



## Kajian Sosial Ekonomi Tentang Kesadaran Dan Kesiapan UKM Dalam Mengadopsi Model Ekonomi Hijau di Kabupaten Sumedang

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### ABSTRAK

Indonesia menghadapi tantangan limbah makanan dan plastik yang besar. Sektor restoran dan kafe (KBLI 56) di Kabupaten Sumedang menjadi kontributor utama, namun juga berpotensi sebagai penggerak transisi ekonomi hijau. Penelitian ini menganalisis kesadaran dan kesiapan UKM makanan-minuman untuk mengadopsi praktik ekonomi hijau dengan menggunakan model kombinasi Technology–Organization–Environment (TOE) dan Pro-Environmental Planned Behavior (PEPB). Data dikumpulkan melalui survei potong lintang terhadap pemilik atau pengelola restoran/kafe dan dianalisis dengan PLS-SEM. Setelah konfirmatori faktor, 19 indikator dipertahankan dan model fit diperoleh. Hasilnya menunjukkan akses pembiayaan hijau ( $\beta = 0,852$ ,  $p < 0,001$ ) dan tekanan institusional ( $\beta = 1,598$ ,  $p < 0,001$ ) berpengaruh signifikan terhadap kapabilitas digital UKM, sedangkan pengetahuan lingkungan dan sikap berkelanjutan tidak signifikan. Kapabilitas digital terbukti menjadi faktor kunci yang memediasi adopsi praktik hijau ( $\beta = 0,769$ ,  $p = 0,046$ ). Jalur langsung dari pengetahuan, sikap, maupun pembiayaan hijau ke adopsi hijau tidak signifikan. Temuan ini menyoroti kesenjangan antara kesadaran-sikap dengan tindakan serta menekankan pentingnya peningkatan kapabilitas digital yang didorong oleh insentif dan tekanan eksternal. Implikasi kebijakan meliputi penyediaan paket pinjaman hijau yang dikombinasikan dengan pelatihan digital dan peraturan yang mendorong UKM untuk meningkatkan kesiapan teknologi mereka.

**Kata Kunci:** *adopsi ekonomi hijau; kapabilitas digital; UKM (KBLI 56); Sumedang*

### ABSTRACT

*Indonesia struggles with significant food and plastic waste. Restaurants and cafés in Sumedang Regency (KBLI 56) are major contributors but could spearhead the green economy transition. This study examines the awareness and readiness of food-service SMEs to adopt green practices by integrating the Technology–Organization–Environment (TOE) framework with Pro-Environmental Planned Behavior (PEPB). A cross-sectional survey of owner-managers was analysed using PLS-SEM; after confirmatory factor analysis, nineteen indicators remained and the model achieved acceptable fit. Results show that access to green finance ( $\beta = 0.852$ ,  $p < 0.001$ ) and institutional pressure ( $\beta = 1.598$ ,  $p < 0.001$ ) significantly enhance SMEs' digital capability, whereas environmental knowledge and sustainability attitude have no direct effect. Digital capability strongly drives green-economy adoption ( $\beta = 0.769$ ,  $p = 0.046$ ) and fully mediates the impact of financial access and institutional pressure on adoption; direct paths from knowledge, attitude or finance to adoption are insignificant. These findings highlight an attitude–behaviour gap and underscore the need to build digital capability through funding and normative pressures. Policy implications include bundling green loans with digital training and establishing gentle regulatory norms to prepare SMEs for sustainable operations.*

**Keywords:** *green-economy adoption; digital capability; SMEs (KBLI 56); Sumedang*

## INTRODUCTION

**Background and Rationale:** The escalating environmental challenges of the 21st century have spotlighted the need for a transition towards a green economy, one that reconciles economic growth with environmental sustainability (Huy & Phuc, 2025). A green economy model emphasizes low-carbon, resource-efficient, and socially inclusive development, urging businesses in all sectors to minimize waste and reduce pollution while maintaining profitability (Cavalli et al., 2024). In particular, the global crises of food waste and plastic pollution have drawn urgent attention in policy and research. Substantial quantities of food are produced worldwide but never consumed, leading to 8–10% of global greenhouse gas emissions being associated with uneaten food (UN Environment Programme, 2021). This unused food represents not only lost economic value but also a significant contributor to climate change through methane emissions from landfills. At the same time, the proliferation of single-use plastics – much of it linked to food packaging, containers, and utensils – has created a pollution epidemic in oceans and landfills. The foodservice industry stands at the nexus of these issues: restaurants, cafes, and similar establishments are **major generators of both food waste and plastic waste**, positioning them as critical targets for green economy interventions. Reducing waste in this sector can yield multi-faceted benefits, from lowering business costs via resource efficiency to mitigating environmental impacts (Huy & Phuc, 2025). Indeed, *cutting down food waste at the retail and foodservice level is seen as key to achieving Sustainable Development Goal 12.3 (halving per capita food waste)* (UN Environment Programme, 2021), while curbing single-use plastics aligns with global commitments to curb pollution.

**Problem in the Foodservice Sector:** The hospitality and foodservice sector (restaurants, eateries, cafes) plays a dual role in sustainable development – it is economically vital yet environmentally impactful. On one hand, it significantly contributes to local economies and employment, but on the other, it tends to operate with *resource-intensive and waste-intensive practices*. Recent estimates from developed countries illustrate the magnitude: in the United States, for example, **restaurants, grocery stores, and food service companies account for roughly 40% of the nation’s food waste** (Recycle Track Systems, 2021). Similarly, studies suggest that up to 40% of food in the global supply is lost or wasted across the value chain (Goodwin & Lipinski, 2024). Much of this wastage occurs at the consumer-facing stages – including restaurants and hotels – through kitchen losses, unsold prepared food, and plate leftovers (Koiwanit & Filimonau, 2025). The environmental toll of such waste is severe, as noted above, and it underscores why foodservice operators are increasingly expected to adopt waste-reduction and sustainable sourcing practices. Furthermore, the sector’s reliance on disposable plastics exacerbates the waste problem. From takeaway containers and cups to straws and cutlery, **single-use plastic usage in foodservice has surged**, especially with the rise of food delivery services (Shin et al., 2025). The COVID-19 pandemic, while boosting food delivery convenience, triggered a significant uptick in plastic waste from take-out packaging (Molloy et al., 2022). Academic studies have begun investigating ways to counter this trend – for instance, examining consumer willingness to forego plastic utensils when ordering online food (Shin et al., 2025) – reflecting a broader recognition that *restaurants and cafes are on the frontlines of plastic pollution*. In summary, the foodservice subsector (classified as KBLI 56 in Indonesia) is both a key generator of organic (food) waste and a notable source of plastic waste, which together pose socio-environmental challenges that cannot be ignored (Ditjen Pengelolaan Sampah, 2024).

**Local Context – Sumedang Regency:** These global and national challenges manifest palpably in local contexts such as Sumedang, a regency in West Java, Indonesia. Sumedang is known for its

rich culinary culture (e.g. tahu Sumedang or Sumedang tofu) and growing tourism sector, which has spurred a proliferation of foodservice SMEs like restaurants, warungs (food stalls), and cafes. Official data indicate that Sumedang had **on the order of 774 registered restaurants by 2024** (Dinas Pariwisata dan Kebudayaan, 2025), a number that has likely increased in recent years alongside the rise of local tourism and dining businesses. These eateries not only cater to residents and tourists but also significantly contribute to the regional economy. The population of foodservice establishments in Sumedang—encompassing the cumulative tally of restaurants, eating houses, and cafés, illustrate in Table 1., experienced a remarkable expansion between 2020 and 2024, escalating from 146 units in 2020 to 774 units in 2024. The data delineates a modest resurgence in the immediate post-pandemic year, marked by a 38.4 percent increase from 146 to 202 units in 2021, followed by a plateau in 2022 at 202 units. A significant structural leap occurred in 2023, when the number surged to 703 units, with growth persisting to 774 units in 2024. When assessed year over year, the variations amounted to +56 units in 2021, no change in 2022, an additional 501 units in 2023—a staggering 248.0 percent increase—and a further 71 units in 2024, representing a 10.1 percent rise. Over the entire period, the compound annual growth rate stands at 51.7 percent, signifying a paradigm shift rather than a gradual progression.

Two aspects of this trajectory warrant particular attention. Firstly, the extended stagnation between 2021 and 2022 aligns with persistent demand and investment frictions, as public health constraints were lifted unevenly and household mobility gradually recovered. Secondly, the surge in 2023 suggests a convergence of demand-side normalization and supply-side entry, potentially intensified by enhancements in connectivity and place-based investments, as well as administrative reforms that bolster the inclusion of smaller venues such as cafés and informal eating houses. Given that the indicator aggregates restaurants, rumah makan, and cafés, the recent levels are not directly comparable to historical statistics that exclusively tracked restaurants; analysts should, therefore, interpret the post-2022 surge as both an economic signal and a potential enumeration effect.

**Table 1. The numbers of Restaurant, Dining, and Cafe Businesses**

Region	The number of businesses	Year	YoY change (units)	YoY change (%)
Sumedang	146	2020		
	202	2021	56	38.36
	202	2022	0	0
	703	2023	501	248.02
	774	2024	71	10.1

(Source: Dinas Pariwisata dan Kebudayaan Provinsi Jawa Barat)

Notably, local government revenues reflect the importance of this subsector – in 2024, Sumedang’s tourism-related Pendapatan Asli Daerah (PAD) reached IDR 32 billion, with restaurants (alongside hotels and entertainment) accounting for a major share (Dinas Pariwisata Kebudayaan Pemuda dan Olahraga, 2024). This economic significance, however, comes with environmental side-effects. Sumedang Regency currently faces mounting waste management pressures. According to the Ministry of Environment and Forestry (KLHK) reported that waste generation in Sumedang has reached 482.27 tons per day, or 176,030.01 tons per year, with organic waste dominating the composition (Kementerian Lingkungan Hidup dan Kehutanan, n.d.). This figure exceeds the provincial average and reflects inefficiencies in the food and beverage subsector supply chain,

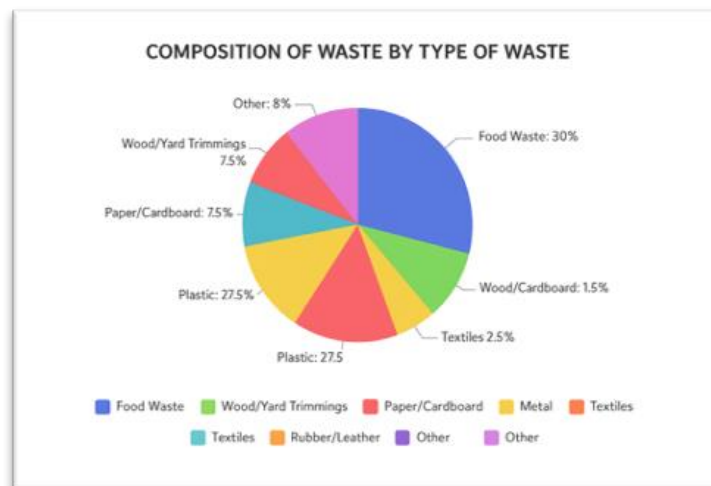
which is dominated by SMEs. When linked to the 2024 Food Waste Index, which emphasizes that 19% of global food is lost at the retail and consumption levels (United Nations Environment Programme, 2024), it becomes evident that strengthening the green literacy and capacity of food and beverage SMEs in Sumedang could contribute both to waste reduction and decarbonization.

**Table 2. Waste Generation in Sumedang Regency**

SIPSN - Sistem Informasi Pengelolaan Sampah Nasional				
Year	Province	Region	Daily Waste Generation (tons)	Yearly Waste Generation (tons)
2024	Jawa Barat	Sumedang	482.27	176,030.01
2023			478.92	174,806.09
2022			442.72	161,592.02
2021			442.36	161,462.89
2020			440.59	160,816.27
2019			437.91	159,837.88

(Source: SIPSN - Sistem Informasi Pengelolaan Sampah Nasional)

These ecological pressures become even more relevant when linked to the demands of global supply chains that emphasize environmental compliance; small-scale food suppliers in Indonesia are increasingly required to provide halal-green certification or carbon footprint declarations in order to access modern retail networks and digital export platforms (Le et al., 2024). This challenge manifests as institutional pressure, which, according to recent studies in the green manufacturing sector, plays a significant role in driving corporate environmental innovation, though its effects vary depending on entrepreneurial orientation and internal resources (Zhang et al., 2024).



**Figure 1. Composition of Waste. Source: SIPSN – (Sistem Informasi Pengelolaan Sampah Nasional)**

The diagram on picture 1. illustrates the composition of municipal solid waste and highlights two dominant fractions: food waste at thirty percent and plastics at 27.5 percent. Together they represent more than half of the total stream, showing that interventions in these categories would bring the greatest impact. Paper and cardboard, glass, textiles, metals, and wood form the bulk of the remaining portion, while only a small percentage falls into miscellaneous waste. This suggests that

in principle more than ninety percent of the waste could be recovered or diverted if supported by effective collection, separation, and recycling systems. The implications are clear for both environmental and economic strategies. Food waste, if not managed properly, becomes a significant source of methane, yet it also represents an opportunity for composting and biogas production. Plastics, which nearly match organics in scale, pose severe risks of pollution but are also central to recycling markets if sorted efficiently. With paper and glass forming notable shares, the local system can design separation and recovery pathways that reduce landfill dependency.

Applying these shares to the daily waste output of Sumedang, which reaches over 480 tonnes, shows that organics alone account for nearly 145 tonnes per day, while plastics exceed 130 tonnes. This provides a quantitative basis for prioritizing investment in organic waste treatment facilities and plastic recovery mechanisms. Even partial diversion of these two streams would significantly cut disposal volumes and emissions, while improving the quality of recyclable materials. The chart therefore supports a green economy agenda centered on SMEs in food and beverage sectors, whose activities generate much of the organic and packaging waste. By adopting source separation, digital monitoring, and partnerships with government and associations, SMEs can align competitiveness with sustainability. At the same time, policymakers can use these data to design cost-effective, targeted interventions that maximise environmental benefits and economic returns. This situation is not unique to Sumedang – many regions in Indonesia and ASEAN face similar predicaments where expanding culinary businesses strain local waste infrastructure (Economic Research Institute for ASEAN and East Asia (ERIA), 2022). However, Sumedang provides a representative case of a semi-urban regency grappling with how to align its small and medium-sized enterprises (SMEs) in foodservice with green economy principles.

**Research Focus – Green Economy Adoption by SMEs:** In light of the above, this study zeroes in on **the socio-economic aspects of awareness and readiness of foodservice SMEs in Sumedang to adopt a green economy model**. Essentially, we investigate to what extent restaurateurs and café owners understand environmental sustainability issues and how prepared they are – in attitude, capacity, and intention – to implement pro-environmental changes in their business operations. Embracing a green economy model in this context could involve various pro-environmental practices: reducing food waste through menu planning and donations, phasing out single-use plastics in favor of reusables or compostables, improving energy and water efficiency in kitchens, sourcing local sustainable ingredients, and so on (Huy & Phuc, 2025). For SMEs, such changes can offer long-term benefits (cost savings from resource efficiency, improved brand image, regulatory compliance) but often require short-term investments or shifts in established habits (Lopez-Torres, 2023; Smith et al., 2022). A recurring concern is that **SMEs typically have lower awareness and fewer resources to devote to sustainability initiatives**, compared to large firms. Studies in Southeast Asia highlight that incentives and external support (e.g. government subsidies, technical assistance) significantly encourage SMEs to adopt environmental management practices (Economic Research Institute for ASEAN and East Asia (ERIA), 2022). Conversely, lack of awareness, limited financial/human capital, and weak enforcement of environmental regulations can hinder small businesses from “going green”[19]. In Sumedang’s case, understanding these socio-economic drivers and barriers is crucial. The local government of West Java has voiced commitments to sustainable tourism and waste reduction (e.g., provincial programs to cut plastic use), but the on-ground readiness of small foodservice entrepreneurs to follow suit remains under-examined. This research addresses that gap by assessing current awareness levels (do SME owners

recognize their environmental impact and know of green practices?) and readiness levels (are they willing and able to adopt those practices?) in the specific context of Sumedang's KBLI 56 subsector. By doing so, the study also aligns with broader calls for integrating SMEs into sustainable development agendas, since SMEs are seen as "*critical in driving the transition towards sustainability*" even though they have been less discussed than large corporations in green growth debates (Huy & Phuc, 2025).

**Theoretical Framework – TOE and PEPB:** To systematically analyze the multifaceted factors influencing green adoption among Sumedang's restaurant/café SMEs, we draw on two complementary theoretical frameworks: the *Technology–Organization–Environment (TOE)* framework and the *Pro-Environmental Planned Behavior (PEPB)* model. The **TOE framework** is introduced by Tornatzky and Fleischer in 1990 is a widely used organizational-level theory explaining how various contexts shape a firm's propensity to adopt innovations (Sousa et al., 2023). It posits that three contexts are pivotal:

- (1) **Technological context** – the availability and characteristics of relevant technologies or practices (e.g. the cost and ease of adopting waste composting systems, energy-efficient appliances, or biodegradable packaging);
- (2) **Organizational context** – internal attributes of the firm, such as its size, resources, managerial structure, and culture (for instance, an SME's financial capacity, employee skills, or the owner's commitment to sustainability); and
- (3) **Environmental context** – the external environment in which the firm operates, including market forces, competition, customer pressure, and regulatory policies (Bagale, 2014; Jackson & Allen, 2024; Maragno et al., 2023; Sousa et al., 2023, 2024; wael AL-khatib, 2023).

The TOE framework suggests that an SME's readiness to embrace green practices will emerge from an interplay of these factors – e.g. perceived relative advantage of green technology, organizational readiness and leadership, and environmental pressures like government regulations or consumer demand for eco-friendly services (Satyro et al., 2024). TOE has been successfully applied in prior studies to examine sustainability and innovation adoption in the hospitality sector, including in emerging markets' hotel industries (Deng et al., 2025; Martin Lucas et al., 2024). However, TOE alone focuses on organizational factors and may not fully capture the individual cognitive determinants of pro-environmental action. This is where the **Pro-Environmental Planned Behavior (PEPB) model** adds a valuable micro-level perspective. The PEPB model is essentially an extended *Theory of Planned Behavior (TPB)* tailored to environmental contexts (Lin et al., 2017). The PEPB integrates classic TPB constructs – Attitude towards the behavior, Subjective Norms, Perceived Behavioral Control – with additional factors reflecting environmental concern and support (Persada et al., 2015). It also includes perceived environmental concern (PEC), which gauges an individual's awareness and emotional concern for environmental issues, and perceived authority support (PAS), which reflects the extent of government or authority support/pressure, alongside the core TPB variables of attitude, norm, control, and behavioral intention (Persada et al., 2015). This enriched model acknowledges that a business owner's intention to implement green practices is not only guided by personal attitude and social norms, but also by their concern for the environment and the institutional support they perceive. The PEPB model has been shown to significantly predict pro-environmental intentions in various contexts, from citizen participation in environmental programs (Lin et al., 2017) to consumer choices of

green products (Mufidah et al., 2018). Notably, a recent study applied PEPB to SMEs in an Indonesian tourism destination (Labuan Bajo) to examine green innovation intentions (Durman & Nadlifatin, 2024). The findings revealed that factors like authority support and environmental concern, together with positive attitude and social norms, were significant drivers of SMEs' intentions to adopt green innovations (Durman & Nadlifatin, 2024). Such evidence reinforces the relevance of combining TOE (to capture external pressures and organizational readiness) and PEPB (to capture individual attitudes and intentions) in our theoretical approach. By using these frameworks in tandem, our study can holistically assess both the structural conditions and the behavioral motivations underlying Sumedang's restaurant SMEs' readiness for the green economy model.

**Significance and Contribution:** This research is poised to contribute to both theory and local practice. Empirically, it provides one of the first focused studies on **the green economy readiness of foodservice SMEs in a West Java regency**, thereby extending the geographical and sectoral scope of sustainability research in developing countries. By contrast, our focus on small restaurants and cafes in Sumedang fills an important gap, shedding light on the challenges and opportunities faced by grassroots businesses in adopting sustainable practices. The study's findings will have practical implications for policymakers and development agencies: if low awareness or certain barriers are identified, targeted interventions (such as *awareness-raising workshops, green certification programs, subsidies for waste management technology, or strengthened regulations on food waste and plastics*) can be designed for Sumedang and similar regions. Likewise, understanding the **motivational factors (via PEPB)** can help in crafting strategies that leverage positive attitudes and normative pressures – for example, showcasing local “green champions” among restaurants to influence peer norms, or highlighting cost savings to shape attitudes. On the theoretical front, our application of the **TOE framework and PEPB** model in tandem will enrich the academic discourse. It demonstrates an integrated approach to study environmental innovation in SMEs, bridging organizational context with individual behavioral intent. If successful, this approach can be replicated in other studies of SME readiness for sustainability, contributing to a more nuanced theory of change for small businesses in the green economy transition.

## METHOD

This study uses a quantitative, cross-sectional survey of foodservice SMEs—restaurants, eating houses, and cafés (KBLI 56)—in Sumedang Regency to assess awareness and readiness to adopt a green-economy model. Primary data were gathered via a structured questionnaire completed by owner-managers or outlet supervisors identified through the local registry of foodservice establishments and field canvassing in major culinary zones. Eligible outlets had operated for at least twelve months. Sampling was stratified by subdistrict and outlet type, with random selection within strata and a priori power analysis guiding sample size. All constructs were measured reflectively on seven-point Likert scales, after expert review and a pilot test to ensure clarity.

**Table 3. Validity and Reliability**

Code	Indicators	Validity >0.5	Results	Reliability > 0.7	Results
<b>Environmental Knowledge</b>				0.850	Reliable
ENV_1	I understand the main sources of waste and emissions in restaurant operations (kitchen, service and packaging)	0.796	Valid		
ENV_2	I understand the impact of food waste on operating costs and the environment.	0.781	Valid		
ENV_3	I am aware of hygiene and environmental impact assessment (AMDAL) standards governing food and beverage waste management.	0.826	Valid		
ENV_4	I understand more environmentally friendly practices or technologies (e.g. circular approaches, low-carbon and high-efficiency methods).	0.513	Valid		
<b>Sustainability Attitude</b>				0.826	Reliable
ATT_1	Reducing the environmental footprint is a strategic priority for my restaurant.	0.729	Valid		
ATT_2	I am willing to incur initial costs to implement energy-saving measures.	0.647	Valid		
ATT_3	I support the reduction of single-use plastic, even though it requires changes to the workflow.	0.818	Valid		
ATT_4	I believe that implementing environmentally friendly practices will enhance my restaurant's reputation and customer loyalty.	0.559	Valid		
<b>Access to Green Financing</b>				0.842	Reliable
FUND_1	I know green financing products and innovative incentives available to restaurant businesses.	0.756	Valid		
FUND_2	I have applied for financing to acquire energy- or water-efficient equipment, or for waste-management systems.	0.727	Valid		
FUND_3	The requirements for green financing are perceived as clear and affordable.	0.801	Valid		
FUND_4	Partner financial institutions or fintech companies support projects on energy or water efficiency, as well as food-waste reduction.	0.576	Valid		
<b>Institutional Pressure</b>				0.878	Reliable
INST_1	Government regulations on hygiene, waste management and plastic bans encourage my restaurant to be environmentally responsible.	0.856	Valid		
INST_2	Customers demand environmentally friendly practices (e.g., no single-use plastics, appropriate portion sizes, recyclable packaging).	0.779	Valid		
INST_3	Competition drives the adoption of green practices in order to remain relevant.	0.876	Valid		
INST_4	Culinary center, mall, or tenant managers require compliance with specific environmental standards.	0.533	Valid		
<b>Digital Capability</b>				0.901	Reliable
MOD_1	Our POS system records operational requirements such as inventory, sales, payroll, financial data and marketing.	0.853	Valid		
MOD_2	The restaurant uses delivery or customer-relationship management platforms to attract customers and process orders.	0.723	Valid		
MOD_3	We integrate smart kitchen sensors to monitor cold-chain temperatures, energy consumption and inventory.	0.876	Valid		
MOD_4	Our restaurant monitors energy, temperature and waste data to support managerial decision-making.	0.587	Valid		
MOD_5	Staff use digital systems as part of standard operating procedures and for employee training.	0.868	Valid		
<b>Green Economy Adoption</b>				0.877	Reliable
READ_1	We have a standard operating procedure (SOP) for segregating organic and inorganic waste, and we implement it consistently.	0.544	Valid		
READ_2	We monitor and set targets for food-waste reduction (e.g., grams per cover, portion sizes, recipes).	0.755	Valid		
READ_3	We have targets and procurement plans for energy- and water-efficient equipment (e.g., stoves, ovens, air conditioners, faucets).	0.722	Valid		
READ_4	We manage the substitution of single-use packaging (e.g., paper, biodegradable materials, bring-your-own options).	0.800	Valid		
READ_5	We comply with hygiene and halal inspections, as well as environmental documentation related to services.	0.520	Valid		
READ_6	We publicize our green commitments and practices to customers (e.g., through menus, signage, and social media).	0.749	Valid		

Source: Data Processing Results 2025

Table 3, shows all standardized factor loadings surpassed the minimum acceptability threshold, with the majority exceeding the recommended cut-offs, thereby affirming that the items meaningfully encapsulate their latent constructs. In our dataset, loadings ranged from 0.559 to 0.879, with most exceeding 0.65. In accordance with established guidelines, indicators with loadings of  $\geq 0.70$  are deemed ideal, whereas those ranging from 0.40 to 0.70 may be retained when theoretically imperative, provided that their exclusion does not enhance average variance extracted (AVE) or reliability (Joseph F. Hair et al., 2021).

The comprehensive model-fit indices reported encompass the normed chi-square (CMIN/DF), the Goodness-of-Fit Index (GFI), the Adjusted Goodness-of-Fit Index (AGFI), the Normed Fit Index (NFI), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). In the examination of the structural equation model, SEM analysis was conducted employing AMOS 23. The model framework for the previously delineated path-analysis study is illustrated in Figure 2.

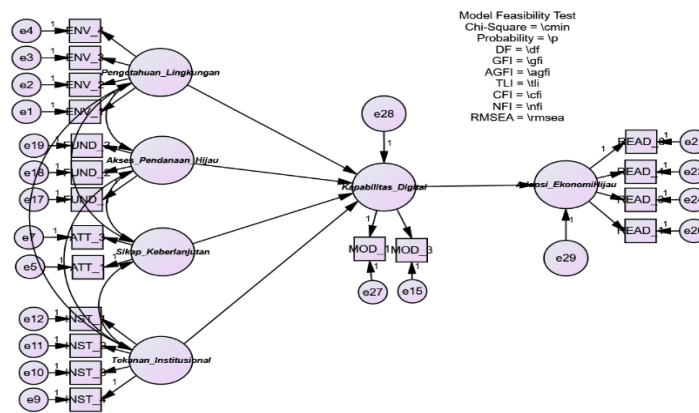


Figure 2. Framework Model, Source: Data Processing Results 2025

Table 4 illustrates that the final model failed to satisfy all statistical goodness-of-fit criteria (p-value, RMSEA, GFI, AGFI, CMIN/DF, TLI, and CFI). Consequently, the measurement model is deemed inadequate and cannot serve as manifest indicators for delineating the complete structural model. To attain an acceptable research model, it was imperative to reduce the number of questionnaire items. This reduction was executed in AMOS version 23 by systematically eliminating items with the highest modification indices. In this study, commencing with 27 initial indicators, eight items were discarded—specifically ATT4, ATT2, FUND4, MOD5, MOD4, MOD2, READ2, and READ5—to derive a model that demonstrates an acceptable fit.

Table 4. CFA- First Model Initial (27 Items)

Goodness-of-fit indices	Cut of Value	Analysis Result	Model Description
<b>Chi-Square</b>	p-value $\geq 0.05$	0.000	Less fit
<b>RMSEA</b>	$\leq 0.08$	0.136	Less fit
<b>GFI</b>	$\geq 0.90$	0.685	Less fit
<b>AGFI</b>	$\geq 0.90$	0.614	Less fit
<b>CMIN/DF</b>	$\leq 2.00$	3.813	Less fit
<b>TLI</b>	$\geq 0.90$	0.719	Less fit
<b>CFI</b>	$\geq 0.90$	0.752	Less fit

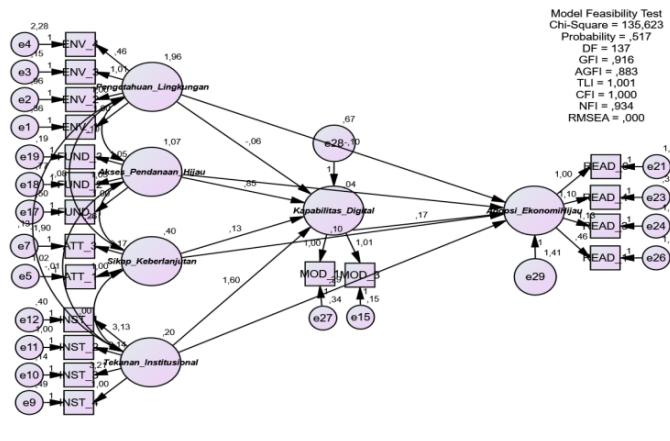
Source: Data Processing Results 2025

Following the re-specification, the 19-item confirmatory factor analysis (CFA) model demonstrated an acceptable global fit ( $p \geq 0.05$ ), indicating a commendable concordance between the proposed measurement framework and the empirical covariance matrix. The retained indicators substantively endorse the final specification; their standardized factor loadings and reliability coefficients, estimated within the context of the fitted model, are delineated in Table 5.

**Table 5. CFA Final Model Fit (19 Items)**

Goodness-of-fit indices	Cut of Value	Analysis Result	Model Description
<b>Chi-Square</b>	$p\text{-value} \geq 0.05$	0.517	Fit
<b>RMSEA</b>	$\leq 0.08$	0.000	Fit
<b>GFI</b>	$\geq 0.90$	0.916	Fit
<b>AGFI</b>	$\geq 0.90$	0.883	Marginal fit
<b>CMIN/DF</b>	$\leq 2.00$	0.990	Fit
<b>TLI</b>	$\geq 0.90$	1.001	Fit
<b>CFI</b>	$\geq 0.90$	1.000	Fit

Source: Data Processing Results 2025



**Figure 3. The result of the full model, Source: Data Processing Results 2025**

The subsequent step in the structural model analysis is to estimate the inter-construct path coefficients, which also serve to test the study’s hypotheses. The results of the structural modeling are presented in Figure 3.

**Table 6. The Result of the Structural Model**

Variable		Variable	Coefficient	t Count	p Value	Result
Environmental Knowledge	--->	Digital Capability	-0,057	-0,988	0,323	H <sub>1</sub> is not supported
Access to Green Financing	--->	Digital Capability	0,852	8,578	0,000	H <sub>2</sub> is supported
Sustainability Attitude	--->	Digital Capability	0,132	1,660	0,097	H <sub>3</sub> is not supported
Institutional Pressure	--->	Digital Capability	1,598	5,616	0,000	H <sub>4</sub> is supported
Digital Capability	--->	Green Economy Adoption	0,769	1,961	0,046	H <sub>5</sub> is supported
Environmental Knowledge	--->	Green Economy Adoption	-0,095	-1,224	0,221	H <sub>6</sub> is not supported
Access to Green Financing	--->	Green Economy Adoption	0,036	0,206	0,837	H <sub>7</sub> is not supported
Sustainability Attitude	--->	Green Economy Adoption	0,104	1,025	0,305	H <sub>8</sub> is not supported
Institutional Pressure	--->	Green Economy Adoption	0,285	0,826	0,409	H <sub>9</sub> is not supported

Source: Data Processing Results 2025

Based on table 6, the standardized regression (path) coefficient from Environmental Knowledge to Digital Capability is  $\beta = -0.057$  with  $p = 0.323$  ( $> 0.05$ ); thus, the effect is statistically non-significant (we fail to reject  $H_0$ ) and  $H_1$  is rejected, indicating that Environmental Knowledge does not influence Digital Capability among food-service establishments (restaurants and cafés; KBLI 56) in Sumedang Regency. Second, the standardized path from Green Financing Access to Digital Capability is  $\beta = 0.852$  with  $p < 0.001$ ; the effect is statistically significant ( $H_0$  rejected) and  $H_2$  is accepted, implying that Green Financing Access positively affects Digital Capability. Third, the standardized path from Sustainability Attitude to Digital Capability is  $\beta = 0.132$  with  $p = 0.097$  ( $> 0.05$ ); the effect is non-significant ( $H_0$  not rejected) and  $H_3$  is rejected, indicating no direct influence of Sustainability Attitude on Digital Capability. Fourth, the standardized path from Institutional Pressure to Digital Capability is  $\beta = 1.598$  with  $p < 0.001$ ; the effect is statistically significant ( $H_0$  rejected) and  $H_4$  is accepted, showing that Institutional Pressure positively affects Digital Capability. Fifth, the standardized path from Digital Capability to Green-Economy Adoption is  $\beta = 0.769$  with  $p = 0.046$  ( $< 0.05$ ); the effect is statistically significant ( $H_0$  rejected) and  $H_5$  is accepted, indicating that Digital Capability positively drives Green-Economy Adoption.

For the mediation tests, two t-tests were conducted for each hypothesis set. For  $H_6/H_6a$ , the direct path from Environmental Knowledge to Green-Economy Adoption is  $\beta = -0.095$  with  $p = 0.221$  ( $> 0.05$ ), indicating a non-significant direct effect ( $H_6$  rejected). The indirect (mediated) effect via Digital Capability is also non-significant ( $p = 0.323 > 0.05$ ), implying that Digital Capability does not mediate this relationship; therefore,  $H_6a$  is rejected. For  $H_7/H_7a$ , the direct path from Green Financing Access to Green-Economy Adoption is  $\beta = 0.036$  with  $p = 0.837$  ( $> 0.05$ ), indicating a non-significant direct effect ( $H_7$  rejected). However, the mediation via Digital Capability is significant ( $p < 0.001$ ), demonstrating that Digital Capability mediates the effect of Green Financing Access on Green-Economy Adoption; the pattern is consistent with full mediation, so  $H_7a$  is accepted. For  $H_8/H_8a$ , the direct path from Sustainability Attitude to Green-Economy Adoption is  $\beta = 0.104$  with  $p = 0.305$  ( $> 0.05$ ), indicating a non-significant direct effect ( $H_8$  rejected). The mediated path via Digital Capability is likewise non-significant ( $p = 0.097 > 0.05$ ), hence  $H_8a$  is rejected. Finally, for  $H_9/H_9a$ , the direct path from Institutional Pressure to Green-Economy Adoption is  $\beta = 0.285$  with  $p = 0.409$  ( $> 0.05$ ), indicating a non-significant direct effect ( $H_9$  rejected). The mediation via Digital Capability is significant ( $p < 0.001$ ), indicating full mediation; accordingly,  $H_9a$  is accepted.

## RESULTS AND DISCUSSION

Table 7. Summary of Findings

Path	SEM Evidence ( $\beta$ , p)	Interpretation	Takeaway
<b>Institutional Pressure</b> → <b>Digital Capability</b>	1.598, $p < 0.001$	Strongest driver of capability building	External pressure catalyzes tech readiness
<b>Access to Green Finance</b> → <b>Digital Capability</b>	0.852, $p < 0.001$	Finance enables tech investments	Funding → tools/skills for implementation
<b>Digital Capability</b> → <b>Green Adoption</b>	0.769, $p = 0.046$	Capability is the proximal driver of adoption	<b>Full-mediation spine</b> to adoption
<b>Environmental Knowledge</b> → <b>Digital Capability</b>	-0.057, $p = 0.323$	Not significant	Knowledge alone doesn't build capability
<b>Sustainability Attitude</b> → <b>Digital Capability</b>	0.132, $p = 0.097$	Not significant (marginal)	Attitude $\neq$ action without enablers
<b>Environmental Knowledge</b> → <b>Green Adoption</b>	-0.095, $p = 0.221$	Not significant	No direct effect on adoption
<b>Access to Green Finance</b> → <b>Green Adoption</b>	0.036, $p = 0.837$	Not significant direct path	Works via capability (mediation)
<b>Sustainability Attitude</b> → <b>Green Adoption</b>	0.104, $p = 0.305$	Not significant	Intent without ability stays latent
<b>Institutional Pressure</b> → <b>Green Adoption</b>	0.285, $p = 0.409$	Not significant direct path	Operates through capability (mediation)

Source: Authors, Data Processing Results 2025

This study examined the readiness of food and beverage (KBLI 56) SMEs in Sumedang to adopt green economy practices, using a PLS-SEM model grounded in Technology–Organization–Environment (TOE) and behavioral intention theories. The results indicate a partial validation of the hypotheses, underscoring the pivotal role of digital capability as a mediating factor. Specifically, access to green finance (H2) showed a strong positive effect on SMEs' digital capability ( $\beta = 0.852$ ,  $p < 0.001$ ), and institutional pressure (H4) was the strongest predictor of digital capability ( $\beta = 1.598$ ,  $p < 0.001$ ), highlighting that external pressures and resources drive firms to enhance their digital readiness. In contrast, neither environmental knowledge (H1) nor sustainability attitude (H3) had a significant influence on digital capability ( $\beta = -0.057$ ,  $p = 0.323$ ;  $\beta = 0.132$ ,  $p = 0.097$ , respectively), suggesting that having eco-related knowledge or a positive attitude alone did not translate into technological preparedness in this context. Crucially, digital capability (H5) itself was a significant enabler of green economy adoption ( $\beta = 0.769$ ,  $p = 0.046$ ), whereas the direct paths from environmental knowledge, access to green finance, sustainability attitude, and institutional pressure to green adoption (H6–H9) were all non-significant ( $p > 0.2$ ).

This pattern implies that digital capability fully mediates the influence of key organizational and environmental factors on green practice adoption. In other words, Sumedang SMEs that successfully adopt green economy practices tend to be those that, prompted by funding opportunities and external pressures, have developed strong digital capabilities – a finding consistent with the idea that digitalization can empower firms to implement sustainability initiatives (Chen & Wang, 2024). By contrast, firms' internal pro-environment attitudes or awareness, in isolation, did not drive action, pointing to a possible attitude–behavior gap in this SME context (Maniu et al., 2021).

**Table 8. Theoretical Implications**

Lens	What the Results Show	Contribution
<b>TOE (Technology–Organization–Environment)</b>	Environment (pressure) + resources (finance) matter, but only materialize <b>through technological readiness</b>	Positions digital <b>capability</b> the conversion mechanism from “pressure & possibility” to “practice”
<b>Behavioral Intention (TPB/PEPB)</b>	Attitude/knowledge fail to predict behavior without capability and contextual enablers	Evidence of attitude–behavior <b>gap in SMEs</b> ; capability $\approx$ perceived behavioral control

*Source: Authors*

The results reaffirm the TOE proposition that innovation adoption is influenced by a combination of **technological, organizational, and environmental** factors (Aboelmaged, 2014). Here, **digital capability** represents the technological context – an internal capability that proved essential for green innovation uptake. Its mediating role demonstrates how the technological readiness of an SME can convert external enablers into actual sustainable practice implementation. This aligns with recent research on SMEs indicating that digital transformation helps firms monitor and reduce environmental impacts, thereby enhancing sustainability performance (Chen & Wang, 2024). Second, the organizational context factors in our model (environmental knowledge and sustainability attitude) unexpectedly showed no direct effect on either digital capability or green adoption. This runs contrary to some prior studies that suggested SME owners’ pro-environmental attitudes facilitate environmental practice adoption (Tyler et al., 2024). Our finding thus highlights a nuance: while a positive sustainability mindset or knowledge base is valuable, it **alone is insufficient** to spur tangible changes in the firm. In line with behavioral theories such as the **Theory of Planned Behavior** (TPB), a supportive attitude must be coupled with perceived behavioral control (in this case, the capability and resources to act) and social or normative pressure to result in behavior change (Kesenheimer & Greitemeyer, 2021). Indeed, our data suggest that without strong external incentives or pressures, pro-environmental attitudes/knowledge may remain **“intentions” that do not translate into action**, reflecting the well-documented attitude–behavior gap in environmental contexts (Adriyanto & Nowo Martono, 2020).

Third, the environmental context of the TOE framework is strongly echoed in our findings: **institutional pressures (regulatory, normative demands) and access to green finance (financial capital availability)** were the critical drivers – albeit indirectly – of green adoption. This is consistent with institutional theory arguments that coercive and normative pressures compel firms to innovate environmentally (Hebaz et al., 2024). Our contribution is to show how these pressures operate through building digital capacity. In essence, Sumedang SMEs responded to external expectations (e.g. government regulations, industry norms) and opportunities (e.g. green financing programs) by upgrading their digital tools and skills, which then enabled them to implement eco-friendly practices. This mediated pathway underscores a theoretical insight: **digital capability acts as the bridge between intention and implementation** in the sustainability domain. From a behavioral intention perspective, one could interpret digital capability as analogous to **perceived behavioral control** or an enabling factor – it increases the SMEs’ ability to actually perform the green practices they might intend or be pressured to do. The significant effect of digital capability on adoption supports this analogy, aligning with TPB that having the requisite skills and

resources greatly facilitates pro-environmental action. In summary, our study enriches the TOE framework by highlighting the interplay of external and internal factors via a technological mediator, and it nuances behavioral theories by evidencing that **without adequate capability and external push, neither positive attitudes nor knowledge guarantee eco-friendly behavior** in small business settings (Adriyanto & Nowo Martono, 2020).

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

This study demonstrates that digital capability is the linchpin linking external enablers to green-economy adoption. Access to green financing and institutional pressure significantly bolster SMEs' digital readiness, while environmental knowledge and sustainability attitudes alone do not translate into action. Digital capability, in turn, strongly influences the adoption of green practices. The insignificant direct effects of knowledge, attitude, finance and pressure on adoption highlight an attitude-behaviour gap. These results validate the TOE framework, showing that technological readiness converts external pressures and resources into practice, and enrich behavioural theories by identifying digital capability as an analogue of perceived behavioural control. The findings imply that without adequate skills and tools, even well-intentioned SMEs may fail to act sustainably. Hence, fostering digital capability through targeted investments and normative pressures is crucial. Limitations of the study include its focus on a single regency and cross-sectional design; longitudinal and multi-regional studies could provide deeper insights. Future research might examine how specific digital interventions or sectoral differences influence the adoption trajectory and explore mixed-methods approaches to capture qualitative nuances.

### Recommendations

Building on the insight that digital capability serves as the immediate catalyst for the adoption of environmentally sustainable practices—and that the influences of financial resources and institutional pressure manifest solely through this capability—we advocate for a comprehensive, capability-centric strategy for Sumedang's food-service SMEs (KBLI 56). Restaurants and cafés should regard digitization (integrated Point of Sale systems with inventory management, monitoring of utilities and waste, smart kitchen sensors, foundational dashboards, and staff Standard Operating Procedures embedded within user-friendly applications) as the operational cornerstone for any initiative aimed at reducing waste, energy consumption, or plastic usage. Public agencies and financial institutions ought to couple taxonomy-aligned green financing options—such as loans or grants—with practical technical assistance, encompassing streamlined application processes, vendor vetting, onboarding to digital tools, and light monitoring, reporting, and verification (MRV) support—ensuring that capital effectively translates into equipment enhancements and quantifiable performance improvements. Local governments and industry associations can further amplify these efforts by establishing “gentle” norms—such as periodic energy audits, minimal waste reporting requirements, or procurement standards for packaging—accompanied by mentorship programs and workshops that guide SMEs from initial awareness to practical implementation. Given that mere knowledge and positive attitudes have proven insufficient to spur action, outreach initiatives should shift from traditional seminars to hands-on workshops where proprietors can configure actual devices, assess their own utility and waste baselines, and depart with a structured upgrade plan. Finally, it is essential to foster peer influence:

highlight early “green champions,” facilitate supplier networks to share templates (such as SOPs, vendor lists, and data sheets), and promote collaborations with larger enterprises to mitigate the risks associated with initial investments. Collectively, these strategies transform external incentives and pressures into the digital preparedness necessary for unlocking sustained and scalable adoption of environmentally friendly practices.

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