

DETERMINANTS OF BUSINESS SUSTAINABILITY AMONG WOMEN MICRO-ENTREPRENEURS: A STUDY OF EAST COAST PENINSULAR MALAYSIA

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Abstract: *Business sustainability is still a major issue for women micro-entrepreneurs in Malaysia, as is the case in the East Coast region of the country, where low levels of financial literacy, lack of government support, and less access to digital participation hinder business sustainability. This paper investigates the determinants of business sustainability among women micro-entrepreneurs in Kelantan, Terengganu, and Pahang. Based on the Resource-Based View (RBV) and Knowledge-Based View (KBV), it assesses whether financial literacy, entrepreneurial competence, digital inclusion, and government support are related to green knowledge management and business sustainability. Data were collected using a structured questionnaire, with responses from 314 women micro-entrepreneurs. Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) version 4.1.1.6. The findings reveal that digital inclusion ($\beta = 0.343$), government support ($\beta = 0.309$), and financial literacy ($\beta = 0.218$) significantly influence GKM, while entrepreneurial competence shows no significant effect. GKM demonstrates a significant positive relationship with business sustainability ($\beta = 0.308$). These findings support a resource- and knowledge-based*

interpretation of sustainability outcomes in an understudied group of women-led micro-enterprises. They do not independently establish causal relationships or statistical mediation.

Keywords: *green knowledge management, women micro-entrepreneurs, business sustainability, financial literacy, digital inclusion, entrepreneurial competence, government support*

Introduction

Micro-enterprises operated by women form the pillar of Malaysia's comprehensive economic growth agenda, contributing substantially to household income, poverty alleviation, and local economic resilience, mainly in semi-urban and rural communities. Despite their economic implication, women micro-entrepreneurs continue to face inconsistent barriers to accomplishing long-term business sustainability compared with their male counterparts and larger enterprises. These barriers are especially distinct in the East Coast region of Peninsular Malaysia, comprising Kelantan, Terengganu, and Pahang, where structural limitations such as low levels of financial literacy, limited access to institutional and government provision, and restricted digital participation continues to delay the transition of micro-businesses from mere survival to sustainable development.

Business sustainability, understood as the capability of an enterprise to tolerate and persist competitive over the long term while balancing economic, social, and environmental considerations, has become a progressively crucial policy concern in the wake of Malaysia's Shared Prosperity Vision 2030 and its obligation to the United Nations Sustainable Development Goals (SDGs). Within this context, green practices and environmentally sensible resource management are no longer optional attachments for micro-enterprises but are gradually becoming fundamentals for continued market relevance, particularly as consumers, financiers, and regulators place greater prominence on environmentally responsible business conduct.

Existing research suggests that firms' capacity to convert intangible resources, such as knowledge, skills and institutional relationships, into sustainability-related practices is linked to how knowledge is managed. Green knowledge management (GKM) encompasses the acquisition, storage, sharing, application and creation of environmentally relevant knowledge (Yu et al., 2022). Although earlier studies link GKM with green innovation and organisational performance (Abbas & Sağsan, 2019; Abbas & Khan, 2023), its relationships with resource antecedents and business sustainability remain insufficiently understood among women-led micro-enterprises in East Coast Peninsular Malaysia.

This study, therefore, pursues to examine the factors involve four key antecedents, namely financial literacy, entrepreneurial competence, digital inclusion, and government support, and business sustainability among women micro-entrepreneurs operating in Kelantan, Terengganu, and Pahang. By integrating the Resource-Based View (RBV) and Knowledge-Based View (KBV) as the underpinning theoretical lenses, this study contributes to a more nuanced understanding of how internal resources and external support structures are reformed into sustainable business practices through the strategic composition of green knowledge. The findings are expected to provide theoretical extension to RBV and KBV literature, as well as practical direction for policymakers, financial institutions, and support agencies seeking to plan more effective involvements for women micro-entrepreneurs in the region.

The central research gap is not simply whether resources matter, but how financial, entrepreneurial, digital and institutional resources become sustainability-relevant knowledge within resource-constrained women-led micro-enterprises. Prior Malaysian research examined determinants of women's business sustainability, but did not establish the role of GKM in the resource-to-sustainability relationship (Adam et al., 2024). Research on GKM has developed its measurement foundations and linked knowledge practices to green innovation and organisational performance, principally in broader organisational settings (Yu et al., 2022; Abbas & Khan, 2023). The present study brings these streams together in the underexamined East Coast Malaysian micro-enterprise context. Its contribution is to compare resource-specific paths to GKM and business sustainability rather than assuming that access to resources automatically produces sustainable outcomes.

Literature Review

This section reviews the underpinning theories and prior empirical evidence concerning to the six constructs surveyed in this study, namely financial literacy, entrepreneurial competence, digital inclusion, government support, green knowledge management, and business sustainability, before presenting the hypothesised relationships that form the research framework.

Underpinning Theories: Resource-Based View and Knowledge-Based View

The Resource-Based View (RBV), first advanced by Barney (1991), suggests that firms attain sustained competitive advantage by possessing and positioning resources that are valuable, rare, inimitable, and non-substitutable. In the context of women micro-entrepreneurs, resources such as financial knowledge, entrepreneurial skills, and access to government schemes establish the firm-specific assets from which competitive advantage and, ultimately, sustainability may be derived (Kodua, 2019). The RBV has increasingly been practical to clarify how micro and small enterprises leverage inadequate internal resources to remain feasible in resource-constrained environments (Adam et al., 2022).

Taken together, RBV explains why access to valuable financial, entrepreneurial, digital and institutional resources may matter, whereas KBV explains why their use and integration through knowledge practices may matter. This distinction is especially pertinent to micro-enterprises, where formal departments and information systems may be absent. Previous Malaysian evidence also suggests that the predictors of women's business sustainability differ across contexts: Adam et al. (2024) found that family support, rather than several conventional entrepreneurial resources, was the significant predictor in their pandemic-period model. The implication is not that one resource universally dominates, but that context and the mechanisms connecting resources with outcomes require empirical examination. Thus, integrating RBV and KBV supplies a testable explanatory lens rather than evidence of a causal process.

Complementing RBV, the Knowledge-Based View (KBV), established by Grant (1996), extends the resource disagreement by emphasising knowledge as the most purposefully significant of a firm's resources. KBV argues that a firm's capacity to integrate and apply specialised knowledge detained by its members is a main source of value creation. Within this study, GKM is conceptualised as the knowledge-orchestration mechanism through which financial, competency-based, digital, and institutional resources are transformed into environmentally responsible and sustainable business practices. The integration of RBV and KBV therefore provides a intelligible theoretical foundation for explaining both the resource

antecedents of GKM and the pathway through which GKM interprets these resources into business sustainability outcomes.

Financial Literacy

Financial literacy may support both operational continuity and environmentally oriented decisions because budgeting, financing and investment appraisal shape a firm's capacity to adopt resource-efficient practices. Evidence from Malaysian and Indonesian MSMEs connects financial literacy and technology adoption with sustainability (Edward et al., 2024), while research on Malaysian micro-entrepreneurs also highlights the relationship between financial literacy and financial sustainability (Nik Azman et al., 2025). Nevertheless, financial viability and environmental performance are distinct outcomes. The present study therefore tests financial literacy's association with both GKM and multidimensional business sustainability instead of assuming that financial knowledge is equivalent to green knowledge.

Financial literacy refers to an individual's knowledge and skills in handling financial matters, including budgeting, saving, credit management, and investment decision-making. For women micro-entrepreneurs, financial literacy is a critical determining factor of business feasibility, as it directly impacts the quality of financial decision-making, access to credit, and the ability to reinvest profits into sustainable business practices (Nik Azman et al., 2025). Previous studies conducted among micro and small enterprises in Malaysia and the broader Southeast Asian region constantly report that financial literacy improves not only business performance but also the tendency to adopt environmentally sustainable practices, as financially literate entrepreneurs are better positioned to appraise the long-term cost-benefit trade-offs of green investments (Edward et al., 2024).

Entrepreneurial Competence

The expected effect of competence may depend on what the construct measures. General entrepreneurial skills, including opportunity identification and resource mobilisation, need not include environmental scanning, green process redesign or knowledge-sharing routines. Sarma et al. (2022) examine the conditions underpinning sustainable opportunity recognition and exploitation, supporting a conceptual distinction between broad entrepreneurship capability and sustainability-specific action. This distinction provides a reason to test, rather than presume, a positive relationship between entrepreneurial competence, GKM and business sustainability. Entrepreneurial competence comprehends the bundle of knowledge, skills, and attitudes that empower an individual to categorize opportunities, mobilise resources, and manage business operations efficiently. Competence-based frameworks recommend that entrepreneurial competence should, in theory, be positively associated with knowledge management practices and sustainability outcomes, as competent entrepreneurs are more accomplished of recognising the strategic value of green knowledge (Schelfhout et al., 2016). However, empirical findings across micro-enterprise contexts persist mixed, with several studies noting that entrepreneurial competence alone is often insufficient to drive knowledge composition or sustainability outcomes in the absence of complementary institutional and financial support (Sarma et al., 2022).

Digital Inclusion

Digital inclusion should also be distinguished from basic connectivity. Access to devices or platforms does not guarantee the ability to evaluate, retain or apply sustainability information. Khairuddin et al. (2021) provide an instrument-development basis for assessing digital inclusion among SME entrepreneurs. From a KBV perspective, meaningful digital participation can reduce barriers to information acquisition and exchange, but its contribution to

sustainability may depend on whether acquired information is translated into organisational knowledge practices. This study accordingly examines both the DI–GKM and DI–BS paths. Digital inclusion refers to the extent to which individuals and businesses have meaningful access to, and the capability to use, digital technologies and platforms in their operations. For women micro-entrepreneurs, digital inclusion facilitates access to markets, financial services, and knowledge networks that would otherwise be constrained by geographic or social barriers (Khairuddin et al., 2021). Digital platforms also serve as important conduits for disseminating environmental and sustainability-related knowledge, thereby positioning digital inclusion as a key antecedent of green knowledge management among micro-enterprises operating in semi-rural and rural East Coast communities.

Government Support

Government programmes can deliver financial assistance, training, advisory services and informational resources; however, the provision of support is analytically distinct from an entrepreneur's internalisation and practical use of that support. Idrees et al. (2023) examine management support, green knowledge acquisition and green innovation, highlighting the importance of knowledge processes in the translation of support into green outcomes. In the present setting, this literature supports testing whether government support is associated with GKM as well as whether it has a separate direct relationship with business sustainability. Government support encompasses the range of policies, financing schemes, training programmes, and institutional assistance made available to micro-entrepreneurs by government agencies and related bodies. In Malaysia, various initiatives, including microfinancing schemes and women-focused entrepreneurship programmes, have been introduced to strengthen the capacity of women-led micro-enterprises (Adam et al., 2024). Government support is theorised to improve a firm's knowledge base by providing access to training, mentorship, and structured information on sustainable business applies, thereby serving as a significant external resource that accompanies the firm's internal abilities.

Green Knowledge Management

GKM is not a single act of acquiring environmental information. Yu et al. (2022) identify five interrelated domains: green knowledge acquisition, storage, sharing, application and creation. The inclusion of knowledge creation is conceptually important because micro-entrepreneurs may not merely adopt externally supplied advice; they may adapt practices to local production processes and market conditions. Studies connect knowledge management with green innovation and sustainable development (Abbas & Sağsan, 2019) and explore the interaction between GKM, green organisational culture and performance (Abbas & Khan, 2023). However, evidence from larger or more formal organisations should not be assumed to generalise directly to women micro-entrepreneurs. The present study investigates GKM as a resource-conversion capability within this specific population.

Green Knowledge Management (GKM) discusses to the organized acquisition, sharing, storage, and application of knowledge related to environmentally sustainable practices within an organisation (Yu et al., 2022). GKM has been shown in numerous industry contexts to mediate the relationship between organisational resources and sustainability performance, as it empowers firms to adapt otherwise latent knowledge resources into actionable green practices (Abbas & Sağsan, 2019; Abbas & Khan, 2023). Within the micro-enterprise context, GKM plays a mainly important orchestrating role, given the restricted formal knowledge management structure typically available to very small firms (Sapiai et al., 2025).

Business Sustainability

The triple-bottom-line perspective differentiates economic continuity, social responsibility and environmental stewardship (Venkatraman & Nayak, 2015). Pardo Martínez and Cotte Poveda (2022), in their analysis of 120 microenterprises, demonstrate the relevance of context-sensitive sustainability strategies for small businesses in emerging economies. For women-led micro-enterprises, an economically viable business may still face weaknesses in environmental or social practices. Consequently, treating sustainability as multidimensional offers a more defensible outcome definition than using profitability alone.

Business sustainability discusses to a firm's capacity to endure its operations and competitive position over the long term while balancing economic performance with social and environmental obligation, often described through the triple bottom line perception of people, planet, and profit (Venkatraman & Nayak, 2015). For women micro-entrepreneurs, business sustainability is often vulnerable by resource constraints, limited access to finance, and susceptibility to economic shocks, making the identification of factors that toughen long-term feasibility a matter of both academic and policy importance (Pardo Martínez & Cotte Poveda, 2022).

Hypotheses Development

The proposed links also require distinguishing direct effects from mediation. Significant resource-to-GKM and GKM-to-sustainability paths are consistent with the possibility of indirect relationships, but do not by themselves demonstrate statistically significant mediation. Establishing mediation requires estimated specific indirect effects, associated uncertainty intervals and an explicit statistical test. Accordingly, the direct hypotheses below are evaluated using the reported structural paths; any substantive claim about mediated effects must be supported by a separate indirect-effect analysis.

Drawing upon the Resource-Based View (RBV) and Knowledge-Based View (KBV), this study conceptualizes financial literacy, entrepreneurial competence, digital inclusion, and government support as key resource antecedents that contribute to the expansion of Green Knowledge Management (GKM). Moreover, GKM is projected as a critical mechanism that facilitates business sustainability. Given that, these factors represent valuable firm-level abilities and institutional resources, this study also examines their direct effects on business sustainability. Accordingly, the following hypotheses are developed:

- H1: Financial literacy has a significant positive relationship with green knowledge management.
- H2: Entrepreneurial competence has a significant positive relationship with green knowledge management.
- H3: Government support has a significant positive relationship with green knowledge management.
- H4: Digital inclusion has a significant positive relationship with green knowledge management.
- H5: Green knowledge management has a significant positive relationship with business sustainability.
- H6: Financial literacy has a significant positive relationship with business sustainability.
- H7: Entrepreneurial competence has a significant positive relationship with business sustainability.
- H8: Government support has a significant positive relationship with business sustainability.
- H9: Digital inclusion has a significant positive relationship with business sustainability.

Research Methodology

This study employed a quantitative cross-sectional research approach to empirically examine the hypothesised relationships between financial literacy, entrepreneurial competence, digital inclusion, government support, green knowledge management, and business sustainability. Data were collected using a structured, self-administered questionnaire distributed to women micro-entrepreneurs operating in the East Coast states of Peninsular Malaysia, namely Kelantan, Terengganu, and Pahang. A total of 314 valid responses were obtained and used for the final analysis, following the removal of incomplete and straight-lined responses.

The questionnaire comprised multiple sections capturing respondent demographic profiles and multi-item measurement scales for each of the six constructs, all measured using a five-point Likert scale ranging from strongly disagree to strongly agree. Measurement items were adapted from established instruments validated in prior studies and refined through a pilot study to ensure content validity and reliability prior to full-scale data collection (Sapiai et al., 2025). Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM), version 4.1.1.6, given its suitability for testing complex models its robustness with non-normally distributed data typical of survey-based social science research (Hair et al., 2019). The analysis followed the standard two-stage approach, whereby the measurement model was first assessed for internal consistency reliability, convergent validity, and discriminant validity (Fornell & Larcker, 1981), followed by an assessment of the structural model through bootstrapping procedures with 10,000 resamples to determine the significance of the path coefficients and to construct bias-corrected confidence intervals (BCI) for each hypothesised relationship.

Results and Findings

The measurement model demonstrated satisfactory reliability and validity, with all constructs achieving composite reliability and average variance extracted values above the recommended thresholds, and discriminant validity confirmed using the Fornell-Larcker criterion and the heterotrait-monotrait ratio of correlations. The structural model was subsequently assessed to test the nine hypothesised direct-effect relationships, the results of which are summarised in Table 1.

Table 1: Path Coefficient Analysis and Results of Direct Hypotheses

Hyp.	Relationship	β	SE	t	p	BCI LL	BCI UL	Decision
H1	Financial Literacy (FL) → Green Knowledge Management (GKM)	0.218	0.050	4.339	P<.001	0.138	0.304	Supported
H2	Entrepreneurial Competence (EC) → GKM	0.049	0.054	0.910	0.182	-0.037	0.139	Not Supported
H3	Government Support (GS) → GKM	0.309	0.061	5.045	P<.001	0.205	0.408	Supported
H4	Digital Inclusion (DI) → GKM	0.343	0.061	5.657	P<.001	0.268	0.461	Supported
H5	GKM → Business Sustainability (BS)	0.308	0.078	3.935	P<.001	0.178	0.434	Supported
H6	FL → BS	0.295	0.068	4.304	P<.001	0.179	0.406	Supported
H7	EC → BS	0.089	0.071	1.257	0.104	-0.029	0.201	Not Supported
H8	GS → BS	0.006	0.069	0.087	0.465	-0.106	0.120	Not Supported
H9	DI → BS	0.047	0.075	0.631	0.264	-0.077	0.169	Not Supported

Note: FL = Financial Literacy; EC = Entrepreneurial Competence; GS = Government Support; DI = Digital Inclusion; GKM = Green Knowledge Management; BS = Business Sustainability

Source: Authors' analysis (2026)

As presented in Table 1, three of the four hypothesised antecedents of GKM were supported. Digital inclusion recorded the strongest effect on GKM ($\beta = 0.343$, $t = 5.657$, $p < .001$), followed by government support ($\beta = 0.309$, $t = 5.045$, $p < .001$) and financial literacy ($\beta = 0.218$, $t = 4.339$, $p < .001$). All three relationships were positive and statistically significant, with bias-corrected confidence intervals that did not straddle zero, thereby supporting H1, H3, and H4. In contrast, entrepreneurial competence did not exhibit a significant relationship with GKM ($\beta = 0.049$, $t = 0.910$, $p = .182$), and H2 was therefore not supported.

With respect to business sustainability, GKM demonstrated a significant positive relationship with business sustainability ($\beta = 0.308$, $t = 3.935$, $p < .001$), lending support to H5 and confirming the pivotal role of green knowledge management as a driver of long-term business viability among the sampled micro-entrepreneurs. Financial literacy also exhibited a significant direct effect on business sustainability ($\beta = 0.295$, $t = 4.304$, $p < .001$), supporting H6. However, entrepreneurial competence ($\beta = 0.089$, $t = 1.257$, $p = .104$), government support ($\beta = 0.006$, $t = 0.087$, $p = .465$), and digital inclusion ($\beta = 0.047$, $t = 0.631$, $p = .264$) did not show statistically significant direct effects on business sustainability, and H7, H8, and H9 were accordingly not supported.

The observed pattern is consistent with a knowledge-based interpretation: digital inclusion and government support are associated with GKM, while GKM is associated with sustainability. Nevertheless, the direct-effect estimates shown in Table 1 do not, in isolation, establish mediation. Specific indirect-effect coefficients and bootstrap confidence intervals would be needed before classifying any relationship as indirect-only or complementary mediation.

Discussion

The finding that digital inclusion applies the strongest influence on GKM underscores the growing importance of digital access and digital capability as enablers of knowledge acquisition and dissemination among women micro-entrepreneurs in the East Coast region. As micro-entrepreneurs gradually rely on digital platforms for market access, customer engagement, and information gathering, digital inclusion appears to function as a critical conduit through which environmentally relevant knowledge is captivated and applied within the business. This finding is constant with prior indication highlighting the role of digital platforms in bridging resource gaps for women-led micro and small enterprises (Khairuddin et al., 2021).

The significant consequence of government support on GKM similarly confirms the value of institutional involvements, such as training programmes, financing schemes, and advisory services, in establishment the knowledge base of micro-entrepreneurs. This is consistent with the KBV proposition that external knowledge inputs, when effectively absorbed by the firm, contribute meaningfully to internal knowledge capability. Interestingly, however, government support did not translate into a direct effect on business sustainability, signifying that the benefits of government assistance are realised primarily through their contribution to green knowledge management rather than through a direct pathway, supporting the mediating position of GKM within the proposed framework.

Financial literacy developed as the only antecedent demonstrating both a significant effect on GKM and a direct significant influence on business sustainability. This finding proposes that financially literate women micro-entrepreneurs possess greater capabilities to acquire, interpret, and apply green knowledge while simultaneously making effective financial decisions that contribute to long-term business viability. These decisions include practical cash flow

management, strategic investment allocation, and effective risk mitigation. The dual influence of financial literacy underscores its role as a high-leverage resource for policymakers and support agencies in developing targeted involvements to enhance the sustainability and resilience of women-led micro-enterprises.

The non-significant effect of entrepreneurial competence on both GKM and business sustainability is a prominent departure from theoretical expectations and warrants further examination. One plausible explanation is that entrepreneurial competence, as commonly conceptualised in the literature, may capture generic business management skills that are not specifically oriented towards environmental or green practices, and may therefore have limited direct bearing on GKM or sustainability outcomes in the absence of targeted green-oriented training. These finding echoes previous studies noting inconsistent effects of entrepreneurial competence across different micro-enterprise contexts (Sarma et al., 2022) and suggests that competence alone, without complementary green-specific knowledge inputs, may be insufficient to drive sustainable outcomes.

The article's principal theoretical contribution is therefore a differentiated account of resource relationships, not a claim to have conclusively established causal knowledge orchestration. Within this sample, the statistically significant direct paths connect digital inclusion, government support and financial literacy with GKM, and GKM and financial literacy with business sustainability. The non-significant competence paths provide a useful boundary condition for propositions that general entrepreneurial capabilities necessarily predict green knowledge management. These associations extend the discussion of RBV and KBV to an underrepresented context while remaining subject to the study's cross-sectional design.

Conclusion, Implications, and Limitations

Using survey responses from 314 women micro-entrepreneurs in Kelantan, Terengganu and Pahang, this article examined financial literacy, entrepreneurial competence, digital inclusion and government support as correlates of green knowledge management and business sustainability. The direct-path results identify digital inclusion ($\beta = 0.343$), government support ($\beta = 0.309$) and financial literacy ($\beta = 0.218$) as significant positive correlates of GKM; GKM ($\beta = 0.308$) and financial literacy ($\beta = 0.295$) are significantly and positively associated with business sustainability. Entrepreneurial competence did not show a statistically significant direct relationship with either outcome, nor did government support and digital inclusion have significant direct relationships with business sustainability. The core message is that different resource types exhibit distinct empirical relationships with knowledge practices and sustainability; they should not be treated as interchangeable.

Theoretically, the article brings the RBV and KBV into a common empirical model and highlights GKM as a potentially important knowledge-related capability in women-led micro-enterprises. Practically, the results support integrating digital access with sustainability-oriented knowledge training, maintaining financial-literacy initiatives, and including green-specific applications in entrepreneurial training. Importantly, the absence of significant GS–BS and DI–BS direct paths does not establish full mediation. Such classification awaits presentation of bootstrapped specific indirect effects and their confidence intervals.

This study has several limitations. First, its cross-sectional survey design does not justify causal inferences. Second, the sample is restricted to women micro-entrepreneurs from three East Coast Malaysian states, limiting transferability to other regions and business populations. Third,

the self-reported measures are potentially vulnerable to common-method and social-desirability biases. Fourth, the results presented in this article concern nine direct effects; the absence of an indirect-effects table limits conclusions about the proposed mediating mechanism. These constraints should be considered when interpreting the theoretical and policy implications.

Future research should consider extending the sample to include micro-enterprises from other regions of Malaysia as well as other rising economies to improve the generalizability of the findings. Furthermore, integrating moderating variables such as industry sector and length of business operation may provide deeper insights into the conditions under which the observed relationships vary. Moreover, future studies could expand the examination of the underlying mechanisms by investigative additional variables, such as green innovation and environmental commitment, to better comprehend how micro-enterprises transform resources and capabilities into sustainable outcomes.

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