

# Renewable energy and value-adding from the supply and demand sides: a diffusion of innovations perspective

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Oanh Thi Kim Vu

*The Business School, RMIT International University Vietnam–Hanoi City Campus,  
Hanoi, Vietnam*

Abel Duarte Alonso and Trung Quang Nguyen

*The Business School, RMIT International University, Ho Chi Minh City, Vietnam*

Thanh Duc Tran

*Faculty of Tourism Studies, Phenikaa University, Hanoi, Vietnam*

Chuyen Nguyen and Nhan H. Nguyen

*The Business School, RMIT International University, Ho Chi Minh City, Vietnam*

Luong Ngoc Tran

*Faculty of Tourism, Hoa Binh University, Hanoi, Vietnam*

Nhu T.H. Do and Gavin John Nicholson

*The Business School, RMIT International University, Ho Chi Minh City, Vietnam, and*

Seamus O'Brien

*Business School, Universidad Intercontinental de la Empresa,  
Santiago de Compostela, Spain*

## Abstract

**Purpose** – The purpose of this research is first to examine the extent to which renewable energy providers (supply side) add value to their consumers (demand side) and how these perceive value-adding when acquiring these solutions. Second, the key challenges in supplying renewable energy solutions and how value-adding is manifested for the demand side are investigated. Third, the study ascertains the key resources needed to provide value (supply side) and how the consumption experience could be enhanced (demand side).

**Design/methodology/approach** – Semi-structured interviews were conducted with representatives from the supply and demand sides of renewable energy in Vietnam; the data were analysed through qualitative content analysis and data structure.

**Findings** – The analysis underlines commonalities and differences between the two participating groups. For instance, whereas members of the supply side perceive committing to higher levels of service or providing expert advice as fundamental opportunities to add value, those on the demand side value additions, including detailed instructions and consultations, together with the possibility to purchase quality products.

**Originality/value** – In embracing the underpinnings of the diffusion of innovations theory, this study makes various contributions to the business and renewable energy literature in emerging markets. Importantly, a conceptual framework with implications for practitioners and researchers was developed. This framework is founded on 21 conceptual dimensions revealed in the analysis, including the action-oriented and service-



oriented, which help discern tangible and intangible ways to add value from the supply side. Relationships between the analysis and the theory's principles were also uncovered.

**Keywords** Renewable energy, Diffusion of innovations theory, Supply and demand stakeholders, Emerging economy, Qualitative research

**Paper type** Research article

## 1. Introduction

Throughout the last decades, renewable energy development has been a crucial issue with key implications for governments and allied stakeholders, including in agenda-planning, delegating and collaborating (e.g. [Dögl et al., 2012](#); [Hussain et al., 2022](#); [Le, 2022](#); [Müller et al., 2020](#)). Renewable sources that include wind, solar, biomass or hydroelectric typically rely on nonperishable resources and help address a nation's sustainable development needs ([Elmassah, 2024](#)). Nevertheless, despite the promising potential of renewable energy sources, worldwide, the energy sector is experiencing manifold and significant transformation (e.g. [Esmaeilpour Moghadam and Karami, 2024](#)). Indeed, energy usage has grown and is expected to continue growing substantially to advance development, particularly in much of the developing world ([Irfan and Ojha, 2023](#); [Roy et al., 2022](#)). Furthermore, rapid industrialisation has inevitably brought negative environmental and natural resource impacts ([Minh and Van, 2023](#)).

The case of Vietnam epitomises some of the above trade-offs, opportunities, and challenges, with implications for the broader community and society. As a country nearing 100 million inhabitants ([Statista, 2024](#)), shifting from a centrally planned to a market-oriented economy ([Minh and Van, 2023](#)) has brought significant changes. For instance, there has been a noticeable growth of small and medium enterprises and the middle class with associated needs for renewable energy products ([Lan et al., 2023](#)). Being a fast-growing economy that has accomplished remarkable developments in recent years and with a continuous aspiration to achieve modernity and higher income levels, Vietnam is expected to maintain its course and, by extension, its energy demands ([Nguyen and Le, 2022, 2024](#)). By considerably making use of its water resources, forests, and agricultural land ([Minh and Van, 2023](#)), Vietnam's traditional energy sources are expected to be drastically reduced in the next decades ([Lan et al., 2023](#)).

In turn, renewable energy promotion and related solutions are increasingly considered a pressing replacement and a long-term alternative to conventional energy sources ([Do et al., 2021](#); [Nong et al., 2020a](#); [Yu et al., 2022](#)). Indeed, the installation of solar photovoltaic energy skyrocketed in 2019 ([Do et al., 2020](#)), suggesting the promising potential for renewable energy in Vietnam (e.g. [Vu et al., 2024](#)). Furthermore, being an agro-industrial nation, Vietnam holds vast quantities of biomass resources that, as in the case of agricultural waste, can help in the generation of renewable energy ([Cuong et al., 2021](#)), with socioeconomic benefits. The additional data presented in [Table 1](#) show that Vietnam's renewable energy capacity has more than tripled since 2011 ([Statista, 2025a](#)). Additionally, the capacity of power generation using various energy sources in the ASEAN region has steadily increased ([Statista, 2025b](#)). Similarly, selecting the cases of five of the region's nations ([Energy Institute, 2025](#)), it is revealed that the total energy supply from renewable energy has grown over the last decade, including in Vietnam.

While scholarly renewable energy research focussing on Vietnam has increased substantially over the last decades, there is merit in delving deeper into areas that have remained under-researched. For example, there is an absence of studies comparing the experiences of members of the renewable energy industry's supply and demand sides, particularly (1) regarding value-adding through renewable energy solutions and (2) from the perspectives of companies operating in an emerging economy. Indeed, research investigating how renewable energy adds value to those providing and consuming it is scant. Definitions of value-adding abound. For instance, in the field of logistics, [Rutner and Langley \(2000\)](#) posit that value-adding stresses the creation of business experiences that exceed customers' expectations and requirements, enabling the recurrence of such experiences and sharing them

**Table 1.** Information on renewable energy in Southeast Asia

Total renewable power generation capacity in Vietnam from 2011 to 2023 in megawatts (MW)			
	2011	2023	
	10,241	46,012	
Installed capacity of renewable power generation in ASEAN from 2015 to 2024, by energy source (in gigawatts)			
	2015	2024	
Bioenergy	7.07	10.18	
Hydropower	42.46	58.22	
Solar Power	1.99	30.46	
Wind power	0.8	8.32	
Total gigawatts	55.88	112.26	
Comparisons between Vietnam and selected ASEAN nations—renewable power total energy supply, including hydropower (in exajoules, input-equivalent)			
	2014	2024	Growth 2014–2024
Indonesia	0.42	1.05	9.6%
Malaysia	0.06	0.15	10.4%
Philippines	0.41	0.45	1.0%
Thailand	0.10	0.21	7.8%
Vietnam	0.22	0.47	7.7%

**Sources(s):** Energy Institute (2025), Statista (2025a, b)

across the business community. Value-adding is also perceived through such hands-on activities as cycle time or inventory reductions, sales boosts, customer service or cash flow improvements, and new distribution or marketing channels (Wigand, 1997). Hence, value-adding can lead to supply chain cost-cutting, revenue gains and overall enhancements of a firm's competitiveness in the marketplace (Rutner and Langley, 2000; Wigand, 1997).

Delving into the expectations, concerns, experiences and future perceptions of members of the supply and demand sides of Vietnam's renewable energy industry could be invaluable. New and accumulated information would provide robust empirical guidance to key renewable energy stakeholders while guiding and improving conceptual understanding among scholars. Against this backdrop, the present study will make two key contributions. First, it will create new knowledge associated with renewable energy, considering two key stakeholders: the supply and the demand side of renewable energy implementation. To fulfil this objective, the following research questions (RQs) will be addressed (Table 2):

**Table 2.** The study's research questions

Supply side	Demand side
RQ1: To what extent do renewable energy suppliers add value to their products/services?	RQ1: How do renewable energy consumers experience added-value products/services?
RQ2: What are the key challenges renewable energy suppliers face in providing 'value-for-money' to their consumers?	RQ2: How do renewable energy consumers perceive 'value-for-money' when investing in renewable energy solutions?
RQ3: What are the key resources needed to continue adding value when delivering renewable energy products/services?	RQ3: How could those consumers acquiring renewable energy products/services experience more fulfilling outcomes?

**Sources(s):** Authors' own work

Second, the study will develop conceptual understanding further. Moreover, embracing an inductive approach supported by conventional qualitative content analysis and data structure, a theoretical framework stemming from the analysis of the above questions will be proposed. In line with previous research (e.g. Franceschinis *et al.*, 2017; Silk *et al.*, 2014; Simpson and Clifton, 2017), the conceptual foundation of the diffusion of innovations theory (e.g. Rogers, 2003) will be considered. The following section presents the rationale behind this choice and the key notions of this framework.

## 2. Literature review

### 2.1 The diffusion of innovations theory

Rogers' (2003) framework discussing the diffusion of innovations is one of the best-known (Ozaki, 2011). Diffusion is conceptualised as a process facilitating the spread of innovation through communication avenues connecting members that belong to a social system, which is "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (Rogers, 2003, p. 23). Organisations, individuals, or informal groups may acquire membership in a social system (Rogers, 2003); as a result, innovation can be diffused through specific community channels among members (Ozaki, 2011). Thus, in the case of renewable energy adoption, suppliers and consumers demonstrate such membership by identifying needs and wants and making product and service decisions to solve energy-related problems, thereby contributing to innovation diffusion.

Innovation has been conceptualised manyfold. Rogers (1986), for instance, underlines its attribute as a new idea, while Zanello *et al.* (2016) acknowledge that innovation can be imitative and ground-breaking/novel. Importantly, innovation in its varied forms can contribute to significant value-adding (Jebli *et al.*, 2020; Zanello *et al.*, 2016), including in services (Anton and Nucu, 2020) and job creation (Heinbach *et al.*, 2014). Several conditions need to be met before consumers are brought into the innovation-decision process, including existing needs/problems, previous experiences, or a need for innovativeness (Ozaki, 2011).

Rogers' (2003) wide range of developed conceptual underpinnings illuminates the understanding of the diffusion of innovations theory (DOIT). First, Rogers (2003) underlines five successive stages in the innovation-adoption decision process:

- (1) *Knowledge* can be mediated by factors such as age, education, socioeconomic features (Franceschinis *et al.*, 2017), or social networks (Ozaki, 2011; Rogers, 2003). At this stage, individuals acquire knowledge of an innovation's existence, for instance, deepening their understanding of its functionality (Ozaki, 2011; Rogers, 2003) and potential for value-adding. In the context of renewable energy (solar photovoltaic adoption), the benefits of focussing on the development of in-house knowledge, expertise or skills are recognised in contemporary research (e.g. Shakeel *et al.*, 2024).
- (2) *Persuasion* occurs when individuals form their own opinions or attitudes toward innovation, whether favourable or unfavourable (Rogers, 2003), potentially affecting their innovation-purchasing intentions (Franceschinis *et al.*, 2017). Furthermore, social networks can influence persuasion or the adoption of an innovation, particularly through peer groups, opinion leaders or change agents (Ozaki, 2011; Rogers, 2003).
- (3) *Decision*: At this stage, the individual is already engaging in activities that are conducive to either adopting or rejecting the innovation (Rogers, 2003).
- (4) *Implementation*: The innovation can be implemented once the decision is made (Rogers, 2003). Nevertheless, Kertcher *et al.* (2020) highlight the importance of adaptation among actors associated with innovation processes, even before the involvement of early adopters as Rogers (2003) suggested. Adaptation could facilitate broader innovation consumption, particularly among those who were not involved in initial developments (Kertcher *et al.*, 2020).

- (5) *Confirmation* entails reinforcing an already-made innovation decision; however, such a decision might be revisited if messages regarding the innovation are conflicting (Rogers, 2003).

These stages can be applicable to understanding the process of adopting (demand side) and providing innovative solutions (supply side). Indeed, as Ozaki (2011) observes, various conditions affect innovation-related decisions, including past experiences, current problems or needs. Given the existing business environment, where the pressures of efficiency and financial gains are augmented by future energy source consumption, these notions have implications for Vietnamese firm managers in making informed renewable energy-related decisions. For example, an argument can be made regarding the significance of the post-sales (supply side) and post-purchase (demand side) domains, where service plays a key role. Vargo (2009) defines service as a process that uses one party's competencies, such as skills or knowledge, for another party's benefit. In this context, service represents the foundation of a service-dominant logic, which predicates "that service is the fundamental basis of exchange" (Vargo, 2009, p. 374). In the field of sustainability science, Saviano et al. (2025) argue for the consideration of service-dominant logic, which provides a systems thinking perspective. Moreover, the service-dominant logic framework stresses that the goal of achieving sustainability demands constant adaptability among various actors, their behaviour and strategies; this adaptability is contingent upon feedback gathered from one another and within the system (Saviano et al., 2025).

Rogers' (2003) work further stresses the following five characteristics of innovation processes:

- (1) *Relative advantage* concerns favourable perceptions of innovation determined by factors such as economic, convenience, satisfaction, or social (Rogers, 2003) vis-à-vis existing alternatives (Silk et al., 2014). Thus, realising innovation-related advantages is paramount in the speed at which innovation is adopted (Rogers, 2003). This aspect is also crucial concerning renewable energy adoption; here, the role of the providers (supply chain) is fundamental in sharing knowledge of renewable energy's advantages and potential benefits. Relative advantage can also be perceived in the form of value co-creation, for instance, at the grassroots level of renewable energy. Indeed, research focussing on renewable energy communities (Mihailova et al., 2022) emphasises the important role to be played by citizens as initiators of renewable energy activities, as potential financiers, engaging in crowdfunding of emerging technologies, and as "prosumers," those individuals who produce and consume energy (Parag and Sovacool, 2016).
- (2) *Compatibility* emphasises consistency with the needs, past experiences, or existing values of those considering innovation adoption (Rogers, 2003). Therefore, the compatibility, or lack thereof, between innovative ideas and an organisation's norms or values may dictate the urgency of innovation adoption (Rogers, 2003). Silk et al. (2014) illustrate this characteristic in the farming environment, where a lack of compatibility between technology and farming practices might render innovation adoption challenging. Here again, depending on companies' philosophy or narrative towards sustainable production or corporate social responsibility activities and principles, there are linkages with renewable energy involvement and resulting value-adding outcomes.
- (3) *Complexity* underlines an innovation's perceived level of difficulty (Rogers, 2003) or its perceived ease of use and understanding (Silk et al., 2014). Moreover, while some members comprehend an innovation promptly, others require more time to understand it, which has implications for their readiness to adopt it (Rogers, 2003). Within renewable energy solutions, the supply chain can once again drive educational processes, guiding potential users in understanding and operating equipment and technologies, thus reducing complexity.

- (4) *Trialability* denotes the extent to which an innovation is experimented with before its permanent adoption (Silk *et al.*, 2014). Some innovations that lend themselves to being trialled in apportionments can also be potentially adopted more quickly than others (Rogers, 2003). In the case of renewable energy adoption, users trialling wind or solar energy solutions can ascertain the benefits and potential for value-adding. This trialling step can be triggered by industry stakeholders; for instance, Shakeel *et al.* (2024) highlight the role of companies in creating and delivering value offerings that, because of their potentially beneficial impacts, may trigger consumers' adoption.
- (5) *Observability* refers to the degree of observation of an innovation before adoption (Silk *et al.*, 2014). Furthermore, the ease of observing an innovation's results can dictate its level of adoption among others (Rogers, 2003). In the renewable energy domain, manufacturers and suppliers are responsible for trialling equipment and technologies and enabling visibility to those on the demand side searching for energy solutions.

In the last decade, researchers embraced the DOIT to understand the juxtaposition between innovation and renewable energy in the consumer, household, or rural domains more deeply (e.g. Ahmad *et al.*, 2023; Wang *et al.*, 2022). Despite its insightfulness, to the knowledge of the author(s), studies examining the supply and demand sides of the renewable energy industry embracing the DOIT tenets, particularly in emerging economies, are nonexistent. Among the very few contemporary contributions focussing on the DOI to examine renewable energy themes in Asia, Zhang *et al.* (2018) presented a model of photovoltaic energy diffusion for Singapore's residential areas. More specifically, the focus of Zhang *et al.*'s (2018) model was associated with the impacts of project uncertainty and interpersonal communication on those adopting it. The authors conclude that, despite the relevance of these factors, numerous others that could equally affect adoption decisions merit investigation in the future. The present study partly adheres to this objective, embracing the DOIT to explore, among other themes, value-adding in the context of renewable energy (e.g. Table 2).

Examining the supply and demand sides could also contribute to a deeper empirical and conceptual understanding. Empirically, ascertaining how the two groups perceive value in the context of renewable energy can provide practical insights for the industry, including in terms of coordination. In fact, as Dranka *et al.* (2021) revealed, an increasing body of research acknowledges the merit of integrating both the supply and demand sides in studies focussing on long-term power systems.

Expanding from these premises, there is also conceptual value in embracing these two stakeholder groups. For instance, new knowledge arising from contrasting the study's analysis and the DOIT's tenets in the context of these two groups could guide future endeavours. These endeavours include conceptually understanding value-adding in the field of renewable energy and extending the DOIT in this domain."

Consequently, the present study will also address the following RQ:

RQ4. To what extent can the DOIT facilitate a deeper understanding of renewable energy involvement, namely regarding:

- (1) value-adding through renewable energy solutions (supply side) and
- (2) perceptions of receiving or consuming added value (demand side)?

### 3. Methodology

#### 3.1 Methods and approaches

The study's focus on a new and under-researched perspective, that is, the examination of the supply and demand sides of renewable energy regarding perceptions of value-adding, called for

an exploratory direction. This approach is in line with [Murthy and Bhojanna \(2008\)](#) in that it can help researchers become familiar with an issue or problem. Exploratory research also aligns with [Hair et al.'s \(2020\)](#) notions that (1) exploratory research helps discover new themes, relationships, or ideas, and (2) various types of data gathering can be implemented, including qualitative techniques such as in-depth interviews and document observation. Exploratory research is also associated with an inductive paradigm, whose main purposes are condensing textual data, creating links between the research's objectives and the findings from the data, and developing a framework capturing the processes or experiences revealed in the data ([Thomas, 2006](#)).

The need to gather data from knowledgeable and experienced individuals suggested the value of purposive sampling, which highlights the importance of information-rich cases for in-depth inquiry ([Patton, 1999](#)). The views of experienced individuals from both the supply and demand sides of renewable energy usage were perceived to help illuminate the answers to the research's central questions ([Patton, 1999](#)).

### 3.2 Data collection and analysis processes

At the end of 2021, groundwork was conducted to learn about companies that supplied and acquired renewable energy equipment/solutions; this process helped identify five from the first and three from the second group. After securing university ethics approval in March 2022, the eight companies' management was approached by email correspondence, where the research was introduced, and managers were formally invited to an interview. Seven managers (supply side: four; demand side: three) agreed to partake in the study and were interviewed. These interviews were carried out during May 2022; in all cases, participants were informed that their agreement to partake in the interview was understood as their consent. The interview protocol was divided into two parts. In the first, participants were asked questions about their career, role, and company demographic details, while in the second, they were presented with the following questions ([Table 3](#)):

These questions were developed after considering extant literature on various themes that included renewable energy usage/implementation ([Cuong et al., 2021](#); [Hussain et al., 2022](#); [Lan et al., 2023](#); [Le, 2022](#); [Minh and Van, 2023](#); [Müller et al., 2020](#); [Nguyen and Le, 2022](#); [Nong et al., 2020b](#)) and value-adding (e.g. [Anton and Nucu, 2020](#); [Jebli et al., 2020](#); [Zanello et al., 2016](#)). At the end of each of the seven interviews, participants were asked to recommend other individuals who might also contribute to the research. This snowballing technique (e.g. [Noy, 2008](#)) helped recruit an additional 17 participants nationwide; together, two balanced cohorts of 12 participants each were interviewed. The 24 semi-structured interviews lasted an average of 90 min. Six interviews were conducted at the participants' premises, allowing for reviewing company information, observing and note-taking. Together with other printed materials showcasing government and industry legal and regulatory codes and prescriptions, method triangulation ([Carter et al., 2014](#)) facilitated a deeper understanding of some of the

**Table 3.** The questions posed to the participants

Supply side	Demand side
RQ1: How is your company adding value to its products/services?	RQ1: How does your company experience 'added value' products/services?
RQ2: What are the key challenges your company faces in providing 'value-for-money' to its consumers?	RQ2: When investing in renewable energy solutions (e.g. products/services), how do you perceive 'value-for-money'?
RQ3: What key resources are needed for your company to continue adding value when delivering renewable energy products/services?	RQ3: How could your company have a more fulfilling experience when acquiring renewable energy products/services?
<b>Sources(s):</b> Authors' own work	

answers participants provided. One demonstration of this type of triangulation was in the form of company, supplier, or government printed documents and materials. As illustrated in Figure 1, some of these documents entailed product warranties, instructions and pricing.

The other semi-structured interviews were conducted online due to the challenges of the geographic distance between the research team and the interviewees. As illustrated in the analysis (Figures 1–3), the interviews contributed to a recurrence of themes, a sign of data saturation (Fusch and Ness, 2015). This recurrence was noticed after the 10th interview in both cases (supply and demand side groups), which led to discontinuing the interview process after the 12th interview.

The majority of the interviews (14) were conducted in Vietnamese, and 10 in English. The questionnaire composition followed protocols of iterative translation (Douglas and Craig, 2007), while the translation process followed protocols regarding the collaboration between the researchers and a professional translator (van Nes *et al.*, 2010).

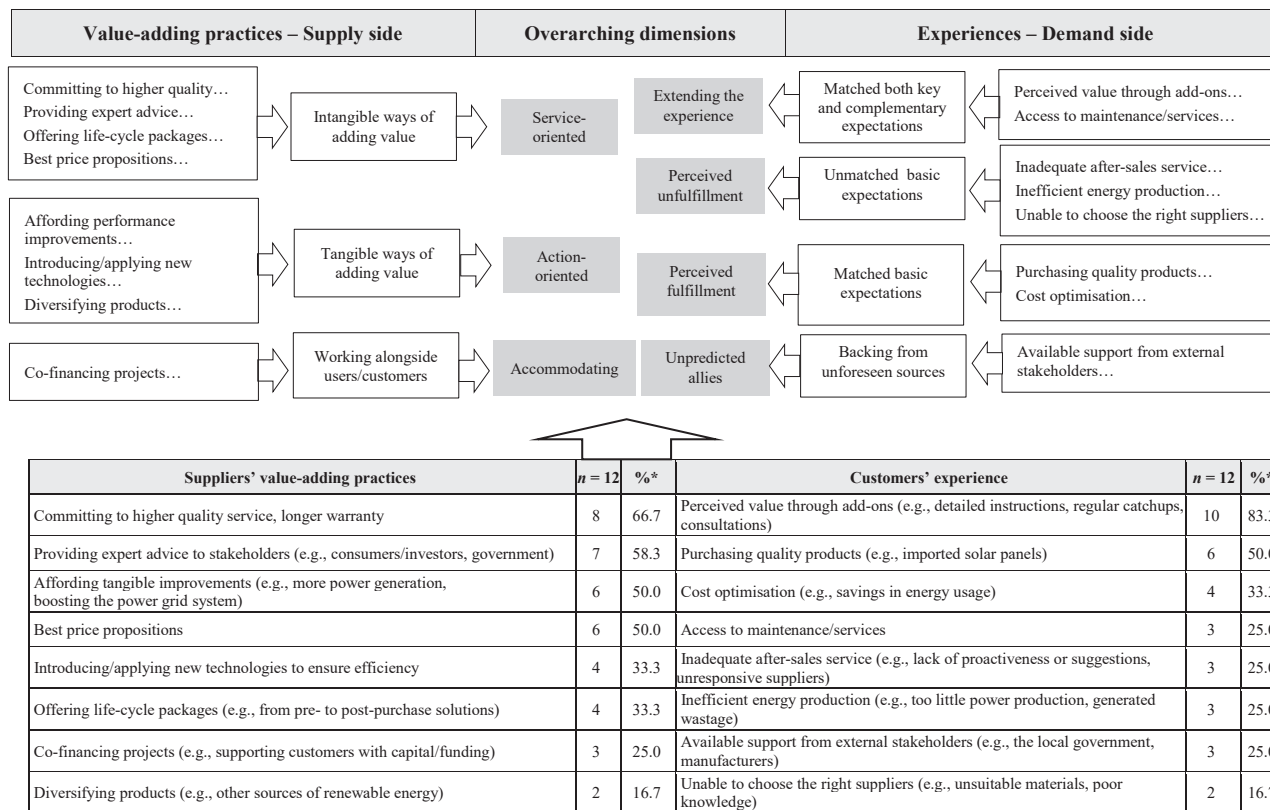
The gathered data were analysed using reliable methods, including conventional qualitative content analysis and a data structure. Conventional qualitative content analysis entails coding categories flowing directly from the gathered data (Hsieh and Shannon, 2005). By using this approach, researchers can obtain direct information from their participants without imposing predetermined theoretical views or categories (Hsieh and Shannon, 2005). The data structure method (Gioia *et al.*, 2013) focuses on a systematic presentation of first-order (informant-centric codes/terms) and second-order analysis (researcher-centric dimensions, themes, or concepts). Table 4 shows the various steps followed while embracing this method in the present research. Importantly, and as with inductive research, the data structure method can contribute to the development of a theoretical model (Gioia *et al.*, 2013). Figures 1–4 provide more in-depth demonstrations of both qualitative content analysis and data structure methods.

### 3.3 A discussion of trustworthiness in qualitative research

Several researchers emphasise the significance of transparency and rigour in qualitative research. The present research strongly subscribes to Shenton's (2004) protocols that are based on the interpretation of the seminal works by Guba (1981), Guba and Lincoln (1981), and Lincoln and Guba (1985), highlighting various criteria:

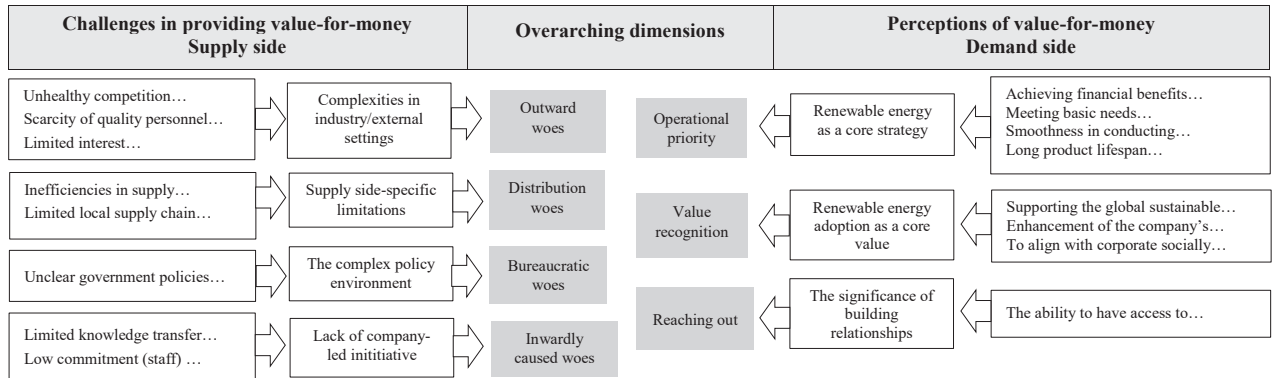
- (1) *Credibility* stresses researchers' duty "to establish confidence in the truth of the data" (Polit and Beck, 2014, p. 492) within the context of the research. Ways to demonstrate credibility include implementing well-established research methods and triangulation (Shenton, 2004), both of which are illustrated in the present study.
- (2) *Dependability* refers to the potential to replicate a study's findings using the same or similar context and participants (Polit and Beck, 2014). In line with Shenton (2004), dependability was addressed by reporting the study's processes in detail, thus enabling researchers to replicate the work should the study be reconducted in the future.
- (3) *Confirmability* emphasises that the data gathered are accurate, relevant, and meaningful; more importantly, that these characteristics represent the participants' thoughts and not the researcher's interpretations or imagination (Polit and Beck, 2014). The interviews and the resulting verbatim comments presented in the next section, together with triangulation (Shenton, 2004), demonstrate confirmability in the present research. Moreover, in line with Carter *et al.* (2014), the study also employed investigator triangulation, involving the participation of various researchers to provide a variety of observations during the data analysis process, including the coding of the interview transcripts.

Additionally, the principles of consensual qualitative research, which are suggested to contribute to trustworthiness and consistency of both analysis and coding (e.g. Van den Berg and Struwig, 2017),



(\*) Some percentages were rounded off.

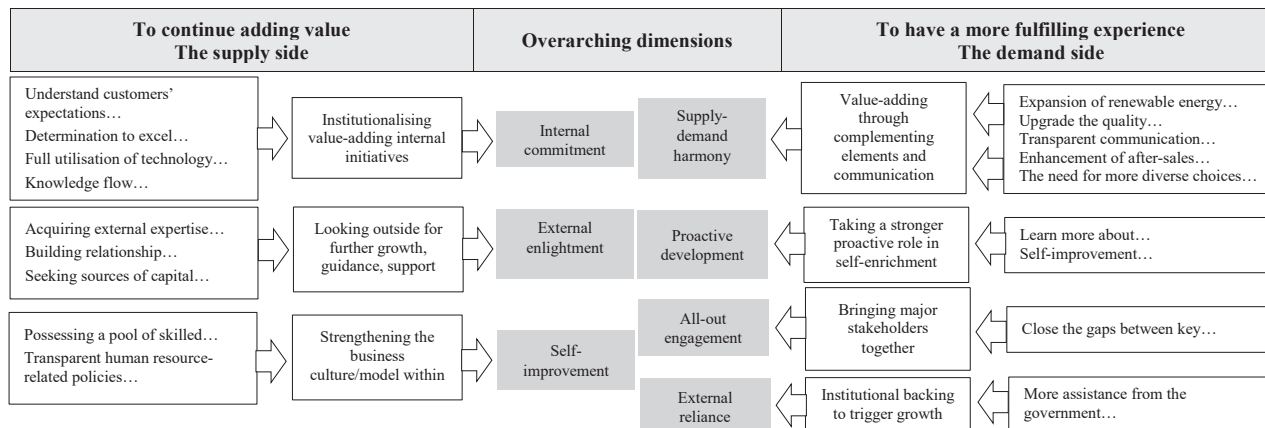
**Figure 1.** Suppliers' value-adding practices and experiences from the demand side. (\*) Some percentages were rounded off. Source: Authors' own work



Suppliers' challenges	n = 12	%*	Customers' perceptions	n = 12	%*
Unhealthy competition (e.g., low entry barriers)	7	58.3	Supporting the global sustainable trend (e.g., reduced emissions, environmentally friendly)	10	83.3
Inefficiencies in supply management (e.g., delays in shipment)	7	58.3	Achieving financial benefits (e.g., saving in operational costs)	9	75.0
Unclear government policies, paperwork (e.g., decision-making is too dependent on officials' input)	7	58.3	Meeting basic needs in various areas (e.g., using the right energy type in the right location at the right time)	9	75.0
Scarcity of quality personnel (e.g., skilled technicians)	6	50.0	Enhancement of the company's profile/image (e.g., branding)	4	33.3
Limited local supply chain (e.g., lack of components, poor power transmission system)	5	41.7	Smoothness in conducting operations (e.g., consistency/reliability of products/services)	3	25.0
Limited knowledge transfer within the organisation (e.g., documentation, training)	3	25.0	The ability to have access to quality partners (e.g., investors)	3	25.0
Limited interest in sustainability among local companies	3	25.0	To align with corporate socially responsible principles (e.g., a better living environment)	3	25.0
Low commitment among staff (e.g., upgrading skills, continuity in the organisation)	2	16.7	Long product lifespan with simple maintenance	2	16.7

(\* ) Some percentages were rounded off.

**Figure 2.** Suppliers' challenges in providing value-for-money and customers' perceptions on value-for-money. (\* ) Some percentages were rounded off. Source: Authors' own work



Suppliers' points of view	n = 12	%*	Customers' points of view	n = 12	%*
Understanding customers' expectations	10	83.3	Learn more about one's own business needs (e.g., required operational features) at the company level	9	75.0
Acquiring external expertise (e.g., learning from foreign companies)	10	83.3	Expansion of renewable energy users (e.g., to benefit from economies of scale)	9	75.0
Possessing a pool of skilled technical experts	9	75.0	Upgrade the quality of products (e.g., components, devices)	8	66.7
Building relationships with high-end partners (e.g., suppliers)	7	58.3	Transparent communication about solutions on offer	6	50.0
Determination to excel at providing renewable energy solutions at all hierarchical levels of the company	7	58.3	Close the gaps between key stakeholders (e.g., consultants-suppliers-users), for instance, in communication	6	50.0
Full utilisation of technology (e.g., in-house database management)	6	50.0	Self-improvement (learning more about renewable energy at the company/individual level)	4	33.3
Knowledge flow within the organisation (e.g., cross-training); providing opportunities internally to nurture ideas/innovation (e.g., staff's voice)	5	41.7	Enhancement of after-sales service (e.g., proactive provider-user interaction)	3	25.0
Transparent human resource-related policies (e.g., remuneration, evaluation)	4	33.3	More assistance from government bodies (e.g., information)	3	25.0
Seeking sources of capital (e.g., external funding)	3	25.0	The need for more diverse choices of renewable energy	3	25.0

(\*) Some percentages were rounded off.

**Figure 3.** Key resources needed to continue adding value (supply side) and perceptions of a more fulfilling experience (demand side). (\*) Some percentages were rounded off. Source: Authors' own work

**Table 4.** Illustrations of operationalising the data structure template

Interview data

Verbatim comment associated with the first-order codes (Figure 1, supply side)

Participant 12: With a long operating time and extensive experience in the field, as well as a lot of business know-how, we can very well assess the capacity of stakeholders (partners, manufacturers and suppliers), ensure the safety of the property of our investors, and ensure that our customers get the best solar energy systems. This evaluation is meticulously carried out and in detail through software systems. Most businesses in Vietnam do not have enough financial capacity to invest in renewable energy power systems. Our funds are a critical component for them to have both clean and cheap energy while also helping to protect the environment; they build a strong business profile for future development and a good public image at no cost. Investing in the development of renewable energy systems requires a significant amount of both physical and time resources. With our assistance, businesses in Vietnam can totally focus their resources on growing their core businesses while still having sustainable energy systems to use.

↓

First-order codes (informant-centric) -  
Samples

Second-order themes  
(researcher-centric) -  
Samples

Overarching  
theoretical  
dimensions-Samples  
Service oriented

Committing to higher quality service,  
longer warranty (Figure 1, supply side)  
Providing expert advice to stakeholders  
(e.g. consumers/investors, government)  
(Figure 1, supply side)

→ Intangible ways of adding  
value

→

Verbatim comments associated with the first-order codes (Figure 1, demand side)

Participant 2: The available renewable energy production system (solar panels) is straightforward, and its maintenance and cleaning are quite easy. Right now, we have no problem with the supplier and are satisfied with the service . . .

Participant 9: We usually meet annually with the supplier to discuss particulars about the performance of the products (we purchased). For example, with the biomass supplier, we have an annual performance review. And we try to improve work progress.

↓

First-order codes (informant-centric) -  
Samples

Second-order themes  
(researcher-centric) -  
Samples

Overarching  
theoretical  
dimensions-Samples  
Extending the  
experience

Perceived value through add-ons (e.g.  
detailed instructions, regular catchups,  
consultations) (Figure 1, demand side)  
Access to maintenance/services (demand  
side)

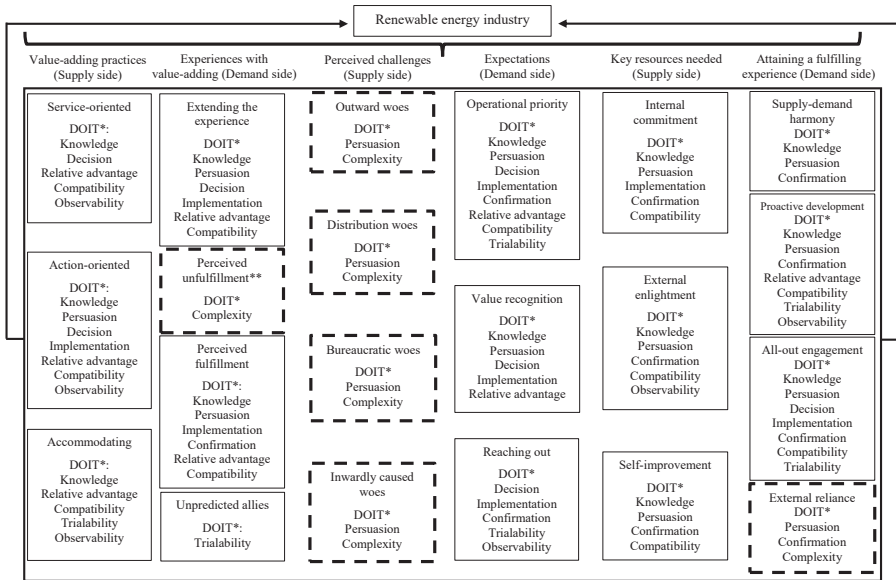
→ Matched both key and  
complementary  
expectations

→

**Sources(s):** Authors' own work and Gioia *et al.* (2013).

were adhered to. Consensual qualitative research is based on the notion that multiple levels of awareness and perspectives are required to address complex issues (Hill *et al.*, 1997); thus, it entails consensus among team members (Depner *et al.*, 2017). Correspondingly, at least three team members are recommended, first, to analyse the data independently and, subsequently, to present and discuss the emerging points as a team, eventually reaching a unified version that best represents the data (Hill *et al.*, 1997). Aligning with this method, in this study, three team members were first involved in coding independently; this process was followed by meetings to discuss their independent analyses and reach consensus. Members of the research team also compiled an audit trail (Shenton, 2004) during the interview process; the notes containing procedures and decisions made during the data collection process were also compared between the researchers.

- (4) *Transferability*, which is comparable to generalisability (Polit and Beck, 2014), indicates the applicability of a study's findings and conclusions to other populations or circumstances (Shenton, 2004). However, as is the case with the present research, the modest numbers of individuals and environments in qualitative inquiry may render transferability unachievable (Shenton, 2004).



**Figure 4.** Renewable energy value-adding framework: The supply and demand perspectives. \* Denotes potential linkages between the emerging dimension and the diffusion of innovation theory (DOIT), including the five characteristics of innovation processes. \*\* Denotes a significant gap between supply-demand. Source: Authors' own work. The following sources were consulted: Franceschinis *et al.* (2017), Ozaki (2011), Rogers (2003), Silk *et al.* (2014)

### 3.4 Demographic results

Table 5 indicates that most participants were directors/managers and male, and their companies were engaged in international business activities. The majority of their companies employ fewer than 250 full-time employees, and half of them operate in Hanoi. In terms of work experience, 20 participants have been in their industry/company for six or more years, thus reinforcing their significance as “information-rich cases” (Patton, 1999). The demand side perspective is represented by a variety of industries. In the following results section, participants’ comments will be deidentified (e.g. supply side = S1, S2, etc.; demand side (consumers) = C1, C2, etc.).

## 4. Findings

### 4.1 Providers’ ways of adding value and consumers’ experience

The first part of the analysis reveals that providers (supply side) add value in predominantly six forms; among these, four were indicated by at least six representatives (50%) of the provider group (Figure 1). These forms included quality service, such as offering post-installation service and extended warranties (66.7%), alongside providing expert advice (58.3%), maximising energy production (50%), and offering competitive prices (50%). The following verbatim comments lend support to the findings:

S2: We are diversifying what we sell to our customers, specifically bioenergy, to produce heat.

S3: We use a simulation program to forecast the [renewable energy] product, ensuring that our system will produce the estimated- and promised- quantities to our clients.

Other providers intended to add value through power generation (S1): “We are willing to invest in the power transmission line system to connect to the national power grid.” This aspect is

**Table 5.** Background characteristics of the participants and their companies

Code *	**Years of experience	Role	Gender	Full-time employees	Main energy source provided	Location
S1	6	Manager	Female	50	Solar power	Bac Lieu
S2	9	Manager	Male	15	Solar power	HCMC***
S3	7	Co-founder	Male	50	Solar	HCMC***
S4	13	Chairman	Male	200	Solar, robotics for solar plants and rooftops	HCMC***
S5	4	CEO	Male	15	Solar power (rooftops)	HCMC***
S6	9	Manager	Male	804	Wind and solar power	Manila
S7	24	R&D Director	Male	3	Wind power	Hanoi
S8	14	CEO	Male	100	Thermal power plant, solar power	HCMC***
S9	22	Director	Male	196	Various (wind power, solar power, thermal power, bioelectricity)	Hanoi
S10	15	Director	Male	9,000	Wind power, solar power, thermal power, bioelectricity	Hanoi
S11	18	CEO	Male	15	Solar	Hanoi
S12	3	Director	Male	130	Solar	Hanoi

Code *	Years of experience	Role	Gender	Full-time employees	Main industry	Location
D1	21	Director	Male	700	Real estate	Other****
D2	5	Co-founder	Male	28	Engineering	Hanoi
D3	6	Manager	Male	700	Energy provider	Hanoi
D4	6	Founder	Male	50	Construction	Hanoi
D5	5	Director	Female	85	Hospitality	Other****
D6	23	Manager	Male	2,100	Energy provider	Hanoi
D7	7	Manager	Male	500	Education	Hanoi
D8	11	Director	Male	234	Energy provider	Hanoi
D9	20	Manager	Female	2,300	Beer sales	Other****
D10	8	Director	Female	25	Exporting	Vinh Phuc
D11	11	Manager	Male	2	Equipment	Hanoi
D12	11	Director	Male	5	Equipment	Other****

**Note(s):** \*S= Supplier; D = Demand side (consumers); \*\* Years of experience in the respective industry; \*\*\*HCMC: Ho Chi Minh City; \*\*\*\*Other provinces in Vietnam

**Sources(s):** Authors' own work

crucial as “most businesses in Vietnam do not have enough financial capacity to invest in renewable energy power systems” (S5). Investments, however, are crucial if countries are to successfully switch to renewable energy sources as opposed to perpetuating the usage of conventional ones (Karamoozian et al., 2023).

The demand side group’s viewpoints regarding added value are, to some extent, in line with providers’ intent to deliver similar outcomes (Figure 1). Indeed, the demand side group’s perceptions were mainly reflected by such add-ons as detailed equipment instructions and regular consultations (83.3%), together with the availability of quality products (50%), and were distantly followed by cost optimisation through products (33.3%). Here, again, several insightful comments emerged:

C2: If the investment has a clear roadmap, it can certainly create financial benefits for businesses.

C5: For us, investing in renewable energy is worthwhile, especially given its very lengthy useful life (at least 10 years), where numerous benefits (saving on electricity usage every day, creating a highlight for the business's marketing and operation activities) can be achieved . . .

Nevertheless, concerns regarding the applicability of the experience with value-added products/services were also raised. C3 expressed reservations about poor after-sales service due to the supplier's lack of initiative in providing further instructions for the installed equipment or responding to queries when contacted. C1 also echoed these views:

The quality of the solar panels we are using is quite high (no damage or maintenance required during use). However, the provider's after-sales service is very poor. There is a lack of initiative in monitoring customers' use to advise and suggest cleaning and maintenance . . .

#### *4.2 Challenges providing “value-for-money” and how consumers experience value-for-money*

When the interviewees were asked about the barriers to delivering value-for-money, these challenges primarily originate at the industry level, and they are mainly reflected in three ways (Figure 2). In fact, seven suppliers (58.3%) perceived unfair competition from current or new competitors entering the industry, unstable state policies for renewable energy business activities, respectively, while six (50%) pinpointed gaps concerning human resources. Regarding renewable energy policies, a recent critical analysis (Ngoc *et al.*, 2025) identifies that regulatory uncertainties, such as land acquisition or power purchase agreements, have adversely affected investors' confidence. Moreover, as a direct result of these uncertainties, foreign direct investment has fallen by as much as 30% between 2022 and 2024 (Ngoc *et al.*, 2025). Similarly, due to the unpredictability in renewable energy policy changes, there has been a stagnation of rooftop solar panel investments (Tham *et al.*, 2025). Complementing these points, Quang *et al.* (2025) argue that Vietnam has yet to enact dedicated renewable energy policies. For instance, hydropower projects are affected by fragmented regulations from different legal documents; furthermore, hydropower-related laws exhibit technocratic and state-led frameworks dominated by licencing procedures and technical permits (Quang *et al.*, 2025). The following views provide additional context to these findings:

S5: Competition in the field is becoming increasingly fierce as demand for development resources (people, components, and suppliers) remains constant and limited.

S6: Finding people with industry knowledge or the mindset and thinking of a foreign investor in planning, initiative, or leadership is extremely tough.

S10: If the government's policy mechanisms are not long-term and change too often, companies cannot adapt because changes consume many resources . . .

Understanding what customers expect from renewable energy products/services is also challenging. The revealed themes (Figure 2), representing customers' investment evaluation, can be interpreted from both external and internal angles. On the outward side, 10 demand side interviewees (83.3%) noted that their investment value mirrored the trend of sustainable development worldwide, while nine (75%) sought financial gains and meeting basic needs in different areas, respectively. Some of their selected comments follow:

C7: Certainly, renewable energy is positive in creating trends . . . However, measuring the effective value of an investment is unachievable, for instance, in North Vietnam, where the amount of sunlight during the year is limited or unstable . . . currently, the system does not contribute highly to our electricity demands . . .

C11: I wanted to do something for Vietnam and for the world and for my investment to be profitable. Unfortunately, because of the increasing price of the materials and the lack of clear government regulations, investing in a renewable energy project at the present time is unviable.

#### 4.3 Extending value-adding and enhancing consumers' experience

Exploring the main resources needed to continue value-adding by providing renewable energy products/services (supply side), the analysis predominantly highlights nine proactive measures and initiatives (Figure 3). At the centre of these are service-related elements, such as a) understanding customers' expectations and b) gaining external expertise, including learning from model international companies, both of which were indicated by 10 (83.3%) interviewees. Also crucial is the availability of skilled technical experts within the firm (9 or 75%). These perceptions are associated with enhancing internal knowledge that, in turn, could help build relationships and change the internal mindset to understand that finding renewable energy solutions is part of a common company philosophy as opposed to isolated individual efforts. The full implementation of technology and knowledge flow improvements, together with designing transparent internal policies and pursuing external funding, were also perceived as crucial in extending value-adding principles. Several viewpoints illuminate the understanding of some of these areas:

S4: We cooperate with a German company with more than 18 years of experience in operations and maintenance manuals . . . it has an artificial intelligence solution that analyses all of the power plant's data and then provides us with the appropriate operational and maintenance instructions . . .

S9: Because this field has unique characteristics . . . having relationships with local management agencies where the energy farm is located is critical in resolving compensation and clearance issues for people, handling waste problems, and determining the impact of production on the local environment.

Concerning ways in which their renewable energy experience could be more fulfilling, nine representatives of the demand side group (75%) underscored the significance of understanding the company's internal needs more. The same number of responses highlighted the importance of increasing renewable energy user numbers to develop economies of scale, where consumers could benefit more. Providers' responsibility to maintain the consistency through the upgrade of products' quality (8 or 66.7%), nurturing communication transparency (6 or 50%), as well as mitigating communication gaps between renewable energy consultants, suppliers or users, were additional valuable ways to create fulfilling experiences. Selected observations further support these views:

C2: The difference here is the after-sales services they provide (maintenance, post-installation maintenance) and their expertise in offering the most optimal investment options with each business's unique characteristics (the fastest way to pay back capital).

C3: It is very difficult to rely on service providers, but it must come from the customers themselves . . . they must carefully assess the specifics of their business and find service/solution providers that are suitable for their needs.

Finally, Table 6 presents comparisons within each group of participants and reveals some differences. For instance, more supply side participants with over a decade of experience perceived the challenge of unhealthy competition than their counterparts with less than a decade of experience. In turn, more participants of the less experienced group viewed the scarcity of quality personnel as a challenge.

## 5. Discussion

The study makes various contributions to the entrepreneurship literature, specifically regarding renewable energy supply and demand, from the perspective of industry practitioners operating in an emerging economy. The study's primary contribution lies in the 21 dimensions that emerged in the analysis, together with the resulting theoretical framework (Figure 4), which provides a) a model highlighting the analysis and b) the juxtaposition between these dimensions and the DOIT. In Figure 1, for instance, the service- and action-oriented, together with the accommodating

**Table 6.** Comparisons between the findings and selected characteristics of participants and their firms

Supply side	Experience (fewer than 10 years)	Experience (10+ years)	Solar power only	Other sources, Various	Size (<100)	Size (100+)
F1: Committing to higher quality ...	3	5	4	4	4	4
F1: Providing expert advice ...	3	4	3	4	3	4
F1: Affording tangible improvements ...	4	2	3	3	2	4
...						
F1: Best price propositions ...	1*	5*	2	4	2	4
F2: Unhealthy competition ...	2*	5*	3	4	4	3
F2: Inefficiencies in supply ...	4	3	4	3	4	3
F2: Unclear government ...	2	4	3	3	3	3
F2: Scarcity of quality ...	5*	1*	4	2	3	3
F3: Understanding customers ...	5	5	5	5	5	5
F3: Acquiring external ...	4	6	4	6	4	6
F3: Possessing a pool ...	5	4	5	4	4	5
F3: Building relationships ...	5*	2*	4	3	3	4
F3: Determination to excel ...	3	4	4	3	5*	2*
F3: Full utilisation ...	3	3	2	4	2	4

Demand side	Experience (fewer than 10 years)	Experience (10+ years)	Size (<100)	Size (100+)
F1: Perceived value through ...	6	4	5	5
F1: Purchasing quality products ...	2	4	4	2
F2: Supporting the global ...	5	5	5	5
F2: Achieving financial ...	4	5	5	4
F2: Meeting basic needs ...	4	5	3*	6*
F3: Learn more about ...	5	4	5	4
F3: Expansion of renewable ...	4	5	5	3
F3: Upgrade the quality ...	4	4	4	3
F3: Transparent communication ...	3	3	4	2
F3: Close the gaps ...	4	2	4	2

**Note(s):** Using the main frequencies (no less than six) from Figures 1–3. F1: Figure 1, F2: Figure 2; F3: Figure 3.  
\* Differences of three frequencies or above

**Source(s):** Authors' own work

dimension, help explain suppliers' value-adding practices. While affording tangible and intangible value, suppliers also engage in working alongside the demand side stakeholders to enhance their potential to use and benefit from renewable energy solutions. Among the three, the action-oriented dimension exhibits as many as seven associations with the DOIT's stages in the innovation-adoption decision process and with the characteristics of innovation processes (Figure 4), including persuasion, decision, compatibility and observability.

Examining the stakeholders' perspectives, the 'extending the experience' dimension reveals two fundamental ways that match central and harmonising aspects, where communication and other forms of service support are crucial. This dimension also reveals several associations with the DOIT, namely, concerning knowledge, implementation and relative advantage. The perceived fulfilment dimension underlines users' level of satisfaction with "hard" aspects of renewable energy involvement, including quality products and cost optimisation, whereas the "unpredicted allies" dimension stresses the significance of external stakeholders to boost the future implementation of renewable energy solutions. Nevertheless, the "perceived unfulfillment" dimension points to various limitations in product/service performance, thus denoting existing gaps.

Figure 2 illustrates that suppliers' perceived challenges can be understood through the outward, distribution, bureaucratic, and inwardly caused woes. This conceptual foundation is based on various premises ranging from existing limitations (human resources) or threats (competition), together with challenges at a broader supply chain level, policy barriers or even the company's limited initiative in engaging in value-adding activities. The analysis of consuming companies' experiences in this domain, however, identifies areas that underline the urgency for suppliers to pay attention to. The operational priority and the value recognition dimensions emphasise companies' needs/wants in areas where the supply side encounters barriers (e.g. distribution, bureaucratic, inwardly caused woes). In turn, such weaknesses could also have direct and negative impacts on building relationships with the demand side, whose members perceive these relationships as vital (reaching out dimension). Importantly, the operational priority dimension illustrates eight links to the DOIT, five related to the stages in the innovation-adoption process (e.g. knowledge and persuasion) and three to the characteristics of innovation processes (e.g. compatibility and trialability).

Figure 3 identifies organisational resources that can help towards competitiveness (supply side) by understanding the demand side's needs to achieve more fulfilling experiences through their involvement in renewable energy solutions. The internal commitment dimension underscores the strategic relevance of "institutionalising" various internal activities that could drive companies' performance and competitiveness. Equally important are the external enlightenment and self-improvement dimensions, which underscore the role of continuous learning while building relationships, procuring capital, acquiring talent, and demonstrating transparency within internal human resource processes. Learning through renewable energy technology understanding and evaluation can lead to consumers' confidence (Irfan *et al.*, 2021).

Conversely, the supply-demand harmony dimension (Figure 3) identifies consuming companies' expectations of enhanced harmony with their providers. The proactive development and all-out engagement dimensions ascertain company leaders' intention to engage, acquire more knowledge and be more proactive to benefit from renewable energy solutions. The proactive development dimension also underscores the significance of self-education as a catalyst for the future adoption of renewable energy solutions (Simpson and Clifton, 2017). Thus, relationships emerge between this dimension and the DOIT, such as regarding knowledge and persuasion (stages in the innovation-adoption decision process) and trialability and observability (characteristics of innovation processes). Additionally, the external reliance dimension aligns with extant research (e.g. Smirnova *et al.*, 2021) that underscores the role of government bodies in supporting the further development of renewable energy implementation, including through financial incentives.

### 5.1 Theoretical implications

By encapsulating the study's key findings and dimensions, Figure 4 contributes to a more rigorous conceptual understanding of renewable energy from the perspectives of business leaders operating on the delivery and consumption sides. At the same time, one fundamental theoretical implication emanates from the value of contrasting the two participant groups. For instance, Figure 1's analysis identifies both alignments and mismatches, notably in what the supply side participants perceive and what the experiences of the demand side are. More specifically, the perceived unfulfillment dimension helps understand existing gaps voiced by the demand side vis-à-vis how the supply side perceives its performance in value-adding. Illuminating the extant gaps helps provide a preliminary foundation to understand the predicaments in adding value and, importantly, what value is expected to exploit the potential of renewable energy in the context of an emerging economy.

Through seven dimensions, Figure 2 also presents conceptual elements associated with the study's themes and suggests the significance of considering these at the individual level and as part of the holistic model (Figure 4). In fact, when set against consumers' expectations, the

operational priority, value recognition, and reaching out dimensions represent tools that can counterbalance the four identified types of woes (supply side), thus affording new and deeper conceptual avenues.

Figure 3 illustrates a juxtaposition between perceived resources for enhancing value-adding (supply side) and for experiencing it (demand side). The internal commitment, external, enlightenment, and self-improvement dimensions have clear conceptual implications. Indeed, a model could emerge in which linkages can be established, first, associated with the supply-demand harmony dimension and additionally with the proactive development and all-out engagement dimensions. The identified juxtapositions also suggest their conceptual significance, guiding researchers and practitioners in their quest for developing robust models to improve processes related to renewable energy implementation, future adoption, and the industry's long-term sustainability.

Theoretical implications also emerge in the context of the study's developed dimensions and their relationship with the DOIT (RQ3). The usefulness of the DOIT is ascertained in illuminating additional elements pertaining to the renewable energy journey undertaken by both members of the supply and demand sites. For instance, when contrasting the three dimensions (supply side) and the four (demand side), in line with Rogers (2003), there is potential for suppliers to play a crucial role in disseminating knowledge. This knowledge can help narrow some of the recognised gaps on the demand side, including enhancing the understanding of functionality, as discussed in earlier research (e.g. Ozaki, 2011). Knowledge can persuade suppliers to embrace and implement innovations (Franceschinis *et al.*, 2017), such as renewable energy solutions. In addition, observability and trialability (Silk *et al.*, 2014) could address issues of complexity in understanding technologies while helping companies gain more favourable views of innovation (Rogers, 2003), potentially embracing renewable energy as a valuable resource. Overall, while the relationships between the study's analysis and the DOIT afford valuable insights, considering other models (e.g. dynamic capabilities) could complement and further increase the conceptual understanding of renewable energy implementation in an emerging economy.

### 5.2 Practical implications

By contrasting the supply and demand sides of renewable energy, the analysis sheds light on the differing or complementary views of each group concerning the investigated areas and signals important implications for practitioners. First, whereas the service-oriented, action-oriented and accommodating dimensions (Figure 1) highlight providers' perceived strengths in adding value, the perceived unfulfillment suggests the need for further attention and efforts in persuading the demand side of embracing renewable energy solutions. Reinforcing this point, the analysis suggests that product/service inconsistencies perceived by the demand side might result in poor word-of-mouth promotion and feedback, thus, discouraging other businesses from considering or adopting those solutions.

To minimise these issues, businesses, industries, and public entities need to develop steps and initiatives to build and maintain a culture that nurtures trust and confidence in products and services. Despite empirical evidence revealing the weak nature of collaborative relationships among renewable energy firms (e.g. Christensen *et al.*, 2019), working together on improving consistency or educating potential users could strengthen the service culture and have implications for equipment sales, energy production, and minimisation of environmental impacts.

The supply side operators' recognised woes (Figure 2) have key implications for several stakeholders, including educational institutions, to play a fundamental role, particularly in offering courses and degrees that could alleviate the industry's difficulties in finding quality and qualified personnel. Indeed, future industry professionals could be introduced to different types of renewable energy options available or with potential to be developed. These courses and degrees could be technical to illuminate scientific demands and knowledge, as well as

uncover legal aspects that are crucial to the progression of the renewable energy sector, as this study identified. Similarly, universities could provide practical knowledge, by exposing students to real-life company cases, industry scenarios, by providing access to internship or part-time job opportunities, or by organising training and workshops at their own or at the companies' premises, including scientific, legal or practical aspects. These initiatives could contribute to enhancing companies' knowledge transfer and employee morale, potentially triggering their interest and commitment to learning and maximising their newly acquired knowledge and skills. Government institutions and representatives could meet with company leaders to learn more deeply about their predicaments in fulfilling the potential of renewable energy. Complementing these implications, the identified dimensions from the demand side participants (Figure 2) underline priorities and their perceived significance moving forward, with implications from addressing suppliers' perceived challenges to further develop the renewable energy industry in Vietnam.

These implications extend to the analysis of Figure 3. In fact, to render the renewable energy industry more competitive, respond to challenges (supply side) and be more useful (demand side), company employees and leaders must commit to continuing their journey of building knowledge, expertise, and adaptive skills associated with this industry.

Finally, there are policy implications, such as the need for renewable energy stakeholders to share concerns and insights as ways to move forward. While this study emphasised the value of juxtaposing supply and demand stakeholders, the evidence from participants' experiences, and recent academic research (e.g. Ngoc *et al.*, 2025; Tham *et al.*, 2025) highlights significant burdens in current renewable energy policies. To mitigate these, much more dialogue and discussions are needed between policy-making bodies and all other affected stakeholders, including industry representatives (suppliers, manufacturers, firms buying/selling) and consumers (businesses, individual households, consumer groups). These conversations are vital for government representatives to understand the challenges faced by industry and consumer groups, and for these to facilitate or even trigger swifter policies that are also more transparent, and more conducive to building trust, predictability and certainty.

## 6. Conclusion

This study made two distinctive contributions. First, it empirically investigated various key themes associated with renewable energy implementation based on the experiences of 24 leaders involved in the supply and demand sides of this industry. This research angle is rarely examined in contemporary research, particularly in the context of companies operating in emerging economies. Moreover, the study focuses on companies operating in the emerging economy of Vietnam, whose economic growth is exerting significant pressure on its energy supplies (Minh and Van, 2023). Given the gradual depletion of its energy sources (Lan *et al.*, 2023), alternative forms are under consideration and trial (e.g. Nong *et al.*, 2020a; Yu *et al.*, 2022). From the supply side, the importance of adding value to renewable energy products and services on the following themes, challenges in doing so, and key resources needed by companies to continue their value-adding journey were examined. From the demand side, the study enquired how users experience added value, how they perceive value-for-money, and how they experience added value, and how their companies' renewable energy experience could be more fulfilling. The study considered the conceptual underpinnings of the DOIT (e.g. Ozaki, 2011; Rogers, 2003; Silk *et al.*, 2014).

The data analysis based on semi-structured interviews uncovered 21 dimensions across the study's various themes and resulted in a theoretical framework (Figure 4). Similarly, the dimensions led to crucial theoretical and practical implications and were enriched through their juxtaposing. For instance, Figure 2 ascertained suppliers' challenges in delivering added value; however, part of their challenges represent areas of significance and need to be expected by the demand side. Thus, the study's implications are multifaceted and include the coordination between renewable energy stakeholders beyond suppliers and consumers to

include educational institutions or government bodies. Conceptually, the 21 dimensions contributed to the proposal of a theoretical framework (Figure 4).

### 6.1 Limitations and future research

Despite its novelty and value, the study presents several limitations. First, the study only focuses on Vietnamese companies and the findings, therefore, may not apply to other socioeconomic or cultural settings. Future research could include companies in other nations to afford comparative analysis, with implications for the further understanding of this study's foci and theory development. Second, the study was conducted in 2022 and only once; thus, it lacks a longitudinal approach, which could identify or illuminate developments at a company or industry level. Future studies could fill this gap by establishing relationships with the subjects and engaging in yearly dialogue to ascertain the extent of any developments from suppliers and consumers.

Third, the study is limited to only 24 companies, 12 from the supply and 12 from the demand side. This limitation prevented conducting more in-depth analyses, including statistical analyses to compare or identify differences in the responses of participants. Future studies could, therefore, broaden the participant pool and seek more responses. Finally, the discussed dimensions and proposed framework were developed in this research based on the findings and analysis; hence, they lack rigorous assessment from subsequent research.

### Author contribution

Oanh Thi Kim Vu. Research interests include entrepreneurship, international business, SMEs, tourism, and hospitality.

Abel Duarte Alonso (Corresponding author). Research interests include international business, hospitality, tourism, micro, small and medium enterprises, family enterprises, innovation, and wine entrepreneurship.

Trung Quang Nguyen. Research interests include international business, economics of sustainable development, and smart transformation management.

Thanh Duc Tran. Research interests include tourism, hospitality, community-based tourism, female entrepreneurship, and local entrepreneurship.

Chuyen Nguyen. Research interests include international business, cross-cultural management, and strategy-as-practice.

Nhan H. Nguyen. Research interests include plastic pollution, zero waste, circular economy, sustainability, small businesses, and community development.

Luong Ngoc Tran. Research interests include travel, hospitality, gastronomy, community-based tourism, culture, and local entrepreneurship.

Nhu T.H. Do. Research interests include entrepreneurship, innovation management, digital transformation, education, education management, and SDGs.

Gavin John Nicholson. Research interests include organisational behaviour, family business, Industry 4.0 and digitalisation.

Seamus O'Brien. Research interests include SMEs in the economy, the economic impact of small businesses, and adaptation and resilience of micro, small and medium-sized enterprises.

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**Corresponding author**

Abel Duarte Alonso can be contacted at: [aronso5@gmail.com](mailto:aronso5@gmail.com)