Received: 13 January 2021 | Revised: 9 June 2021 | Accepted: 21 June 2021

DOI: 10.1002/bse.2858

RESEARCH ARTICLE

Business Strategy and the Environment

WILEY

# Past, present, and future of green product innovation

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**Funding information**
Basic Research Program of the HSE University

## Abstract

Firms are under constant pressure from various governmental and nongovernmental agencies to switch from conventional environmentally polluting products to green product innovations (GPIs). However, the relevant research pertaining to GPI has been published in a diverse set of journals that vary in their scope and readership and, therefore, the scholarly contribution to the topic remains largely fragmented. This study has utilised a systematic literature review approach to examine the literary corpus on GPI to paint a holistic picture of its different aspects. The content and thematic analysis of 85 studies resulted in the extraction of seven key research themes: organisational capabilities, organisational learning, institutional pressures, barriers, structural changes, benefits of GPI, and methodological choices. This study's findings further highlight the various gaps in the GPI literature and raise some research questions that warrant scholarly investigation in the future. Likewise, our study has important implications for practitioners who are likely to benefit from a holistic understanding of the different aspects of GPI. Similarly, policymakers can use this study's findings to introduce policy interventions, especially in countries where GPI adoption is low.

**KEYWORDS**
green product innovation (GPI), institutional pressures, organisational learning, structural changes, systematic literature review

## 1 | INTRODUCTION

In the past few years, the adoption of green product innovations has gained momentum because firms see green product innovations (GPIs) as an opportunity to remain competitive in the market (Porter & Van Der Linde, 1995). The terms "firms," "organisations," and "businesses" have been used interchangeably in this study. GPI refers to the application of ideas to design new products or to modify existing ones so as to reduce their negative effects on the environment (Ghisetti & Rennings, 2014). Accordingly, GPI involves the design of energy-efficient innovative products and the use of eco-friendly or recovered materials or both as input measures in the production process (Amores-Salvadó et al., 2014; Ghisetti & Rennings, 2014). Similar to conventional innovations, GPIs also bring new knowledge, resources, and technologies to firms to make the necessary adjustments to changing customer's tastes and demands and to institutional expectations (Zhang, Zeng, et al., 2021).

Customers are now becoming aware of the detrimental effects of the products they consume. In consequence, they are asking for and switching to less polluting products with a better lifespan (Chen, 2008). Similarly, there is mounting pressure on firms from governmental regulatory bodies, nongovernmental agencies, rival firms, and indeed the media to switch to environmentally friendly products. Collectively, all stakeholders are pushing organisations to adhere to green labelling, adopt the certifications from the international organisation for standardisation (ISO), and make public disclosures related to

the use of materials and energy in their production processes (Amores-Salvadó et al., 2015). Consequently, organisations are becoming increasingly interested in adopting GPI.

Ever since sustainable development goals came into force, sustainability has taken centre stage in the innovation process. As a result, firms are feeling increasing pressure to develop sustainable products (Hofman et al., 2020). While innovation has always remained a critical success factor for firms across industries, producing greener products has become normal. Past research suggests that achieving sustainability requires a systemic approach guided by a proper vision (Walker et al., 2004). As biodiversity is fast declining, economic and social costs associated with not addressing environmental issues have become alarmingly higher (Stern et al., 2006). While radical change is required at the social, cultural, and institutional levels, businesses have a particular role to play (Loorbach & Wijsman, 2013). Therefore, firms have taken up green innovation to address societal concerns because it is seen as a significant factor in achieving environmental sustainability (Chen, 2008). Producing innovative green products reduces the wastage of materials and energy in production processes. It focuses on the usage and reusage of environmentally friendly materials that have a longer lifespan overall (Kivimaa & Kautto, 2010). All the above reasons act as drivers of firms' acceptance and adoption of GPIs.

The extant literature on GPIs has proliferated sizeably. This is evident from the number of studies that are published on GPIs each year. However, there has been a limited attempt to systematically review and synthesise the emerging prior literature on GPIs. The assessment of prior literature on GPI reveals that two noteworthy systematic literature reviews (SLRs) already exist in the domain. To begin with, Karimi Takalo et al. (2021) conducted a recent SLR on green innovation. However, green innovation is a much broader topic that does include GPI and other dimensions such as green process innovation, green managerial innovations, and green marketing innovations (Abu Seman et al., 2019). Moreover, it is a bibliometric review in which the authors have highlighted the various research contexts, top-cited authors, and journals apart from the methods and techniques utilised by researchers in green innovation studies. Although this SLR has its own significance, it does not provide a holistic picture of GPI literature in terms of the different challenges that green firms face in their day-to-day operations. In the second SLR, however, Dangelico (2015) has systematically extracted the antecedents, outcomes, and success factors of GPIs. This study is of great importance and has received significant attention from scholars, judging by the number of citations. However, it was published in 2015 when GPI research was still nascent, and our search revealed that a significant number of studies have been published on GPI since 2015. In addition, this study's focus was confined only to manufacturing concerns, further limiting the scope of this SLR. Consequently, there is an urgent need to systematically review the literature published on GPI to date. Building on the work of Dangelico (2015), this study aims to provide a detailed analysis of the relevant literature on GPI. In particular, the study focuses on the factors that facilitate or inhibit the efforts of organisations to successfully implement GPI. A meticulous review of the extant literature reveals different factors that influence the successful implementation of GPI. These include firms' capabilities and the roles of various external stakeholders. Therefore, an SLR cannot only help to synthesise and understand the issues related to GPI but, at the same time, it can also help in developing a comprehensive framework that can guide both management and external stakeholders.

The present study, therefore, has four main research objectives (**ROs**). **RO1**: To analyse the research profile of the relevant prior literature on GPI; **RO2**: To identify and assimilate the thematic foci of prior research studies on GPI; **RO3**: To understand gaps in the prior GPI literature; **RO4**: To develop a research framework that can be used by different stakeholders to understand the contours of GPI. To achieve this study's objectives, we synthesised the literature in consonance with the recently published SLR (Seth et al., 2020). To achieve the first objective (**RO1**) of this study, we first explain how to extract the congruent studies in terms of the conceptual boundary, databases selected, and keywords used along with the search and shortlisting criteria. We then conduct the study's research profiling and present the statistics on publication frequency, publication sources, geographical focus, methods used, sampling technique, and theoretical underpinnings. The second objective (**RO2**) was achieved by extracting seven different themes of shortlisted studies through manual content analysis, *including organisational capabilities*, *organisational learning*, *institutional pressures*, *barriers*, *structural changes*, *benefits of GPI*, *and methodological choices*. To achieve the third objective (**RO3**) of this study, we present the research gaps and the potential research questions that researchers can pursue to answer the various issues pertaining to GPI. Finally, the fourth objective (**RO4**) was achieved by developing a framework that explains the thematic findings of this study.

Sustainable development goals drive GPI, and much of the research has been interdisciplinary in nature. The studies on GPI have been published across journals with varied scope and diverse audiences, so the research contribution remains largely fragmented. This SLR outcome would be of great interest to a wider segment of stakeholders, including scholars, practitioners, and policymakers. As this study earmarks directions for future research, scholars are able to home in on the existing gaps in the GPI literature and contribute to the field. Practitioners can also benefit from the findings of this study. They can obtain a holistic understanding of the issues that organisations encounter while transitioning to GPIs, which may well help them to make better decisions. Likewise, policymakers, especially in emerging markets, can use the current study's results to make necessary policy interventions, pushing firms to adopt GPI. In this manner, our SLR contributes significantly to both theory and practice.

Our paper, segregated into six sections, begins with an introduction to the study. The second section outlines the scope and boundary conditions of this SLR. In the third section, we explain the research methods utilised to select and filter relevant studies. In the fourth section, we present the thematic review of the studies that we filtered. The fifth section covers the gaps in the GPI literature and potential research questions. In the sixth section, we provide the framework for this study. We conclude this paper with a seventh section discussing the theoretical and practical implications.

## 2 | SCOPE OF THE REVIEW

As environmental deterioration threatens the human race's very existence, increasing attention is being paid to every aspect of firms' innovation endeavours. The product innovation literature has gradually moved to green innovation over recent years, broadly categorised as green process innovation and GPI (Salvadó et al., 2012). While sustainability focuses on the reduce-reuse-recycle formula, it encompasses the greening of both products and process innovations. Green process innovation pertains to an overall reduction in the consumption of energy in production processes (Salvadó et al., 2012). It entails pollution and emission reduction and the switch to bioenergy (Kivimaa & Kautto, 2010). In comparison, GPI deals with changes or modifications in product designs to reduce their toxicity or enhance their biodegradability while, at the same time, reducing the overall raw material input (Kivimaa & Kautto, 2010).

This study focuses on the GPI literature for three reasons. First, scholars argue that it is easier for firms to switch from conventional nongreen product innovations to GPIs, which usually involve reducing toxic and nontoxic raw material usage. Accordingly, a firm can continue to use its existing nongreen processes to produce new green products (Peng & Liu, 2016). Second, most firms shy away from opting for green process innovation (Ma et al., 2017) due to the huge capital investments required to acquire new green technology and the longer pay-back periods associated with such acquisitions (Kassinis & Vafeas, 2006). Third, many firms have a current preference for designing green products in-house while outsourcing production to third parties (Khurshid et al., 2019). As firms are witnessing stiff competition with newer green product offerings from rival firms each passing day, most firms tend to go for GPIs. They require lower investment, and the results in terms of sales and profitability are short term in nature (Peng & Liu, 2016). All these arguments indicate that firms are moving in this direction because adopting and practising GPI is much easier to achieve various sustainable development goals. For this reason, the present study has focused on GPI.

To select the most fitting studies on GPI, we adopted a two-step process. First, we made sure to include only those papers in this SLR that mentioned "green innovation" in the title but discussed GPI instead. Second, as different synonymous terms such as environmental product innovation, eco-innovation, sustainability-oriented innovation, and green-based product innovations have been used for GPI by firms, we compared the definitions and the scale items used in those studies to assess whether the paper measured GPI. Specifically, as GPI involves the reduction of toxic material inputs, an increase in biodegradability, and an improvement in the energy efficiency of the products (Kivimaa & Kautto, 2010), we meticulously analysed the different terms used by researchers to see if they coincided with the definition and measurement scales used by GPI researchers. Accordingly, this SLR includes studies on GPIs and includes those journal articles that have used the above-mentioned terms.

## 3 | RESEARCH METHOD

This study aimed to conduct a critical literature review of studies on GPI and, for this purpose, we selected the SLR methodology. This deliberate choice of SLR was made for two reasons: its wider use and acceptability in management discipline (Talwar et al., 2020) and the ability to enable researchers to extract matching results (Seth et al., 2020). To ensure such replication of results by future researchers, the authors must report the identification, inclusion, and assessment criteria. In line with these arguments, the current study has followed a four-step process. In the first step, the review was planned; in the second step, the screening criteria were set out; in the third step, the data were extracted; and, in the fourth step, the data were executed.

### 3.1 | Planning the review

Since we wanted to maximise our search results for the GPI-related academic studies, three terms were specified: "green product innovation," "product innovation," AND "green." In our initial search, we utilised the Google Scholar search platform and analysed the initial 300 results to ascertain other relevant terms. Subsequently, top-rated journals on sustainability, pollution, and green innovation were searched using these terms to confirm if other related terms have been used for GPIs. A team comprising one senior professor, one practitioner, and two research scholars was constituted to discuss the keywords, search, and filtration criteria. The panel, after several discussions, added *sustainable product innovation*, *eco product innovation*, *eco-product innovation*, and *environment product innovation* to the keywords list. Once finalised, the list of keywords was searched on Scopus and Web of Science databases. These two databases include most, if not all, of the journal articles in question (Seth et al., 2020), which helps to explain our preference for using these two databases.

### 3.2 | Screening criteria

After selecting the keywords, we specified criteria to screen the studies to be included or excluded from the search results. Three inclusion criteria were specified: (a) studies published in the English language, (b) peer-reviewed articles, and (c) articles with a primary focus on GPI. The exclusion criteria were: (a) studies noncongruent with GPI, (b) not directly related to GPI, (c) duplicate articles, and (d) conceptual articles, editorials, review papers, theses, and conference proceedings.

### 3.3 | Data extraction

The final set of keywords was converted into a search string using "OR" and "AND" connectors (Figure 1) and executed on the 2nd of March 2021. The search results revealed a total of 641 English

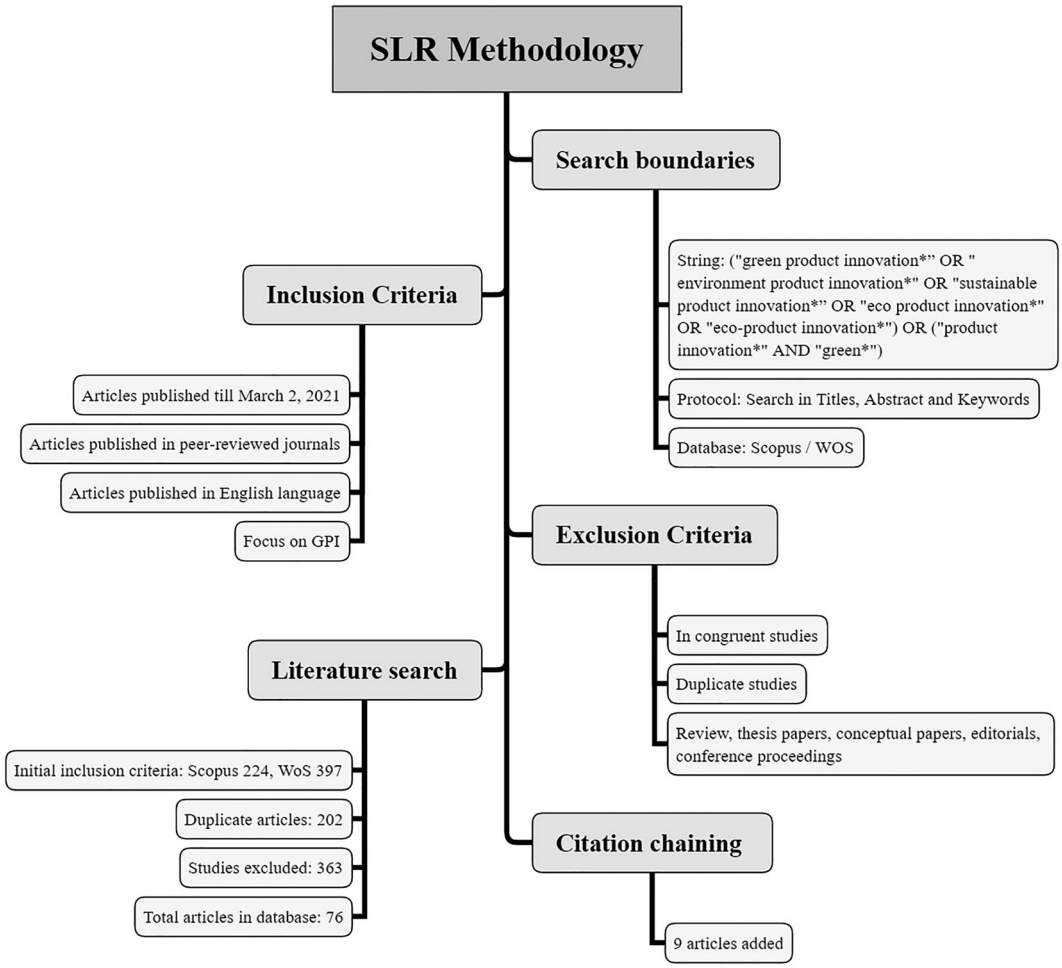



**FIGURE 1** SLR methodology adopted

language articles, of which 401 papers were extracted from the Web of Science and 240 papers from Scopus. The pre-specified inclusion criteria helped us remove 202 duplicate articles, while the exclusion criteria helped with the removal of 239 articles from the list. To minimise bias in the screening procedure, the researchers individually filtered the articles using the screening criteria. The researchers shared their results and discussed any differences in shortlisting to reach a final agreement. After several days of screening, 117 articles that the researchers felt were incongruent with the current study's conceptual boundary were removed. At this stage, the remaining 83 articles were assessed by a professor and a practitioner with significant green innovation research experience. Based on their feedback, we excluded a further seven articles from the list. However, going through the shortlisted articles, we identified nine articles on GPI not pinpointed in the initial search and, therefore, they were added to the list. The final list of 85 articles was then processed to extract the themes of this study, the limitations of our research, and potential directions for future research and practice.

### 3.4 | Research profiling

The review of the relevant studies suggests that the number of studies on GPI has gained momentum, especially over the last 3 years (see Figure 2), signifying the growing importance that researchers have attached to this field. It is evident (see Figure 3) that most of the studies have been published in *Business Strategy and the Environment* and the *Journal of Cleaner Production*, which illuminates the strategy-oriented focus of green researchers. Empirical studies conducted by researchers have focused on the Chinese and Vietnamese sample firms (see Figure 4). While tabulating the theories used by researchers (see Table 1), it was revealed that institutional theory, the resource-based view, and stakeholder theory had been the most used frameworks. As far as research methods (Figure 5) are concerned, most of the studies have utilised regression and structural equation modelling techniques, based on small sample primary data (Figure 6) and collected using various online tools (Figure 7), which limits the generalizability of the results.

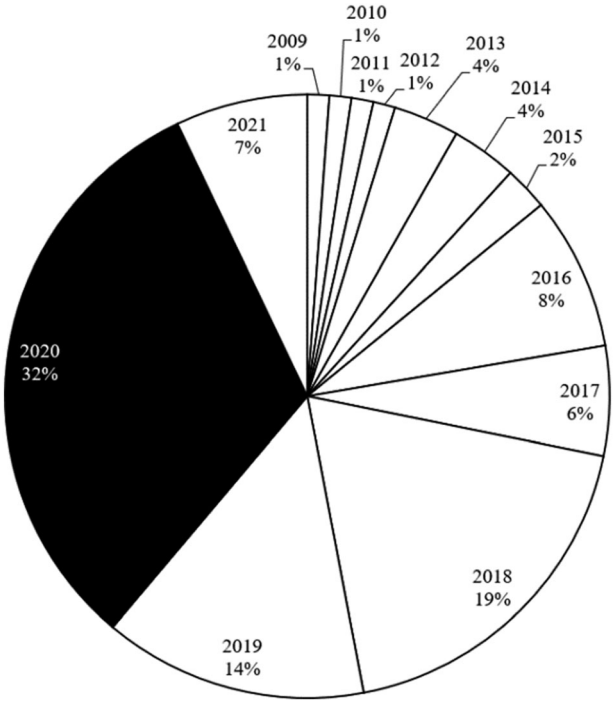



FIGURE 2 Yearly distribution of relevant GPI studies

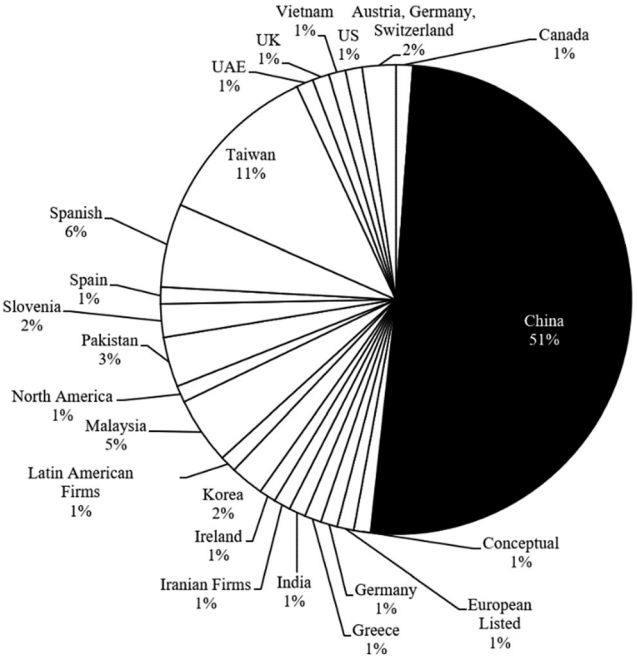
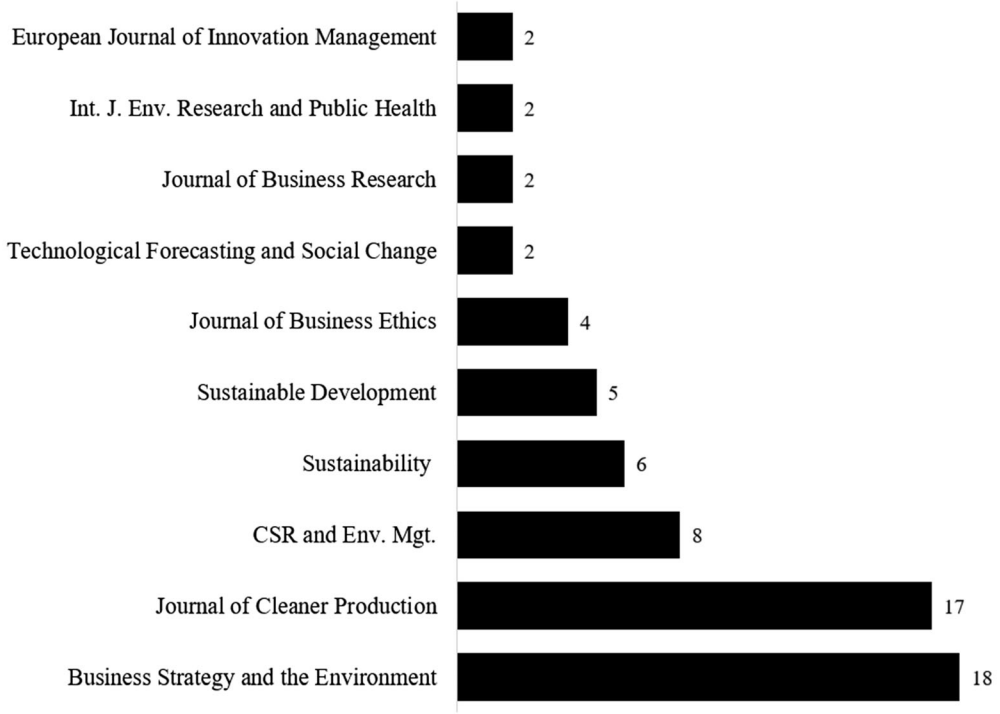



FIGURE 4 The geographic scope of relevant GPI studies




**Note:** Other journals that published one article each include Asia Pacific Business Review, Review of Managerial Science, Natural Hazards, Journal of Business & Industrial Marketing, International Journal of Physical Distribution & Logistics Management, Knowledge Management Research and Practice, International Journal of Production Economics, Management Decision, European Management Journal, Organization & Environment, Industrial Marketing Management, Industry and Innovation, Environmental Science and Pollution Research, Journal of Knowledge Management, Information Systems Management, Journal of Open Innovation: Technology, Market, and Complexity, Energy Policy, Ecological Economics, Journal of Environmental Economics and Management.

FIGURE 3 Journal-wise distribution of relevant GPI studies

**TABLE 1** Theoretical underpinnings of the relevant GPI studies

| Theoretical underpinnings | Authors |
|---|---|
| Absorptive capacity (2) | (Albort-Morant et al., 2018; Awan et al., 2021) |
| Business model theory (1) | (Ma et al., 2018) |
| Contingency theory (4) | (Chan et al., 2016; Li, Msaad, et al., 2020; Tsai & Liao, 2017; Zhang et al., 2018) |
| Dynamic capabilities (3) | (Huang & Li, 2017; Nanath & Pillai, 2017; Qiu et al., 2020) |
| Externality theory (1) | (Guo et al., 2018) |
| Innovation diffusion theory (1) | (Zhang, Sun, et al., 2020) |
| Institutional theory (10) | (Chen et al., 2018; Choi & Yi, 2018; Duque-Grisales et al., 2020; Hofman et al., 2020; Hu et al., 2019; Li et al., 2017; Shu et al., 2016; Xie et al., 2019; Yao et al., 2019; Zhang, Liang, et al., 2020) |
| New product development (2) | (Huang & Jim Wu, 2010; Pujari, 2006) |
| The resource-based view (9) | (Awan et al., 2019; Chen et al., 2018; Doran & Ryan, 2016; Feng et al., 2018; Guo et al., 2020; Li et al., 2017; Liao & Long, 2018; Lin et al., 2014; Nanath & Pillai, 2017) |
| Knowledge-based view (3) | (Cheng, 2020; Kong et al., 2020; Shahzad et al., 2020) |
| Legitimacy theory (1) | (He & Jiang, 2019) |
| Managerial cognition theory (1) | (Peng & Liu, 2016) |
| Natural resource-based view (6) | (Alos-Simo et al., 2020; Amores-Salvadó et al., 2014, 2015; Demirel & Kesidou, 2019; Duque-Grisales et al., 2020; Zhang, Pan, et al., 2020) |
| Organisational creativity theory (1) | (Song et al., 2020) |
| Organizational learning theory (3) | (Cui et al., 2020; Hojnik et al., 2018; Zhang & Zhu, 2019) |
| Resource dependency theory (3) | (Ilg, 2019; Peng & Liu, 2016; Xie et al., 2019) |
| Social capital theory (2) | (Awan et al., 2019; Delgado-Verde et al., 2014) |
| Social exchange theory (2) | (Guo et al., 2020; Zhang, Zeng, et al., 2020) |
| Stakeholder theory (17) | (Abdullah et al., 2016; Chang, 2019; Chen and Liu, 2020; Djoutsa Wamba et al., 2020; Doran & Ryan, 2016; Feng et al., 2018; Guoyou et al., 2013; He & Jiang, 2019; Lin et al., 2014; Lisi et al., 2020; Ogbeibu et al., 2020; Papagiannakis et al., 2019; Waheed et al., 2020; Wang, 2020; Xie et al., 2019; Zhang & Zhu, 2019; Zhang et al., 2018) |

## 4 | THEMATIC FOCI

The studies selected ($N = 85$) in this review have looked at GPIs from different perspectives and have investigated various aspects of them. To synthesise these diverse studies, an in-depth review and content analysis of each study was conducted to extract the common themes, which is in line with the recently published SLRs (Seth et al., 2020; Talwar et al., 2020). To ensure an unbiased narration of the selected literature, we followed a three-step procedure. First, the open coding of the filtered studies was undertaken by two researchers in the Microsoft Excel 2019 programme. Second, axial coding was undertaken by utilising inductive and deductive reasoning to identify the relationships among the open codes (see Table 2). Finally, one practitioner and a professor were engaged to review the identified themes that were extracted through open and axial coding. The experts were largely in agreement with the extracted results. However, in response to their feedback, some minor changes were incorporated. Accordingly, seven themes were finalised: organisational capabilities, organisational learning, institutional pressures, barriers to GPI development, structural changes, benefits of GPIs, and methodological choices, as presented in Figure 8.

### 4.1 | Organisational capabilities

Organisational capability is the ability of an organisation to develop and refine its resources and competencies to synchronise its new product developments with changing market dynamics (Dangelico et al., 2017). Capabilities are essential in transforming organisational resources into improved performance. Firms are currently working hard on their capabilities to innovate in order to stay relevant and sustain a competitive advantage in today's fiercely competitive markets (Demirel & Kesidou, 2019). The relevant literature on GPI has studied five organisational capabilities: green motives, corporate environmental ethics and commitment, environmental management systems, R&D strength, and technological readiness, which broadly

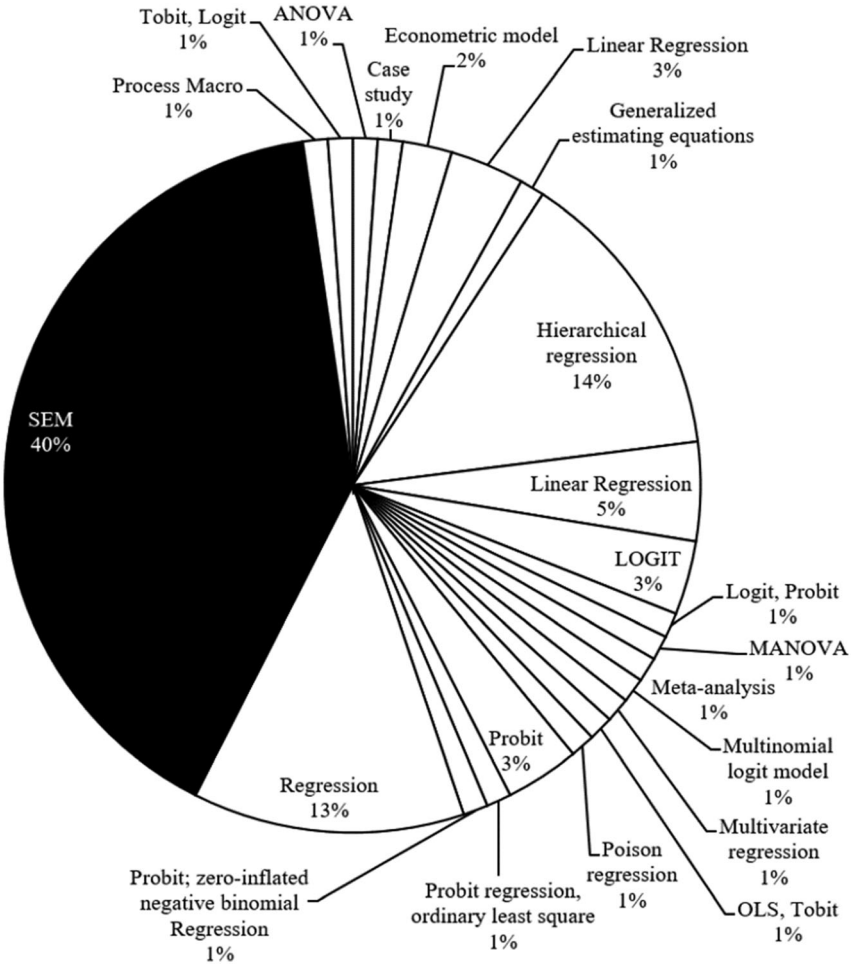



**FIGURE 5** Methods used in the relevant GPI studies

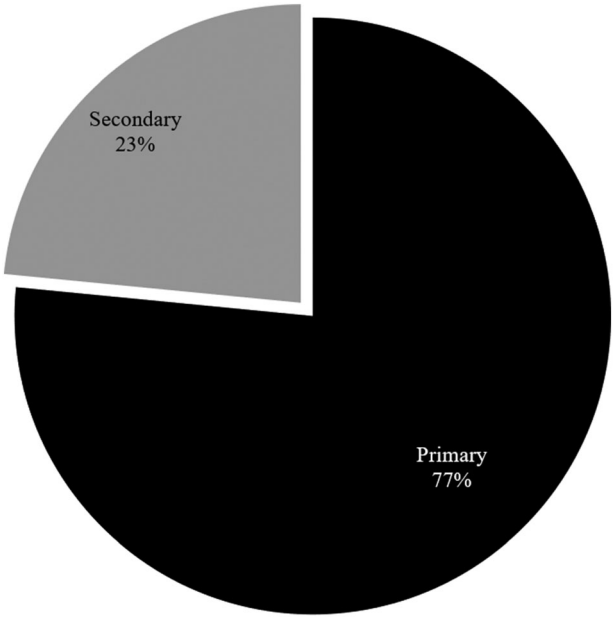



**FIGURE 6** Sampling procedure of relevant GPI studies

reflect the firm-specific capabilities that are required to produce GPIs.

### 4.1.1 | Green motives

The review of relevant studies suggests that three different green motives drive firms' participation in GPI: instrumental, relational and moral (Paulraj et al., 2017). These three motives stimulate firms to pursue GPI. To begin with, *instrumental motives*, driven by self-interest, help an organisation to reduce wastage of energy and resources by following sustainable guidelines. In consequence, its financial performance and reputation in the market are improved (Chang, 2019). In comparison, *relational motives* are driven by the firm's relationships with various stakeholders. It is difficult for a firm to strike a balance with the interests of its stakeholders (Testa et al., 2018) but, to survive in the marketplace, it must comply with stakeholder norms and expectations (Paulraj et al., 2017). Finally, *moral motives* are driven by ethical standards and principles. They push organisations to move beyond mandatory regulatory pressures to make a more positive contribution than competing firms (Chang, 2019). While the literature is clear on what drives these three motives and how they impact collectively on GPI, theoretical and empirical studies on their moderating impact on GPI are missing. Likewise, the moderating impact of other factors that can amplify or inhibit the influence of green motives on GPI is yet to be explored.

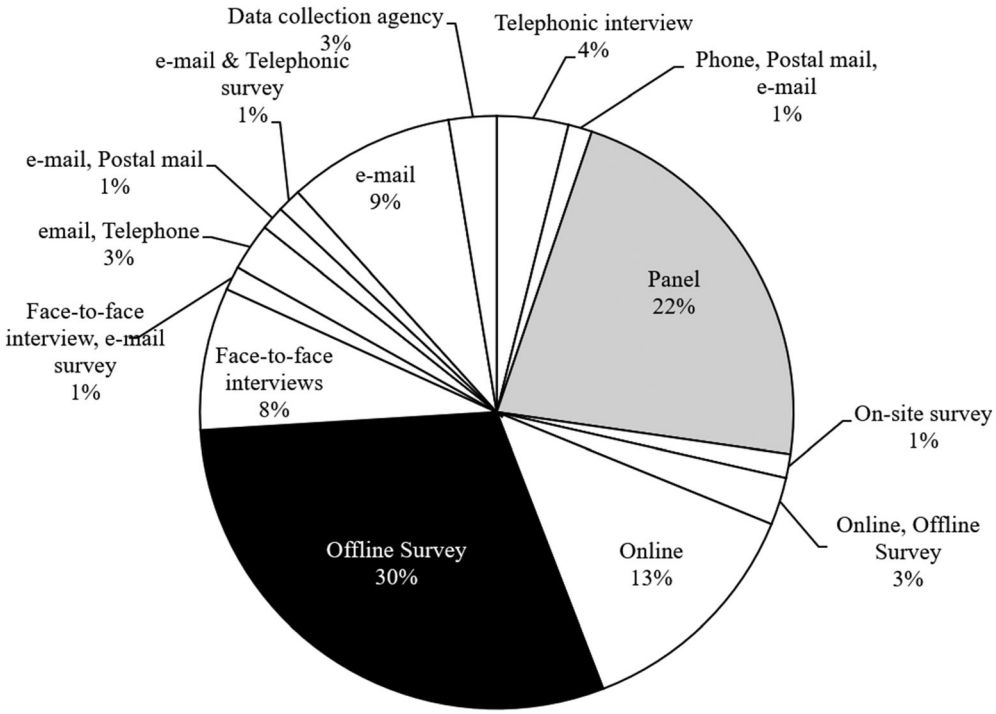



**FIGURE 7** Data collection techniques of relevant GPI studies

### 4.1.2 | Corporate environmental ethics and commitment

Corporate environmental ethics (CEE) encompasses the consolidation of environment-centric beliefs into the firm's overall decisions (Guo et al., 2020), and commitment is the strong sense of being green (McAllister & Studlar, 1999). Organisations with environmental ethics are concerned about the environment and tend to devote more time, effort, and resources to the development of GPIs (Hojnik & Ruzzier, 2016). CEE plays a positive role in pushing firms to commit to environmental management practices (Chen et al., 2006) and to conserve resources and reduce wastage in the production process (Liao, 2018). Chang (2011). Finding a positive influence of environmental ethics on GPI suggests that firms should invest more resources to develop their environmental ethics. Although there are a significant number of studies on the performance implications of ethical practices, studies on the antecedents of ethical practices are lacking. Moreover, the environmentally unethical practices of firms and the manner in which such practices can be tackled have not been thoroughly investigated.

On the other hand, commitment plays a critical role in strengthening the capabilities of an organisation to catch up with the changing environmental trends (Chang, 2016). The literature on GPI has used corporate environmental policy (Jabbour & Santos, 2006) and top management support (Huang & Jim Wu, 2010) to measure a firm's commitment to the environment. The policy aspects set the aims and structures needed to achieve such targets (Jabbour & Santos, 2006), while top-managerial support facilitates action through appropriate training, rewards, and other incentive schemes. Appropriate policy frameworks, commitment, and the support of top management for GPI are vital in integrating environmental concerns across different firms' functional areas (Huang & Jim Wu, 2010). While these studies have highlighted the importance of policy frameworks and top managerial support for GPI, research efforts are needed to understand the mechanisms through which the commitment of nongreen firms can be enhanced. Moreover, incumbent firms may find it hard to commit to green initiatives due to cultural and structural issues and, therefore, become tied to their nongreen offerings. Therefore, the factors or structural changes required to enhance the commitment of such firms to environmental issues need attention from the research community.

### 4.1.3 | Environmental management system

Considered as soft environmental policy instruments, the environmental management system (EMS) represents an organisation's self-regulation efforts and consists of defining the formal policies and strategies required to improve environmental product offerings (Anton et al., 2004). Deployment of a proper EMS not only helps in the development of tacit skills, irreplicable by competing firms, but it also offers organisations the capability to evaluate their present position and to identify potential environmental opportunities vis-à-vis the use of critical resources (Hernandez-Vivanco et al., 2018; Porter & Van Der Linde, 1995). It enables firms to reap the benefits of reduced material wastage and efficient production processes (Darnall et al., 2008). Similarly, the organisational learning process derived from the successful implementation of EMS has a significant impact on the GPIs (Rennings et al., 2006). However, the EMS's value creation abilities are conditional on the effective involvement of stakeholders who enhance the capabilities needed to address the firm's internal

**TABLE 2** Segregation of the relevant GPI articles into the six main themes of this study

| THEME | ARTICLES |
|---|---|
| Organisational capabilities | (Chang, 2011, 2016, 2019, 2018; Demirel & Kesidou, 2019; Feng et al., 2018; Guo et al., 2020; Hernandez-Vivanco et al., 2018; Hu et al., 2021; Huang & Li, 2017; Huang & Jim Wu, 2010; Nanath & Pillai, 2017; Papagiannakis et al., 2019; Zhang, Sun, et al., 2020) |
| Organisational learning | (Afshar Jahanshahi et al., 2020; Albort-Morant et al., 2018; Alos-Simo et al., 2020; Awan et al., 2019; Awan et al., 2020; Awan et al., 2021; Cheng, 2020; Cui et al., 2020; Delgado-Verde et al., 2014; Kong et al., 2020, 2016; Liao, 2018a; Lisi et al., 2020; Shahzad et al., 2020; Shu et al., 2016; Song et al., 2020; Waheed et al., 2020; Zhang, Pan, & Feng, 2020; Zhang et al., 2018) |
| Institutional pressures | (Chan et al., 2016; Chen & Liu, 2020; Chen et al., 2018; Choi & Yi, 2018; Doran & Ryan, 2016; Guo et al., 2018; Guoyou et al., 2013; Hofman et al., 2020; Hojnik et al., 2018; Hu et al., 2019; Kammerer, 2009; Li et al., 2017; Li, Tang, et al., 2020; Li & Ding, 2013; Li, Msaad, et al., 2020; Liao, 2018b; Lin et al., 2014, 2013; Stucki et al., 2018; Tsai & Liao, 2017; Wang, 2020; Yu et al., 2019; Zailani et al., 2015; Zhang & Zhu, 2019; Zhang, Liang, et al., 2020; Zhang, Zeng, et al., 2020; Zhao et al., 2020; Zubeltzu-Jaka et al., 2018) |
| Barriers to GPI development | (Abdullah et al., 2016; Dugoua & Dumas, 2021; Stucki, 2019) |
| Structural changes | (He & Jiang, 2019; Liao & Long, 2018; Muisyo & Qin, 2021; Nadeem et al., 2020; Ogbeibu et al., 2020; Peng & Liu, 2016; Singh et al., 2020) |
| Benefits of GPI | (Amores-Salvadó et al., 2014, 2015; Ch'ng et al., 2021; Djoutsa Wamba et al., 2020; Duque-Grisales et al., 2020; Hojnik & Ruzzier, 2017; Li, Msaad, et al., 2020; Long & Liao, 2021; Ma et al., 2018; Qiu et al., 2020; Skordoulis et al., 2020; Tang et al., 2018; Wong, 2012; Xie et al., 2019; Yao et al., 2019) |

deficiencies (Papagiannakis et al., 2019). Although the literature clearly states that the effective involvement of stakeholders is necessary to reap the benefits of GPI, what has not been investigated are the various internal capabilities required to implement such initiatives.

#### 4.1.4 | R&D strength

R&D refers to an organisation's capacity and resource abundance for new technological developments (Li & Calantone, 1998). R&D activities are critical in building the technological capabilities necessary for green innovation (Demirel & Kesidou, 2019). Developing such technologies helps organisations to produce radical innovations, but the results are not guaranteed (Scherer & Harhoff, 2000). R&D activities are time consuming and generate uncertain and highly skewed returns (Scherer, 1998), which in part explains why firms shy away from committing resources to such programmes.

Organisations that do not provide the required resources for R&D in green technologies may get stuck with environment-polluting technologies (Demirel & Kesidou, 2019). Although producing new environmentally friendly products has a positive impact on firm performance and holds the key to a sustainable competitive edge over rivals, especially in environmentally sensitive markets, it requires huge investment in technology and firm capabilities (Hutchinson, 1992). To motivate firms to increase their R&D activities in green product development, the role of governmental bodies cannot be under-emphasised (Guo et al., 2018). Appropriate governmental subsidies and tax incentives can promote organisations' green innovation activities because it reduces their overall development costs associated with such technologies (HE, 2014; Hu et al., 2021). While the GPI literature is clear on the benefits of R&D investments and government incentive programmes, studies have not unravelled the time taken by such investments to mature. Likewise, the costs associated with R&D investments in terms of failure rates, especially under dynamic environments, have not been studied.

#### 4.1.5 | Technological readiness

Technological readiness refers to the smoothness with which an enterprise adopts new technologies and integrates them into its business processes (Zhang, Sun, et al., 2020). GPIs require not only new materials that are less polluting but also the use of energy-efficient technologies. Although different environmentally friendly technologies are readily available to firms, the value of such technological acquisitions relies on how well they are integrated into the existing organisational systems. The organisation's challenge is to make such technology compatible with its system so that green innovation activities are facilitated (Mohammed et al., 2017). Zhang et al. (2020) have highlighted technological compatibility and relative advantage as two aspects of green innovation's technological readiness. They contend that technological compatibility will be extremely difficult to achieve for firms that lack the necessary resources or do not synchronise their strategies with the changing requirements of such a transition. The literature on GPI has not explored the various challenges that firms face while integrating different technologies into their organisational systems. Likewise, the coping practices that such firms use in this transition have also not been studied.

### 4.2 | Organisational learning

Organisational learning is a critical factor in the GPI process. Firms learn from different internal and external stakeholders, including their

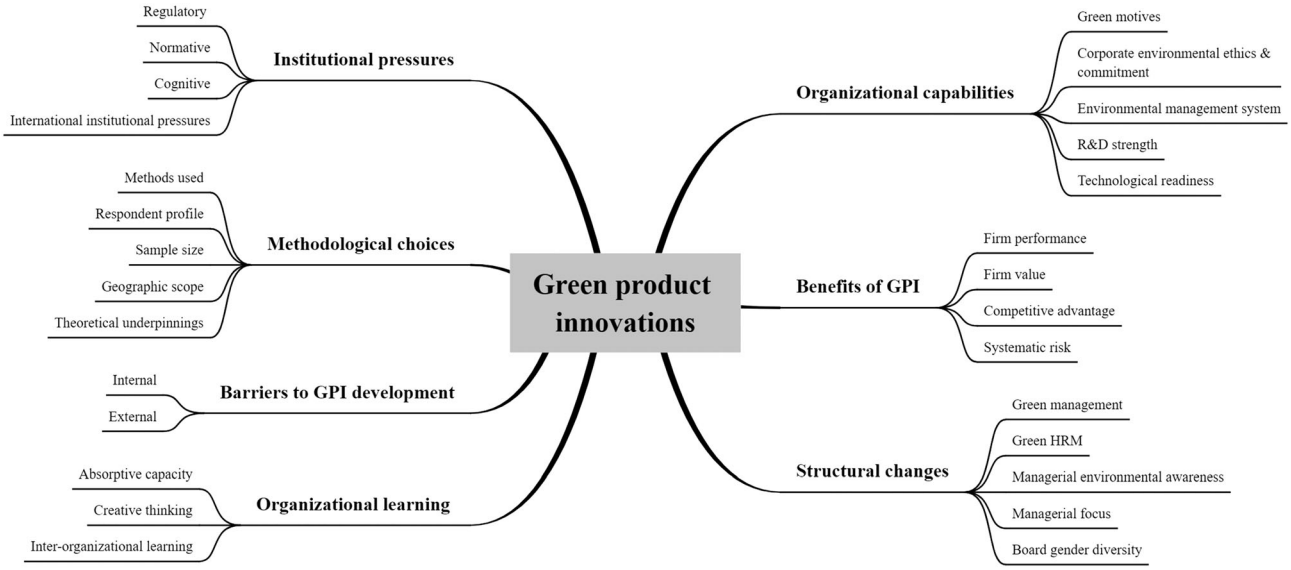



**FIGURE 8** Thematic foci of the studies

customers, suppliers, and alliance partners. They all play a significant role in the transmission of new knowledge to the firm (Manuj et al., 2014). The extant literature on GPI has broadly focused on the firm's absorptive capacity, creative thinking, and inter-organisational learning, which are explained below.

### 4.2.1 | Absorptive capacity

Absorptive capacity is defined as the ability of a firm to recognise, assimilate, and apply new information to profitable ends (Cohen & Levinthal, 1990). Zahra and George (2002) reconceptualised it as potential absorptive capacity (PACAP) and realised absorptive capacity (RACAP). PACAP involves acquiring and assimilating new knowledge, while RACAP transforms and exploits the newly absorbed knowledge. Knowledge acquisition refers to the attainment of new knowledge crucial for effective organisational processes (Attia & Salama, 2018), while knowledge assimilation refers to assessing, processing, and understanding information captured from external sources (Kim, 1997). Being a part of the organisational learning process, firms acquire knowledge from their internal sources—namely, colleagues and team members (Qasrawi et al., 2017). Firms also acquire knowledge through rigorous environmental scanning, which helps them gather information on customer buying behaviour and competitor strategies (Awan et al., 2020; Liao, 2018a). Environmental scanning refers to the acquisition and use of information about events, trends, and connections in an organisation's external environment (Aguilar, 1967). Regular environmental scanning keeps the firm sensitive and alert to consumers' changing tastes and preferences, thereby allowing it to seize potential opportunities for green innovation (Awan et al., 2020; Grimpe & Sofka, 2009; Liao, 2018a). As the firm widens its environmental scanning, it comes across different market segments and stakeholders demanding green products, directly on its product offerings, market share, and profitability (Liao, 2018a). This new information is made sense of by sharing it with employees while, at the same time, collecting information back from them (Attia & Salama, 2018). Discussions, collaborations, and networking activities drive these processes. Assimilation of knowledge in the organisation enhances employees' capabilities to handle tasks geared to the development of green innovations (Shahzad et al., 2020). PACAP has a positive impact on the production of new green products and triggers innovation activities, helping the firm beat the competition and grow faster than its rivals (Weerawardena & O'Cass, 2004).

RACAP involves leveraging the PACAP to transform and exploit it for commercial ends. Knowledge transformation refers to the refinement of routines that facilitates the integration of new and old knowledge (Zahra & George, 2002), while exploitation refers to the process of making knowledge vigorous and appropriate for the firm so that it can acquire a competitive edge over competitors whilst satisfying customer demands (Darroch, 2005). RACAP is a critical factor in GPI as mere acquisition and disseminating knowledge does not make much difference. RACAP allows the firm to implement new technologies that reduce emissions and waste and, therefore, has a positive impact on GPIs (Shahzad et al., 2020). While the GPI literature has clearly highlighted the positive impact of absorptive capacity on a firm's green performance, the mechanisms through which the firm can enhance its absorptive capacity for GPI has not been explored. Specifically, the role of big data and related techniques in GPI has not been explored by researchers.

### 4.2.2 | Creative thinking

Creativity is a problem-solving process of generating unique ideas or solutions (Awan et al., 2019), which allows the organisation to widen

its knowledge base while developing new product offerings (Leonard-Barton, 1992). Although creativity rests on the dimensions of originality and effectiveness (Moreau & Dahl, 2005), as per Awan et al. (2019), creativity involve five modes of thought: perceptual, creative, inventive, metacognitive, and performance thought. The novelty that arises from the combinatorial effect of different creative modes of thought helps in new knowledge creation and the resolution of conflicts in the organisation through the exchange of knowledge on a higher plane. Therefore, firms must divert their attention to novel green ideas that, once implemented, can increase the probability of green product development and enhance the competitive product advantage (Im et al., 2013). Likewise, scholarly attention is needed to understand the routines that can enhance the creativity of individuals in the firm, especially those engaged in nongreen production.

#### 4.2.3 | Inter-organisational learning

Cui et al. (2020), while empirically examining the roles of *vertical exploitative learning* (VEL) and *lateral explorative learning* (LEL) as elements in inter-organisational learning, conclude that both VEL and LEL assist an organisation in undertaking green innovation. Vertical exploitative learning helps firms refine existing knowledge on customers' environmental preferences, suppliers' environmentally friendly components, and distributors' market information. These knowledge resources play a crucial role in helping firms fulfil their customers' needs (Cui et al., 2020).

Research on green innovations indicates that the success of GPIs to a greater extent relies on their value for various stakeholders (Chen, 2008). Likewise, firms wanting to diversify their green offerings stress the importance of understanding the multifaceted needs of their stakeholders, which is facilitated by involving suppliers in the innovation process (Calic & Mosakowski, 2016). Such involvement gives the firm access to external complementary and heterogeneous knowledge (Laursen & Andersen, 2016). Therefore, firms are increasingly using suppliers as a *knowledge source* (Isaksson et al., 2016) and a *co-creator of knowledge* (Menguc et al., 2014) in the innovation development process. Since organisations are facing external pressures to act in environmentally friendly ways, involving suppliers in the production process enhances the firms' complementary (Kong et al., 2020) and heterogeneous knowledge about stakeholders' needs. This, in turn, helps them in the process of new product development (Isaksson et al., 2016). Likewise, green suppliers' involvement helps in the adoption of novel technologies and improvements in R&D functions (Cheng, 2020). Although involving suppliers in the learning process significantly helps firms with their GPI outcomes, researchers have not attempted to investigate the extent of such learning agreements. Involving suppliers in the learning process may compromise the firm's critical knowledge learnt over the years, and it might risk losing that knowledge to third parties and other suppliers who, ultimately, may become rival firms.

In contrast, lateral explorative learning is associated with exploring new knowledge rooted in universities and research institutes who have strong scientific, technological and R&D capabilities (De Silva & Rossi, 2018). Collaboration with universities and research institutions can help the firm secure access to environmentally friendly materials and new green technologies essential in creating green products (Cui et al., 2020). However, entering into such agreements does not guarantee the firm positive outcomes; on the contrary, it can lead to huge financial expenditure.

### 4.3 | Institutional pressures

According to institutional theory, firms exist in specific contexts, both implicit and explicit, represented broadly by various governing bodies, local communities, industries, and media, which provide guidelines and rules that these organisations tend to follow in order to gain legitimacy (Bansal & Clelland, 2004; Campbell, 2007). In analysing the literature on the different institutional pressures on firms to develop green products, we uncovered a wide range of regulatory, normative, cognitive, and international institutional pressures.

#### 4.3.1 | Regulatory pressure

Coercive pressure originates from governmental regulations (Prajogo et al., 2012) and compliance by firms is mandatory. Numerous studies have empirically verified the positive impact of such pressures on GPI (Hofman et al., 2020; Liao, 2018b; Yu et al., 2019), but the influence of these regulations varies across countries (Zhu et al., 2017). Coercive pressures push firms to follow environmental policies and regulations, which exercises a dampening impact on their GPI adoption practices (Stucki, 2019). Such policies impose additional costs on a firm to control pollution and increased production costs due to higher prices of certain factors, adversely affecting a firm's competitive advantage (Guo et al., 2018). Firms operating under such regulatory settings may become constrained in producing new green product offerings because dynamic capabilities are required. While the firm may also face other competitive pressures simultaneously, the manner in which a firm tackles these issues and finds ways to offer GPIs has yet to be explored.

#### 4.3.2 | Normative pressure

Normative pressure originates from different stakeholders, which include consumer groups and other nongovernmental bodies (Berrone et al., 2013). Firms tend to adopt innovative green initiatives to cater to customers' environmental requirements (Huang et al., 2016; Wang, 2020). Similarly, investors and the local community scrutinise firms' actions (Bansal & Clelland, 2004). Furthermore, media coverage plays a crucial role in highlighting the environmental practices that firms pursue (Chen et al., 2018). However, adopting GPI initiatives requires significant capital investment, further increasing the organisation's financial risks because results can never be

guaranteed (Ahuja et al., 2008). With regard to such initiatives, slack resources will increase the adaptive capability of the firm while reducing the level of uncertainty (Cyert & March, 1963). Conversely, organisations lacking such resources will find it hard to respond to such pressures (Leonidou et al., 2013). However, Chen and Liu (2020) propose that firms deficient in such resources, especially SMEs, should employ a co-opting strategy focused on customer involvement in the innovation process, which will, in turn, enhance their GPI capacities.

#### 4.3.3 | Cognitive pressure

Cognitive pressure is also referred to as mimetic pressure, which originates from competitors (Daddi et al., 2016). When firms lack goal clarity or face greater uncertainty, they imitate their successful competitors to gain legitimacy (Li & Ding, 2013). Firms operating under such pressure tend to take best practices as raw models and emulate competitors' actions. While Chen et al. (2018) recognise the importance of cognitive pressures on firms' GPIs efforts, they did not test this relationship empirically.

#### 4.3.4 | International institutional pressures

Firm internationalisation has a positive impact on adopting green innovation practices because the organisation will likely adhere to the demands of foreign partners and customers (Love & Ganotakis, 2013). International institutional pressure stimulates the adoption of corporate environmental practices, eco-auditing, and total environmental quality management systems (Kassolis, 2007). It pushes firms to adopt green certification (Luan et al., 2016).

### 4.4 | Barriers to GPI development

GPI barriers is the lack of appropriate factors needed to drive innovation (Stucki, 2019). The relevant literature has revealed various barriers to GPI, both internal and external (Abdullah et al., 2016; Dugoua & Dumas, 2021; Stucki, 2019). Although both internal and external barriers prevent an organisation from making a transition to GPI (Abdullah et al., 2016), Stucki (2019), our analysis of the impact of these barriers on the GPI efforts of firms showed that organisations with broad green innovation activities and those firms with little nongreen innovation experience perceive greater green innovation barriers. On the contrary, firms with higher experience in nongreen innovative activities and firms with experience in multiple technological fields perceive fewer green innovation barriers. While the literature has unravelled the various internal and external barriers that firms face in their transition to GPI, the manner in which firms tackle these barriers has not been studied. Greater research efforts are needed to investigate and empirically test the practices that firms can adopt or have adopted to tackle such barriers.

### 4.5 | Structural changes

Structural changes, defined as variations in the overall setup of organisations, are often required to provide adequate support for the new operations (Matt et al., 2015). Structural changes encompass changes in employees' organisational structure, organisational culture, leadership, roles, and skills (Vial, 2019). While analysing the studies selected, we encountered different structural variables: green management, green human resource management, managerial environmental awareness, managerial focus, and board gender diversity.

#### 4.5.1 | Green management

Green management may be defined as the firm's managerial approach to addressing environmental issues by adopting GPIs. Green management reduces the costs associated with capital, labour, and materials used in green products and increases firm revenues through preferential market access, product differentiation, and the transfer of lesser-polluting technologies (Ambec & Lanoie, 2008). As green management reshapes the entire business operation, it stimulates the organisation to radically innovate (Leonidou et al., 2013). While green management positively influences product innovation, the impact is greater on radical GPIs (Shu et al., 2016). The scant literary studies on green management have only examined the impact on GPIs, and other issues that managers may encounter in their pursuit of GPIs have not been examined.

#### 4.5.2 | Green human resource management

Green human resource management (GHRM) may be defined as a set of guidelines that inculcate an environmentally friendly employees' environment (Roscoe et al., 2019). GHRM practices include green recruitment and selection, green performance and compensation, and green training and development. Ogbeibu et al. (2020), while analysing the impact of GHRM practices on GPIs, found that green recruitment and selection, as well as green training and development, significantly influence GPIs through green team creativity. During the initial implementation of eco-friendly product innovations, green recruitment and selection might well be the core element required. Therefore, it is important for firms to continuously revisit and revise their green job descriptions (Renwick et al., 2016), which will help to realign teams' creativity and increase GPIs. As far as green performance and compensation are concerned, it negatively impacted green team creativity, exerting a dampening impact on GPI (Ogbeibu et al., 2020). This negative outcome could be a consequence of poorly drafted environmental guidelines and policies (Alfred & Adam, 2009). Likewise, the inclusion of strict targets and green responsibilities that are poorly defined or harder to achieve will dampen team creativity and further inhibit the organisation from developing GPIs (Renwick et al., 2013). Although GHRM practices have a positive influence on the green performance of organisations, without green innovative culture, an organisation

cannot reap the ultimate benefits of such practices (Muisyo & Qin, 2021). The literature clearly points to the fact that inducting employees with a bent towards environmental issues positively influences firms' GPI offerings. Yet, how to gauge such orientation during the recruitment and selection process has not been studied. Equally, the structural changes required to initiate a culture change conducive to fostering green-related product innovations in the firm have not been explored.

Transformational leaders also influence GHRM with a clear vision of a firm's present position and the future course of action needed to progress in dynamic markets (Bass & Avolio, 1990). While analysing the role of transformational leadership on the relationship between green human resource practices, Singh et al. (2020) found that green transformational leaders positively impact green human resource practices, which then translates into GPIs. They argue that organisations should develop green transformational leadership as a strategic resource and use it to further shape their green human resources, which will, in turn, help the organisation to implement GPIs.

#### 4.5.3 | Managerial environmental awareness

Managerial environmental awareness is one of the main drivers of GPI and concerns the environmental risk and cost–benefit awareness of managers (Gadenne et al., 2009; Peng & Liu, 2016). Environmental risk is the managerial awareness pertaining to the negative impact that a firm has on the environment. Environmental cost–benefit awareness refers to managerial awareness of the cost advantage accruing from better environmental-friendly practices (Peng & Liu, 2016). Managers with awareness of environmental risks are better versed in environmental regulations and the industry's healthy environmental practices (Gadenne et al., 2009). Therefore, they are more likely to adopt GPIs. However, managers with environmental cost–benefit awareness will focus more on improving the current product line and producing green products with a shorter pay-back period and higher visibility (Peng & Liu, 2016). While we know that managerial environmental awareness positively influences managers' decisions to adopt GPIs, research studies are needed to understand the process of structural change that firms can initiate to enhance environmental awareness in their staff, especially at top managerial team level.

#### 4.5.4 | Managerial focus

Managerial focus refers to the attempt made by an individual to reduce the gap between the current situation and the desired goal (Higgins, 1997). Liao and Long (2018), while studying the effect of this tendency on GPIs, divided it into promotion focus and prevention focus. Managers with a promotion focus pay attention to organisational growth, achievement, and ideal goals and, thus, are more concerned to achieve the same. Individuals with this orientation tend to be open to experimentation and, therefore, take higher risks. In contrast, managers with a prevention focus are highly sensitive to adverse outcomes and tend to tread a conservative path (Adams et al., 2011). Accordingly, managers with a promotion focus are open to new ideas and are more willing to take risks in pursuit of GPIs. Managers with a prevention focus have a negative influence on GPIs because they tend to avoid innovative ideas in the workplace (Liao & Long, 2018). Although the literature provides meaningful insights into the focus-related tendencies of top-level executives, studies that reflect on the ways and means through which potential CEOs with such tendencies can be inducted by firms are still lacking.

#### 4.5.5 | Board gender diversity

Men and women differ in their sensitivity to nature and their care for others (Carlson, 1972). As women are sensitive to ethical issues, female directors comply more readily with ethical practices (Ibrahim et al., 2009), avoid and discourage unethical practices (Cumming et al., 2015), and promote sustainability (Nadeem et al., 2017). Nadeem et al. (2020) endorse women's participation on boards and argue that women's sensitivity to environmental issues allows them to play a significantly positive role in the adoption of GPI strategies. The empirical investigation of He and Jiang (2019) found that female directors had a positive correlation with green innovations. They further contend that the inclusion of more women on boards enhances the likelihood of firms to pursue GPI because women are aware of the complexity of different stakeholders' needs. Although female participation does enhance firms' GPI outcomes, the issue largely centres on the changes required in the overall structure and thinking of the firm, which has not yet been explored.

### 4.6 | Benefits of GPI

Firms are increasingly adopting GPIs to earn higher profits based on increasing demand for environmentally friendly products from customers and to acquire a competitive edge over rival firms. Studies on GPIs have broadly analysed whether pursuing such innovations drives higher firm performance and value, reduces systematic risks, and helps obtain a competitive advantage in the marketplace.

#### 4.6.1 | Firm performance

Findings related to the performance implications of GPIs are somewhat inconclusive. A body of scholars firmly believes that pursuing GPI positively influences firm performance (Ch'ng et al., 2021; de Burgos-Jiménez et al., 2013). Likewise, Li et al. (2020), through their empirical analysis, demonstrate that GPI has a positive impact not only on the economic and social performance of a country but also on the firms' financial performance. On the contrary, some scholars (Duque-Grisales et al., 2020) argue that GPIs negatively impact firms' performance. Several reasons have been advanced to explain this

adverse effect, the most common of which is the higher cost associated with such investment (Rosenbusch et al., 2011). Other reasons include the myopic vision of managers and the high cost of acquiring cutting-edge technology (Duque-Grisales et al., 2020). In addition to these reasons, researchers found the performance of firms to be contingent on the firm's green image (Amores-Salvadó et al., 2014) and environmental management systems (Amores-Salvadó et al., 2015), managerial environmental concern (Tang et al., 2018) and the level of market turbulence (Ch'ng et al., 2021). Although the positive performance implications of GPI have been widely documented and accepted, what has not been explored is the impact of such decisions on the performance of small ventures, especially in dynamic environmental settings. Likewise, the time duration required for such investments to generate a return has not been studied.

#### 4.6.2 | Firm value

In the emerging economy context, GPIs harm firm value. Yao et al. (2019) have advanced two reasons for this adverse outcome. First, lack of awareness of customers about environmentally friendly products and their lack of willingness to bear the higher cost of such products. Second, since pursuing GPIs involves higher R&D costs, the lack of secure intellectual property rights makes it easier for other firms to imitate such products without facing legal action, resulting in the innovating firm's adverse financial performance (Lee & Zhou, 2012). However, proper and stringent institutional pressures can alter such negative implications for the valuation of organisations developing GPIs (Yao et al., 2019). However, not all countries have strict regulatory frameworks in place and, even if they do, the implementation of such regulations is a challenge, especially in emerging economies riddled with corruption. Researchers have not examined how green firms operating in such contexts secure their intellectual property whilst enticing customers to buy their products when cheaper nongreen alternatives are available in the market.

#### 4.6.3 | Competitive advantage

GPIs enhance the competitive advantage of firms in comparison to their rivals (Chang, 2011; Skordoulis et al., 2020). As GPIs use fewer resources, reduce toxic waste in the design process, and increase the lifespan of products (Kammerer, 2009), they are readily accepted by customers. These factors enhance the image of organisations in the marketplace and even create new markets where the firm has a competitive advantage (Chang, 2011). However, if the firm has a history of violating environmental norms and regulations, its product offerings in terms of GPI could be questioned by consumers who may regard such acts as hypocritical (Long & Liao, 2021). While the literature suggests that GPI enhances the competitive advantage of firms, researchers have not explored the manner in which firms producing nongreen product offerings retain a competitive edge during their transition to GPIs.

#### 4.6.4 | Systematic risk

Systematic risk is regarded as a nondiversifiable risk (Brealey & Myers, 2000) and, therefore, it has an impact on the stock price (Sharpe, 1964). Managerial decisions related to investments, operations, and financing influence a firm's systematic risk (Qi et al., 2012). The empirical analysis of Djoutsa Wamba et al. (2020) shows that GPIs reduce the systematic risk of a firm. They argue that producing environmentally friendly products can lead to improved operational efficiency, which then enhances the firm's financial performance. By enhancing the overall financial performance, the cost of capital comes down, which reduces the volatility of the stock price (Djoutsa Wamba et al., 2020). Accordingly, investing in the stock of those firms engaged in GPIs increases the wealth of shareholders while, at the same time, reduces the risks inherent in equity investing (Muhammad et al., 2015). However, this argument is based on the fact that producing GPIs reduces the operational efficiency of firms, which then translates into higher profits for the firm. In emerging economies, nongreen products are much cheaper than GPIs, and customers prefer to purchase those products (Yao et al., 2019) This can exert pressure on green firms because their inventory levels may pile up with fewer customers. While this counter argument may or may not be true, it has not been thoroughly examined, especially in an emerging economy context.

### 4.7 | Methodological choices

The focus of studies selected in this SLR has revolved around different aspects of GPI. In pursuing this line, researchers have included different stakeholders and employed varied methodologies. Therefore, the discussion in this section will focus on the different methods used, the sample profile, the geographical coverage, and the theoretical underpinnings. *Methods used:* Most of the empirical studies included in this SLR have utilised primary data for hypotheses testing, collected from offline surveys (e.g., Peng & Liu, 2016), face-to-face interviews (e.g., Lin et al., 2013), mail surveys (e.g., Abdullah et al., 2016), telephone interviews (e.g., Amores-Salvadó et al., 2014, 2015), and data collection agencies (e.g., Hofman et al., 2020). While most of these methods are cross-sectional in nature, they suffer from method variance bias and generalizability issues. *Respondent profile:* Data were collected from top-level executives (e.g., Dangelico & Pujari, 2010), managers from the top and middle levels (e.g., Shahzad et al., 2020; Shu et al., 2016), product development executives (Pujari, 2006), and team subordinates (e.g., Ogbeibu et al., 2020). Although data have been collected from a diverse set of respondents in the studies selected for this SLR, most of the studies have included senior management but have avoided junior managers and ground-level workers. *Sample size:* Most of the empirical studies included in this review have utilised data from fewer than 250 respondents (e.g., Ogbeibu et al., 2020; Pujari, 2006; Zailani et al., 2015). Therefore, the results extracted may not be generalizable to the wider segment of firms. *Geographic scope:* More than half of the empirical studies included in

**TABLE 3** Theme-based research questions

| Themes | Subthemes | Research gaps | Potential RQs for future research |
|---|---|---|---|
| **Organisational capabilities** | Green motives | • General lack of research on green motives.<br>• Researchers have not empirically examined factors that influence the green motives of firms.<br>• Factors that have a moderating effect on firms' green motives have not been studied. | RQ1.1. How do organisations inculcate green motives in their workforce?<br>RQ1.2. What factors positively or negatively influence the green motives of firms?<br>RQ1.3. Which factors act as moderators in the relationship between green motives and GPI? |
| | Corporate environmental ethics & commitment | • The extant literature has not fully explored the unethical behavioural practices of firms.<br>• The literature seems to be silent on the factors that enable or inhibit commitment to GPIs. | RQ1.4. What are the reasons behind firms' unethical behavioural practices?<br>RQ1.5. In what ways can firms modify and strengthen their ethical behavioural norms?<br>RQ1.6. How do firms enhance the commitment to GPIs across various hierarchical levels? |
| | Environmental management system (EMS) | • Not many studies have been undertaken to understand the capabilities required for EMS implementation.<br>• Studies are required to examine the conditional impact of factors on successful EMS implementation. | RQ1.7. What capabilities, internal and/or external, does a firm require for smooth EMS implementation?<br>RQ1.8. Which moderating factors enhance the EMS implementation success of the firm? |
| | R&D strength | The research on green R&D activities is under-explored. | RQ1.9. Which factors positively influence the firms' green R&D capabilities?<br>RQ1.10. How much time does it take the firms to reap the benefits of green R&D investments?<br>RQ1.11. Do firms still fail to develop meaningful green innovative products despite high R&D budgets?<br>RQ1.12. What is the impact of a highly volatile and uncertain environment on the green R&D activities of firms? |
| | Technological readiness | • The extant literature has not explored the challenges that firms encounter while integrating different technologies required to produce green products. | RQ1.13. What issues do firms encounter while integrating different technologies in their organisational systems, and how can such challenges be tackled? |
| **Organisational learning** | Absorptive capacity | • The mechanisms through which firms enhance their green absorptive capacity has not been properly explored.<br>• Studies are lacking on the role played by big data capabilities in understanding the negative perceptions and behavioural biases of customers towards green products. | RQ2.1. Which factors facilitate and strengthen the green absorptive capacity of firms?<br>RQ2.2. In what ways can big data and other related techniques help understand the negative perceptions and behavioural biases towards green products? |
| | Creative thinking | • There is a limited understanding of the individual's creativity amplifying or inhibiting factors in organisations. | RQ2.3. How do the incumbent firms enhance their creativity while transitioning to GPIs? |
| | Inter-organizational learning | | |

(Continues)

**TABLE 3** (Continued)

| Themes | Subthemes | Research gaps | Potential RQs for future research |
|---|---|---|---|
| | | • Literature seems to be lacking on the extent to which supplier involvement is deemed fit in inter-organisational learning agreements.<br>• The performance implications of university collaborations for GPIs have not been studied. | RQ2.4. In what ways and to what extent are university collaborations for green product-related knowledge beneficial for firms?<br>RQ2.5. Are university collaborations on GPIs fruitful in the long run for the firm? |
| **Institutional pressures** | Regulatory pressure | • Since firms' performance and competitive advantage are contingent on external and internal factors, there is a shortage of literature examining the same. | RQ3.1. In high regulatory environments, how do green firms constantly innovate with their product offerings?<br>RQ3.2. How do governmental agencies increase pressures on firms operating in contexts with little awareness and adoption of green products? |
| | Normative pressure | • Researchers have not explored how resource-constrained nongreen firms operating under increasing normative pressure switch to GPIs. | RQ3.3. In high normative environments, how do resource-constrained nongreen for-profit organisations raise long-term capital to switch to green products?<br>RQ3.4. How do the media and other nongovernmental agencies effectively increase pressure on nongreen firms operating in contexts with little economic incentives to switch to green products? |
| | Cognitive pressure | • Researchers have not examined the role of cognitive pressure in the development of GPI by firms. | RQ3.5. Are cognitive pressures effective in pushing rival firms to adopt GPIs? If yes, how? |
| **Barriers to GPI** | Internal/external | • Studies are lacking on the mechanisms that firms should adopt to overcome their internal and external barriers to GPIs. | RQ4.1. How do firms motivate nongreen customers to switch to green products?<br>RQ4.2. How do firms overcome the stigma associated with green products?<br>RQ4.3. In what ways can policy decisions at the government level amplify innovation efforts concerning green products? |
| **Structural changes** | Green management | • Challenges faced by top management in adopting GPIs have not been explored. | RQ5.1. When is the induction of an environmentally oriented CEO into the firm met with resistance from the employees?<br>RQ5.2. What structural changes in board composition are required to turn firms towards GPIs. |
| | Green human resource management | • Factors that may explain the environmental sensitivity of candidates in the interview have not been explored.<br>• The antecedents and facilitating conditions to green innovative culture have not been explored. | RQ5.3. What factors should organisations look for during the recruitment and selection of personnel?<br>RQ5.4. What are structural changes required to develop an innovative culture in the firm conducive to GPI? |

**TABLE 3** (Continued)

| Themes | Subthemes | Research gaps | Potential RQs for future research |
|---|---|---|---|
| | Managerial environmental awareness | • Researchers should focus on understanding the mechanisms through which the environmental risk awareness of managers and other personnel can be amplified. | RQ5.5. What processes enhance the environmental awareness of management in organisations? |
| | Managerial focus | • Previous studies have not unravelled the processes followed by firms to recruit potential CEO with an environmental focus. | RQ5.6. How do firms gauge the promotion/prevention focus of potential CEOs during recruitment?<br>RQ5.7. How do CEOs establish a balance between promotion and prevention strategies? |
| | Board gender diversity | • Studies are needed to understand the policy decisions required to bridge the gender gaps in boards.<br>• Researchers need to unravel the various issues that female board members are facing in the workplace. | RQ5.8. Can national policy level decisions push firms to create more gender-diverse boards? How?<br>RQ5.9. How much power do female board members have in the overall decision making? |
| **Benefits of GPI** | Firm performance | • More in-depth studies are needed to explore the implications of GPI decisions on the long-term performance of firms. | RQ6.1. Does adopting a GPI strategy pay higher returns in the long run?<br>RQ6.2. Do micro, small, and medium-scale firms succeed with their green product offerings in less developed economies?<br>RQ6.3. What time lag should be considered while estimating the performance implications of GPIs? |
| | Firm value | • As the stock market valuation of firms is contingent on their sales performance, research seems to be lacking on the factors that can create the acceptability of green products at the political and societal level. | RQ6.4. In what ways do firms operating in emerging economies motivate customers to buy green products?<br>RQ6.5. In what ways are network ties helpful to the firms engaged in GPIs in lobbying for strict environmental regulations? |
| | Competitive advantage | • The mechanisms through which nongreen firms, switching to GPIs, sustain their competitive advantage have not been studied. | RQ6.6. How do organisations engaged in nongreen product development maintain their competitive edge during their transition to GPIs?<br>RQ6.7. How do firms offering green products sustain their competitive edge in cost-conscious markets? |
| | Systematic risk | • Literature is silent on the role of cheaper nongreen products in amplifying the systematic risks of firms engaged in GPIs. | RQ6.8. How do firms offering green products in emerging economies reduce their systematic risk? |
| **Methodological choices** | | • A limited number of studies have utilised longitudinal survey design.<br>• The literature on GPI has mostly surveyed senior and mid-level management, while junior employees and customers have been avoided.<br>• Studies published on GPIs have mostly tested their hypotheses through sample | RQ7.1. In what ways do longitudinal survey designs improve our understanding of GPI-related issues?<br>RQ7.2. Can the inclusion of junior employees in the sample add to our understanding of GPI issues? If yes, how? |

(Continues)

**TABLE 3** (Continued)

| Themes | Subthemes | Research gaps | Potential RQs for future research |
|---|---|---|---|
| | | sizes, which may not adequately represent the population.<br>• The focus of most studies in this SLR has been on China and Taiwan, and other important emerging countries have been neglected. Similarly, fewer studies have been conducted on GPIs in the developed world.<br>• Fewer studies have utilised learning and related networking theories to understand GPI-related issues through different dimensions. | RQ7.3. How do customer-centric surveys add value to the GPI efforts of the firm?<br>RQ7.4. How can researchers improve the generalizability of their findings extracted from small samples?<br>RQ7.5. Can the findings of a study examined in one emerging economy be generalised to other emerging economies? Why?<br>RQ7.6. Are there any unique GPI strategies from the less developed world that other developed economies can adopt?<br>RQ7.7. In what ways can different theoretical lenses be used by researchers to add to the GPI literature? |

this review have utilised samples from China and Taiwan (see Figure 4), while other developed or emerging economies have been neglected. *Theoretical underpinnings:* As is evident from Figure 4, a majority of researchers have used the institutional, resource-based view and stakeholder theories to understand the various GPI issues. Future work incorporating other theories of learning, dynamic capabilities, networking, and behaviour are needed to further contribute to this topic.

## 5 | RESEARCH GAPS AND POTENTIAL RESEARCH QUESTIONS

A critical analysis of the research profile and the seven themes extracted from the review has enabled us to identify the lacunas in the selected GPI literature. These gaps—categorised and highlighted in Table 3—provide a pathway for future research that can aid managerial decision making on GPI strategies.

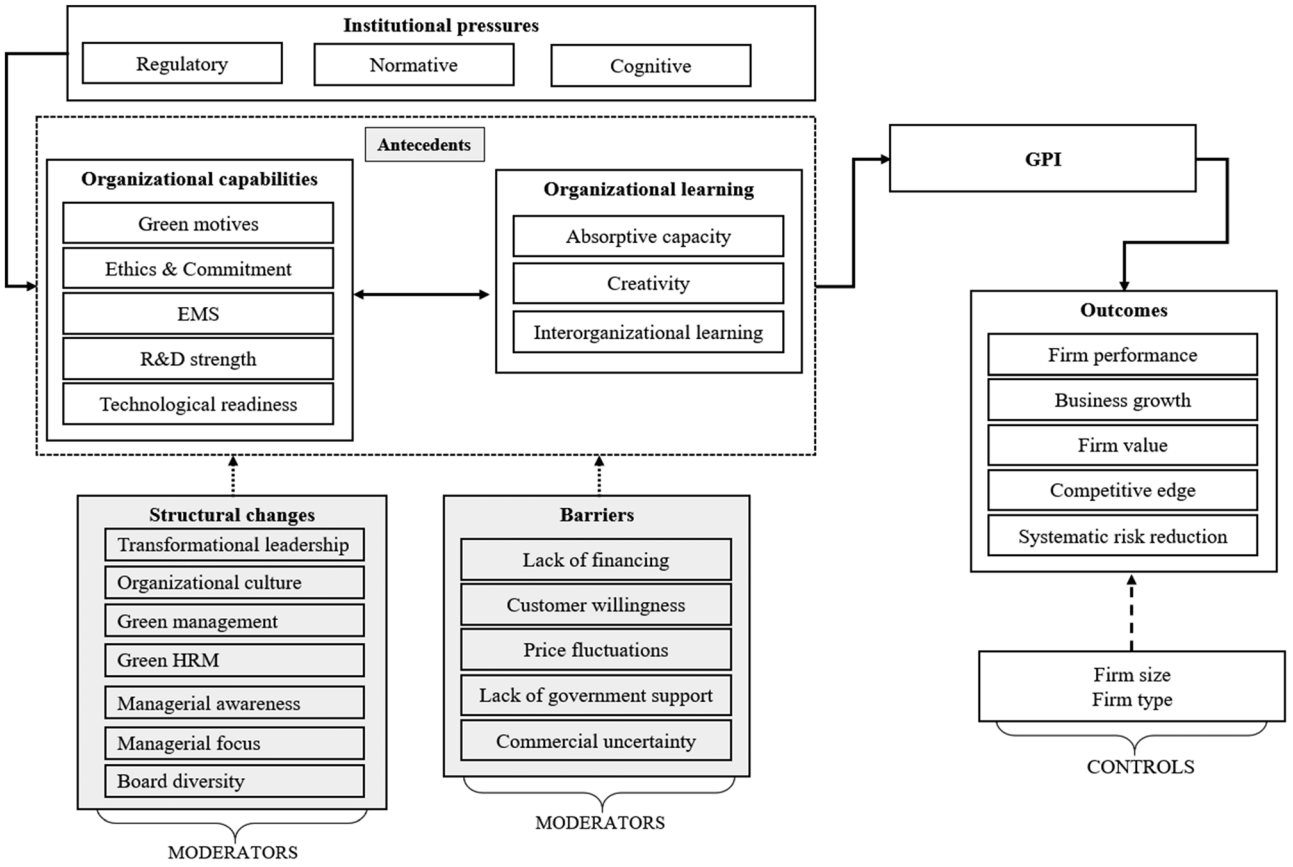
## 6 | FRAMEWORK FOR GREEN PRODUCT INNOVATION DEVELOPMENT AND IMPLEMENTATION

We have developed a conceptual framework to underscore the various aspects of GPI that are worth exploring. The framework is based on the content analysis of the selected studies, which has furnished various thematic areas of research, possible research gaps, and avenues for future research (see Figure 9). The study has utilised a diverse set of theoretical lenses to explore the association of this framework's different components. Included are the dynamic capabilities view (DCV) theory, organisational learning theory (OLT), and institutional theory. DCV theory contends that firms must develop dynamic capabilities that rest on their ability to adapt their available resources and competencies to address the changing demands of the environment (Teece, 2007). DCV theory is, therefore, relevant to the developed framework because scholars have viewed GPI as a dynamic capability, representing the firm's ability to innovate in the face of a changing environment (Huang & Li, 2017; Qiu et al., 2020).

OLT posits that firms tend to conform to the fundamental operating paradigm and resist change in the absence of organisational learning processes (Levinthal, 1991). As GPIs require significant changes in the existing structures and capabilities (Huang & Li, 2017), it is impossible without proper organisational learning mechanisms in place. Therefore, organisational learning theory is relevant because GPI requires overcoming organisational inertia, learning new behaviours, and interpreting phenomena in new ways (Albort-Morant et al., 2016).

On the other hand, institutional theory holds that organisational behaviour is contingent on the institutional environment that surrounds the firm (DiMaggio & Powell, 1983). Broadly, the literature has categorised the various institutional pressures such as regulatory, coercive and normative pressures; they all have a significantly positive impact on GPI (Hofman et al., 2020). Institutional theory suits the present context because these pressures force the firm to switch to GPIs, which warrants significant change in an organisation's capabilities and learning processes.

The framework has been sectioned into five blocks—institutional pressures, antecedents, moderators, outcomes, and controls—that firms should consider when pursuing GPIs. *Institutional pressures* act as trigger points that push the firm to initiate change in its capabilities and learning activities. Our framework's *antecedents* include




**Note:** The arrows do not represent statistical relationships. Rather, they detail an overarching sequence of relationships extracted from the extant literature.

**FIGURE 9** The framework of the present study

organisational capabilities (grounded in DCV theory) and organisational learning (embedded in OLT). We argue that organisational capabilities and organisational learning go hand in hand—that is to say, learning-related activities have a bidirectional relationship with organisational capabilities because learning activities will trigger a change in the firm's capabilities and vice versa. The various capabilities and learning activities reinforce each other and have a positive impact on GPIs. However, this relationship will be influenced by different *moderators*, which are broadly categorised as structural changes and barriers. The successful implementation of GPIs will lead to positive outcomes in firm performance, business growth, firm value, competitive edge, and systematic risk reduction. This performance is subject to type and firm size and, therefore, have been added as *control* variables.

The developed framework hypothesises that institutional pressures trigger changes in organisational capabilities. As firms are pressured to switch to GPI, they would be required to abandon unethical behaviours and practices, increase their commitment to the environment, implement a proper EMS in the organisation, and enhance their R&D strength and technological readiness. Similarly, institutional pressures will trigger changes in organisational learning processes. Firms under different pressures will enhance their absorptive capacity, be more creative, and enter into different agreements with various stakeholders and partner firms. However, organisational capabilities and organisational learning will enforce each other, and together they will positively lead to GPIs.

Furthermore, while utilising the DCV theory, we argue that structural changes are dynamic capabilities that the firm must possess or acquire to effectively change and manage the various organisational learning processes and firm-specific capabilities required. For instance, since researchers favour diverse boards that include women on the premise that they are highly sensitive to environmental issues (Nadeem et al., 2020), their participation would significantly alter learning processes. Likewise, GPI requires thinking outside the box; organisational creativity would depend on the human capital available. As the organisation inducts new talent with significant knowledge on sustainability and environmental issues, inter-organisational learning, creativity, and absorptive capacity would receive a commensurate boost.

Utilising institutional theory, the various barriers (lack of financing, customer willingness, price fluctuations, lack of government support, and commercial uncertainty) will act as moderators and negatively impact GPI adoption by firms. Both organisational capabilities and related learning activities require adequate institutional support, a willingness on the part of customers to pay for such products, and stable prices in the marketplace—which most firms lack.

## 7 | CONCLUSION

The present SLR study on the current state of GPI makes a multifaceted contribution to the literature. At the very outset, this SLR disentangles existing studies on GPI by organising them on the basis of year-wise distribution, journal-wise distribution, country of study, theoretical frameworks used, methods utilised, and the sampling procedure. This study's second contribution lies in the detailed analysis of the themes extracted from selected studies, which has helped identify gaps in the GPI literature. These themes draw attention to the capabilities that organisations should develop, the role of organisational learning and institutional pressures in persuading the firm to switch to GPIs, the various barriers that firms encounter in developing GPIs, the benefits that accrue from GPIs, and the various structural changes demanded of the firm when pursuing GPIs. This study also uncovers the lacunas in the published studies and earmarks research questions for further academic investigation.

### 7.1 | Theoretical implications

Research on GPIs is crucial given the range of challenges that firms face in seeking successful implementation. This SLR provides four key theoretical implications.

First, although Dangelico (2015) has conducted a systematic review, it was restricted to manufacturing firms and, therefore, does not fully capture the various factors influencing GPI. Furthermore, the study was published in 2015 when the research had yet to pick up pace. To overcome these shortcomings, this SLR has included all the studies published on GPIs, providing a platform for scholars to focus on the services sector and widen their research investigations.

Second, the thematic dissection of the selected articles endeavours to paint a complete picture of the different aspects of GPI research. This theme-based refinement of the literature can help scholars widen their exploration of key issues and the challenges facing GPI implementation.

Third, this study highlights the different gaps in the selected studies along with potential research questions (Table 3) that can begin to address these gaps. Furthermore, it is argued that future research work should take a deeper look at the various challenges facing organisations as they develop or adopt GPIs. Such studies will deepen our understanding of GPI-related issues and ensure that sustainability takes centre stage in organisational thinking.

Fourth, this study has developed a conceptual framework that captures the various antecedents, moderators, and outcomes of GPIs. This framework highlights the various institutional pressures that trigger change in organisational capabilities and learning activities, and the various moderators that support or inhibit the relationship between antecedents and GPIs. We contend that our framework will help future researchers understand and investigate the various elements in GPI and explore the factors affecting the adoption of GPIs in dynamic environments.

### 7.2 | Practical implications

The study has five important implications for management and practice:

First, the thematic segregation of filtered articles paints a holistic picture of the depth and breadth of GPI literature issues. For example, it is evident from the literature that different green technologies are available to firms. Yet, they yield no value unless they are successfully integrated into existing organisational systems (Mohammed et al., 2017). Therefore, management has a highly important role to play in devising ways and means to acquire new technologies and integrating them into the firm's systems to facilitate GPI implementation.

Second, managers need to work on developing the organisational capabilities required for GPI. Based on this study's extraction of different capabilities required for GPI, it is advised that managers focus on each subdimension of these capabilities to inculcate green thinking into the firm's overall culture. Managerial attention is needed to devise formal policies on GPIs, penalise environmentally unethical practices in the workplace, implement EMS in the organisation, and strengthen the R&D activities and technological skill-enhancing capabilities.

The third implication for managers is to understand the importance of organisational learning activities in GPIs because they bring new knowledge to the firm and exploit previously learnt and newly acquired information (Cohen & Levinthal, 1990). Therefore, managers must involve various stakeholders in the learning process so that the absorptive capacity and creativity of the firm can be enhanced. Then, the firm will be well placed to successfully develop and implement GPIs.

Fourth, most of the empirical studies published on GPIs were tested in specific geographies and different product categories. While these studies contribute to our understanding of the different issues and challenges facing firms in the GPI process, managerial validation is still required to substantiate these findings. Such validation will help in highlighting the shortcomings of the theoretical findings propounded by the extant literature.

Fifth, while highlighting the positive impact of regulatory and normative pressures, this SLR signals to policymakers that more policy interventions of this kind are required. Although the influence of regulatory pressures is not homogeneous across countries (Zhu et al., 2017), policymakers should work on cross-country collaborations to ensure strict implementation of GPIs. Likewise, at the country level, such pressures can increase the burdens on nongreen product imports in terms of tariffs and quota restrictions and, at the same time, help domestic firms producing green products.

### 7.3 | Limitations

The present study has certain limitations. First, in this SLR study, we have only included peer-reviewed English language journal articles available on Scopus and WoS and, therefore, relevant studies may

have been omitted. Future SLRs could look at conference proceedings, book chapters, and studies published in languages other than English, augmented with a literature search on other academic databases. Second, due to this study's scope and space constraints, we had to utilise a stringent exclusion criterion and, consequently, conceptual studies and thesis papers were excluded from the final list of articles selected. Future studies could focus on such studies because they deepen our understanding of the issues and challenges facing GPIs. They may also offer novel solutions to such problems, especially when GPI adoption is low. Lastly, since this SLR was confined to extracting the various dimensions, barriers, benefits, enablers, and structural issues concerning GPIs, we were unable to extend this study's scope beyond those parameters. While our motive was to systematically review the existing literature so that a future research direction on GPIs could be set, future researchers could go a stage further by looking at the various antecedents, consequences, and challenges to the factors extracted as subthemes. For example, researchers might consider looking at the contingent factors, external and internal, that influence a firm's R&D strength and the impact of such factors on a firm's GPI endeavours.

## ACKNOWLEDGEMENT

Armando Papa's contribution is based on the study funded by the Basic Research Program of the HSE University.

## CONFLICT OF INTEREST

The authors do not have any competing interests to declare.

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**How to cite this article:** Khan, S. J., Dhir, A., Parida, V., & Papa, A. (2021). Past, present, and future of green product innovation. *Business Strategy and the Environment*, 1–26. https://doi.org/10.1002/bse.2858