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Driving Towards Sustainable Development Goals (SDGs) in the Ready-Made Garments (RMG) Sector: The Role of Digital Capabilities and Operational Transparency

Palash Saha, H. M. Belal, and Subrata Talapatra

***Abstract*— In today's digital transformation era, the importance of developing dynamic capabilities has significantly increased. However, the literature has not fully explored the significance of dynamic capabilities in sustainable development. Hence, this study examines the impact of digital capabilities (DC) and operational transparency (OT) on achieving sustainable development goals (SDGs). Drawing upon the dynamic capability view (DCV), we analysed the impact of DC on decent work conditions (DWC), reduced inequalities (RI), responsible consumption and production (RCP), and reduced carbon footprint (RCF) through the mediating effect of OT. We conducted fourteen semi-structured interviews to understand how developing dynamic capabilities can drive organisations toward achieving SDGs. Subsequently, we applied a cross-sectional survey to gather data from 257 respondents in the Bangladeshi ready-made garments (RMG) industry. We used the variance-based structural equation modelling (PLS-SEM) technique to test our research hypotheses. Our findings suggest that DC significantly enhances OT and that OT can positively impact DWC, RI, RCP, and RCF. Additionally, we found that OT partially mediates the link between DC and SDGs. Our study provides valuable insights into the DCV, offering a better theoretical understanding of the role of DC in enhancing OT to achieve SDGs. It can also encourage firms to take advantage of emerging digital technologies and the trend toward digitalisation by demonstrating a strong commitment to adopting new advanced technologies, developing dynamic capabilities, and striving to achieve SDGs.**

***Managerial Relevance Statement*— By highlighting the critical role of digital capabilities (DC) and operational transparency (OT), our research offers actionable insights for policymakers and managers in the RMG sector to drive toward SDGs. Through targeted training and mentorship programs, managers are encouraged to enhance employees' digital skills, foster digital leadership, and nurture a digital culture. Integrating SDGs into corporate strategies, prioritising investments in sustainable technologies, and implementing robust Standard Operating Procedures (SOPs) for sustainability are essential steps. Adopting digital tools and platforms to improve OT can also drive significant progress. Leveraging advanced data analytics and blockchain technology will ensure transparency and accountability across the supply chain. These recommendations empower RMG firms to overcome challenges, optimise resource allocation, and achieve long-term sustainability goals.**

***Index Terms*— Digital capabilities, operational transparency, RMG industry, sustainable development goals (SDGs), structural equation modelling.**

I. Introduction

THE garment industry has experienced rapid expansion due to the popularity of fast fashion. However, as its harmful social and environmental impacts become more evident, this sector is under increasing scrutiny [1]. Major brands in this industry encounter highly intricate sustainability challenges involving interconnected social and environmental issues. For instance, the global textile sector is responsible for about 3% of global greenhouse gas emissions and significantly contributes to modern slavery [1]. To effectively tackle the extensive sustainability issues within the garment industry, organisations must adopt a holistic approach and comprehend how various activities generate positive or negative external effects [1], [2].

This is particularly evident in Bangladesh, the world's second-largest exporter of RMG, with exports valued at around $46 billion in 2022-23. The RMG sector contributes about 10.35% to the country's GDP and accounts for approximately 85% of the country's export earnings [3]. However, the rapid expansion of this sector is adversely affecting social and environmental aspects of sustainability, including labour conditions, inequality among employees, sustainable consumption, and carbon footprint. Biswas et al. [3] and Akter et al. [4] reported that the Bangladeshi RMG sector currently faces the most critical challenges and criticism regarding the safety and rights of employees and environmental protection.

The RMG industry came under scrutiny after the Rana Plaza disaster in April 2013, which killed over a thousand garment workers. This tragedy raised concerns about labour regulations and safety standards in Bangladesh's RMG sector [5]. The industry also faces criticism for income inequality among workers, with significant wage disparities and limited career development opportunities for female employees, leading to a

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decline in women's participation. [4], [6]. This trend hinders progress toward sustainable development goals (SDGs) related to women's empowerment. Additionally, the sector heavily consumes natural resources, generates substantial waste, and is a major contributor to CO2 emissions in Bangladesh at 15.4%, posing environmental challenges and impacting SDGs related to climate action [3]. Therefore, this industry must address concerns associated with sustainable development targets (SDTs) to drive towards the SDGs.

In this study, we present an exploratory analysis of SDTs, including decent work conditions (DWC), reduced inequalities (RI), responsible consumption and production (RCP), and reduced carbon footprint (RCF) of the Bangladeshi RMG industry, related to the socio-ecological aspects of SDGs. The increased awareness of consumers and business partners on the social and environmental impacts of manufactured products or services adds significance to the social and ecological targets of SDGs [3], [5]. Aligning business practices with the SDGs enhances corporate reputation, fosters stakeholder trust, and attracts consumers who increasingly seek socially and environmentally responsible products [7]. Uddin et al. [2] urged that as a leading global manufacturer of garment products and a significant driver of the nation's socio-economic growth, the Bangladeshi RMG sector should commit to social and ecological sustainability in alignment with the SDGs to stay competitive. Hence, the literature greatly requires insights regarding practices or capacities that promote the achievement of SDGs, particularly from a developing nation's perspective.

Existing literature suggests that organisational digital capabilities possess promising potential to achieve SDGs [8], [9]. Digital capabilities (DC) can be defined as the collective skills, knowledge, and capacities of individuals and organisations to harness and leverage digital technologies for enhanced performance, innovation, and adaptation in the evolving digital landscape [9], [10]. This encompasses proficiency in utilising digital tools, understanding digital trends, embracing a digital mindset, and fostering a culture of continuous learning and agility. Shin et al. [11] argued that building and leveraging DC within the industry becomes an operational necessity and a strategic move towards aligning with the global sustainability agenda. Clark et al. [12] claimed that building DC enhances an organisation's ability to collaborate with diverse stakeholders and communities, fostering partnerships to address social and environmental challenges collectively. Organisations can optimise the use of environmental information and carbon emissions and enhance efficient technological integration into their operations by building corporate digital innovation [13] and organisational DC. Environmental information includes data on air and water quality metrics, resource consumption rates, waste management statistics, and environmental impact assessments. Firms can optimise this information by leveraging digital capabilities to monitor and manage their environmental footprint in real time [13].

Although the potential of DC in achieving SDGs is frequently mentioned, existing literature still lacks sufficient empirical studies exploring these effects. The majority of scholars expanded on that subject using qualitative approaches like literature reviews or conceptual studies [12], [14]. Academics stressed the need for additional empirical studies to better comprehend an organisation's DC [15]. While specific studies have analysed or conceptualised the impact of DC on SDGs, the precise pathways through which DC influences SDGs have not been explicitly explored. For example, Clark et al. [12] analysed the significance of digital dynamic capabilities in achieving SDGs. Nevertheless, such an approach fails to uncover the DC–SDG link's underlying mechanisms. Scholars have argued that the impact of DC on organisational competitive advantages may be transferred through some contextual factors [9] and also called for in-depth research [15]. For instance, Dubey et al. [16] proposed a framework for developing DC to achieve sustainable competitive advantages in the digital transformation age and called for further empirical research. Hence, to answer the calls, we seek to empirically investigate the effect of DC on SDTs (DWC, RI, RCP, and RCF) and reveal their internal mechanisms.

We conceptualised our theoretical framework based on the dynamic capability view (DCV), an extended version of the resource-based view (RBV). DCV focuses on how organisations combine, enhance, and reconfigure firm-specific internal and external capabilities to create new abilities that align with their dynamic business environment [17]. Aligning with this view, we here argue that DC can enhance an organisation's operational transparency (OT), further leading to achieving SDGs. OT, viewed as a mediator, aligns with DCV's emphasis on the need for organisations to reconfigure internal and external competencies dynamically [18]. OT, acting as a strategic resource, can enhance the organisation's ability to orchestrate resources effectively, learn from its endeavours, and adapt strategies in alignment with SDGs [19]. Hence, following DCV, we aim to investigate the mediating role of OT in the association between DC and SDTs (DWC, RI, RCP, and RCF).

Generally, we aim to address the basic research question: how does building DC improve OT in organisations and further lead to achieving SDGs? To be more specific, our research intends to address the subsequent research questions (RQs):

- *RQ1: How does DC influence OT?*
- *RQ2: How does OT influence SDGs (DWC, RI, RCP, and RCF)?*
- *RQ3: How does OT mediate the relationship between DC and SDGs (DWC, RI, RCP, and RCF)?*

We empirically answer these RQs utilising the 257 complete survey-based responses collected from the Bangladeshi RMG industry. By addressing these RQs, our research offers valuable insights into the existing literature. We present an empirical interplay between DC, OT, and organisational responses to sustainable development challenges. Furthermore, we expanded the scope of DCV beyond external aspects to encompass the potentials of DC and the additional advancement of the mediating role of OT to achieve SDGs. This novel mediation perspective emphasises that transparency in organisational operations significantly aids in the orchestration of resources in pursuit of strategic sustainability goals. It extends the DCV's focus on resource orchestration by highlighting the importance of transparent processes in enhancing the effectiveness and ethical alignment of resource utilisation. The remaining structure of our analysis includes literature background, research methodologies, data analysis, results, discussion, and a brief conclusion.

II. Literature Review And Hypothesis Development

A. Digital Capabilities

The evolution of new advanced technologies and the rise of digital transformation trends are causing a shift in traditional business operations and strategies [8]. Dubey et al. [9] stated that in the digital era, building dynamic capabilities is imperative for organisations, enabling them to respond flexibly to technological advancements, rapidly changing market conditions, and evolving customer expectations. DCV asserts that dynamic capabilities act as the primary driver of competitive advantages in a dynamic business environment [17]. Firms often acquire dynamic capabilities when they operate in a highly competitive and rapidly evolving business landscape by effectively integrating, developing, and reconfiguring their internal and external resources or abilities [20]. Aligning with DCV, Teece et al. [17] argued that organisational dynamic capabilities should possess robust sensing, seizing, and transforming abilities. Building on the principles of DCV, digital capabilities (DC) can be regarded as a dynamic capability, signifying an organisation's capability to innovate business processes and operations [9], [21].

Digital capability (DC) commonly refers to the capacity to align individual capabilities with organisational and technological capabilities to adapt to swift changes in a competitive landscape [9], [22]. Warner and Wager [22] provided an operational definition of DC, drawing upon the concept of DCV. Moreover, Sousa-Zomer et al. [23] tried to define and operationalise the concept of DC. Overall, they emphasised that the crucial dimension characterising digital transformation in a swiftly changing business environment is the capacity to sense changes in the marketplace. However, several scholars have also highlighted the importance of seizing and transforming the abilities of digital transformation in a dynamic environment. For instance, Shin et al. [11] emphasised proactive identification and opportunity exploitation capabilities empower organisations to actively leverage and capitalise on digital opportunities for sustained competitiveness. Besides, Westerman et al. [24] illustrated digital capabilities as essential skills in the digital domain, serving as the foundational elements for reshaping consumer experiences, operational procedures, and business models. Moreover, Dubey et al. [16] argue that organisations require a critical assessment of resources and capabilities to build skilful human resources and promote digital culture and savvy leadership for a successful digital transformation.

Hence, in line with the literature, we posit that digital transformation, relying on the widespread utilisation of digital technologies in the dynamic nature of the business environment, recognises employees' digital skills (sensing opportunities or threats), digital leadership (seizing business opportunities), and digital culture (transforming business model by utilising resources and capabilities) as its core competencies. *Employees' digital skills (EDS)* refer to the collective skills, knowledge, and proficiencies of an organisation's workforce in utilising digital tools, technologies, and platforms [11]. This encompasses a spectrum of competencies, from basic digital literacy to advanced skills in data analysis, artificial intelligence, computational skills, and digital collaboration. In the context of DCV, employees with digital skills become the frontline sensors, actively interpreting and discerning signals from the dynamic digital environment [25]. Their ability to navigate, collect, and analyse digital data positions the organisation to identify evolving market trends, technological advancements, and emerging opportunities [26].

Digital leadership (DL) encompasses the strategic guidance and effective management of organisations in the context of the digital age. It goes beyond traditional leadership by emphasising a profound understanding of digital technologies, trends, and their influence on business processes [27]. As Teece [21] emphasised, leadership is a critical element in building and exploiting dynamic capabilities. Leaders with digital acumen foster a culture of agility and responsiveness, ensuring that the organisation can proactively identify, evaluate, and exploit digital opportunities in the dynamic business landscape [11].

Digital culture (DCT), as a component of digital capabilities, represents the organisational environment and mindset that facilitates transformative capabilities of business strategies into competitive and sustained advantages [11]. Digital culture, defined by shared values, beliefs, and behaviours regarding the application of advanced technologies [28], becomes the catalyst for fostering an environment conducive to innovation and adaptability. This cultural dimension encourages organisational members to embrace change, experiment with new ideas, and learn from both successes and failures [11]. In doing so, digital culture becomes a driving force for transformative capabilities, ensuring that the organisation can effectively harness the full potential of digital technologies [29].

B. Sustainable Development Goals (SDGs) and Bangladeshi RMG Industry

The Bangladeshi RMG industry stands at a critical juncture, with its growth trajectory intricately linked to the global pursuit of SDGs. Bangladesh is an essential hub for producing clothing and textile items worldwide, and this sector plays a substantial part in the nation's socio-economic progress. Since gaining independence, Bangladesh has pledged to support global social, economic, and environmental development regulations, particularly the UN-led 17 SDGs [3]. While the international market of the Bangladeshi RMG industry has expanded notably in the recent past, a significant portion of the RMG factories are yet to achieve the global standard regarding SDTs [4], [30]. This sector is mainly criticised for unsafe work conditions and human rights violations. Cai & Choi [5] stated that the catastrophic incident of Rana Plaza raised serious concerns regarding labour legislation and workers' safety rights in the industry. Akter et al. [4] emphasised the concerns regarding unpleasant and risky working conditions and gender-based inequalities in the Bangladeshi RMG industry. Numerous scholars also highlighted the detrimental impacts of RMG business operations on the environment (resource consumption and carbon footprint) [2], [3].

The existing literature highlights numerous deterrents hindering the achievement of SDGs in the Bangladeshi RMG sector. Jenkins [31] reported that the unwillingness of top management, resistance to change, and lack of employee capabilities are the main obstacles to integrating digital technological innovations to achieve SDGs. Moreover, Biswas et al. [3] contend that poor working conditions, unskilled workforces, and lack of transparency are the primary

hindrances to the advancement of sustainable business operations. Debnath et al. [32] suggested that the Bangladeshi RMG sector needs to focus on fostering a culture committed to continuous improvement and adaptation inside the organisation to drive towards achieving SDGs. From the literature, it is clearly understood that most scholars emphasise the development of skilful workers, organisational culture, managerial interest and competencies, and transparent business operations to achieve sustainable development targets. Hence, in line with the literature, we argue that developing digital capabilities (employees' digital skills, digital leadership, and digital culture) and enhancing operational transparency can be useful solutions to achieve SDGs further.

C. Theoretical Underpinning

The main interest of this study is to analyse the mechanism through which digital capabilities (DC) can help achieve SDGs. For that purpose, we proposed a conceptual framework linking DC, OT, and SDTs (DWC, RI, RCP, and RCF) (Fig. 1) based on the dynamic capability view (DCV). The DCV is commonly seen as an extended view of the existing resource-based view (RBV) [17].

RBV, a widely used theoretical lens, aids in comprehending how organisations can achieve greater performance by combining their existing resources and capacities [33]. Nevertheless, the RBV falls short of providing a satisfactory justification of how existing organisational resources and capacities maintain competitive advantages in a highly dynamic environment [9], [20]. Zhou and Li [20] argued that in a swiftly evolving environment, excessive emphasis on developing current resources might restrict an organisation's ability to adapt its capabilities for capitalising on emerging market opportunities. Concerning SDGs, Horn and Grugel [34] argued that SDGs should be analysed in conjunction with every industry's evolving dynamics rather than a universal framework for development.

The DCV is regarded as a superior approach for understanding dynamic market situations compared to the RBV. This view focuses on how organisations integrate, cultivate, and adjust their capabilities to create novel competencies aligned with their dynamic business landscape [17]. Uddin et al. [2] stated that possessing dynamic capabilities enables speedy reconfiguration and helps firms remain agile, innovative, and competitive in the fast-changing environment. As per Winter [35], organisational capabilities, also known as higher-order capabilities, involve high levels of routine encompassing a set of advanced, acquired, patterned, and repetitive behaviours that signify a firm's ability to outperform its competitors. Lower-order capabilities involve the efficient manipulation of the current resources, while higher-level capabilities pertain to the effective exploitation, integration, and implementation of new opportunities [35].

We formulated the construct "digital capabilities" (EDS, DL, and DCT) as a lower-order dynamic capability, commonly known as operational capability, primarily emphasising exploiting the current resources. Lower-order capabilities refer to a firm-specific collection of skills, approaches, culture, and routines integrated within the business management fields, consistently applied in problem-solving through the reconfiguration of existing resources opportunities [35]. We formulated the construct "operational transparency" (OT) as a higher-order dynamic capability with the primary target of fostering accountability, ensuring responsible resource management, and promoting ethical practices. OT manages or enhances an organisation's operational capacities by adjusting them to better align with the changing business environment. Following the DCV proposed by Teece et al. [17], we contend that OT can assist in integrating and reconfiguring organisational capabilities to achieve the targets of the SDGs.

D. Digital Capabilities and Operational Transparency

In today's quickly changing business environment, the impact of digital capabilities (DC) on business performance has gained considerable interest in both academic and practitioner circles [36]. As businesses progressively incorporate digital technologies into their operations, exploring the potential influence of DC on operational transparency (OT) emerges as a crucial research area. Colombari and Neirotti [25] highlights that competence in digital skills enable employees to access, analyse, and share information efficiently, therefore fostering a more transparent and collaborative work environment. Moving beyond employee capacities, the significance of digital leadership emerges as a pivotal factor, considering its impact on shaping the organisational environment [11]. Digital leaders are apt to develop an environment that promotes transparent communication and collaboration by fostering a culture of openness and embracing technological advancement [27]. Shin et al. [11] emphasised that digital leaders can establish the foundation for a digital-first culture, creating an atmosphere where transparency is not just valued but ingrained in the organisational DNA. The literature also highly states the significance of establishing a digital culture in the business environment to enhance OT. Ebinger and Omondi [29] argue that a digital culture encourages information sharing and collaboration, which are foundational elements of building operational transparency. Organisations promoting a digital culture can exhibit more flexibility, responsiveness, and inclination toward transparent operational practices [28]. Aligning with the literature, we argue that digital capability, meaning a digitally skilled workforce guided by visionary leadership and embedded in a digitally oriented culture, is likely to contribute positively to organisational OT and propose our first research hypothesis as:

H1: DC positively impacts operational transparency (OT).

E. Operational Transparency and Sustainable Development Goals

Operational transparency (OT) involves disclosing information about an organisation's internal operations, and fostering trust among stakeholders by providing a clear understanding of business practices [37]. The existing literature highlights that OT can significantly influence achieving SDGs, especially in the realms of decent work conditions (DWC) [38], reduced inequalities (RI) [39], responsible consumption and production (RCP) [40], and reduced carbon footprint (RCF) [41]. In this regard, Carter and Rogers [42] considered OT as one of the five fundamental components of achieving sustainable supply chain management. They emphasised that along with fostering trust among stakeholders, transparency establishes a precedent for responsible business behaviour that

aligns with the broader agenda of SDGs.

By ensuring openness and information accessibility, OT supports a secure working environment. Buell et al. [37] argued that transparency in policies, practices, and commitments related to employee well-being builds stakeholder trust. Besides, promoting transparency in workplace safety, equitable compensation, and employee benefits empowers workers and holds organisations accountable for maintaining decent work standards [29]. Caro et al. [38] presented that following the Rana Plaza disaster, 166 firms and worker unions formed an Accord to guarantee workplace safety, with suppliers' adherence to safety regulations publicly disclosed. This openness can help create a safe and decent working environment. Therefore, we state our research hypothesis as follows:

H2: OT positively impacts decent work conditions (DWC)

Transparency provides a clear view of an organisation's internal processes and practices, enabling visibility into business operations [18]. Transparency in recruitment, promotions, and remuneration policies allows stakeholders to assess the equity of these policies. For instance, disclosing information about pay structures and diversity programs promotes accountability and motivates organisations to address internal inequalities [42]. Kang and Hustvedt [43] noted that transparency in decision-making can reveal biases and foster fair opportunity distribution. Besides, Walker [39] highlighted that awareness of partners in procurement and production can ensure accountability and ethical standards. Therefore, we argue that by embracing OT, companies demonstrate a commitment to diversity, inclusivity, and equal opportunities, aligning with the global agenda of creating a more inclusive and equal society and propose our next research hypothesis as follows:

H3: OT positively impacts reduced inequalities (RI)

Responsible consumption and production (RCP) advocate for sustainable practices in resource utilisation, waste management, and production methods [5]. OT supports this objective by providing stakeholders with a transparent view of a firm's internal processes. Walker [39] highlights the need for increased transparency to meet the growing consumer demand for sustainable products. Trabucchi et al. [44] noted that 73% of participants in the Label Insight Transparency Study, 2016, expressed willingness to pay more for transparent products. However, Gomes et al. [45] argued that while customers are ready to pay a premium for sustainability, they need reliable information to make informed decisions. Papú Carrone [19] emphasised that transparent practices help customers understand the socio-ecological effects of business functions, leading to better decisions. By sharing information about eco-friendly initiatives, recycling programs, and efforts to minimise environmental impacts, companies build trust and demonstrate a commitment to responsible production. Therefore, based on the discussion, we propose our next research hypothesis as follows:

H4: OT positively impacts responsible consumption and production (RCP)

Villena and Dhanorkar [41] argued that transparency is a crucial step toward enhancing carbon performance. Organisations often use selective disclosure about their environmental impact to protect their legitimacy, complicating the comprehensive understanding of GHG emissions. Regarding that context, Dahlmann et al. [46] stressed the need for transparent business initiatives to manage carbon emissions, while Bag et al. [47] emphasised collaboration between industry and stakeholders to achieve carbon neutrality. Transparent disclosure of carbon emissions, energy consumption & product transparency, and eco-friendly initiatives allows stakeholders to understand the organisation's environmental impact [41]. The presence of OT can foster accountability, encouraging firms to adopt eco-friendly technologies, leading to carbon emissions reduction. As organisations become more transparent, they foster innovation and collaboration, driving sustainability goals and ultimately contributing to a reduced carbon footprint [46]. Based on the discussion, we propose our next research hypothesis as follows:

H5: OT positively impacts reduced carbon footprint (RCF)

F. Mediating role of operational transparency (OT)

Horn and Grugel [34] highlighted in their study that SDGs should be analysed within the context of each industry's evolving dynamics rather than a universal framework. In that context, Shin et al. [11] emphasised the necessity of developing dynamic digital capabilities (DC), as DC can address societal and environmental challenges by driving innovations in sustainable practices, improving resource management, and enhancing operational efficiency [9], [12]. However, Ufua et al. [48] highlighted in their investigation that digital transformation can impact SDGs, but the effect is mediated through different contextual mediators. Papú Carrone [19], highlighting operational transparency (OT) as a dynamic capability, argued that engagement in transparent business operations makes a huge competitive contribution to achieving SDGs. Hence, we argue that OT can play a mediator role in the association between DC and SDGs. Aligning with the DCV [17], we conceptualised DC as a lower-order and OT as a higher-order dynamic capability. Bag et al. [49] argued that building operational capabilities will result in developing higher-order capabilities and drive organizations to competitive advantages. This suggests that the significance of DC in achieving SDGs can be understood through OT. Hence, we propose our research hypotheses as follows:

H6: OT mediates the association between DC and DWC
H7: OT mediates the association between DC and RI
H8: OT mediates the association between DC and RCP
H9: OT mediates the association between DC and RCF

The proposed theoretical model is shown in Fig. 1.

G. Control Variable

In this study, we incorporated firm size (FS) as a control variable to consider the variations among different RMG firms. In this scenario, we used the number of employees as the FS measure. Generally, large firms exhibit a greater tendency to engage in sustainable practices and possess a greater capacity to invest in digital technologies to enhance digital capabilities [9]. Therefore, we posit that firm size (FS) can be a crucial control variable in this research.

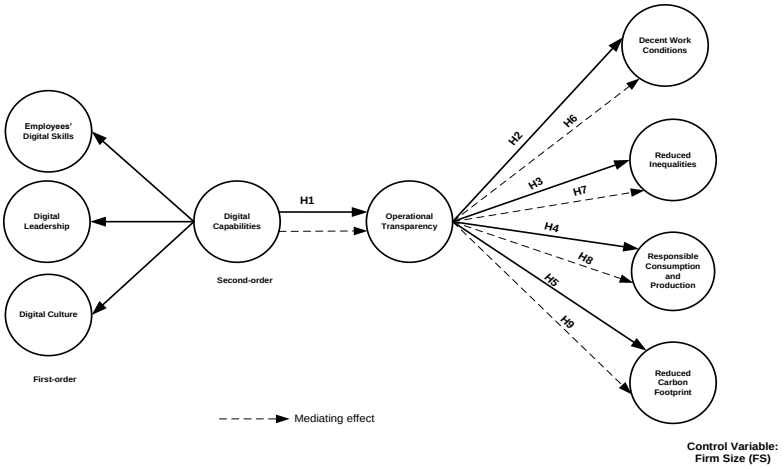

Fig. 1. Theoretical Model (Source: Authors' creation)

III. Research Design

In this empirical study, we adhered to a two-step sequential process [50]. In the initial step, we carried out extensive qualitative interviews to (i) gain insights into diverse capabilities associated with the reconfiguration of the organisational resources and their influences in achieving SDGs and (ii) pre-test our survey-based questionnaires, which is used in the second step to collect data. In the second step, we carried out a cross-sectional survey to gather data to test our theoretical model and hypotheses.

A. Interviews

We conducted 14 semi-structured qualitative field interviews (see Online Appendix A) with high-ranking executives from Bangladeshi RMG firms over two months. The participants were chosen for their expertise in dynamic capabilities, operational transparency, and sustainable development. We prioritised individuals in leadership positions (see Online Appendix B) to capture top-level perspectives on the application of digital capabilities in achieving SDGs. The interviews provided valuable insights that quantitative surveys alone might not capture. Each interview lasted 30 to 50 minutes and was structured in two phases. In the initial phase, we asked executives about the impact of digital capabilities on achieving SDGs. We noted that employee skills, digital leadership, and digital culture were important aspects. In the final phase, we validated our model and hypotheses. Most executives agreed that digital capabilities have substantial potential to achieve organisational SDGs, although some disagreed. We also asked executives to complete the primary version of the survey instrument and then we modified it based on their feedback. All the constructs were embodied as reflective constructs. We took steps to minimise biases in understanding academic terms and used visual aids during interviews. We employed member checking to enhance the credibility of the findings.

B. Questionnaire Design

We developed our questionnaire by reviewing academic articles and pre-testing the survey, using multi-item scales to operationalise the constructs of our model. We refined our measurement scales through 14 semi-structured interviews (see subsection 3.1) following DeVellis' [51] guidelines. We conceptualised digital capability (DC) as a second-order construct (reflective-reflective). Dubey et al. [16] highlighted the necessity of building skillful human resources, promoting digital culture, and leadership for a successful digital transformation. Hence, we measured DC through three first-order constructs: employees' digital skills (EDS), digital leadership (DL), and digital culture (DCT). Conceptualising DC as a second-order construct captures its holistic nature, reflecting the synergy of skills, leadership, and cultural norms in driving digital effectiveness. All constructs, their indicators, and sources are presented in Table C1 (Online Supplementary Appendix C). We used a seven-point Likert scale (where 1=strongly disagree and 7=strongly agree) to measure the items.

We then pre-tested the survey instrument to assess content validity [52], seeking feedback from five expert scholars. Their feedback highlighted issues with phrasing, industry relevance, and length. They also evaluated the coverage of the subject domain using the indicators. Based on their input, we refined the questionnaire to improve clarity and appropriateness, resulting in a survey instrument with a high level of content validity.

C. Data Collection

We used cross-sectional data to test our research hypotheses, surveying Bangladeshi RMG factories from May to November 2023. The sample details were withdrawn from the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) website. With assistance from the BGMEA spokespersons, we selected 340 firms based on their relatively high-level use of digital technologies. We then mailed Google Forms surveys to 1050 potential participants of these 340 firms. The participants included managers, senior-level managers, general managers, and engineers, who met the eligibility criteria of knowledge of digital capabilities and sustainable practices, over two years of experience, and familiarity with the questionnaire. We ensured the respondents' anonymity and assured them that the data would be used only for academic objectives.

After two follow-up remainders, we finally received 257 complete responses from 117 firms, a response rate of 34.41%, consistent with similar survey-based studies [9], [53]. The

respondents' profile is presented in Table C2 (Online Supplementary Appendix C). We conducted two tests to assess non-response bias. First, we divided responses into early-wave and late-wave categories and treated late responses as non-responses [54]. We then performed a student t-test on 20 randomly chosen survey responses, which showed no significant variance between early and late responses ($p > 0.1$). Second, following Wagner and Kemmerling's [55], recommendations, we asked 30 randomly chosen non-respondents to answer one item per construct from the survey. The resulting t-test revealed no significant differences between respondents and non-respondents ($p > 0.1$). These findings indicate that non-response bias is not a significant issue in this study.

IV. Data Analysis

We applied the partial least-square-based structural equation modelling (PLS-SEM) approach to test our theoretical model. Hair et al. [56] stated that PLS-SEM could be effectively utilised for models with relatively small sizes and non-normal data distributions. Peng and Lai [57] stated that PLS-SEM is effective in analysing complex models where considerations such as multi-level analysis, mediation analysis, and higher-order constructs can increase the total number of parameter estimates, possibly leading to model identification and convergence issues in covariance-based SEM (CB-SEM). However, the effectiveness of the traditional PLS approach, which utilises a composite-based algorithm, has faced some criticisms. Henseler et al. [58] contend that the conventional PLS approaches estimate constructs as a weighted mean of indicators but without considering measurement errors. Kock [59] argued that the exclusion of measurement errors in the composite-based algorithm leads to a certain degree of biases for numerous parameters, including path-coefficient, indicator weights, and loadings. However, the recent advancement in the PLS-SEM approach, specifically the transition from composites to factors, has effectively addressed the discrepancy between PLS-SEM and CB-SEM [59]. Therefore, to address the criticisms, we followed the recommendations of Kock [59] and used WarpPLS 8.0, a PLS-SEM analysis tool, to conduct hypothesis testing in our work.

A. Multi-rater Agreement Measures

As we collected data using a multiple-rater approach, evaluating the validity of the replies provided by two or more participants affiliated with the same firm is necessary. While certain studies advocate for the exclusion of redundant data points from a single firm, others argue that doing so would lead to a substantial and meaningful decline in data reliability [60]. Hence, we followed Ketokivi and Schroeder's [61] suggestions and conducted an inter-rater agreement assessment employing four distinct methods, namely, ratio method, percentage method, inter-class correlation coefficient, and paired t-test method. These methods confirm the validity and support the data's credibility for subsequent testing [61]. The result, presented in Table C3 (Online Supplementary Appendix C), confirms that our data is suitable and fitting for further analysis.

B. Measurement Model- Validity and Reliability

Schwab [62] highlighted construct validity as a major component in empirical research, defining it as the degree to which a measuring item effectively reflects the underlying concept of a construct. Hence, according to the recommendations of O'Leary-Kelly and Vokurka [63], we performed three assessment tests- *unidimensionality, reliability, and validity*- to ensure the construct validity. Gerbing and Anderson [64] reported that two specific conditions must be satisfied to establish the unidimensionality of constructs. Firstly, there must be a significant association between the empirical representation of a construct and theoretical items. Secondly, the items should be loaded onto a single construct. Our results, presented in Table C4 (Online Supplementary Appendix C), confirm the unidimensionality of the first-order construct in our study [9].

We further assessed the reliability criteria of the first-order measurement model based on Cronbach's alpha (α) value [65]. Hair et al. [65] stated that the α value must exceed 0.7 to make the measurement model reliable. In our study, all alpha values met the requirements (EDS=0.940, DL=0.863, DCT=0.883, OT=0.844, DWC=0.711, RI=0.809, RCP=0.907, and RCF=0.708). Next, we followed two steps to ensure the validity of our theoretical model. First, we performed confirmatory factor analysis (CFA) to assess the convergent validity of our first-order constructs [66]. The CFA results are presented in Table C5 (Online Supplementary Appendix C). Fornell and Larcker [66] suggested that for the multi-item constructs to be valid, the factor loading of each item must exceed 0.5, while the scale composite reliability (SCR) and the average variance extracted (AVE) values for each construct must exceed 0.7 and 0.5, respectively. In our study, all the specified values of the constructs are in allowable ranges, confirming the convergent validity of both the constructs and measuring items.

As the last step of validity tests, we then checked the discriminant validity of our first-order constructs based on the heterotrait-monotrait (HTMT) ratio of correlations following the suggestions of Henseler et al. [67]. The threshold value for the HTMT ratio is 0.90, meaning that any HTMT correlation value over 0.90 indicates insufficient discriminant validity [67]. The analysis showed that all the values in our study are in the allowable range (see Online Appendix C), which ensures the discriminant validity.

C. Common Method Bias and Causality Assessment

As we used the survey-based questionnaire for data collection, our data may be susceptible to common method bias (CMB) [68]. Hence, we conducted two assessment tests to check the CMB issues. Firstly, we conducted the updated Harman's single-factor test. Here, following Kock's [68] suggestions, all measuring items were incorporated into a single construct. Then, the AVE value is calculated for the construct using the factor-based PLS-SEM test, where "*Factor-Based PLS Type CFM3*" was used as the outer model algorithm [68]. In our analysis, the construct's AVE value was 0.424, signifying that a single construct can explain about 42.4% of the total variance in our model. Kock [68] stated that the value of AVE for the single construct over 0.5 concludes the presence of CMB in the dataset. Therefore, based on our findings, we can conclude that our data was not affected by CMB. Secondly, we validate the CMB issues in our study by performing a full collinearity test. Following the guidelines of Kock [68], we

analysed the VIF values of all latent variables (EDS=2.062, DL=2.108, DCT=1.731, OT=1.899, DWC=2.354, RI=1.769, RCP=1.443, and RCF=2.007). Kock [68] suggested that any VIF value greater than 3.3 indicates the contamination of the theoretical model with CMB. Hence, from our analysis, we can firmly conclude that the CMB issue is not a major concern in our study.

We further assessed causality issues following Kock's [69] guidelines. We computed four parameters: Simpson's paradox ratio (SPR), R-squared contribution ratio (RSCR), statistical suppression ratio (SSR), and the nonlinear bivariate causality direction ratio (NLBCDR). Kock [69] stated the allowable threshold value for NLBCDR is 0.7 or above. In our study, the NLBCDR value is found to be 0.889, which satisfies the allowable criteria. The value of other parameters is also found to be in the allowable range (SPR=1.00 (allowable if ≥ 0.7, ideally = 1), RSCR=1.00 (allowable if ≥ 0.9, ideally = 1), SSR=0.889 (allowable if ≥ 0.7)), which ensures the absence of causality issues in our study.

D. Model Fit and Quality Indices

We calculated three indices (Average path coefficient (APC), Average R2, and Average block VIF (AVIF)) to assess the fitness and quality of our model [60]. APC and Average R2 are found to be significant at $p<0.001$ level (APC=0.304, $p<0.001$ and Average R2=0.246, $p<0.001$). AVIF is also found to be in the allowable range (AVIF=1.004 (allowable if ≤ 5, ideally ≤ 3.3)), which also confirms the absence of multi-collinearity issues in our data. Tenenhaus GoF is used to measure the goodness of fit of the theoretical model. We found Tenenhaus GoF to be 0.422, which is considered large [70]. Based on these findings, we can conclude that our model shows a great fit with our data.

E. Hypothesis Testing

We determined the association among the second-order DC construct, OT, and SDTs (DWC, RI, RCP, and RCF) to evaluate the validity of our structural model. We applied PLS-SEM analysis to test our developed hypotheses. We calculated the beta-coefficient (β) and p-value for every path of our structural model (see Online Appendix C). For instance, it is found that H1(DC→OT) is statistically significant and supported ($\beta = 0.47$, $p< 0.01$). The path coefficient (β) value and corresponding p-value suggest that DC strongly influences OT. Likewise, we found H2 (OT→DWC) ($\beta = 0.56$, $p< 0.01$), H3 (OT→RI) ($\beta = 0.56$, $p< 0.01$), H4 (OT→RCP) ($\beta = 0.37$, $p< 0.01$), and H5 (OT→RCF) ($\beta = 0.43$, $p< 0.01$) also as statistically significant and supported. We also estimated the impact of the control variable, namely firm size (FS), on all the endogenous variables (DWC, RI, RCP, and RCF). We only found the effect of FS on RI significant, whereas the effect on others is insignificant.

Next, we analysed the mediating impacts of OT on the association between DC and SDTs (DWC, RI, RCP, and RCF). We followed the recommendations outlined by Preacher and Hayes [71] to analyse the significance of the mediating effects of OT. At first, we analysed the indirect effects of DC. The beta-coefficient value regarding any indirect association was computed by multiplying the beta-coefficient values of the two direct associations corresponding to the two path segments constituting the indirect association, and the p-value was directly estimated through resampling; these processes were automated by WarpPLS [59]. We then calculated the direct effect between DC and SDTs (DWC, RI, RCP, and RCF) by establishing direct links between them. The results of the mediation analysis are presented in Online Appendix C. Moreover, we also estimated the variance accounted for (VAF) values to assess the extent of the mediating impact of OT. Hair et al. [65] suggested that a VAF value over 0.2 indicates partial mediation and a VAF over 0.8 indicates full mediation. From the results, we can conclude that OT partially mediates all the relationships between DC and SDTs (DWC, RI, RCP, and RCF). Hence, H6, H7, H8, and H9 all are significant.

We further calculated the R2, Q2, and f2 values (see Online Appendix C). The R^2 values are used to describe the explanatory power of the conceptual model. In our study, we found the R^2 values for the endogenous variables as OT (0.22), DWC (0.32), RI (0.35), RCP (0.15), and RCF (0.19), which are strong for all constructs [60]. We also estimated the Stone–Geisser Q^2 values of the endogenous variables to evaluate the predicting capability of our conceptual model. All Q^2 values for the endogenous variables are found above zero, indicating the strong predictive capability of the model [57]. Finally, we calculated the effect size of the endogenous constructs in relation to the preditor constructs using Cohen's f^2 criteria [72]. We found all the f^2 values to be strong, as per Cohen's [72] suggestion.

V. Discussion

Our empirical results paint an interesting picture of associations among digital capabilities (DC), operational transparency (OT), and sustainable development goals (SDGs). Grounded on the DCV theory, we proposed a conceptual framework outlining the mechanism of how developing DC can facilitate OT, which ultimately drives towards decent work conditions (DWC), reduced inequalities (RI), responsible consumption and production (RCP), and reduced carbon footprint (RCF). By providing data-driven empirical evidence, our study attempts to answer the calls of previous studies [15], [16]. Dubey et al. [16] developed a digital capabilities framework and called for further empirical research on the domain of digital dynamic capabilities and organisational sustainable competitive advantages. However, despite significant attention, the literature lacks empirical evidence on how building digital dynamic capabilities can drive organisations toward sustainability. Hence, through our study, we have attempted to address the following research questions (RQs):

1) *RQ1: How does DC influence OT?*
2) *RQ2: How does OT influence SDTs (DWC, RI, RCP, and RCF)? and*
3) *RQ3: How does OT mediate the relationship between DC and SDTs (DWC, RI, RCP, and RCF)?*

To address the proposed RQs, we developed nine research hypotheses based on the DCV and tested them with PLS-SEM analysis. Our findings suggest that DC can significantly and positively impact OT (H1), aligning with previous studies by Shin et al. [11] and Buell [18], which highlight the importance of digital dynamic capabilities in enhancing transparency and performance. Buell [18] argued that OT relies on seamless

communication and real-time data sharing. Here, we argue that without employees possessing the requisite digital skills, information flow gets hindered, impeding transparent insights into operations. Furthermore, digital leadership is essential for fostering a culture that values transparency, empowering the workforce to effectively utilise technology [11]. We also argue that promoting a digital culture is crucial for enabling free information exchange, collaboration, and openness.

Papú Carrone [19] and Walker [39] indicated that developing OT is crucial for achieving SDGs. Our findings support this, showing that OT significantly impacts DWC (H2), RI (H3), RCP (H4), and RCF (H5). Here, we argue that organisations must engage in clear communication and equitable practices tied to OT to ensure a decent work environment. Besides, we also argue that organisations struggle to identify and address disparities among employees without a clear view of internal practices, processes, and decision-making structures, which can only be achieved through transparent reporting mechanisms. OT catalyses fostering accountability and equity, making it an indispensable foundation for any meaningful progress toward the goal of reduced inequalities in the pursuit of SDGs [43]. We also argue that organisations without visibility into supply chains and resource utilisation, operate in the dark regarding their environmental impact. This absence of transparency hinders the establishment of sustainable practices and inhibits the ability to make informed decisions on responsible consumption and production [19]. Furthermore, in this study, we argue that OT acts as the compass, guiding organisations to identify areas where carbon emissions can be reduced and sustainable practices can be implemented. Without clear insights into internal processes and resource utilisation offered by OT, organisations lack the necessary information to assess and mitigate their environmental impact regarding carbon emission [46].

OT facilitates the integration of digital advancements into strategic initiatives aligned with SDGs by ensuring clear visibility, integration, and accountability of business operations [19]. Hence, OT is essential in integrating the potential of digital advancements and their tangible contributions to SDGs. Our analysis suggests that OT partially mediates the association between DC and SDTs (DWC, RI, RCP, and RCF). This implies that by providing clear visibility into internal processes, OT ensures that the positive impact of digital capabilities on sustainable development is effectively communicated and implemented. Here, we argue that without operational transparency, the potential of DC to drive meaningful progress toward SDGs may remain unrealised, underscoring the pivotal role of OT in translating digital advancements into sustainable actions. The role of OT is crucial here. Hence, H6, H7, H8, and H9 are supported. Overall, our findings of the study attempt to address the previous research calls made by Cai and Choi [77]. Cai and Choi [77] suggested in their research that to stay competitive, the textile and apparel sector should align with the sustainable development goals. This alignment would involve incorporating sustainable practices in their operations, supply chain, and product development processes. According to Choi et al. [78], disruptive technologies are crucial in addressing social issues. Their arguments highlight how operational transparency is essential for achieving sustainable development goals (SDGs), emphasising the significant role of digital capabilities. Our study aligns with these arguments and further underscores the importance of leveraging disruptive technologies to enhance operational transparency and digital capabilities in addressing social issues and achieving SDGs.

A. Theoretical Implications

In this research, we analysed how developing digital dynamic capabilities helps organisations drive toward achieving SDGs. This study adds significant theoretical contributions to the current literature, particularly enriching the DCV theory in digital dynamic capabilities and operational transparency. First, by empirically analysing the interplay between digital capabilities (DC) and operational transparency (OT), this study extends our understanding of the DCV framework by illustrating how the development of dynamic capabilities can facilitate adopting and enhancing transparency practices within organisations. Second, this study provides novel perspectives on how DT influences SDGs via OT, bridging a gap noted in previous research [12], [14]. While DCV theory acknowledges the importance of resource reconfiguration, learning, and innovation, this study extends the scope of dynamic capabilities to encompass a broader range of activities specifically geared toward achieving SDGs. By emphasising the role of DT and OT in driving sustainable development outcomes, the study illustrates how organisations can leverage a diverse set of dynamic capabilities to address complex societal and environmental challenges. Third, based on the DCV theory, we explained how the higher-order and lower-order capabilities are integrated into the overarching framework to elucidate sustainable development. According to our results, we advocated for OT as a higher-order and DC as a lower-order dynamic capability. Furthermore, we demonstrated the distinctive role of OT as a partial mediator, assisting DC to drive toward SDGs. This novel insight expands the scope of DCV beyond external aspects to encompass the potentials of DC and the additional advancement of the mediating role of OT to achieve SDGs. It extends the DCV's focus on resource orchestration by highlighting the importance of transparent processes in enhancing the effectiveness and ethical alignment of resource utilisation.

B. Managerial Implications

Our study offers suggestions for policymakers and managers in the RMG sector in Bangladesh and similar sectors globally. The RMG industry faces significant challenges in achieving SDGs due to climate change, social inequalities, and environmental degradation, promoting a focus on building dynamic capabilities. To cultivate these capabilities, managers should establish clear objectives and reconfigure operational capacities, emphasising employees' digital skills (EDS), digital leadership (DL), and digital culture (DCT). Workshops, training programs, and knowledge-sharing sessions can enhance EDS, while leadership training and mentorship programs can foster DL, and promoting a culture of innovation can nurture DCT [10], [11].

At the planning and strategic levels, RMG firms must integrate SDGs into corporate strategies. This involves setting clear objectives aligned with sustainability principles. Policy changes should prioritise investments in technology, workforce training, and sustainable practices. For instance, incentivising

the adoption of eco-friendly technologies and practices through tax breaks or subsidies can encourage firms to invest in sustainable initiatives. Process changes should focus on streamlining operations to minimise environmental impact and promote social responsibility. This could include and optimising energy usage, reducing waste generation, and implementing fair labour practices throughout the supply chain.

To operationalise these changes, specific Standard Operating Procedures (SOPs) are required. SOPs should outline guidelines for integrating sustainability considerations into every aspect of the RMG supply chain. From sourcing raw materials to production, distribution, and waste management, SOPs ensure that sustainability principles are embedded into daily operations. Robust monitoring and evaluation mechanisms should accompany these SOPs to ensure effective alignment with SDG objectives and track progress. Regular audits and reviews should be conducted to identify areas for improvement and ensure compliance with SOPs.

Moreover, our study suggests that managers should devise a comprehensive action plan to embrace higher-order capabilities such as operational transparency (OT), which is crucial for achieving SDGs. However, the practical implementation of OT necessitates specific system changes. This includes adopting digital tools and platforms to enhance transparency and traceability across the supply chain. For example, implementing advanced data analytics systems can provide real-time insights into operational processes, enabling the identification of improvement areas and optimising resource allocation. Additionally, leveraging emerging technologies like blockchain technology can provide a secure and immutable record of transactions, ensuring transparency and accountability throughout the supply chain. By prioritising these system changes, RMG firms can overcome challenges and leverage digital capabilities to enhance operational transparency, ultimately driving progress toward achieving SDGs. The importance of the RMG sector in Bangladesh taking on a significant role in addressing pressing social issues cannot be overstated. Immediate attention is needed to tackle these challenges, and it has been underlined that the concept of extended producer responsibility is crucial in addressing major societal challenges [79] [80].

VI. Conclusion

Drawing on the DCV theory, this study attempts to address three RQs: *how does DC improve OT? how does OT contribute to achieving SDGs? and how does DC impact SDGs through OT?* Analysing 257 data samples from Bangladesh, this study underscores the importance of developing dynamic capabilities to foster transparency and sustainability in the RMG industry. The study confirms that developing DC contributes significantly to enhancing OT. It also confirms the essential role of OT in transferring the impact of DC to achieve SDGs. The study also offers valuable insights into DCV and encourages firms to leverage emerging digital technologies to achieve their sustainability targets.

We acknowledge several limitations of our work and propose suggestions for future work. Firstly, the use of cross-sectional data may lead to common method bias (CMB) issues; thus, future research should consider collecting longitudinal data. Secondly, our data was collected from a single developing country, so future studies could include data from multiple countries to examine cross-cultural variations and validate our findings. Lastly, we used firm size (FS) as the only control variable. Future research could explore additional variables to better understand their influence on the relationship between dependent and independent variables.

References

[1] M. M. Shourkaei, K. M. Taylor, and B. Dyck, "Examining sustainable supply chain management via a social-symbolic work lens: Lessons from Patagonia," *Bus. Strategy Environ.,* 2023.

[2] M. H. Uddin, M. R. Razzak, and A. A. Rahman, "Sustainable supply chain management practices, dynamic capabilities, and competitive advantage: Evidence from Bangladesh ready-made garments industry," *Bus. Strategy & Dev.*, vol. 6, no. 2, pp. 176–188, 2023.

[3] M. K. Biswas, A. K. Azad, A. Datta, S. Dutta, S. Roy, and S. S. Chopra, "Navigating Sustainability through Greenhouse Gas Emission Inventory: ESG Practices and Energy Shift in Bangladesh's Textile and Ready-made Garment Industries," *Environ. Pollut.*, vol. 345, p. 123392, 2024.

[4] R. Akter, J. Teicher, and Q. Alam, "Gender-Based Violence and Harassment in Bangladesh's Ready-Made Garments (RMG) Industry: Exploring Workplace Well-Being Issues in Policy and Practice," *Sustainability*, vol. 16, no. 5, p. 2132, 2024.

[5] Y.-J. Cai and T.-M. Choi, "A United Nations' Sustainable Development Goals perspective for sustainable textile and apparel supply chain management," *Transp. Res. E Logist. Transp. Rev.,* vol. 141, p. 102010, 2020.

[6] S. Islam and A. K. Azad, "The impact of personal remittance and RMG export income on income inequality in Bangladesh: evidence from an ARDL approach," *Rev. Econ. Polit. Sci.,* vol. 9, no. 2, pp. 134–150, 2024.

[7] M. Wang, R. Y. K. Chan, M. Kumar, and N. Tsolakis, "Does Increasing Supply Chain Flexibility Contribute to the Enhancement of a Firm's Sustainability Performance?" *IEEE Trans. Eng. Manag.,* vol. 71, pp. 8606–8622, 2024.

[8] K. Govindan, "How digitalization transforms the traditional circular economy to a smart circular economy for achieving SDGs and net zero," *Transp. Res. E Logist. Transp. Rev.,* vol. 177, p. 103147, 2023.

[9] R. Dubey, D. J. Bryde, Y. K. Dwivedi, G. Graham, C. Foropon, and T. Papadopoulos, "Dynamic digital capabilities and supply chain resilience: The role of government effectiveness," *Int. J. Prod. Econ.,* vol. 258, p. 108790, 2023.

[10] D. Proksch, A. F. Rosin, S. Stubner, and A. Pinkwart, "The influence of a digital strategy on the digitalization of new ventures: The mediating effect of digital capabilities and a digital culture," *J. Small Bus. Manag.,* vol. 62, no. 1, pp. 1–29, 2024.

[11] J. Shin, M. A. Mollah, and J. Choi, "Sustainability and Organizational Performance in South Korea: The Effect of Digital Leadership on Digital Culture and Employees' Digital Capabilities," *Sustainability*, vol. 15, no. 3, p. 2027, 2023.

[12] S. Clark et al., "Including Digital Connection in the United Nations Sustainable Development Goals: A Systems Thinking Approach for Achieving the SDGs," *Sustainability*, vol. 14, no. 3, p. 1883, 2022.

[13] J. Dong, J. Tian, H. Lin, X. Suo, H. Wu, and R. Zeng, "Can Corporate Digital Innovation Speed Up Climate Change Mitigation? Evidence from China," *IEEE Trans. Eng. Manag.*, vol. 71, pp. 7797–7814, 2024.

[14] S. ElMassah and M. Mohieldin, "Digital transformation and localizing the Sustainable Development Goals (SDGs)," *Ecol. Econ.,* vol. 169, p. 106490, 2020.

[15] J. Heredia, M. Castillo-Vergara, C. Geldes, F. M. C. Gamarra, A. Flores, and W. Heredia, "How do digital capabilities affect firm performance? The mediating role of technological capabilities in the 'new normal,'" *J. Innov. Knowl.,* vol. 7, no. 2, p. 100171, 2022.

[16] R. Dubey, D. J. Bryde, C. Blome, Y. K. Dwivedi, S. J. Childe, and C. Foropon, "Alliances and digital transformation are crucial for benefiting from dynamic supply chain capabilities during times of crisis: A multi-method study," *Int. J. Prod. Econ.,* vol. 269, 2024.

[17] D. J. Teece, G. Pisano, and A. Shuen, "Dynamic capabilities and strategic management," *Strateg. Manag. J.*, vol. 18, no. 7, pp. 509–533, 1997.

[18] Buell R. W., "Operational transparency," *Harv. Bus. Rev.,* vol. 97, no. 2, pp. 102–113, 2019.

[19] N. Papú Carrone, "Traceability and Transparency: A Way Forward for SDG 12 in the Textile and Clothing Industry," in *Gardetti, M., Muthu, S. (eds) the UN Sustainable Development Goals for the Textile and Fashion Industry*, Singapore: Springer, 2020, pp. 1–19.
[20] K. Z. Zhou and C. B. Li, "How strategic orientations influence the building of dynamic capability in emerging economies," *J. Bus. Res.*, vol. 63, no. 3, pp. 224–231, 2010.
[21] D. J. Teece, "Explicating dynamic capabilities: the nature and micro-foundations of (sustainable) enterprise performance," *Strateg. Manag. J.*, vol. 28, no. 13, pp. 1319–1350, 2007.
[22] K. S. R. Warner and M. Wäger, "Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal," *Long. Range Plann.*, vol. 52, no. 3, pp. 326–349, 2019.
[23] T. T. Sousa-Zomer, A. Neely, and V. Martinez, "Digital transforming capability and performance: a micro foundational perspective," *Int. J. Oper. Prod. Manag.*, vol. 40, no. 7/8, pp. 1095–1128, 2020.
[24] G. Westerman, D. Bonnet, and A. McAfee, "The digital capabilities your company needs," *MIT Sloan Manag. Rev.*, pp. 1–5, 2012.
[25] R. Colombari and P. Neirotti, "Leveraging Frontline Employees' Knowledge for Operational Data-Driven Decision-Making: A Multilevel Perspective," *IEEE Trans. Eng. Manag.*, pp. 1–12, 2024.
[26] L. Liang, S. Chen, D. Wu, and X. Wu, "How established firms build digital capabilities for business model innovation: An exploratory case study." *J. Eng. Technol. Manag.*, vol. 72, p. 101819, 2024.
[27] S. Chatterjee, R. Chaudhuri, D. Vrontis, and G. Giovando, "Digital workplace and organization performance: The moderating role of digital leadership capability," *J. Innov. Knowl.*, vol. 8, no. 1, p. 100334, 2023.
[28] Z. Zhen, Z. Yousaf, M. Radulescu, and M. Yasir, "Nexus of Digital Organizational Culture, Capabilities, Organizational Readiness, and Innovation: Investigation of SMEs Operating in the Digital Economy," *Sustainability*, vol. 13, no. 2, p. 720, 2021.
[29] F. Ebinger and B. Omondi, "Leveraging Digital Approaches for Transparency in Sustainable Supply Chains: A Conceptual Paper," *Sustainability*, vol. 12, no. 15, p. 6129, 2020.
[30] M. T. Islam, M. A. Jabber, and Md. N. Sakib, "Application of revised theory of planned behavior model to assess the readiness of circular economy in the RMG sector of Bangladesh," *J. Clean. Prod.*, vol. 420, p. 138428, 2023.
[31] L. D. Jenkins, "'Band aid' for women in the ready-made garment industry: self-help and surveillance in Bangladesh," *Globalizations*, vol. 21, no. 1, pp. 1–19, 2024.
[32] B. Debnath et al., "A grey approach to assess the challenges to adopting sustainable production practices in the apparel manufacturing industry: Implications for sustainability," *Results Eng.*, vol. 22, p. 102006, 2024.
[33] M. A. Hitt, K. Xu, and C. M. Carnes, "Resource based theory in operations management research," *J. Oper. Manag.*, vol. 41, no. 1, pp. 77–94, 2016.
[34] P. Horn and J. Grugel, "The SDGs in middle-income countries: Setting or serving domestic development agendas? Evidence from Ecuador," *World Dev.*, vol. 109, pp. 73–84, 2018.
[35] S. G. Winter, "Understanding dynamic capabilities," *Strateg. Manag. J.*, vol. 24, no. 10, pp. 991–995, 2003.
[36] L. Li, W. Tang, H. Zhou, and S. Yang, "Digitalization and Firm Performance: The Moderating Role of Top Management Team Attributes," *IEEE Trans. Eng. Manag.*, vol. 71, pp. 6595–6605, 2024.
[37] R. W. Buell, E. Porter, and M. I. Norton, "Surfacing the Submerged State: Operational Transparency Increases Trust in and Engagement with Government," *Manuf. Serv. Oper. Manag.*, vol. 23, no. 4, pp. 781–802, 2021.
[38] F. Caro, P. Chintapalli, K. Rajaram, and C. S. Tang, "Improving Supplier Compliance Through Joint and Shared Audits with Collective Penalty," *Manuf. Serv. Oper. Manag.*, vol. 20, no. 2, pp. 363–380, 2018.
[39] J. Walker, "Transparency in the Supply Chain," in *Sustainable Development Goals; Harnessing Business to Achieve the SDGs through Finance, Technology, and Law Reform*, Wiley, 2019, ch. 15, pp. 275–284.
[40] N. Schäfer, "Making transparency transparent: a systematic literature review to define and frame supply chain transparency in the context of sustainability," *Manag. Rev. Q.*, vol. 73, no. 2, pp. 579–604, 2023.
[41] V. H. Villena and S. Dhanorkar, "How institutional pressures and managerial incentives elicit carbon transparency in global supply chains," *J. Oper. Manag.*, vol. 66, no. 6, pp. 697–734, 2020.
[42] C. R. Carter and D. S. Rogers, "A framework of sustainable supply chain management: moving toward new theory," *Int. J. Phys. Distrib. Logist. Manag.*, vol. 38, no. 5, pp. 360–387, 2008.
[43] J. Kang and G. Hustvedt, "The Contribution of Perceived Labor Transparency and Perceived Corporate Giving to Brand Equity in the Footwear Industry," *Cloth. Text. Res. J.*, vol. 32, no. 4, pp. 296–311, 2014.
[44] D. Trabucchi, A. S. Patrucco, T. Buganza, and G. Marzi, "Is transparency the new green? How business model transparency influences digital service adoption." *Technovation*, vol. 126, p. 102803, 2023.
[45] S. Gomes, J. M. Lopes, and S. Nogueira, "Willingness to pay more for green products: A critical challenge for Gen Z," *J. Clean. Prod.*, vol. 390, p. 136092, 2023.
[46] F. Dahlmann, S. Brammer, and J. K. Roehrich, "Navigating the 'performing-organizing' paradox: tensions between supply chain transparency, coordination, and scope 3 GHG emissions performance," *Int. J. Oper. Prod. Manag.*, vol. 43, no. 11, pp. 1757–1780, 2023.
[47] S. Bag, M. S. Rahman, S. Ghai, S. K. Srivastava, R. K. Singh, and R. Mishra, "Unveiling the impact of carbon-neutral policies on vital resources in Industry 4.0 driven smart manufacturing: A data-driven investigation," *Comput. Ind. Eng.*, vol. 187, p. 109798, 2024.
[48] D. E. Ufua et al., "Digital transformation: a conceptual framing for attaining Sustainable Development Goals 4 and 9 in Nigeria," *J. Manag. Organ.*, vol. 27, no. 5, pp. 836–849, 2021.
[49] S. Bag and M. S. Rahman, "The role of capabilities in shaping sustainable supply chain flexibility and enhancing circular economy-target performance: an empirical study," *Supply Chain Manag. J.*, vol. 28, no. 1, pp. 162–178, 2023.
[50] T. Choi, T. C. E. Cheng, and X. Zhao, "Multi-Methodological Research in Operations Management," *Prod. Oper. Manag.*, vol. 25, no. 3, pp. 379–389, 2016.
[51] R. F. DeVellis, "Scale development: Theory and applications," Sage Publications, 1991.
[52] S. G. Sireci, "The construct of content validity," *Soc. Indic. Res.*, vol. 45, no. 1/3, pp. 83–117, 1998.
[53] P. Saha, S. Talapatra, H. M. Belal, V. Jackson, A. Mason, and O. Durowoju, "Examining the viability of lean production practices in the Industry 4.0 era: an empirical evidence based on B2B garment manufacturing sector," *J. Bus. Indus. Mark.*, vol. 38, no. 12, pp. 2694–2712, 2023.
[54] J. S. Armstrong and T. S. Overton, "Estimating Nonresponse Bias in Mail Surveys," *J. Mark. Res.*, vol. 14, no. 3, pp. 396–402, 1977.
[55] S. M. Wagner and R. Kemmerling, "Handling Nonresponse in Logistics Research," *J. Bus. Logist.*, vol. 31, no. 2, pp. 357–381, 2010.
[56] J. F. Hair, C. M. Ringle, and M. Sarstedt, "PLS-SEM: Indeed a Silver Bullet," *J. Mark. Theory Pract.*, vol. 19, no. 2, pp. 139–152, 2011.
[57] D. X. Peng and F. Lai, "Using partial least squares in operations management research: A practical guideline and summary of past research," *J. Oper. Manag.*, vol. 30, no. 6, pp. 467–480, 2012.
[58] J. Henseler et al., "Common Beliefs and Reality About PLS," *Organ. Res. Methods.*, vol. 17, no. 2, pp. 182–209, 2014.
[59] N. Kock, "From composites to factors: Bridging the gap between PLS-SEM and covariance-based structural equation modelling," *Inf. Syst. J.*, vol. 29, no. 3, pp. 674–706, 2019.
[60] A. Behl, J. Gaur, V. Pereira, R. Yadav, and B. Laker, "Role of big data analytics capabilities to improve sustainable competitive advantage of MSME service firms during COVID-19 – A multi-theoretical approach," *J. Bus. Res.*, vol. 148, pp. 378–389, 2022.
[61] M. A. Ketokivi and R. G. Schroeder, "Perceptual measures of performance: fact or fiction?" *J. Oper. Manag.*, vol. 22, no. 3, pp. 247–264, 2004.
[62] D. P. Schwab, "Construct validity in organizational behavior," *Res. Organ. Behav.*, vol. 2, no. 1, pp. 3–43, 1980.
[63] S. W. O'Leary-Kelly and R. J. Vokurka, "The empirical assessment of construct validity," *J. Oper. Manag.*, vol. 16, no. 4, pp. 387–405, 1998.
[64] D. W. Gerbing and J. C. Anderson, "An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment," *J. Mark. Res.*, vol. 25, no. 2, pp. 186–192, 1988.
[65] J. Hair, C. L. Hollingsworth, A. B. Randolph, and A. Y. L. Chong, "An updated and expanded assessment of PLS-SEM in information systems research," *Ind. Manag. Data Syst.*, vol. 117, no. 3, pp. 442–458, 2017.
[66] C. Fornell and D. F. Larcker, "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *J. Mark. Res.*, vol. 18, no. 1, pp. 39–50, 1981.
[67] J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," *J. Acad. Mark. Sci.*, vol. 43, no. 1, pp. 115–135, 2015.
[68] N. Kock, "Common Method Bias in PLS-SEM," *Int. J. e-Collab.*, vol. 11, no. 4, pp. 1–10, 2015.

[69] N. Kock, "Using causality assessment indices in PLS-SEM," *Data Anal. Pers. J.*, vol. 3, no. 5, pp. 1-6, 2022.
[70] M. Tenenhaus, V. E. Vinzi, Y.-M. Chatelin, and C. Lauro, "PLS path modeling," *Comput. Stat. Data Anal.*, vol. 48, no. 1, pp. 159–205, 2005.
[71] K. J. Preacher and A. F. Hayes, "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models," *Behav. Res. Methods*, vol. 40, no. 3, pp. 879–891, 2008.
[72] J. Cohen, "Statistical Power Analysis for the Behavioral Sciences". Routledge, 1988.
[73] S. Zhu, J. Song, B. T. Hazen, K. Lee, and C. Cegielski, "How supply chain analytics enables operational supply chain transparency," *Int. J. Phys. Distrib. Logist. Manag.*, vol. 48, no. 1, pp. 47–68, 2018.
[74] A. Miola and F. Schiltz, "Measuring sustainable development goals performance: How to monitor policy action in the 2030 Agenda implementation?" *Ecol. Econ.*, vol. 164, p. 106373, 2019.
[75] R. B. Swain and F. Yang-Wallentin, "Achieving sustainable development goals: predicaments and strategies," *Int. J. Sustain. Dev. World Ecol.*, vol. 27, no. 2, pp. 96–106, 2020.
[76] J. Truby, "Governing Artificial Intelligence to benefit the UN Sustainable Development Goals," *Sustain. Dev.*, vol. 28, no. 4, pp. 946–959, 2020.
[77] Y. J. Cai and T.M. Choi, "A United Nations' Sustainable Development Goals Perspective for Sustainable Textile and Apparel Supply Chain Management," *Transp. Res. E: Logist. Transp.*, vol. 141, p. 102010, 2020.
[78] T. Choi, S. Kumar, X. Yue, and H. Chan, "Disruptive Technologies and Operations Management in the Industry 4.0 Era and Beyond," *Prod. Oper. Manag.*, vol. 31, no. 1, 2021.
[79] Y. J. Cai and T. M. Choi, "Extended producer responsibility: A systematic review and innovative proposals for improving sustainability", *IEEE Trans. Eng. Manag.*, 68(1), 272-288, 2019.
[80] G. George, J. Howard-Grenville, A. Joshi and L. Tihanyi, "Understanding and tackling societal grand challenges through management research", *Acad. Manag. J.*, 59(6), 1880-1895, 2016.

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