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Investigating the relationship between entrepreneurial orientation and sustainable business performance: the mediating role of circular business practices

U Amaleshwari¹ and R Jeevitha^{1*}

*Correspondence:
R Jeevitha
jeevithavenu9@gmail.com;
jeevithara@dgyaishnavcollege.edu.in
¹School of Management, Dwaraka
Doss Goverdhan Doss Vaishnav
College, Chennai, India

Abstract

The Indian economy is experiencing robust growth; however, the industrial landscape faces fierce competition driven by advancements in AI and 3D printing technologies. This dynamic environment is shifting the business focus from employer-centric to employee-centric, fostering entrepreneurial behaviour among the workforce. Entrepreneurship emerges as a critical factor in securing successful business outcomes amidst these unpredictable conditions. This study aims to explore the entrepreneurial behaviours and strategies employed by Indian SME's to understand their role in adopting sustainable business practices. The research methodology involved conducting a survey among corporate companies based in Chennai. Data collection was facilitated through a structured questionnaire, ensuring comprehensive insights into the entrepreneurial practices within these firms. The study found that Entrepreneurial Orientation does not directly influence Sustainable Business Performance in Indian SME's. However, EO positively impacts SBP only when mediated by Circular Business Practices, highlighting the critical role of circular approaches. The study is unique in its comprehensive approach, involving the distribution of survey questionnaires to 600 companies affiliated with the Madras Chamber of Commerce. A significant response rate was achieved, with 363 companies participating in the survey through both online and offline modes.

Keywords Entrepreneurial orientation, Circular economy, Sustainable business performance, Resources based view, Sustainability

JEL Classification L26, Q56, L10, Q01, M14

1 Introduction

In India, businesses are increasingly adopting sustainable practices such as Corporate Social Responsibility (CSR), ethical sourcing, and circular economy models to address environmental and social challenges while fostering long-term economic growth. Educational institutions play a vital role in preparing future leaders to implement these strategies effectively [1]. Simultaneously, Environmental, Social, and Governance (ESG)



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disclosures have become more common among publicly traded firms, driven by the need for transparency, stakeholder inclusion, investor demand, and competitive pressures, further supporting sustainable and ethical business practices [2]. Entrepreneurship serves as a pivotal element for the prosperity of a nation [3]. Entrepreneurs play a pivotal role in fostering economic advancement through the generation of employment opportunities. Their ability to turn ideas into products can drive a country toward becoming more advanced. The government has simplified procedures and reduced red tape to make it easier for entrepreneurs to start and run businesses. It has invested in infrastructure and facilities to support entrepreneurship, including incubators, accelerators, and co-working spaces [4]. The Skill India Mission aims to develop a skilled workforce through various initiatives. The MSDE has established model training centers across India to provide short-term and long-term training in various skills. Entrepreneurship activities have been increasing worldwide, and India is no different. Key programs include Pradhan Mantri Kaushal Vikas Yojana (PMKVY) that offers short-term training in various skills, Pradhan Mantri Kaushal Kendras (PMKK) provides training in specific sectors, Startup India that helps in support and incentives to startups, Make in India to promote manufacturing and industrial growth, National Apprenticeship Promotion Scheme (NAPS) that promotes apprenticeship training, Skill Acquisition and Knowledge Awareness for Livelihood Promotion (SANKALP) to promote skill development and entrepreneurship (Ministry of Skill Development and Entrepreneurship, 2022). Entrepreneurial activities are widely recognized as key drivers of social and economic growth. Entrepreneurship plays a crucial role in driving an economy forward from a state of stagnation, relying on the skills and abilities of innovative individuals [5].

In today's fast-evolving business landscape, it is important for organizations to empower employees and develop the entrepreneurial spirit for driving innovation and adapting to change. By allowing employees to take on new challenges and implement fresh ideas, companies can enhance productivity and boost morale, fostering a more dynamic and engaged workforce [6]. Entrepreneurship involves acts of creation, renewal, or innovation that happen both within and outside an organization. When these activities occur within an established firm, especially a large one it is called Corporate Entrepreneurship [7]. Organizations facilitate the generation of creative ideas for environmental sustainability. When companies offer appropriate support, including leadership encouragement, resource accessibility, and a culture that prioritizes innovation, employees are more inclined to suggest and engage in sustainable initiatives [8].

The recognized gap in the study pertains to a lack of thorough and comprehensive analysis of the factors affecting the success of sustainable enterprises. During the process of formulating the hypothesis, a comprehensive literature study was carried out. Examining this gap requires an analysis of both direct and mediating relationships with the dependent variable. This study analyses articles sourced from multiple databases, including ScienceDirect, Google Scholar, ProQuest, and other reputable platforms. In the initial framework, EO is defined by Risk-taking, Proactiveness, Innovation, Autonomy and Competitive aggressiveness. The second component encompasses economic, social, and environmental performance, analyzing their combined impact on sustainable company performance. The third variable is circular business practices mediating the Entrepreneurial orientation and sustainable business performance. The hypothesis, based on existing literature, requires additional exploration via data testing in SPSS AMOS.

The body of the paper is structured in the following manner: In the second section, we will conduct a comprehensive analysis of the most recent research about entrepreneurial orientation, innovation, risk taking, proactiveness, autonomy and competitive aggression, sustainable company performance, and circular business activity. Furthermore, a conceptual framework for research is constructed after the completion of this review. In the third section, the approach that was used to carry out the research is described. The outcomes of this investigation are broken down in great depth in Sect. 4. The findings of the research are summarised in Sect. 5, which also highlights the constraints that our study had.

2 Theoretical background

2.1 Research based view (RBV)

Penrose initially laid the foundation for the Resource-Based View (RBV) [9], which was later advanced by Wernerfelt [10]. Following their contributions, several other researchers [11–14] emphasized the significance of RBV as a source of competitive advantage within organizations. The RBV framework identifies four key attributes of resources that can provide firms with a competitive edge: value, rarity, inimitability, and non-substitutability. These strategic resources help firms capitalize on environmental opportunities and mitigate risks [11]. RBV encompasses all organizational resources, including attributes, knowledge, assets, information, and skills, and must be effectively organized to maximize their potential [15]. For firms to achieve sustained success, it is essential to integrate adequate resources while maintaining social and environmental responsibility [16]. RBV emphasizes that when firms deploy their unique and hard-to-imitate resources effectively, they develop strategies towards sustainability. In the lens of the RBV framework, innovation emerges as a critical driver that not only strengthens competitive advantage but also supports long-term sustainable outcomes [17]. Innovation strengthens trust across supply chains to support circular practices, one such is access to trade credit to enable the circular practice financially where credit constitutes a valuable and rare financial resource that supports firms in implementing circular economy practices and achieving competitive advantage. In addition, firms should engage in technology scouting, which is a critical step before launching Circular practices in projects [18]. Supporting this, a study conducted among 150 top- and middle-level managers at Mellat Bank in Iran found that RBV plays a pivotal role in attaining sustainable competitive advantage, highlighting the importance of identifying and developing unique internal resources to ensure long-term competitiveness [19].

2.2 Entrepreneurship and entrepreneurial orientation

Entrepreneurial Orientation (EO) refers to the strategic processes that provide organizations with a framework for autonomous decision-making and entrepreneurial activities. An organization demonstrates EO when it consistently supports and exhibits entrepreneurial behavior, making it a defining characteristic of the firm [20]. EO is primarily reflected in the goals, beliefs, actions, and communications of senior management, signifying their commitment to entrepreneurship. It is also embedded in the organization's internal processes, routines, structures, and culture, all of which promote entrepreneurial initiatives. This orientation is further evident through proactive and innovative actions, such as entering new markets or developing new products and services [21].

Over time, scholarly contributions have shaped EO into a multidimensional construct [22]. Initially, EO was assessed using dimensions such as risk-taking, innovativeness, and proactiveness [23], and later linked to strategic decision-making processes within firms [24]. The construct was further expanded by including autonomy and competitive aggressiveness, framing EO as the act of launching new ventures [25, 26]. EO has also been associated with dynamic capabilities, enabling firms to adapt and reconfigure resources to exploit opportunities and achieve a competitive advantage [27]. Additional studies have integrated environmental and organizational factors to assess EO's comprehensive impact [28], while others adopted a multi-level perspective to explore how EO influences individual attitudes toward innovation in technology, markets, and processes [29]. EO has also been linked to novel market entry strategies and redefined as a multi-level organizational characteristic that impacts top management, internal structures, and venture creation efforts [21].

2.3 Entrepreneurship orientation and sustainability business performance

Sustainable development is defined as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN Brundtland Report, 1987). Large firms with their economic strength play a leading role in society and increase responsibility for development [30]. Large firms may be the starting point and as a trend towards development, which in turn may stimulate entrepreneurs and small businesses. medium-sized businesses. They play a crucial role in the open market economy, driving innovation and improving overall performance [31]. Public-private partnerships focused on sustainability have been proven in their effectiveness in attaining sustainable development goals by integration of economic, social, and environmental objectives [32]. The previous study found that companies that practice sustainability get a lot of business benefits, such as better brand recognition, fresh marketing chances, bigger business skills, higher profits, and better new product performance [33]. Consequently, businesses are increasing their efforts to enhance sustainability, thereby aligning their economic objectives with their environmental and societal responsibilities [16]. Sustainable performance blends environmental, social, and financial performance to make it easier for businesses to run while also helping people and the world around us [33]. RBV to examine how innovation and entrepreneurial abilities affect SMEs' sustainability. The outcome of the survey, entrepreneurial abilities significantly predict perpetuated success [34]. Factors support the triple bottom line concept, which seeks to enhance business practices while employing various methods to promote social advancement and environmental sustainability. Initially, enhancing market efficiency and mitigating market failure via entrepreneurial action may diminish ecological harm and seize economic value [35]. Secondly, by decreasing the intake of toxic chemicals and mitigating hazardous emissions, the adverse effects on workers' health and safety in the workplace may be alleviated [36]. Third, entrepreneurial mindset expedites adaptation to the demands of rapidly evolving surroundings [37]. Simultaneously, entrepreneurial orientation enhances financial performance by emphasising the elements of entrepreneurial orientation: risk-taking, proactiveness, and innovativeness [38, 39]. business sustainability as a business strategy that incorporates social, economic, and environmental factors into the business model. This is consistent with the perspective [40] on business sustainability, which is the company's endeavor to consider not only

profitability, but also the impact on the surrounding environment, social, and broader economy and society.

Extensive research indicates that innovation is primarily influenced by EO, recognized as one of the significant strategic orientations [41, 24]. The study investigated in Kenya, explains the relationships that exist between technological innovation, environmental sustainability practices, and the performance of small and medium-sized enterprises (SMEs). The findings of this study demonstrated that environmentally conscious business owners are highly influenced by technological innovation, which in turn has a favorable effect on the success of their enterprises. An innovative posture, reflected in the entrepreneurial orientation in businesses, results in an increased number of novel and valuable solutions, as well as new products and services [42].

While business risk-taking may promote long-term development, excessive risk-taking can be detrimental to organizations. Excessive risk-taking behavior may undermine financial stability and hinder economic growth [43]. In a study done in Malaysia, it is found that implementation of sustainable efforts did not considerably lower risk-taking by enterprises. companies' ESG scores were much lower than their Governance Score, indicating fewer sustainable initiatives [44].

Research investigating the correlation between EO and company success indicates that EO contributes to enhanced and more sustained performance of organizations. A proactive strategy in a company's operations regarding sustainable development can reduce production costs by optimizing the use of natural resources. Proactive companies, defined as those adept at identifying and capitalizing on market opportunities, can incorporate sustainable development into their operational frameworks to leverage the market opportunities it presents. Putting the idea of sustainable development into practice requires a shift of perspective [45]. The researchers emphasize that positive correlation between EO and company performance may be more intricate in family businesses than in non-family businesses. They assert that innovativeness, proactiveness, and autonomy are positively correlated with the long-term orientation of family firms. Nevertheless, it is inversely correlated with competitive aggressiveness and risk-taking. It indicates that the performance of firms is not equally influenced by all five dimensions of EO [46].

Autonomy, defined as the independence of individual employees and teams in executing professional tasks, appears unrelated to the notion of sustainability, as the implementation of sustainable development arises from the long-term strategies of organisations or societies rather than from the independent choices of individual employees. Nevertheless, if sustainable development is integrated into a company's strategy, employee autonomy may enhance the effective execution of this goal [45]. They investigated the sustainable performance of SMEs in Ghana. The study employed RBV theory and identified a positive correlation between social, economic, and environmental performance influenced by sustainable production. In contrast, operational competitiveness and firm reputation did not demonstrate a significant effect on economic performance [47].

2.4 Circular business practices and sustainable business performance

Sustainability requires a careful equilibrium of economic development, social equity, and environmental stewardship to promote well-being for both present and future generations. Circular economy focuses on product reuse, repair, and the development of

restorative industrial systems, incorporating lifecycle costs into procurement [48]. Creating a sustainable circular business model requires aligning strategies with a company's resources, capabilities, and operational constraints. Transitioning to a circular economy involves designing durable products, offering services, and leveraging resource recovery technologies. These models reduce waste, lower costs, and enhance sustainability while necessitating significant changes in design, operations, and supply chains [49]. Five circular economy models that give businesses an edge are described in a piece from the World Economic Forum: Product as a Service (PaaS), where businesses rent out goods instead of selling them; Resource Recovery: reusing materials from old products; Product Life Extension: making products last longer and easier to fix; Sharing Platforms: letting people trade or share things; and Circular Inputs: using recycled or green materials. These models cut down on waste, save money, and open up new ways to make money. Companies can become more sustainable, attract people who care about the environment, and become more competitive in the long run by using circle practices [50]. The Ellen MacArthur Foundation played a major role in bringing the notion of the circular economy to the attention of scholars, companies, lawmakers, and ultimately, consumers [51]. RBV emphasizes the critical role of internal capabilities, knowledge, and technological assets such as AI, IoT, and Big Data as key enablers for SMEs to adopt advanced digital technologies for sustainability [52]. The literature further suggests that adopting circular principles can provide businesses with a competitive advantage by reducing energy use, saving resources, and mitigating risks like price volatility, which ultimately improves profitability [53]. RBV is closely linked to circular business practices, as developing capabilities for managing natural resources is essential for long-term competitive advantage [53]. Moreover, businesses that implement reverse logistics by reusing, remanufacturing, and recycling materials—can improve their financial performance, as a strong commitment to sustainability leads to cost savings, enhanced efficiency, and new value creation opportunities [54].

This sustainability commitment not only benefits the environment but also boosts profitability, customer trust, and market competitiveness [54]. In the context of Indian SMEs, there is growing pressure from external stakeholders such as customers, regulators, and larger corporations to adopt environmentally friendly practices [55]. However, organizational commitment plays a crucial role in enabling these businesses to successfully implement circular practices [55].

Based on the above literature the following research questions are framed:

RQ1 Role of EO and its dimensions in influencing Sustainable business performance.

RQ2 How circular business practices improve EO and help in achieving sustainability within the business.

3 Methodology

3.1 Research model and hypothesis

This investigation centers on two main questions: first, exploring the relationship between Entrepreneurial Orientation and Sustainable Business Performance via a literature review. Secondly, it seeks to explore the influence of EO with circular business practices mediating the SBP of organizations. Drawing from the existing literature and the

defined research objective, a conceptual framework is presented in Fig. 1. In this conceptual framework, entrepreneurial orientation is considered the independent variable, while sustainable business performance is regarded as the dependent variable and circular business practices as the mediating variable.

It can be inferred from the prior research on the relationship between entrepreneurial orientation and sustainable business performance that there is still a research gap, with only few studies examining the aspects of EO (innovation, risk-taking, autonomy, competitive aggressiveness and proactivity) and sustainable business performance with the mediating variable of circular business practices. This investigation aims to address the existing gap, and it can be posited that,

H1 There is a positive and significant relationship between Entrepreneurial Orientation and Circular business practices.

H2 There is a positive and significant relationship between Circular Business practices and sustainable business performance.

H3 There is a positive and significant relationship between Entrepreneurial Orientation and sustainable business performance.

H4 Circular business practices mediating between Entrepreneurial Orientation and sustainable business performance.

3.2 Sampling and measures

The study adopted entrepreneurial orientation's five dimensions such as Innovation, proactiveness, risk taking, competitive aggressiveness and autonomy. The study adopted six items, (e.g., "My workplace really values and appreciates creativity and coming up with new ideas," to evaluate innovativeness), four item for competitive aggressiveness (e.g., "My company places emphasis on beating competitors to enter new markets"), four item for risk taking (e.g., "My company views innovation as hazardous and resists it"), three item for proactiveness (e.g., "My company's new strategy has caused competitors

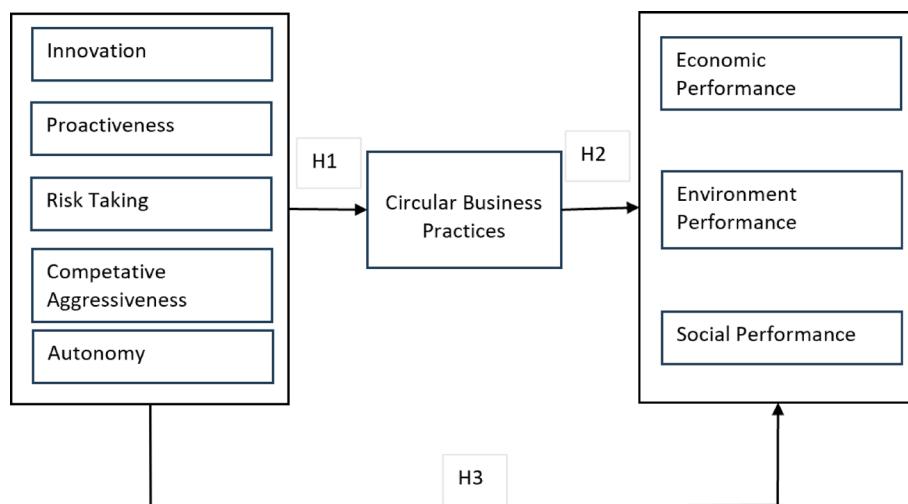


Fig. 1 Conceptual framework

to respond in the market"), and four items for Autonomy (e.g., Employees in my organization are empowered to address both problems and opportunities) [22, 25, 56]. Items were taken from the study to measure Sustainable Business performance. Four statements from each of social performance (e.g., "Our organization have good health and safety standards"), four statement from environmental performance (e.g., "My firm generates revenue through the sale of waste products, including scrap and electronic waste"), and three statement from economic performance (e.g., "my organization experience a growth through increase in revenue") [56, 57]. Ten items for circular business practices are taken from (e.g., "My organization provides Circular Economy related training to our employees") [57–59]. For all factors, respondents were asked to rate their agreement or disagreement on a 5-point Likert scale (from "strongly disagree" as 1 to "strongly agree" as 5).

The companies were selected using convenience sampling, a non-probability sampling technique that involves collecting data from participants who are easily accessible to the researcher [60]. This method allows researchers to select participants based on availability rather than through random selection. For this study, the sample was drawn from companies registered with the Madras Chamber of Commerce and Industry (MCCI). MCCI plays a significant role in the business landscape of Chennai and beyond, serving as a platform for business collaboration, representing the interests of its diverse membership, and offering a range of services to support business growth and development. Over 600 SMEs are registered under MCCI, spanning sectors such as manufacturing, services, and trade. Although MCCI's membership also includes entities such as colleges and legal associates, these were excluded from the study as they do not fall under the SME category. This selective inclusion aligns with the principles of convenience sampling, whereby only accessible and relevant SME participants were chosen for the study. The data were collected using a survey method with a cross-sectional design related to demographic characteristics such as age, experience, hierarchical position, and the size of SMEs were collected. The data was collected by the Survey data gathering methodology over a duration of nine months, from February 2024 to October 2024. The study targeted 400 employees throughout the organizational hierarchy of small and medium-sized firms (SMEs) via personal visits and WhatsApp Quick Response (QR) scanning. To facilitate participation, we sent 1–2 friendly reminders for each survey session. Before presenting the enquiries, we included a consent statement and detailed information on the study's purpose, assuring participants that their responses would exclusively be used for academic research purposes, with an obligation to maintain their privacy.

3.3 Response rate

For the purpose of the current research study, the respondents were employees and managers from SMEs in Chennai, Tamil Nadu. The sample was limited to firms registered under the Madras Chamber of Commerce. Chennai, being one of the largest and most densely populated districts in TamilNadu, provided a suitable setting for the study. Data was collected using a structured questionnaire, with prior approval obtained from the respective HR departments. A total of 600 questionnaires were distributed to employees in Chennai. Out of these, 400 completed questionnaires were returned, yielding a response rate of 66.67%. However, only 363 questionnaires were deemed usable for further analysis, resulting in a valid response rate of 60.51%. The remaining 37

questionnaires were excluded due to incomplete or improper responses. The data collected in this study is consistent with prior research conducted in similar geographical and thematic contexts.

3.4 Data analysis

The concepts of entrepreneurial orientation and sustainable business performance are considered to be of the second order, whereas the dimensions of these concepts are considered to be of the first order. Statistical package for the social sciences (SPSS) was the computer program that was used in order to calculate the total scores for the dimensions of entrepreneurial orientation and sustainable business performance. This was done in order to lessen the complexity of the model. The dimensions were changed into observable variables by the use of total scores, while the EO and SBP were turned into first order constructs. The data analysis consisted of developing measurement and structural models via the use of confirmatory factor analysis (CFA) and structural equation modelling (SEM) techniques, respectively. This was accomplished through the use of the Analysis of Moment Structures (AMOS) database management system.

4 Results

This study surveyed 363 SMEs from MCCI located in Chennai, India. The sample includes a diverse mix of organizations across different sectors, sizes, and respondent profiles. As shown in Table 1, 56% of the SMEs belong to the service sector, 34% to the manufacturing sector, and 10% to the trade sector. In terms of organizational size, 45% of the companies have more than 500 employees, only 11% at 201–500, while 22% have between 51 and 200 employees, and 21% employees are less than 50 people. Regarding the respondents' educational background, 55% hold a postgraduate degree, 30% are graduates, and 15% have professional qualifications. The seniority profile shows that 51%

Table 1 Demographic profile of the respondents

Demographic Variables	Particulars	Frequency	Percent
Organization Sector	Services	202	56%
	Manufacturing	124	34%
	Trade	38	10%
Employee Size	501+	164	45%
	201–500	41	11%
	51–200	80	22%
	Less than 50	78	21%
Education Wise	Post Graduation	200	55%
	Graduation	107	30%
	Professional	55	15%
Gender	Male	271	75%
	Female	92	25%
Seniority	Less than 10 years	184	51%
	11 to 20 Years	92	25%
	21 to 30 Years	66	18%
	31+ Years	21	6%
	Above 15 years	171	47%
Age of the Company	Less than 3 Years	25	7%
	3 to 5 Years	48	13%
	5 to 10 Years	71	12%
	10 to 15 Years	52	7%
	Above 15 years	171	47%

of the respondents have less than 10 years of experience, while 25% have 11–20 years of experience, 18% have 21–30 years, and 6% have over 30 years of experience. Finally, the age of the companies represented in the sample varies, with 47% operating for more than 15 years, 13% for 3–5 years, and 12% for 5–10 years.

4.1 Exploratory factor analysis (EFA)

Exploratory Factor Analysis was used to understand the shared variance among the measured variables, which has been determined to be linked to a factor or latent construct [55]. The Kaiser-Meyer-Olkin (KMO) and Bartlett's tests were conducted for the three constructs, and the results confirmed that the KMO values were greater than 0.50, indicating sampling adequacy for factor analysis. Second, Factor Analysis is done to basically identify the important factors or variables that influence the measuring variable. In this research, Factor Analysis is done to identify the important factors that influence the sustainable business performance.

Table 2, shows the Factor analysis is performed for EO, all the 5 factors align with the theoretical construct of EO such as ready to innovate, proactiveness, risk taking, competitive aggressiveness and autonomy. Each factor contains variables with high factor loadings more than 0.80, indicating strong relationships between the variables and their respective factor. Based on the factor loading, Autonomy has the highest average factor loading of 0.952, followed by Competitive aggressiveness at 0.923 and proactiveness at 0.919 which strongly influences EO. Factor analysis is performed for Circular business practices, the 2 factors were splitted and named after their item statement such as “circular action” and “circular product”. Factor analysis is performed for Sustainable Business performance, all the 3 factors align with the theoretical construct of SBP.

4.2 Confirmatory factor analysis (CFA)

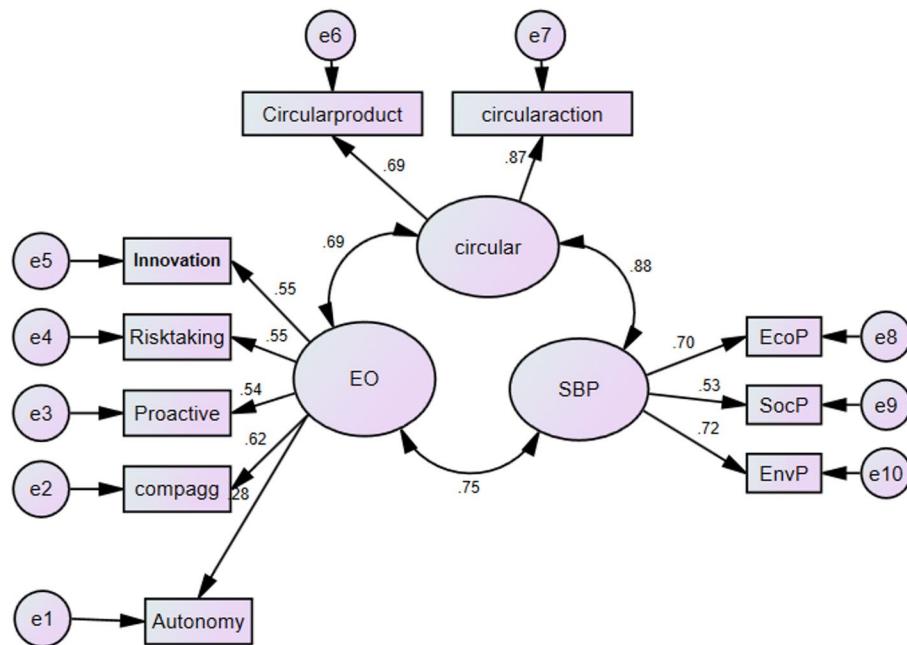
In order to measure the factor loadings, construct correlations, and model fit indices for the models that were created based on Entrepreneurial orientation, circular business the CFA approach was used. Figure 2 shows the Measurement model of the SEM. The standardised regression weights exceed 0.4. All values indicate significance, as evidenced by ($p < 0.05$).

After the examination of the standardized residual covariance matrix and modification indices, few items were deleted to obtain a model that better represents the data. This deletion was conducted because those items have the highest absolute value of standardized residual covariance. This is an indication that a particular covariance is not well reproduced by the hypothesized model [61]. As a result of the deletion, the new model does fit the data, which reveals that the significant chi-square fit, $\chi^2 = 138.018$, indicates that the model does fit the data well. The model sufficiently fits the data, thus further re-specification of the measurement model is unnecessary. This finding has been confirmed [62], indicating that the removal of items in Confirmatory Factor Analysis (CFA) enhances model parsimony. Following the CFA analysis of the research model, the results demonstrate that the model aligns with the validity of the measurement. However, it is necessary to re-evaluate, particularly since CFA includes a deletion process. This stage conforms to the methodology proposed by [63], which recommends the examination of construct validity via convergent and discriminant validity tests. The Average Variance Extracted (AVE), reliability, and correlation matrix were performed,

Table 2 Factor analysis using primary data

Grouping of Variables into Factors	Factor Loading
Innovation	
My employer highly rewards creativity and innovation.	0.897
My organization actively seeks innovative ideas	0.892
Employees could grow and be innovative in their everyday routine.	0.894
We prioritize gaining new skills, even if our current ones are effective.	0.905
Competitive Aggressiveness	
My firm prioritizes beating its competitors in new markets.	0.892
In my organization, we prioritize reducing costs quicker than our rivals.	0.909
My organization has sufficient talents and resources to compete effectively.	0.923
Risk Taking	
Employees in my organization see innovation as risky and fight it.	0.842
Missing market opportunities is a danger for my organization.	0.811
My organization is willing to take modest risks for positive transformation and enhanced effectiveness.	0.873
Proactiveness related variables	
My organization's new strategy makes the competitors to respond in the market	0.919
My company often leads in product and service development.	0.905
Change in my organization happens regularly	0.853
My organization engages in strategic collaborations and joint ventures with other firms.	0.889
Autonomy	
My organization does allow employees to operate independently.	0.875
Employees at my organization are empowered to tackle challenges and opportunities.	0.899
Middle-level managers in my organization need senior management's approval for decision-making.	0.939
My company's top management assigned new staff duties.	0.952
Circular Action	
My organization prefers outbound storage (cloud for data handling)	0.67
My organization prefers outbound transportation	0.893
My organization provides repair information (IT equipment)	0.867
Circular Product	
My organization focuses on creating with prolonged life span	0.885
My organization chooses input materials for various projects carefully	0.927
My organization designs products for reuse, recycle and remanufacture	0.902
Environmental Performance	
My organization increases performance by improving energy efficiently.	0.909
My organization increases resource efficiency	0.907
My organization contributes to waste reduction (by energy efficient practices)	0.901
Economic Performance	
My organization experience a growth through increase in revenue	0.892
My organization advances its economic performance through enhanced business growth	0.912
My organization contributes to local economy	0.894
My firm generate revenue by selling waste (scrap or E-waste) product	0.843
Social Performance	
My organization actively enhance the well-being of its employees as part of its social performance initiatives	0.923
Our organization have good health and safety standards	0.911

with results presented in Table 3 . According to [63], an Average Variance Extracted (AVE) value should be 0.50 or higher. The AVE values for all constructs, as indicated in Table 2, exceed 0.50. The discriminant validity was assessed using Pearson correlation matrix. The discriminant validity measurement should not exceed 0.90. The correlation coefficient is evaluated by examining the relationships among constructs. Results

**Fig. 2** Measurement model**Table 3** Result of average variance extracted (AVE) and composite reliability (CR)

Construct	Items	Average Variance Extract (AVE)	Composite Reliability (CR)
Entrepreneurial Orientation	Competitive aggressiveness Proactive Risk taking Innovation	0.896	0.853
Circular Business practices	Circular Action Circular Product	0.717	0.786
Sustainable Business Practices	Economic Performance Social Performance	0.53	0.7

Table 4 Discriminant validity

Construct/Variable (Relationship)	Pearson Correlation
EO <---> SBP	0.75
EO <---> Circular Business practices	0.693
Circular Business practices <---> SBP	0.875

are presented in Table 4, indicating that the correlation coefficients are not highly correlated, though most are significant.

Based on the test results, the data proves a strong convergent validity, construct reliability, and discriminant validity. To address the research questions, test the hypotheses, and achieve the research aims, to test the proposed framework. The structural model process illustrates the relationship between observed and unobserved variables.

Structural equation modelling assessed model adequacy using samples. According to scholars [64], the structural model was tested using AMOS version 26 after the measurement model was tested for validity and reliability of the survey instrument. The

framework SEM is effective for identifying causal relationships and ensuring model compatibility.

Structural equation modelling assesses the compatibility of data with a theoretical model. The model evaluation focused on Chi-square/degrees of freedom (χ^2/df), CFI, TLI, IFI, RMSEA, and PCFI (Table 4). The Chi-square value with $p=0.000$ indicates a not so good model fit. Nonetheless, a large sample size may result in Chi-Square statistics indicating a significant probability level ($p=0.00$) Schumaker and Lomax (1996). Therefore, this model is considered for further analysis in the goodness of fit metrics. To assess the measurement model fit, standard model-fit measures such as chi-square/degree of freedom (χ^2/df), comparative fit index (CFI), root mean square error of approximation (RMSEA), normed fit index (NFI), incremental fit index (IFI), and Tucker-Lewis index (TLI) were used. The model fit indices estimates using AMOS structural modelling are shown in Table 5.

5 Discussion and conclusion

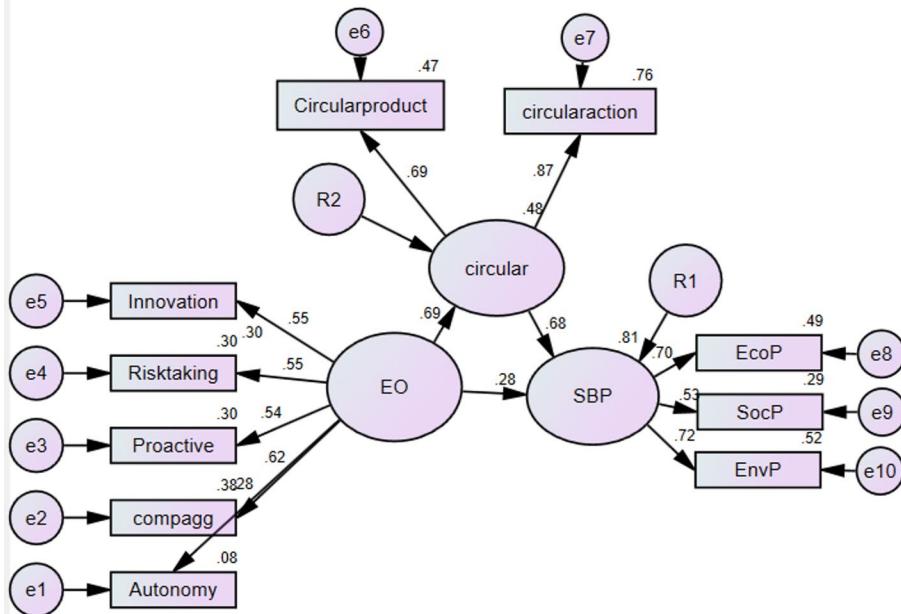
Figure 3 shows the structural model revealing a positive and substantial effect of EO on circular business practices, as evidenced by SBP metrics ($\beta=0.69, p<0.05$). This indicates that when employees exhibit all the dimensions of EO, they are more likely to engage in entrepreneurial activities that align with circular economy principles. Furthermore, the analysis indicates that circular business practices have a positive and significant influence on SBP ($\beta=0.68, p<0.05$). This highlights that when an organization adopts circular practices such as reusing, recycling, and reducing resources it is more likely to achieve sustainability outcomes.

However, the direct relationship between EO and SBP was found to be not significant ($\beta=0.28, p>0.05$), indicating that EO alone does not directly contribute to improved sustainable business performance. Further, the results from bootstrapping with 5000 samples at a 95% confidence interval demonstrate that EO influences SBP only indirectly through the mediation of circular business practices ($\beta=0.469, p<0.05$). The detailed results for both direct and indirect effects are presented in Table 6.

The bias-corrected confidence intervals provide robust evidence for the model's relationships. For all supported paths (EO → CBP, CBP → SBP, and the indirect EO → CBP → SBP), the confidence intervals do not include zero, confirming the significance of these relationships at the 95% level. In contrast, the direct effect of EO on SBP shows a confidence interval that crosses zero (LLCI = -0.126), indicating that this relationship is not statistically significant. This further emphasizes the critical mediating role of circular business practices in linking entrepreneurial orientation to sustainable business outcomes. The analysis explains the relationship between Entrepreneurial Orientation and Sustainable Business Performance is mediated by circular business practices, and

Table 5 Model fit indices

Fit Indices	Results	Suggested values
Chi-square	138.018 (0.000)	DF- 32 P-value > 0.05
Chi-square/degree of freedom ($\chi^2/\text{d.f.}$)	4.313	≤ 5.00 (Hair et al., 1998)
Comparative Fit index (CFI)	0.980	> 0.90 (Hu and Bentler, 1999)
Normated Fit Index (NFI)	0.954	≥ 0.90 (Hu and Bentler, 1999)
Incremental Fit Index (IFI)	0.980	Approaches 1
Tucker Lewis Index (TLI)	0.932	≥ 0.90 (Hair et al., 1998)
Root mean square error of approximation (RMSEA)	0.073	< 0.08 (Hair et al., 2006)

**Fig. 3** Path Diagram of the SEM**Table 6** Direct and indirect effects for sustainable business performance

Paths	Coefficient β	SE	Bias Corrected confidence interval 95%		Results
			Boot LLCI	Boot ULCI	
Circular <--- EO	0.69 (0.000)	1.335	0.683	3.938	Supported
SBP <--- CBP	0.68 (0.000)	0.787	0.588	1.47	Supported
SBP <--- EO (direct Effect)	0.28 (0.024)	1.007	-0.126	3.944	Not Supported
SBP <--- CBP <--- EO (Indirect Effect)	0.469 (0.000)	1.344	0.666	4.16	Supported

the indirect effect (the path through the mediator(s)) is statistically significant. Indirect effect refers to the influence of EO on SBP that operates through the mediator(s), rather than directly. These results provide evidence that hypotheses H1, H2, H3 and H4 are supported by the collected data.

6 Theoretical implications

This study makes several theoretical contributions. First, while previous literature has examined the relationships between entrepreneurial orientation, circular business practices, and sustainable business performance individually, this study integrates these constructs within a single model to explore their interconnections. By examining the relationships between entrepreneurial orientation, circular business practices and sustainable business performance this study offers new insights that deepen the understanding of key dynamics within the field of entrepreneurship. This study confirms that EO dimensions innovativeness, proactiveness, and risk-taking enhance a firm's ability to

develop a competitive advantage. This supports the Resource-Based View argument that firms must cultivate internal capabilities such as innovation and adaptability to remain competitive and resilient in dynamic markets [65]. Findings reinforce the RBV by demonstrating that firms with EO are more likely to engage in circular business activities such as recycling, reusing, and remanufacturing [65]. This suggests that a firm's ability to implement circular strategies arises from its control over critical resources (e.g., knowledge, technologies, supply chains) that enable circularity. The study found that EO does not have a direct impact on SBP [66]. This aligns with prior research showing that EO, particularly proactiveness, may not directly enhance environmental performance. These results highlight the need for context-sensitive research and caution in generalizing EO's impact on sustainability [67]. The research shows that EO influences SBP only when mediated by CBP [68].

The results reinforce earlier findings that sustainability transitions rarely follow a linear trajectory. For example, the nonlinear effects of ICT-trade openness on Bangladesh's sustainable energy transition highlight how external drivers interact in complex ways [69]. In line with this, our study shows that entrepreneurial orientation influences sustainability outcomes primarily through circular business practices, positioning CBP as a crucial mediating mechanism. This emphasizes the need for policy frameworks that are adaptive to such nonlinearities, focusing not only on regulatory design but also on effective implementation. Mechanisms to monitor and evaluate firms' adoption of circular practices, combined with government support for innovative projects, capacity building, and resource provision, can bridge the gap between policy intent and tangible outcomes. Importantly, collaboration with SMEs ensures that policies remain practical and aligned with real business challenges, thereby strengthening sustainability transitions.

From a theoretical perspective, this highlights a gap in the existing literature, the role of CBP as a bridge between EO and sustainability. EO's indirect effect suggests that firms must embed circular thinking into their innovation strategies if they are to achieve sustainable outcomes [67]. As a behavioral and strategic orientation, EO equips firms to navigate evolving business environments, reinforcing its importance for long-term survival and growth.

7 Managerial implications

Managers should note that EO alone is insufficient for achieving sustainability. Rather, EO must be channelled into CBP such as recycling, reuse, and product life cycle management to reduce environmental impact and enhance resource efficiency [70]. Building capabilities in technological innovation, supply chain adaptability, and knowledge management enables firms to effectively implement such practices [65]. In this way, EO translates into measurable sustainability outcomes when directed toward circular strategies.

However, the effectiveness of EO and CBP also depends on the broader sustainability transition and policy environment in which firms operate. Even well-intentioned sustainability efforts, such as renewable energy adoption, may fail to generate positive societal impacts without supportive governance and infrastructure [71]. Thus, the integration of EO and CBP into business processes requires alignment with institutional support, resource availability, and adaptive policy frameworks. Only when these conditions are met can EO and CBP function as critical drivers of sustainable business performance.

Managers should foster an environment where innovation and risk-taking drive circular business strategies, thereby enhancing competitiveness and resilience [68]. However, EO's influence on SBP is not universal; it is contingent on the presence of circular business practices, underscoring the need for contextualised strategies [66, 67]. Overcoming barriers to circular economy adoption—such as consumer resistance, technological limitations, and regulatory gaps—requires active stakeholder engagement. Involving suppliers, customers, and policymakers in co-creating sustainable business models can help firms embed CBP more effectively [70].

Beyond stakeholder collaboration, digitalisation introduces new opportunities and challenges for circular transitions. Emerging technologies such as AI and blockchain can enhance transparency, efficiency, and resource recovery, thereby supporting CBP. At the same time, their ecological costs highlight the importance of governance and responsible resource management. For organisations, particularly SMEs, this implies that strategies must balance the benefits of digital innovation with environmental constraints to achieve long-term sustainable outcomes [72].

Considering that the data for this study were drawn from SMEs in the service trade and manufacturing sectors, the findings cannot be fully generalized beyond this context. Nevertheless, the study adds value by situating Entrepreneurial Orientation, Circular Business Practices, and Sustainable Business Performance within the under-researched context of Indian SMEs. The Resource-Based View (RBV) provides a theoretical foundation for why firms with strong EO should develop and deploy circular practices to transform internal strengths into sustainable competitive advantages.

Although the empirical evidence is contextually bound to SMEs in Chennai, the implications extend beyond this regional setting. For instance, similar to Nordic countries, where resource productivity and environmental taxation accelerate circular transitions (73), SMEs in emerging economies can also benefit from regulatory mechanisms that align EO with sustainability goals. Much of the prior research on EO, CBP, and SBP has been conducted in developed economies with stronger institutional support, advanced infrastructure, and higher sustainability awareness. In contrast, developing economies like India face challenges such as resource constraints, regulatory gaps, and socioeconomic diversity, making it essential to study how EO, CBP, and SBP co-evolve in such contexts. Recent work further highlights that institutional frameworks and CBP advance together, suggesting that effective circular economy progress depends on coordinated governance, fiscal incentives, and sustainable trade strategies—lessons applicable to both high-income and industrializing economies (73).

This study therefore contributes a context-sensitive framework that positions EO and CBP as key antecedents of SBP. It captures the synergistic interaction among these constructs, advancing theoretical understanding of sustainability in entrepreneurial firms. At the same time, it offers practical guidance for SME leaders and policymakers in developing countries seeking to embed circular economy principles into business practices and development plans.

The scope of this investigation is restricted to the measurement of EO. There are five dimensions, yet SBP is considered to be unidimensional. All of the research is limited to SMEs operating in the city of Chennai, which is located in India. The finding may not be fully generalised to SMEs in other geographical regions or any specific sector. This study is primarily based on quantitative data analysis. While this approach allowed

for the measurement of patterns and relationships across a large sample, the absence of qualitative input is a key limitation. A mixed-methods approach was not feasible due to time constraints, limited resources, and the defined scope of the study. However, incorporating qualitative input in future research could help refine measurement scales by providing deeper insights into how respondents interpret items. This study hypothesized a model linking entrepreneurial orientation and sustainable business performance to inform future research. The results suggest that future research can be evaluated to a specific sector or industry, addressing sector-specific challenges and opportunities, thereby providing deeper insights. Due to the complexity of entrepreneurial orientation and sustainable company success, researchers should include mediating and moderating factors to the model. These factors may illuminate how EO affects SBP. This work adds to the literature on EO and sustainability, however operationalizing sustainable business performance might benefit from a deeper understanding of its sub-dimensions, such as environmental, social, and economic performance measures. Policy implications from recent studies suggest that digital transformation must be coupled with robust sustainability frameworks. Policies that address resource scarcity, promote eco-innovation, and prevent rebound effects in digitalization. Integrating such policy directions within entrepreneurial ecosystems could accelerate both digital and circular sustainability [72]. Future research should include company development, financial success, social and environmental repercussions to evaluate sustainable performance holistically.

Author contributions

J.R. wrote the main manuscript text, and A.U supervised the paper. All authors reviewed the manuscript.

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Data availability

Datasets were generated or analysed during the current study.

Declarations**Ethics approval and consent to participate**

Ethical approval for the study was granted by the Research Development Cell of Dwaraka Doss Goverdhan Doss Vaishnav College, University of Madras. Informed consent was obtained from all participants prior to their completion of the questionnaire. All methods were carried out in accordance with relevant guidelines and regulations. All experimental protocols were approved by our institution.

Consent for publication

Consent was obtained from all respondents or legal guardians before using the data.

Competing interests

The authors declare no competing interests.

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