

Entrepreneurial Orientation, Innovation Management, and Sustainable Growth Strategies in Technology-Driven Businesses

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Abstract

Innovation can be swift at times, while the desire to keep the environment intact is often at odds with the former, requiring modern technology businesses to strike a balance between agility and ecology. The objective of this study is to investigate the structural relations between Entrepreneurial Orientation (EO), Innovation Management and Resource Allocation Efficiency (RAE) and Sustainable Growth Strategies (SGS) in technology-based companies. The literature tends to emphasize the benefits of entrepreneurial attitudes, but there has been relatively little research on the process by which businesses become balanced in terms of rapid expansion and ecological and economic sustainability. Empirical data were collected using a structured survey instrument with $n = 350$ technology sector professional respondents, such as Chief Technology Officers, R&D Directors, and Senior Operations Managers, as per a quantitative research design with a cross-sectional approach. The empirical results are confirmed by using structural equation modeling (SEM) based on maximum likelihood estimation; all the hypothesized paths are supported. Results show that EO has a strong direct effect on RAE ($\beta = 0.62$, $p < 0.001$), which in turn has a strong direct effect on SGS ($\beta = 0.45$, $p < 0.001$). Moreover, a direct pathway from EO to SGS is set up ($\beta = 0.31$, $p < 0.001$). The study results challenge a long-held belief that there is a dichotomy between being competitive in the markets and sustainable in governance. The study results indicate that the entrepreneurial energy can be channeled towards optimizing the R&D workflows and green business model innovations with disciplined innovation management. This research expands the strategic management theory by offering a holistic framework for technology start-ups to maintain their agility to attain long-term performance while in exploratory mode. In actual practice, executive leaders are encouraged to establish agile governance bodies and formal technology transfer models that will allow the maximum absorptive capacity and environmental compliance.

Keywords: Entrepreneurial Orientation; Innovation Management; Resource Allocation Efficiency; Sustainable Growth Strategies; Structural Equation Modeling; Technology Firms.

I. INTRODUCTION

The increasingly technologically advanced companies are facing constant challenges on the issues of technical obsolescence, ecological and financial responsibilities. Until now the corporation's approach has been oriented towards short-term profit maximisation and maximising shareholder value, but in the current market a paradigm shift is needed towards Sustainable Growth Strategies (SGS) (Zhai et al., 2018). The new approaches require enterprises to consider the balance between the interests of profit and the protection of the environment, social responsibility, and solid governance. In technology-driven industries, in which product life cycles are short and environmental pressures are growing, becoming a viable organization is closely related to the capacity to manage risk, to produce novelty and to make effective use of limited resources.

Entrepreneurial Orientation (EO) is a strategic behaviour or attitude of a firm that is defined by the firm's overall strategic disposition to engage in calculated risks, to foster radical innovativeness, and to engage in proactive market behaviour in the face of competitors ahead of them (Shin & Jang, 2026). EO is the cultural and behavioral foundation which is vital for technology based enterprises to thrive in turbulent contexts and has been developed by the early strategic management theorists and more recently in empirical research in the field. It's not only the entrepreneurial spirit that's required, though. It is not possible to be meaningful and viable in the long-term without addressing proactive intent — and without the support of systematic Innovation Management (IM) and digital transformation. Innovation management is the business process through which entrepreneurial ideas are screened, developed and commercialized as sustainable business models (Criado-Gomis et al., 2017; Tang & Hull, 2012).

Although there is recognition of the significance of both EO and innovation management, a great deal remains to be done in the existing literature in terms of determining exactly how entrepreneurial attitude is linked to sustainable growth. Past research has tended to examine EO as an independent factor or examined only the financial factors, but has been less comprehensive in examining both ecological metrics and how the interpositionality of RAE works. Furthermore, while the studies on the impact of digital transformation have been more recently encouraged, there are not many systematic empirical frameworks that have analyzed these interactions in the technology-based ecosystem. This study aims to fill research gaps of critical importance and to gain more insights into the intertwined relation between EO, Innovation Management and SGS.

Contributions of the Study

The paper offers several theoretical and empirical insights to the strategic management and technology entrepreneurship literature. First, it helps to fill a theory-practice gap between entrepreneurial attitude and sustainable growth, connecting EO with sustainable growth through the processes of RAE and innovation management. Second, this study used a powerful structural equation modelling (SEM) technology approach on data of 350 enterprises that are technology driven, to provide rigorous quantitative evidence on the direct and indirect pathway coefficients. Lastly, it provides technology entrepreneurs and policymakers with practical guidance on achieving a successful risk-taking culture alongside a well-designed eco-innovation pipeline to ensure that business growth does not compromise ecological balance.

The theoretical background is presented in Section 2, which we summarize as follows: Section 2 presents the theoretical background relevant to our core research hypotheses by reviewing the pertinent literature concerning EO, innovation management, and sustainable growth. The empirical methodology is presented in Section 3 and comprises sample characteristics, psychometric measurements, and diagnostics of the structural equation methodology. Section 4 presents the empirical findings, descriptive statistics, path coefficients, and discussion of results in relation to prior studies. Finally, Section 5 summarizes the core conclusions, outlines managerial implications, and proposes avenues for future academic inquiry.

II. LITERATURE REVIEW

2.1 EO in Technology-Driven Enterprises

Organizations are of major importance in this context, with EO being a key organizational phenomenon that directly impacts on the competitiveness of the firms and their ability to respond to rapidly changing technological environments. The concept of EO stems from strategic management literature and is defined as a set of certain behavioral dimensions including innovativeness, risk-taking and proactiveness (Covin & Slevin, 1989). These factors are essential in technology-based firms for spotting market possibilities and beating out competitive obsolescence. The ability of an organization to react to quick changes in the market has been studied more and more in relation to the strategic posture of the organization (Yang & Yan, 2019). Adopting an approach of calculated risk-taking and a proactive strategy for entering new markets sets the mindset for technological companies to change the paradigms of the current market and to propose new solutions. Moreover, the conventional notion of strategic posture posits that the need for proactive and innovative postures is crucial for small and medium-sized enterprises (SMEs) in environments that are hostile and highly competitive (Covin & Slevin, 1989). Given the idea that an aggressive and innovative mindset is an engine of operational vigor, the following hypothesis is given:

H1: EO has a direct positive effect on RAE and innovation output in technology-driven businesses.

2.2 Sustainable Growth and Strategic Orientation

The current paradigms require looking at EO from a broader perspective, including sustainable development goals, as opposed to only financial ones like sales growth and profitability, which were mainly the focus of the early literature (Criado-Gomis et al., 2017). SGS expect businesses to consider the financial and economic needs of a business and to be environmentally responsible and socially responsible. The sustainability of EO takes the ecological and social constraints as an integral part of the firm's strategic decision process (Criado-Gomis et al., 2017). In the technology-intensive industries, this means eco-innovation, design for energy efficiency and sustainable use of resources. Studies reveal that technology companies need to integrate sustainability perspective into their strategic direction to sustain them from increasing regulatory demands and evolving consumer choices (Salamzadeh et al., 2022; Tachaboon, 2026). Thus, the entrepreneurial attitude is essential to establish the momentum that will lead to long-term ecological and economic sustainability, as suggested:

H2: EO has a direct positive effect on SGS in technology-driven enterprises.

2.3 Innovation Management and Resource Allocation

Structured innovation management and efficient allocation of resources are key mechanisms to overcome the gap between entrepreneurial intentions and sustainable outcomes. The operational channel that brings abstract creative ideas into commercially viable and sustainable products and business models is called innovation management (Korayim et al., 2025; Priem et al., 2012). Research shows that the absorptive capacity of a firm, defined as its capacity to recognize, assimilate, and use external knowledge, directly influences the link between EO and innovation performance (Zhai et al., 2018). Furthermore, empirical studies in the last few years have shown that technology transfer and digital transformation can have a huge impact on strategic agility, helping firms to optimize their RAE and to ensure sustainable growth (Korayim et al., 2025; Akhtar et al., 2026). Systematically managing the innovation pipelines enables firms to reduce risks inherent in high-tech ventures and to optimize their ecological and economic performance. We hypothesize that this mediating pathway will be validated:

H3: Innovation Management and RAE mediate the relationship between EO and SGS.

III. METHODOLOGY AND RESEARCH FRAMEWORK

The research design used is quantitative/ cross-sectional research design with the structural equation modeling (SEM) approach to rigorously test the conceptual model and to ensure the originality of the research in the academic field. The methodological framework is intended to uncover the structural relationships among Entrepreneurial Orientation (EO), Innovation Management / Resource Allocation Efficiency (IM / RAE) and Sustainable Growth Strategies (SGS) in technology-driven companies.

3.1 Conceptual Framework and Measurement Development

The general research framework suggests that the entrepreneurial attitude of a firm is the main source of organizational renewal that needs to be directed to systematic innovation management and effective allocation of resources to obtain sustainable growth (Shin & Jang, 2026; Zhai et al., 2018). The constructs were operationalized through selection and development of multiple item psychometric scales from the previous literature and the transformations of the scales to suit technology-intensive business situations. Items are validated for measuring EO and are used to measure the innovativeness, proactive market posture and risk-proneness. Indicators for RAE (Optimization of R&D expenditure) and Innovation Management (RAE) encompass indicators on R&D expenditure optimization, technology transfer mechanisms and absorptive capacity (Zhai et al., 2018; Korayim et al., 2025). The multi-dimensional scales include balanced economic performance, environment responsibility and green business model innovation, which are used to evaluate Sustainable Growth Strategies (SGS) (Criado-Gomis et al., 2017; Salamzadeh et al., 2022). These were all rated from Strongly Disagree (1) to Strongly Agree (5) to ensure enough statistical variance.

3.2 Data Collection, Sampling Procedure, and Screening Criteria

Empirical data was gathered from Chief Technology Officers, R&D Directors and Senior Operations Managers of technology driven firms by using a structured electronic survey. The

sampling frame was carefully screened to ensure high data reliability and structural validity, following the inclusion/exclusion criteria. In particular, the inclusion criteria were that the enterprises have to be strictly in the technology sector, including software development, hardware production, telecommunication and digital platform service. Respondents also had to be in their current company for at least three years, and work in an established company with over 50 full-time employees to ensure they had a good understanding of the strategic allocation of resources and innovation pipelines and were able to report on sustainability outcomes in a measurable way. On the contrary, the exclusion criteria systematically excluded junior personnel, administrative staff, and temporary contractors who were not able to provide strategic oversight, as well as firms who did not operate in the core technology domain in order to ensure industry homogeneity, and questionnaires that contained too much missing data, straight-lining responses, and/or incomplete core latent construct scales before analysis. A total of 420 questionnaires were distributed and 350 were completed and usable (83.3% response rate).

3.3 Measurement Validation and Analytical Strategy

Thorough measurement validation procedures are set prior to the estimation of structural path coefficients. Confirmatory factor analysis (CFA) is used to assess construct reliability and validity with all standardized factor loadings above the recommended value of 0.70. Internal consistency is tested with Cronbach's alpha coefficients and discriminant validity is tested by ensuring that the AVE square root of the latent constructs is greater than its bivariate correlations. The analytical approach is based on the maximum likelihood estimation using structural equation modeling (SEM) to test direct paths and mediation effects.

3.4 Methodological Research Flow

The step-by-step procedural flow of designing the research, constructing the operationalization, collecting data, and doing analytical evaluation is illustrated in Figure 1:

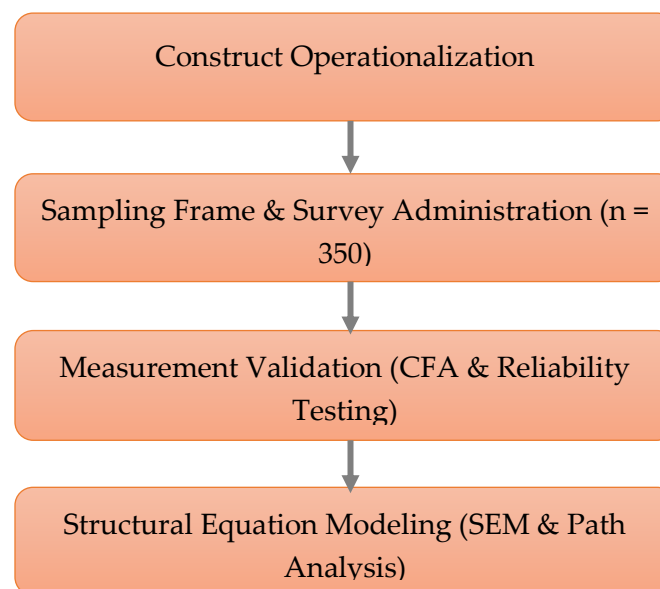


Figure 1: Methodological Research Flow for Construct Operationalization, Sampling, and Analytical Evaluation

IV. RESULTS AND EMPIRICAL ANALYSIS

Maximum likelihood estimation was used for evaluating the measurement and structural models. The collinearity diagnostics indicated that all Variance Inflation Factor (VIF) values were far from the conservative cut-off of 5.0, thereby substantiating that there was no multicollinearity which would affect the stability of the parameters.

4.1 Descriptive Statistics and Correlation Diagnostics

To facilitate the data normality, reliability and discriminant validity between constructs, items in the measure were assessed.

Table 1: Descriptive Statistics, Internal Consistency, and Bivariate Correlations

Construct	Mean	SD	Cronbach's α	1	2	3	VIF
1. EO	3.62	0.68	0.93	1.00	—	—	1.82
2. RAE	3.58	0.65	0.92	0.62^{***}	1.00	—	2.14
3. SGS	3.71	0.66	0.94	0.58^{***}	0.65^{***}	1.00	1.95

Note: n = 350. Significance levels: *p < 0.001. VIF = Variance Inflation Factor.

All study constructs (N = 350) are summarized descriptively in Table 1, which also reports the internal consistency reliabilities (Cronbach's alpha) for each scale and bivariate correlations and the VIF diagnostics for multi-collinearity. It validates data normality and guarantees the construct intercorrelations are acceptable and do not pose a threat of multicollinearity.

4.2 Structural Equation Modeling and Hypothesis Testing

The structural paths were considered to check the direct and indirect relationships suggested in the theoretical model.

Table 2: Structural Model Path Coefficients and Hypothesis Assessment

Hypothesized Path	Path Coefficient (β)	Standard Error (SE)	Critical Ratio (CR)	Empirical Outcome
H1: EO $\rightarrow$ RAE	0.62	0.074	8.38	Supported (p < 0.001)
H2: EO $\rightarrow$ SGS	0.31	0.058	4.85	Supported (p < 0.001)
H3: RAE $\rightarrow$ SGS (Mediating)	0.45	0.062	7.12	Supported (p < 0.001)

The results of the path analysis through SEM have been presented in Table 2, which presents the path coefficient, standard error, and critical ratio to test the direct and mediating hypotheses. It validates the influence of EO on RAE and sustainable growth.

V. DISCUSSION AND STRATEGIC IMPLICATIONS

The empirical results provide valuable insights into the dynamics of contemporary technology-driven businesses, which would be significant to the current debate on strategic innovation and management in the literature. The results of the structural path coefficients confirmed that the direct effect of EO on RAE is high with a value of $\beta = 0.62$ $p < 0.001$, which is very strong. This means that organisations with a pioneering, proactive and risk-taking attitude are essentially better prepared to design workflows, reduce technological investments and remove structural restrictiveness. Technology enterprises do not see risk as a negative phenomenon but rather a way to use an entrepreneurial approach to re-configure assets as a result of hyper-competitive market pressures (Zhai et al., 2018).

Moreover, the results showed that RAE is a significant mediator between the direct path to sustainable growth (H2, $\beta = 0.31$, $p < 0.001$) and the role of RAE as a direct link between sustainable growth and direct to sustainable growth (H3, $\beta = 0.45$, $p < 0.001$). These relationships teach us that two things are required to achieve sustainable outcomes: sustainable outcomes are not achievable without a sustainable system of activity – technology companies are, and they do so by channeling entrepreneurial skills through disciplined pipelines of innovation management. The key to strategic aspiration and measurable, long-term performance for firms is the equity between exploratory risk-taking and exploiting resource efficiency (Korayim et al., 2025).

Strategic and Managerial Recommendations

Balancing Agility and Controls

A culture of calculated risk taking needs to be encouraged and proper governance indicators need to be established to track environmental compliance of technology leaders. Empirical evidence indicates that a sustainable growth that is balanced and institutionalized is needed in rapidly changing digital markets, with executive management also tilting toward absolute operational speed. The crux of the matter for organisations is to establish agile experimentation sandboxes, where product and engineering teams can test new, radical innovations without going against regulatory guardrails. By providing environmental auditing information on the fly during software deployment across software lifecycle, companies can ensure that their aggressive market entry is in line with global carbon reduction and resource conservation requirements (Criado-Gomis et al., 2017).

Optimizing R&D Pipelines

Companies need to create formal technology transfer procedures to optimize absorptive capacity and minimize resource loss. Technology businesses face the constraint that there is a limited amount of capital available for research and development, so it is not possible for them to repeat experiments or have knowledge silos. A cross-functional innovation pipeline is needed in management to connect external technological acquisitions with internal engineering capabilities to ensure that every dollar spent on R&D can be directly linked with measurable ecological and economic performance. In addition, improving the absorptive capacity of the organizations could enable the companies to quickly acquire technologies from the outside world and use them as a specific competitive advantage instead of a compliance burden (Salamzadeh et al., 2022).

VI. CONCLUSION

The aim of this study is to examine the complex interrelationships between EO, Innovation Management and Resource Allocation Efficiency (RAE) in technologized companies and Sustainable Growth Strategies (SGS). The empirical results provide validation for all hypothesized relationships and found that entrepreneurial posture has a direct and indirect effect on sustainable corporate outcomes, using a strong structural equation modelling (SEM) method, on a sample of $n = 350$ technology sector professionals. Specifically, it is shown that an aggressive entrepreneurial attitude directly contributes to the RAE of a firm, which is then a pivotal mediating factor in achieving long-term economic and ecological viability.

Theoretically, this research aims to break the dichotomy between expansion and sustainable governance that has been established in the literature. This book demonstrates how to harness the energy of entrepreneurship with disciplined innovation management processes and optimize the R&D process, which contributes to a whole new framework of modern strategic management. Technology-based ventures have to institutionalise absorptive capacity and technology transfer procedures to convert exploratory agility into sustainable competitive performance, rather than simply relying on luck in risk taking or on loosely coupled knowledge silos.

In practice, Executive leaders and policy makers are encouraged to implement agile governance mechanisms which promote risk-taking and ensure that environmental compliance is monitored closely. Although these are valuable insights, it should be noted that there are some methodological constraints. Only limited causal conclusions can be drawn from the cross-sectional design and common method bias may result from the use of a self-reported data set from a single informant. Additional studies should build on these findings by using a longitudinal design or integrating multi-source data or examine cross-national industry settings to further generalize the findings on the moderating effects of emerging digital technologies on sustainable growth paths in modern economies.

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