2021; Yu *et al.*, 2019).

Zairi and Libur's (2001) discussion of TQM sustainability defined sustainable development as the ability to adapt to changes to deploy the best methods for maintaining superior performance. This definition of sustainable development implies that an organization's competitiveness is partly dependent on its quality management practices. Therefore, this vital concept of organizational and global sustainability should be a focus for company planning and should influence all policy development within a firm (Agyabeng-Mensah *et al.*, 2020; Baah *et al.*, 2020); a concept in line with the TQM philosophy and its implementation.

Several scholars have studied the characteristics within a firm that might lead to better SP. For example, Batas and Liyanage (2018) and Green *et al.* (2019) determined that managers' attitudes regarding green initiatives may influence their perceptions of quality improvement programs implemented in the workplace. Other research examined employee involvement (Rapp and Eklund, 2002), human resource management and leadership (Agyabeng-Mensah *et al.*, 2020), commitment (Matta *et al.*, 1996) and personality traits (Ahmad and Schroeder, 2002). This research determines that other factors could impact a manager's perceptions and attitudes. This current study further tests whether managers' perceptions of the effectiveness of varying TQM tools employed in the workplace will significantly affect managers' attitudes about going green.

Further research shows that strategic and human resource-enabling factors are significant in implementing TQM practices (Talapatra *et al.*, 2019). Aquilani *et al.* (2017) argued that one of the most significant gaps in the literature is the relationship between TQMP and SP. The Thanki and Thakkar (2019) study suggested that the implementation of TQMP could positively and directly influence SP. Khalil and Muneenam (2021) show that three TQMPs, namely, strategic planning, process management and human resource management, positively and significantly impact SP. This study will further explore the indirect effect of TQMP on SP through the implementation of GPs. Based on this evidence, we developed the following hypotheses:

H4. TQMPs have a significant positive relationship with GPs.

H4a. TQMPs have a significant positive relationship with GPs, directly affecting economic performance.

H4b. TQMPs have a significant positive relationship with GPs, directly affecting environmental performance.

H4c. TQMPs have a significant positive relationship with GPs, directly affecting SoP.

H5. TQMPs have a significant positive relationship with GPs, indirectly affecting SP.

H5a. TQMPs have a significant positive relationship with GPs, indirectly affecting economic performance.

H5b. TQMPs have a significant positive relationship with GPs, indirectly affecting environmental performance.

H5c. TQMPs have a significant positive relationship with GPs, indirectly affecting SoP.

2.5 The relationship between organizational culture and total quality management practices

Long *et al.* (2015) found that managers in Malaysian manufacturing firms could create a positive relationship between OC and TQM standards by implementing educational and innovative experiences. Lasrado and Kassem (2021) also found that an OC involving employee participation and engagement consequently leads to significant benefits in TQMPs. Choi *et al.* (2010) studied the performance of teams in organizations and observed cultural norms integrated into daily work practices. The authors concluded that shared knowledge identifies opportunities for continuous process improvement and product innovation (Choi *et al.*, 2010). Ababneh (2021) concluded that OC had a significant positive impact on quality management; therefore, it was imperative to cultivate a culture that engaged and encouraged employees. These studies support the notion that a robust OC should relate to better executed TQM performance and practices. Khalil and Muneenam (2021) show that OC positively and significantly mediates the causal relationship between TQMPs and SP. Based on Chan *et al.* (2012) and Wang (2019), this study supports that TQMPs mediate the relationship between OC and GPs that positively affect SP. Consequently, we developed the following hypotheses for this study:

H6. OC has a significant positive relationship with TQMPs, positively affecting the relationship between GPs and SP.

H6a. OC has a significant positive relationship with TQMPs, positively affecting the relationship between GPs and economic performance.

H6b. OC has a significant positive relationship with TQMPs, positively affecting the relationship between GPs and environmental performance.

H6c. OC has a significant positive relationship with TQMPs, positively affecting the relationship between GPs and SoP.

2.6 The research model

Based on the above hypotheses, we included four elements in this study's research model: TQMP, OC, GP and SP (Figure 1). The objectives of this study were to examine the relationships between these elements with the primary prediction that GPs within the organization should be related to SP and its three subcategories of Economic performance

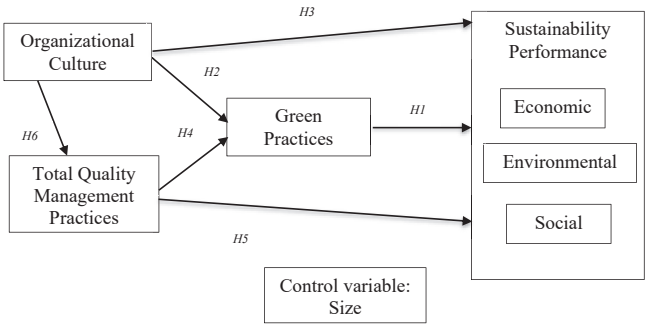


Figure 1.
Research model

(EP), Environmental performance (EnP) and SoP or H1 as shown in Figure 1. Additionally, a stronger green OC should be directly related to GPs but indirectly related to SP (H2 and H3 in Figure 1). Furthermore, organizations with TQMPs in place should be more supportive of the GPs (H4 in Figure 1) and will indirectly impact SP (H5 in Figure 1). Based on previous research, we expect OC to positively relate to an organizations' TQMPs (H6 in Figure 1).

3. Methodology

3.1 Research design, survey questionnaires, sample size and data collection

Due to the mixed results (Abbas and Sagsan, 2019; Ghadimi *et al.*, 2021; Khalil and Muneenam, 2021; Thanki and Thakkar, 2019) and the call for more research on corporate green practices (Wang, 2019), this study employed the quantitative and explanatory design to establish a clear relationship between the exogenous (OC) and endogenous (TQMP, GP, EP, EnP and SoP) latent variables depicted in Figure 1.

A structured questionnaire was developed by following the procedures suggested by the literature (Brace, 2018). The research team comprised four academic experts who reviewed existing scales, adopted the relevant items and developed new items based on current literature. We explain the items and scales used for each construct in Section 3.2. The questionnaire was pre-tested with 15 management practitioners. The feedback and recommendations from the practitioners helped discard ambiguous or irrelevant items. The final electronic questionnaire was composed of five sections. One section included demographic data, and four additional sections contained questions related to each of the four constructs. We developed the survey using Qualtrics.

Initially, 955 companies were contacted via personal referrals from the working professionals of different trade groups and advisory boards to seek participation in the study. We distributed electronic questionnaires through email with an electronic consent form upon approval from the companies. The email included an introduction and the research objectives and information on respondents' anonymity and confidentiality. Managers had four weeks to complete the questionnaires. In addition, respondents received a weekly email reminder to increase participation and response rate. Upon receiving the surveys, respondents were screened and validated by three criteria. First, the respondent's managerial experience had to be three or more years. Second, the company had at least one year of sustainability experience. Third, the data from regular and reverse-phrased questions were checked for consistency. Thus, the retained surveys were unbiased and answered by the respondents who knew the company's sustainability situation. There were 441 completed and validated surveys retained, which constitutes a response rate of 46%. From a data analysis standpoint, the sample size of 441 was sufficient for this study because the sample size computation for the structural equation model (SEM) Soper (2021) reveals that the minimum sample size for validity was 311, with 0.3 as the effect size, 0.99 as the power, 6 as the number of latent variables, 34 as the number of observed variables and 0.05 as Type I error. We studied a total of 441 full-time managers from various industries in several regions of the USA, and their demographic information is shown in Table 1.

3.2 Operationalization of the constructs and measures

3.2.1 Green practices. Standard GPs include emissions-reducing systems or processes, waste or pollution minimization equipment and technology and eco-friendly energy sources. Despite the extensive research done in the past two decades, there is no conclusive way to measure the GP construct. Based on previous research (Abdul-Rashid *et al.*, 2017; Afum *et al.*, 2020; Cabral and Lochan Dhar, 2019; Green *et al.*, 2019), this study measured GP by gauging

	Frequency	Percent
Industry		
Financial services	38	8.6
Health care	58	13.2
Technology	26	5.9
Manufacturing	44	10.0
Retail	50	11.3
Utilities	13	2.9
Food and restaurant	72	16.3
Others	140	31.7
Number of employees		
Fewer than 50	193	43.8
51–250	102	23.1
251–500	29	6.6
Over 500	117	26.5
Annual revenue		
Less than $25 Million	210	47.6
$25 to $100 Million	40	9.1
$101 to $500 Million	30	6.8
Over $500 Million	79	17.9
Unknown	82	18.6

Table 1.
Demographic variables

the perceived levels of use of 14 green sustainability initiatives with a 5-point Likert scale. After exploratory factor analysis (EFA), we retained 11 items for the GP construct (Table 2).

3.2.2 Organizational culture. OC refers to different beliefs, values, hidden assumptions and symbols shared by organization members that represent a general pattern of all dynamic interactions among the psychological and social elements (Brenyah and Darko, 2017; Cadden *et al.*, 2020). Based on previous research (Ababneh, 2021; Hartman *et al.*, 2009), the OC construct was operationalized and included a series of paired opposite items that asked whether the organization emphasizes quality or speed, innovation or tradition, proactive or reactive and the like, using a 7-point Likert scale. The two opposite ends are labeled as "3" with "0" in the middle to lessen the sensitizing effect on the respondents. After EFA, four out of seven items were retained for the OC construct (Table 2).

3.2.3 Total quality management practices. TQM is the paradigm of integrating and embracing technical and behavioral management perspectives to gain a competitive advantage (Jiménez-Jiménez *et al.*, 2020; Kaur *et al.*, 2020). In this study, TQMPs focused on the "hard aspects" of quality management and are devoted to measuring the *degree* of TQM tools and initiatives implemented in an organization. Previous research has shown (Al-Dhaafri and Al-Swidi, 2016; Castello *et al.*, 2020; Green *et al.*, 2019; Isa *et al.*, 2016) that TQMP can be measured by examining the perceived use of quality improvement techniques, procedures and tools. These ideas assume that if an organization has completely followed a quality management philosophy, TQMP should be used throughout the organization and in various functional areas rather than in isolation. Moreover, if "quality is indeed everyone's job," where quality management is more fully in place, managers should be aware of the various TQMP tools and techniques in use. On the other hand, if an organization has very little or no experience with TQM, the opposite should occur. To test this construct, we asked respondents about their perception of seven quality activities within their organization using a 5-point Likert scale. After EFA, all seven items were retained for the TQMP construct (Table 2).

Constructs	Factor loadings	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
Green practices (GPs)		0.913	0.903	0.703
Produces and designs environmentally friendly goods and services	0.740			
Uses recycled materials and reduces waste in the production of goods and services	0.844			
Uses less environmentally harmful materials in goods and services	0.762			
Reuses or safely disposes of products and supplies	0.630			
Uses environmentally friendly and energy-saving technologies in the production of goods and services	0.762			
Eliminates business practices that harm the environment	0.626			
Promotes environmentally friendly goods and services	0.763			
Leads and supports green activities inside and outside of the organization	0.647			
Allocates sufficient financial resources for green practices	0.782			
Creates a sustainable work culture and environment	0.449			
Measures the effectiveness of green procedures	0.653			
Social sustainability performance (SoP)		0.908	0.901	0.695
Have better relationships with customers	0.829			
Have better relationships with suppliers	0.712			
Have better relationships with employees	0.801			
Have better relationships with the community	0.868			
Provide a safer and healthier work environment	0.566			
Economic sustainability performance (EP)		0.862	0.872	0.634
Increase sales	0.695			
Increase profits	0.980			
Reduce costs of materials, energy and waste disposal	0.564			
Improve productivity	0.627			
Environmental sustainability performance (EnP)		0.876	0.877	0.703
Decrease the use of environmentally harmful materials or production processes	0.656			
Minimize the negative environmental impacts of business activities	0.594			
Reduce waste of energy and materials	0.781			
Organization Culture (OC)		0.765	0.762	0.533
Emphasize Quality or Speed	0.588			
Innovative or Traditional	0.424			
Proactive or Reactive	0.601			

(*continued*)

Table 2.
Construct reliability and convergent validity

Constructs	Factor loadings	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
Environmentally mindful or Environmentally unaware	0.540			
Total quality management practices (TQMPs)		0.815	0.898	0.595
Quality management awareness program	0.668			
Quality improvement teams/quality circles	0.790			
Quality checking tools (e.g. statistical process control, acceptance sampling)	0.785			
Internal quality audit	0.760			
Quality cost-benefit analysis	0.806			
Quality improvement/benchmarking measures	0.848			
Six Sigma program	0.547			

Table 2.

3.2.4 Sustainability performance. Following the NRBV framework, GP, TQMP and involvement culture are possible sources of substantial performance gains that enhance competitiveness (Hart, 1995). For an organization to be sustainable, achieving balanced economic, social and environmental success is necessary. Based on previous research (Abdul-Rashid *et al.*, 2017; Agyabeng-Mensah *et al.*, 2020, 2021a, b; Fuzi *et al.*, 2020; Hami *et al.*, 2015; Sahoo and Vijayvargy, 2021; Singh *et al.*, 2020; Yu *et al.*, 2019), sustainability performance was measured in three perspectives: environmental performance (EnP), SoP and economic performance (EP). We asked respondents to rate, on a Likert scale, 14 sustainability practices, such as: "Decrease the use of environmentally harmful materials or production processes," "Minimize the negative environmental impacts of business activities," "Have better relationships with employees," "Have better relationships with the community," "Have better relationships with customers," "Increase sales," "Increase profits," "Reduce costs" and "Improve productivity." After EFA, we retained 12 out of 14 items for the three sustainability performance constructs: EP, SoP and EnP (Table 2).

3.2.5 Control variable. We included firm size in the study as a control variable because previous studies (Isa *et al.*, 2016; Melao and Guia, 2015; Zee *et al.*, 2017) have shown that firm size, measured by the number of employees, is an important factor in explaining organizational strategy initiatives, like green and quality improvement practices and organizational effectiveness. A dummy variable, named size (1 if the company has 250 or more employees, 0 if the company has fewer than 250 employees), was used as a control variable.

3.3 Data screening, reliability and validity

We applied SPSS and AMOS statistical programs, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to obtain the constructs and used various tests to ensure the constructs were sound, reliable and had no validity issues. First, we checked normality, homoscedasticity and multicollinearity assumptions of variables. Since the skewness and kurtosis values were within positive and negative three, the variables in the study met the normality requirement. We tested for homoscedasticity using scatter plots with the research variable on the *y*-axis and the residual on the x-axis (Hair *et al.*, 2019). The plots demonstrate consistent patterns, and homoscedasticity was established. Variable Inflation Factor (VIF)

for each independent variable was used after running multivariate regression with SoP, EnP and EP as dependent variables. As seen in Table 3, all VIFs are less than 3, and Tolerances are less than 1, which implies that multicollinearity is not an issue in our study.

Lastly, construct reliability, convergent validity and discriminant validity were examined and summarized in Table 3. We estimated both Cronbach's alpha and composite reliability (CR) for construct reliability. The Cronbach's alphas for all constructs, ranging from 0.765 to 0.913, are above the 0.7 criterion, and the CRs, ranging from 0.762 to 0.903, are above 0.6 (Sarstedt *et al.*, 2017; Hair *et al.*, 2019). Hence, the constructs in the research model demonstrate good reliability. Average Variance Extracted (AVE) was used to determine convergent validity. The AVE values for all constructs, ranging from 0.533 to 0.703, are greater than 0.5 (Benitez *et al.*, 2020; Hair *et al.*, 2019), which indicates that convergent validity is achieved in this study. As shown in Table 4, the discriminant validity of the constructs is accomplished since AVE values are greater than the inter-construct correlations (Gaskin, 2016; Hair *et al.*, 2016, 2019).

3.4 Nonresponse bias and common method bias

Nonresponse bias is a concern in survey studies that can affect the generalizability of the findings. A *t*-test was used in this study to verify any significant differences in respondents' demographic and company information between early and late responses (Armstrong and

Model		Unstandardized coefficients B	Unstandardized coefficients Std. Error	Standardized coefficients Beta	*t*	Sig	Collinearity statistics Tolerance	Collinearity statistics VIF
1	(Constant)	1.569	0.223		7.049	0.000		
	GP	0.547	0.056	0.557	9.755	0.000	0.396	2.524
	OC	−0.055	0.060	−0.053	−0.922	0.357	0.390	2.565
	TQMP	0.139	0.046	0.122	3.012	0.003	0.787	1.270
Dependent variable: SoP								
1	(Constant)	2.018	0.221		9.151	0.000		
	GP	0.476	0.056	0.506	8.573	0.000	0.396	2.524
	OC	−0.148	0.060	−0.148	−2.489	0.013	0.390	2.565
	TQMP	0.007	0.046	0.007	0.156	0.876	0.787	1.270
Dependent variable: EnP								
1	(Constant)	1.245	0.287		4.345	0.000		
	GP	0.566	0.072	0.523	7.840	0.000	0.396	2.524
	OC	0.117	0.077	0.102	1.514	0.131	0.390	2.565
	TQMP	0.078	0.059	0.062	1.317	0.189	0.787	1.270
Dependent variable: EP								

Table 3.
Collinearity check

	AVE	GP	SoP	EP	EnP	OC	TQMP
GP	0.509	*0.713*					
SoP	0.695	0.584	*0.833*				
EP	0.634	0.416	0.726	*0.796*			
EnP	0.703	0.553	0.755	0.605	*0.839*		
OC	0.533	0.706	0.471	0.280	0.473	*0.730*	
TQMP	0.595	0.387	0.343	0.211	0.251	0.395	*0.771*

Table 4.
Discriminant validity - average variance extracted (AVE) and construct correlations

Overton, 1977). The test found no statistically significant differences ($p < 0.05$) between the early 305 samples and late 136 samples, ensuring that the data is valid and does not have substantial nonresponse bias. Next, we used Harman's one-factor test (Harman, 1976) to verify if there was a common method bias. The first extracted factor from EFA explained 33.84% of the variance, lower than the 50% cutoff point. Consequently, we confirmed the absence of common method bias in this study.

4. Results and discussions

4.1 Assessment of structural model

The hypothesized full structural model (Figure 2) with size as the control variable was tested using AMOS, and the model parameters were estimated using the maximum likelihood method. The proposed relationship between TQMP and EnP was removed due to the insignificant relationship and to free up the degrees of freedom for AMOS to run the model. Overall, the proposed model has a good fit based on the measures and thresholds in Hair *et al.* (2019). RMSEA (root mean square error of approximation) is 0.001 (threshold of less than 0.05); PCLOSE (p of close fit) is 0.896 (threshold of greater than 0.05); and CFI (comparative fit index) is 0.956 (threshold of greater than 0.95). The model also has shown predictive accuracy, evident by several significant R^2. OC has explained 24% of the variance in TQMP, TQMP and OC explained 62% of the variance in GP, and GP explained 40% of the variance in EnP, 44% in SP, and 23% in EP, respectively (Table 5).

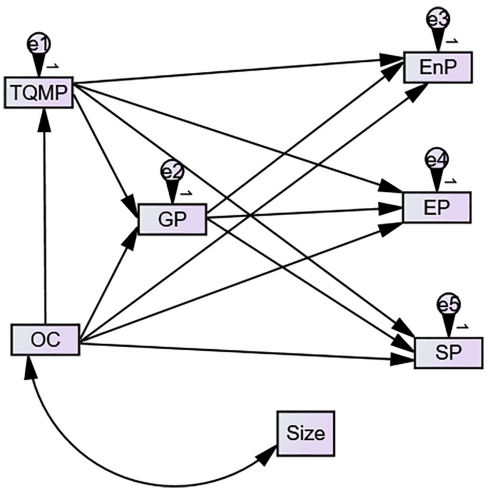


Figure 2.
Full structural model

Constructs	R Square
GP	0.616
EnP	0.545
SoP	0.436
EP	0.230
TQMP	0.241

Table 5.
Predictive accuracy (R^2)

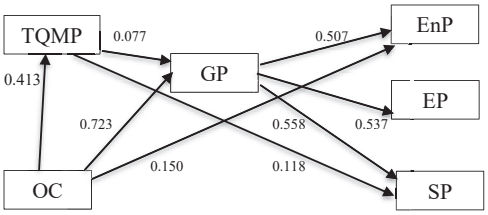
4.2 Hypotheses testing

To test the hypotheses of the study, we estimated and tested the path coefficients of the model, with the firm's size as the control variable. The first hypothesis (*H1a, H1b* and *H1c*) examined the relationships between GPs and SPs. Table 6 shows the beta coefficient values and *p*-values for each direct path of the SEM, and Figure 3 depicts the significant paths with the standardized coefficients. GP had substantial relationships with EP, EnP and SoP (*H1a, H1b* and *H1c*) and provided strong evidence supporting *H1*. The second and third hypotheses proposed relationships between OC and GPs, and OC and SPs indirectly through GPs. The paths between OC and GP and OC and EnP were statistically significant, but those between OC and EP and OC and SoP were not. When examining the indirect path of OC through GP to EnP, EP and SoP (Table 6), the relationships are significant. The results strongly supported *H2* and *H3*. The fourth and fifth hypotheses looked at relationships between TQMPs and GPs, and TQMPs and SPs through GPs. The direct paths from TQMP to GP and TQMP to SoP were significant (Table 5). The indirect paths TQMP to each of the sustainability performance measured (EnP, EP and SoP) through GP were significant (Table 7). *H4* and *H5* were supported. The sixth hypothesis suggested that OC has a positive relationship with TQMPs that positively affect SP through GPs. The direct path (Table 6) and the indirect paths from OC to TQMP to GP and then to EnP, EP and SoP (Table 7) are all statistically significant. The results strongly supported *H6*. Table 8 summarizes the statistical evidence to show whether each hypothesis was supported or not.

			Beta	*p*-value
GP	→	EnP	0.507	***
GP	→	EP	0.537	***
GP	→	SoP	0.558	***
OC	→	GP	0.723	***
OC	→	EnP	0.150	0.010
OC	→	EP	0.109	0.104
OC	→	SoP	0.054	0.339
TQMP	→	GP	0.077	0.023
TQMP	→	EP	0.069	0.088
TQMP	→	SoP	0.118	***
OC	→	TQMP	0.413	***
Size	→	EP	0.043	0.160
Size	→	TQMP	0.217	***
Size	→	GP	0.112	***

Note(s): *** significant at 0.001 level

Table 6.
Path coefficient (direct effect)



Note(s): * Values represent standardized coefficients with significance at $p < 0.05$

Figure 3.
SEM path model results

4.3 The direct effect

This research has accomplished the first research objective by examining the direct impact of GPs, OC and TQMPs on the triple bottom line dimensions of SP (EP, EnP and SoP). Results show that GP positively influences all three SP measures, which is consistent with the literature and the NRBV theory that organizations adopted green environmental practices and other strategies to gain competitive advantages and achieve organizational excellence (Ababneh, 2021; Al-Dhaafri and Alosani, 2021; Carvalho *et al.*, 2021). However, some previous studies that linked sustainability initiatives with SP did not use all three measures and showed mixed results. Çankaya and Sezen (2019) concluded green supply chain management practices were related to some but not all SP dimensions. Agyabeng-Mensah *et al.* (2020, 2021a, b) found positive relationships between green supply chain practices and social and environmental performances in manufacturing firms in Ghana. Sahoo and Vijayvargy (2021) found similar impacts of green supply chain practices on SP of Indian manufacturers. Baah *et al.* (2020, 2021) showed significant positive relationships between GPs and financial and economic SP.

Table 7.
Indirect path coefficient (indirect effect)

Indirect path	Estimate	*p*-value
OC→GP→EnP	0.036	***
OC→GP→EP	0.044	***
OC→GP→SoP	0.042	***
TQMP→GP→EnP	0.043	0.012
TQMP→GP→EP	0.052	0.012
TQMP→GP→SoP	0.049	0.012
OC→TQMP→GP→EnP	0.016	0.012
OC→TQMP→GP→EP	0.020	0.012
OC→TQMP→GP→SoP	0.019	0.012

Note(s): *** significant at 0.001 level

Table 8.
Summary of support for hypotheses

Hypotheses	Path	Beta coefficient	*p*-value	Supported?
H1a	GP→EP	0.507	0.001	Yes
H1b	GP→EnP	0.537	0.001	Yes
H1c	GP→SoP	0.558	0.000	Yes
H2	OC→GP	0.723	0.000	Yes
H2a	OC→EP	0.109	0.104	No
H2b	OC→EnP	0.150	0.010	Yes
H2c	OC→SoP	0.054	0.339	No
H3a	OC→GP→EP	0.036	0.001	Yes
H3b	OC→GP→EnP	0.044	0.001	Yes
H3c	OC→GP→SoP	0.042	0.001	Yes
H4	TQMP→GP	0.077	0.023	Yes
H4a	TQMP→EP	0.069	0.088	No
H4b	TQMP→EnP	N/A in SEM		
H4c	TQMP→SoP	0.118	0.001	Yes
H5a	TQMP→GP→EP	0.043	0.012	Yes
H5b	TQMP→GP→EnP	0.052	0.012	Yes
H5c	TQMP→GP→SoP	0.049	0.012	Yes
H6	OC→TQMP	0.413	0.001	Yes
H6a	OC→TQMP→GP→EP	0.016	0.012	Yes
H6b	OC→TQMP→GP→EnP	0.020	0.012	Yes
H6c	OC→TQMP→SoP	0.019	0.012	Yes

The results also show that OC and TQMP have a significant positive effect on GP. OC was found to positively affect EnP but not EP and SP, while TQMP was positively related to SP but not EnP and EP. These findings are comparable to several recent studies (Fuzi *et al.*, 2020; Ghadimi *et al.*, 2021; Green *et al.*, 2019; Thanki and Thakkar, 2019; Wang, 2019), in that GPs improved economic and SoP when the organizational culture supported sustainability and quality improvement. OC had a positive direct impact, while TQMP had minimal impact on environmental performance, such as decreasing the use of harmful materials and minimizing negative environmental impacts. An OC supporting environmentally friendly values motivates companies to become conscious of resources used, waste produced and energy consumed. TQMP's ideology of stakeholder focus and continuous improvement encourages strategies to satisfy stakeholder demands. The results relate to Khalil and Muneenam's (2021) findings that the impact of OC and TQMP on sustainability performance depends on several interrelated factors, such as top management engagement, knowledge and capitalization of the modern technologies and infrastructure. In general, OC governs the broad business environment, and TQMP focuses on economic-oriented activities, such as productivity improvement and cost reduction (Carvalho *et al.*, 2021; Lasrado and Kassem, 2021). OC and TQMP are possible strategic initiatives, as defined by the NRBV theory, in that they may affect sustainability performance indirectly through GP. We discuss indirect effect in the next section.

4.4 The indirect effect

To achieve the second objective, this research further tested the indirect effect of OC and TQMP on sustainability performance (EP_SP and EnP) through GP. The findings have shown that OC and TQMP have significant positive relationships with EnP, EP and SP through GP. In addition, OC has significant positive relationships with TQMP, which has significant positive relationships with EnP, EP and SP through GP. This indicates that OC is a prerequisite for properly implementing TQMPs and GPs. These, in turn, improve sustainability performance economically, socially and environmentally. This finding is similar to Ghadimi *et al.'s* (2021) study that successful implementation of GPs must be supported by an environmentally friendly OC, resulting in lower production costs and improved relationships with stakeholders (customers and suppliers). Developing a supportive and engaging OC is crucial for successfully implementing strategic initiatives, such as TQM practices and green environmental practices Ababneh (2021), Carvalho *et al.* (2021), Lasrado and Kassem (2021). Consistent with the Agyabeng-Mensah *et al.* (2021b) study, these results demonstrate that GPs combined with TQMPs and an environmentally supportive culture improve SP significantly and further conclude that the synergy between GPs, TQMP and OC plays a vital role in gaining competitive advantage via SP. Additionally, Green *et al.* (2019) and this study found that TQMP elevates green environmental practices to achieve economic, social and environmental sustainability performances. The substantial results of this study highlight the vital role of OC and TQMP that organizations implementing green environmental practices to increase competitive advantages, based on the NRBV theory, must involve multiple complex organizational initiatives and practices.

5. Conclusions

The present research considers the impact of organizational culture and total quality management practices on corporate green practices and sustainability performances. The researchers collected data from a large number of companies in diverse industries and used Structural Equation Modeling for data analysis. The findings have revealed a positive and significant impact of organizational culture and Total Quality Management Practices on green

practices and sustainability performance. As the results section indicated, we found strong support for Hypotheses 1, 4, 5, and 6 and partial support for Hypotheses 2 and 3 (Table 8). The paths between organizational culture and green practices and between organizational culture and environmental aspects of sustainability performance were statistically significant. However, the paths between organizational culture and economic aspect, and also the social aspect of sustainability performance, were statistically insignificant. This result could be attributed to the length of time companies have implemented green practices or promoted green awareness. Another attributing factor would be the inconsistencies of social perception within the sustainability literature and how organizations and individuals identify and interpret sustainability performance's social aspect.

Many businesses have undertaken various sustainability initiatives to mitigate the negative environmental impacts of their operations while achieving economic objectives and social welfare. These efforts highlight the complexity of environmental, social and economic sustainability dimensions and the power dynamics between achieving business and society goals. Organizations that embrace a green-oriented corporate culture and prioritize sustainability practices exude higher economic performance, greater positive impact on the environment, and have more concerns for the welfare of employees and community (Afum *et al.*, 2020; Çankaya and Sezen, 2019). When managers believe they work in organizations with a cohesive and environmentally impactful organizational culture that recognizes the importance of quality improvement practices, the sustainability initiatives generate a greater impact on the triple bottom line dimensions of sustainability performance (Agyabeng-Mensah *et al.*, 2021b; Ghadimi *et al.*, 2021; Thanki and Thakkar, 2019).

In the ever-changing global environment, organizations must implement innovative strategies and practices to balance economic, environmental and social sustainability performance. Being competitive and sustainable can be achieved when companies are willing to continuously pay attention to environmental issues and strategically invest in cost-efficient, eco-friendly and stakeholder-driven initiatives.

5.1 Theoretical implications

According to the NRBV theory, organizations adopt organizational and environmental initiatives to gain competitive advantages over their competitors (Hart, 1995). Several recent studies (Afum *et al.*, 2020; Agyabeng-Mensah *et al.*, 2020; Baah *et al.*, 2020, 2021) have reported statistical support for this construct. This study has extended the existing theoretical knowledge by developing and testing a complex model to examine both the direct and indirect effects of OC and TQMPs on the relationship between GPs and SP (economic, social and environmental). The structural analysis findings provided strong empirical evidence to confirm that GP positively influences EnP, EP and SP and the significant indirect effect of OC and TQMP, which is crucial for understanding the implementation success of GPs. Furthermore, the indirect impacts of OC-GP, TQMP-GP and OC-TQMP-GP on EnP, EP and SoP provided a more thorough explanation of SPs.

The current study illustrates that OC and TQM are important variables to consider when examining the effectiveness of GPs and SP. The results explain the vital role of OC and TQM practices. Organizations that strive for sustainability success must implement GPs while strengthening OC and improving the levels of TQMPs. From a theoretical point of view, based on the NRBV theory, this study provides an essential empirical step to understanding the integration of strategic practices, such as GPs, OC and TQMPs and their effectiveness at achieving the triple bottom line dimensions of sustainability success. This research bridges the literature gap on the OC–GP–SoP relationships and the TQMP–GP–SoP relationships and validates the NRBV theory by exploring the conceptual model's robustness via the SEM model, something not addressed in prior studies.

5.2 Practical implications

The current complex business environment compels companies to remain competitive, remain viable and thrive internationally while the pressure for businesses to protect and preserve the natural environment is mounting. As suggested by the NRBV theory, it is increasingly pertinent for businesses today to deploy sustainability strategies in addition to those typically implemented to stay competitive. The findings of this study support previous studies that show improvement in SP can be made through a sustainability-supportive and innovative OC (Agyabeng-Mensah *et al.*, 2021b; Fuzi *et al.*, 2020; Ghadimi *et al.*, 2021; Green *et al.*, 2019). These results encourage managers to make green OC a priority. Managers must cultivate the shared values of adopting eco-friendly strategies to differentiate themselves from their competitors. The results further demonstrate that through the synergy effect of TQM practices and environmentally mindful culture, organizations can accomplish financial, social and environmental success, leading to competitive advantage. Managers and practitioners must be fully aware of the importance of building an OC that supports environmental concerns and continuous quality improvement when developing a green strategy.

5.3 Limitations and future research

While this study contributes to the body of knowledge on sustainability, the results may not be generalizable because of the demographics of the respondents and the year in which we collected the data. First, the data were collected using a sample of respondents who worked in various industries, ranging from healthcare to manufacturing. Follow-up studies with a larger sample size ensuring statistically minimum representation in several major industries would better validate the findings and help determine if there are significant differences in industry-specific organizational cultures, total quality management practices, green practices and sustainability performances. Focusing on several key industries, such as manufacturing, healthcare, retail and finance and banking, would likely allow the development of industry-specific sustainability strategies and best practices. Second, ensuring a better geographical representation (both within the USA and internationally) in the data would help determine if the findings vary according to the location of the respondents or the company market. Future studies based in a different country should be conducted to examine if the findings can be generalized across different countries. If possible, the authors recommend replicating this study in India, Malaysia and Ghana, where research into some of these relationships has already occurred. Future studies can investigate the impact of GPs on companies with local, national or international markets. Third, because we collected the data during year 1 of the COVID pandemic, the results may be skewed, especially in the healthcare, retail and food and restaurant industries. Finally, once the working environment has been "normalized," the survey should be repeated as needed, perhaps annually, to provide insights into how various companies and industries perform during a crisis.

In addition, we also recommend further research to capture additional impact data on different supply chain partners and the bigger ecosystem. Aligning one company's sustainability effort to others in the entire supply chain may generate more substantial economic, environmental and social impacts since the coordinated efforts benefit the same ecosystem.

References

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