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Model of Green Entrepreneur Capability, Work Time Flexibility, and Green Innovation in Creative MSME Development in Sidoarjo Regency

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A R T I C L E I N F O

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A B S T R A C T

This study analyzes the role of green entrepreneurial capabilities, flexible working hours, and green innovation in the development of creative Micro, Small, and Medium Enterprises (MSMEs) in Sidoarjo. The core problem of the study revolves around the urgent need for sustainable business transformation amidst global environmental challenges, recognizing the important role of MSMEs, although the level of understanding and implementation of green entrepreneurship in Sidoarjo varies. Using a qualitative methodology with a phenomenological approach, this study aims to explore the deep meanings and perspectives of 11 informants from creative MSMEs, the Sidoarjo Creative MSME Association, and the Sidoarjo Cooperative and MSME Service. Informants were carefully selected through purposive sampling. Data collection involved in-depth interviews, then analyzed using NVivo 15 Plus through data reduction, display, and verification. Triangulation was used to ensure the credibility of the data. The research findings show that green entrepreneurial capabilities significantly increase the competitiveness and sustainability of MSMEs by fostering awareness of environmental sustainability as a business strategy that creates value. Notable examples include the biofloc system in catfish farming and waste processing into new products in the handicraft sector.

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are a type of business owned by a specific entity or the private sector. The establishment of an MSME is subject to requirements determined by the stages of the MSME establishment process. MSMEs are one option to help reduce the impact on the Indonesian economic sector (Ayu et al. 2020). Indonesian MSMEs currently use the eco-business concept. The eco-business concept is a combination of business objectives and space. Literally, it can also be referred to as an entrepreneur who has local wisdom in running his business or can also be called an eco-businessman. Traditionally, the main goal of locally knowledgeable business leaders is to make their companies more environmentally friendly (green companies), from the raw materials used, the manufacturing process to the mining waste, which of course requires a lot of time and effort. Continuously maintaining the industry, developing and remaining unchanged to maintain the sustainability of living space in a sustainable manner.

Green economic design is now widely used in various economic activities. This also applies to companies striving to produce environmentally friendly products. The area effect is a result of increased plant activity. Over the past few decades, improvement policies have been implemented to address areas such as accidents. As part of protecting life on our planet, we need to implement a protective approach to environmental pollution. Innovation in environmentally friendly products is one of the keys to enabling this industry to continue to grow and produce better quality products. Green innovation is explained as the result of the interaction between innovation and the philosophy of sustainability (Sezen & Çankaya, 2013). The MSME sector is often understood as a crucial development sector in Indonesia, as the majority of economic activity occurs in the MSME sector. MSMEs participate significantly in economic development, including absorbing business power, developing the local economy, and increasing exports (Amri, 2020; Thaha, 2020).

Sidoarjo City's MSMEs are diverse, spanning the beauty, fashion, food, beverage, and handicraft sectors. According to data from the Cooperatives and MSMEs Office, of the 70,000 MSMEs, only 30% are listed online. Fashion and beauty factories are among the many micro-enterprises with significant potential for relocation or the establishment of environmentally friendly businesses. Attention to this area is also in the interest of the eco-friendly entrepreneurs who run these businesses, which is crucial in their product production, which will certainly minimize damage to the existing area, both in waste management and the raw materials used for production. Whatever the Sidoarjo Regency Government hopes for truly stems from a sincere intention and commitment to maximizing and developing MSMEs in Sidoarjo. Furthermore, the existence of MSMEs is crucial for Sidoarjo Regency because the Regency's economic structure relies on the industrial, trade, and MSME sectors (Sidoarjo Government, 2021).

Although not one of them in increasing the development of MSMEs in Sidoarjo, innovation in marketing and capital is the main thing that must be the main solution for business actors. MSMEs have problems that do not have market access and low bargaining power because they are too small in addition to the

low quality of human resources which causes business management to be weak (Abeng, 2015: 23). According to Mujanah, S., Urohman, T., & Ridwan, MS (2024) shows that competent human resources and community participation for management that supports economic improvement and environmental sustainability, then Murtadlo, K. (2018) the results of this study show that entrepreneurial competence influences the performance of MSMEs and entrepreneurial competence influences competitive advantage. However, other facts were also found that difficulties in understanding and practicing so that they can have quality abilities, not only occur during the online learning process or external factors. This causes a gap between the research that has been done and the facts in the field.

Green innovation has become a hot topic in recent years as it offers solutions to global warming and other environmental issues that continue to severely impact humanity (Miao et al., 2017). Green innovation has become strategically important over time. Green innovation focuses on mitigating or reducing environmental damage caused by a company's business activities. Green innovation creates tremendous value for both companies and consumers. Companies can absorb the costs of investing in the environment because they provide customer satisfaction by developing and marketing new environmentally friendly products, while consumers accept environmentally friendly products because they purchase in high volumes (Burki & Dahlstrom, 2017).

Business models in the management of MSMEs pioneered by entrepreneurs can also be considered government assets due to their contribution to the community economy and unemployment reduction. A business model is a narrative and calculative tool that allows entrepreneurs to explore markets and play a performative role by contributing to the development of techno-economic networks of innovation (Doganova & Eyquem-Renault, 2009). Competitive advantage is a crucial aspect that ensures business sustainability and competitiveness. Innovative ideas play a significant role in business success (Shanker et al., 2017). Entrepreneurs must also face various risks inherent in business. The principle is that the greater the risk, the greater the potential profit, and vice versa. Risks in entrepreneurship include raw materials, human resources, and finances (Juliana, 2019). Therefore, it is important to minimize these risks to prevent business failure. Innovation and creativity are key factors in entrepreneurial success. Competitive advantage is a crucial aspect that ensures business sustainability and competitiveness. Innovative ideas play a significant role in business success (Shanker et al., 2017). Putra & Utama (2022) showed that green entrepreneurial orientation has a positive effect on green innovation, while green innovation has a positive effect on SME environmental performance and economic performance. Auliana & Alhazami (2023) demonstrated a relationship between environmental performance, green innovation, and the competitive advantage of SMEs. Witriaryani et al. (2022) showed that Work Time Flexibility affect performance.

Work Time Flexibility is a compressed working time discussed previously giving employees time off during normal working hours, but they still follow

regular and predetermined hours on the days when they work and the main advantage of this approach is that workers can arrange their workdays to suit their personal needs (Griffin, 2013). Listyani & Suryawirawan (2023) showed that flexible work affects satisfaction and performance. Based on the description of the problem, the focus of this study is how the green entrepreneur capability model supports the development of creative MSMEs in Sidoarjo, how the work time flexibility strategy supports the development of creative MSMEs in Sidoarjo, and how the green innovation strategy supports the development of creative MSMEs in Sidoarjo.

LITERATURE REVIEW

Green Entrepreneur Capability

Green Entrepreneurship is a form of entrepreneurship with an environmentally friendly commitment. Green Entrepreneurship originates from a combination of entrepreneurial characteristics, namely innovation, business ideas, ecological, and social (Gevrenova, 2015), then developed into a new type of entrepreneurship with a commitment to building businesses and preserving the environment. Environmentally friendly businesses have a positive impact on the environment and help improve the lives of people both now and in the future, as well as supporting economic growth. Green Entrepreneur Capability is an entrepreneur who is able to see new opportunities in the market and utilize their innovative ideas to address various environmental problems. Green Entrepreneurship is a type of entrepreneurship that focuses on creating sustainable, environmentally friendly, and environmentally conscious businesses. The indicators used to measure Green Entrepreneur Capability (Hendro, 2021: 28) in this paper are: Ability to identify business opportunities, Ability to think creatively, Ability to think strategically, Ability to take risks, and Ability to innovate.

Work Time Flexibility

Work Time Flexibility is a flexible work arrangement that means choosing where and when to work, whether formal or informal, which facilitates employees in terms of policies on how long, when and where employees work (Kezia et al., 2014). According to Griffin (2013: 102), Work Time Flexibility is the compressed workweek discussed earlier gives employees time off during normal working hours, but they still follow regular, predetermined hours on the days they work. The main advantage of this approach is that workers can organize their workdays to suit their personal needs. For example, someone who needs to visit a doctor in the afternoon can start work early in the morning. Someone who stays up late one night can start work the next day at noon. According to Robbins (2021: 218), flexible work schedules are a timetable that allows employees, within specific parameters, to decide when to go to work.

Green Innovation

According to Ar, IM (2012), green innovation is a strategy that considers the impacts that will arise on the environment and can improve economic performance through efficiency in the use of raw materials and energy, creating

new market share and having superior products in competitive advantages. Financial support plays an important role in promoting green technology innovation of companies with ESG ratings. Companies strive for excellent ESG ratings, which significantly attracts external attention and investment in financial institutions. According to Chen (2008) in the journal Vera Putri Fabiola (2022), green innovation aims to reduce the impact of environmental damage, which will be responsive to the environment or with the aim of increasing consumers with the company's environmental efficiency.

METHODOLOGY

Within the framework of this research, the author adopted a qualitative approach with a case study design. The case study design was chosen because it allows for in-depth exploration of one or more bounded cases, such as individuals, groups, organizations, or events. Creswell (2008)explains that a case study is an inquiry design in which the researcher develops an in-depth analysis of a case or cases, usually over a period of time, to gain a detailed understanding of the complexities involved. This approach is particularly relevant for research that seeks to explore why and how a phenomenon occurs in a real-world context, rather than simply what happens.

This study examines the Green Entrepreneur Capability, Work Time Flexibility, and Green Innovation Models in the Development of Creative MSMEs in Sidoarjo Regency. The research subjects will focus on the owners or managers of creative MSMEs operating in Sidoarjo Regency. The focus of the research will highlight three fundamental aspects inherent in these business actors. First, Green Entrepreneur Capability, which is a set of mindsets, values, knowledge, and skills possessed by an entrepreneur to run a business that is in line with the principles of environmental sustainability. Second, Work Time Flexibility, which is the freedom and autonomy in managing the rhythm and workflow, a characteristic that is often the soul of the creative industry to grow original ideas. Third, Green Innovation, which is a real manifestation of the two previous aspects, in the form of new products, services, processes, or business models that are not only creative but also ecologically responsible.

The data collection technique used is the interview technique. The data analysis technique in this study uses a thematic analysis approach that is extensively assisted by NVivo 15 software. The thematic analysis approach was chosen because of its ability to systematically identify, analyze, and report patterns (themes) in qualitative data, which is essential for understanding the experiences, perspectives, and practices of informants in depth. The use of NVivo 15 aims to increase efficiency, accuracy, and transparency in data management, coding, and exploration of complex relationships between concepts.

RESEARCH RESULT AND DISCUSSION

Model Green Entrepreneur Capability in Supporting the Development of Creative MSMEs in Sidoarjo Regency

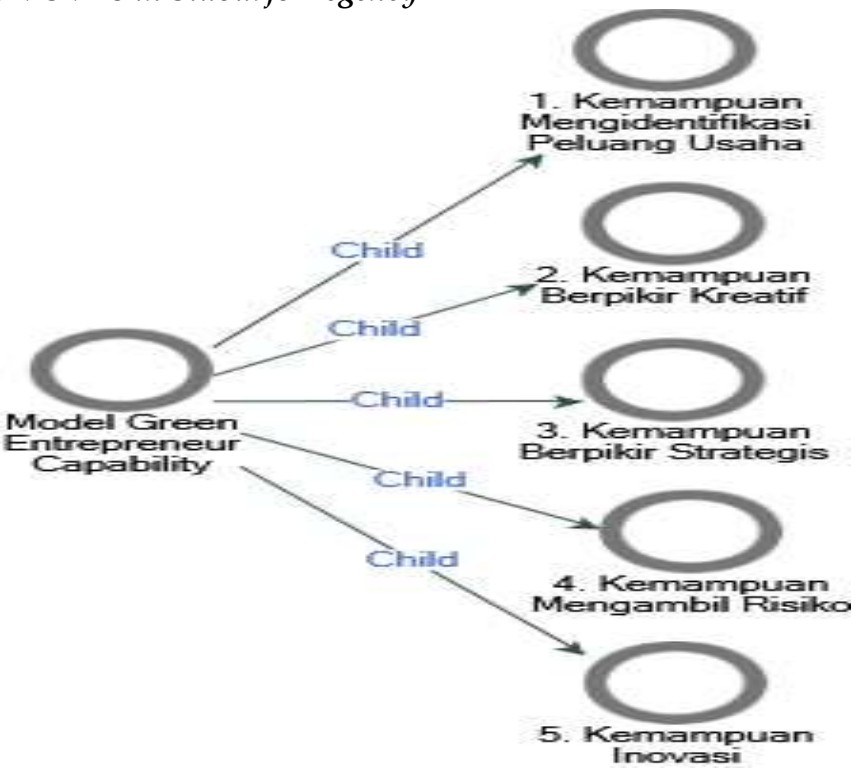

Figure 1. Green Entrepreneur Capability Project Map Model
Source: Nvivo Analysis Results 15, 2025

The green entrepreneurial capability model consists of five main dimensions, namely the ability to identify business opportunities, think creatively, think strategically, take risks, and innovate, all of which are supported by awareness and basic knowledge about green entrepreneurship Interview data shows that MSME actors in Sidoarjo have a strong understanding of green entrepreneurship, although expressed in various ways, ranging from the idealistic definition of a consultant that includes the triple bottom line, to the practical understanding of catfish farmers, craftsmen, and F&B entrepreneurs who emphasize sustainability and environmental friendliness. This internalized environmental knowledge, as demonstrated by a batik entrepreneur who switched to electric stoves, becomes a driver of innovative actions and acts as a cognitive foundation or moral compass for entrepreneurs, in line with the concept of sustainability orientation. Without this knowledge foundation, the other five capabilities will lose their direction and green purpose the ability to identify business opportunities.

1) Creative Thinking Ability and Innovation Ability
   The ability to identify opportunities is inherently linked to Creative Thinking and Innovation, two capabilities that in practice often overlap and feed back into each other. If creative thinking is the process of generating new ideas, then innovation is the successful implementation of those ideas. The sources of creativity among Sidoarjo's MSMEs are highly pragmatic and rooted in

reality. A batik entrepreneur's expression, ilmu kepepet (a "peaceful science"), is a highly authentic description of bricolage, a concept in entrepreneurship studies where entrepreneurs create solutions from whatever resources are available, often under pressure. A shortage of oil stoves prompted her to think creatively and find a solution using electric stoves. This demonstrates that green creativity doesn't always stem from grand visions, but often from the pressing need to survive more efficiently and environmentally. Other sources of creativity, as expressed by a food entrepreneur, come from fellow MSMEs, training, and YouTube, highlighting the importance of social learning and access to digital information as idea triggers. This creativity then culminates in tangible innovation. The NVivo model aptly positions innovation as a vital output capability. Innovations occurring in Sidoarjo Regency can be classified into several types:

a) Process Innovation: A prominent example is the implementation of the Biofloc System by a catfish farmer. This was not just a minor change, but rather the adoption of a technology that fundamentally changed the way he produced fish, reducing water pollution, lowering feed costs by recycling waste into feed, and ultimately increasing overall efficiency.
b) Product Innovation: This is most evident in the artisans' utilization of waste into new products. Furthermore, the diversification of derivative products such as catfish floss, catfish fillets, and frozen packaging are product innovations aimed at maximizing the value of harvested produce and reducing potential food waste. The Schumpeterian theory of innovation, which views entrepreneurs as agents of creative destruction, finds resonance here, albeit on a micro scale. These MSMEs are disrupting old, less efficient and more polluting methods, creating new, more sustainable processes and products.

2) Strategic Thinking Skills

The leap from opportunity identification and creativity to successful innovation doesn't happen randomly; it's mediated by Strategic Thinking Skills. These skills involve seeing the big picture, formulating long-term goals, and consciously allocating resources to achieve a sustainable competitive advantage. Entrepreneurs who think strategically don't simply react to problems but proactively plan the future of their businesses. A statement from an F&B entrepreneur who saw green entrepreneurship. As a concept that implements environmental stewardship while creating economic growth, it is at the heart of strategic thinking. He does not view green practices as a cost center, but rather as an integral part of the value creation model. This view aligns with the Sustainable Business Model framework, which emphasizes the simultaneous creation of value for customers, the environment, and society. Time flexibility, discussed extensively in the interviews, is also an element of strategic thinking. MSMEs view flexibility not simply as a lifestyle but as a strategic tool that enables the implementation of complex innovations, such as the biofloc system that requires intensive monitoring. This adaptability is at the heart of strategic thinking in a volatile business environment. Entrepreneurs use flexibility to experiment, learn, and

pivot when needed a dynamic capability crucial for implementation green innovation which is often full of uncertainty.

3) Risk Taking Ability
   Every strategy and innovation contain an element of uncertainty, which brings us to the final but equally important capability: Risk-Taking. Entrepreneurship is fundamentally about managing risk, and green entrepreneurship. Adding a new layer of risk. A catfish farmer faces market risk: one challenge is the trust of sales partners in their processed products. Will consumers and distributors accept processed products from small-scale producers implementing new systems? A batik entrepreneur, by switching to electric stoves and a new dyeing system, faces technological and financial risks. Will the initial investment pay off? Will the technology perform as expected? The entrepreneurs in this study are not blind risk-takers, but calculated risk-takers. They take risks based on the strategic belief that the long-term benefits of green practices, such as efficiency, product differentiation, and a positive image, will outweigh the short-term costs and uncertainties. However, this risk-taking capacity is often limited by external constraints, particularly funding for business development and financial factors. This underscores that individual risk-taking capabilities need to be supported by a supportive financial ecosystem.

An analysis of these five individual capabilities would be incomplete without considering the ecosystem context in which they operate. Interviews indicate supportive efforts from the government and community. The MSME Naik Kelas (Upgrade MSME) program, zero-waste socialization, and exhibition facilitation are important forms of institutional support. The collaboration between MSME associations and waste banks is a shining example of grassroots synergy. However, the data also reveals a significant gap between the programs designed and the perceived support. Complaints about difficult access to capital, marketing, and especially a supervisory approach that is judgmental rather than directive are strong signals that the supporting ecosystem is not fully aligned with the needs of green entrepreneurs. Strong entrepreneurial capabilities can be hampered if they do not find fertile ground to grow. The government and supporting institutions need to shift from a uniform approach to more differentiated support that specifically addresses the challenges of implementation. Green innovation, such as assisting with the certification of environmentally friendly products, opening up access to premium markets, and providing funding schemes that understand the risk profile of sustainable innovation.

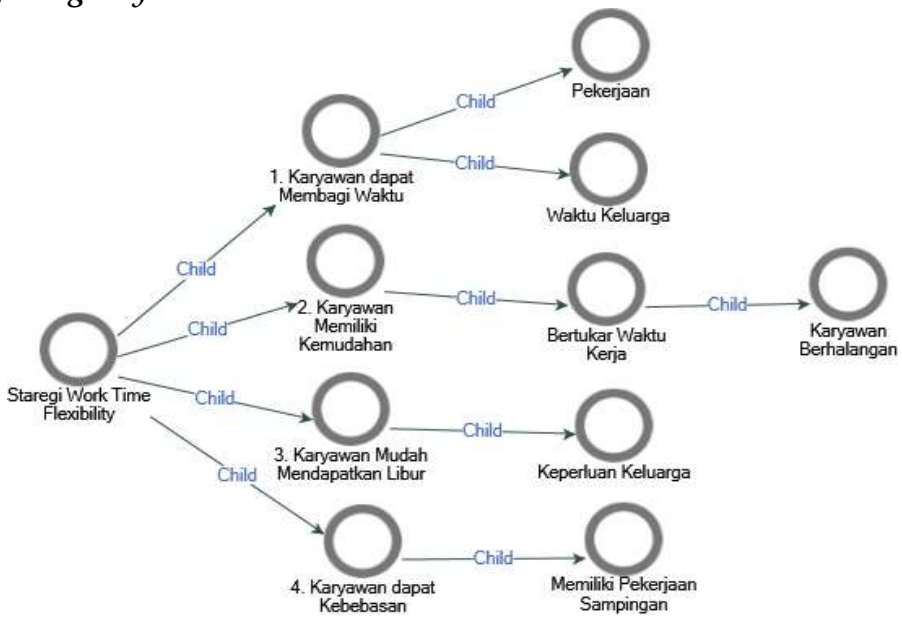

Figure 2. Strategy Work Time Flexibility Project Map
Source: Nvivo Analysis Results 15, 2025

The image above depicts the hierarchical structure of Work Time Flexibility, which consists of four main dimensions: (1) employees can manage their time, (2) employees have convenience, (3) employees can easily get time off, and (4) employees have freedom. Each dimension has derivative indicators that reflect real conditions in the field, such as the ability to manage time between work and family, swapping work schedules when absent, the ease of taking time off for personal needs, and the freedom to carry out side jobs.

1) Employees can divide their time
   Addressing two crucial aspects of an individual's life: Work and Family Time. This visual finding directly confirms the central hypothesis in much of the literature on work-life balance. Work-time flexibility inherently gives individuals the autonomy to allocate their time resources more proportionally between professional demands and personal responsibilities. This was articulated very clearly in interviews. Mr. Tejo Sunaryo, an entrepreneur and batik trainer, enthusiastically stated that time flexibility makes work more enjoyable and improves work-life balance. This statement was reinforced by Ms. Eti Soviati, a beverage entrepreneur, who experienced a direct impact on both productivity and work-life balance. In the context of MSMEs, where the boundaries between owner and employee are often blurred, and personal life is closely integrated with the business, this ability to manage time is vital. This is not simply a benefit, but a survival mechanism that prevents burnout and maintains the mental health of entrepreneurs and their teams. Research by Hill et al. (2008) found that flexibility, particularly control over work time and place, significantly reduces work-family conflict, which in turn increases job satisfaction and organizational commitment. The

findings in Sidoarjo Regency show that the same principles apply strongly, and even more essentially, on an MSME scale.

2) Employees Have Convenience
Opening up an understanding of the practical and operational aspects of flexibility. This node branches into "Swapping Work Time," which is a direct solution when an employee is unavailable. This reflects the agility that is a key competitive advantage for MSMEs compared to large corporations. In small teams, the absence of one person can disrupt the entire workflow. The ability to swap schedules or cover for colleagues without rigid bureaucracy is a necessity. Interview narratives enrich these findings. Ms. Sri Asih, a craft entrepreneur, and Mr. M. Roni Yudianto from the leather craft industry both highlighted the use of WhatsApp groups as coordination hubs. This digital platform enables instant information exchange, facilitates schedule negotiations, and ensures that work continues even when teams are not physically located. This is a form of flexibility driven by technology and trust. This concept aligns with the Dynamic Capabilities theory introduced by Teece, Pisano, and Shuen (1997), which states that a company's ability to integrate, build, and reconfigure internal and external competencies to address a rapidly changing environment is key to success. The ease of exchanging working hours is a micro manifestation of these dynamic capabilities at the operational level.
3) Employees Can Easily Get Holidays
Focusing on Family Needs highlights the humanistic aspect of flexibility. In MSMEs, the relationship between the owner and the team is often more personal and familial. The ability to take time off or permit for urgent matters such as caring for a sick family member or attending a child's school event is considered normal. This kind of flexibility builds loyalty and a sense of belonging that is difficult to measure with conventional metrics. Mr. Ja'far Shodiq, the owner of a used car showroom, explicitly stated that flexibility allows him to schedule customer meetings according to his own needs, which implicitly also applies to his team in balancing work and personal life. This creates a supportive work environment, which, according to research by Kossek, Lewis, & Hammer (2010), is a strong predictor of employee health and well-being, ultimately positively impacting performance.
4) Employees get freedom
This interesting finding points to Having a Side Job. This finding is highly relevant to the current context of the creative economy and gig economy. Unlike traditional corporate views that might view side jobs as a form of disloyalty, flexible MSMEs are able to accommodate this reality. For many workers in the creative sector, income may not come from a single source. By providing freedom and autonomy, MSMEs can attract and retain talent with diverse skills and income sources. Mr. Fery Hidayat, the founder of an HR training institute, emphasized that flexibility is essential for the emergence of other business ideas, which indirectly also applies to the personal development and portfolio of his employees. This freedom fosters an internal

entrepreneurial spirit (intrapreneurship) and a greater sense of responsibility, as employees are treated as autonomous partners, not simply subordinates.

Work Time Flexibility very strategic for MSMEs in Sidoarjo, proven to be a catalyst for innovation, especially green innovation, because it provides "mental space" for MSMEs to think outside the box, as demonstrated by Nizar Umarullah's biofloc system innovation, Ibu Sri Asih's sewing waste experiment, and Mr. Tejo Sunaryo's batik electric stove. This flexibility also forms the foundation for adaptability in a fluctuating market, enabling MSMEs to respond quickly to changes in supply and demand and government programs such as the MSME Naik Kelas (Upgrading MSMEs). Conceptually, Work Time Flexibility This is in line with Griffin's (2013) theory, which explains how to adjust work schedules to suit personal needs without disrupting performance. Previous research by Witriaryani et al. 2022 also supports the positive impact of work flexibility on satisfaction, productivity, and performance, which aligns with field findings that MSMEs in Sidoarjo utilize flexibility for work-life balance, work motivation, innovation, and side activities. Therefore, the strategy Work Time Flexibility become an important part of the transformation of work culture in the development of adaptive and sustainable creative MSMEs.

Green Innovation Strategy to Support the Development of Creative MSMEs in Sidoarjo Regency

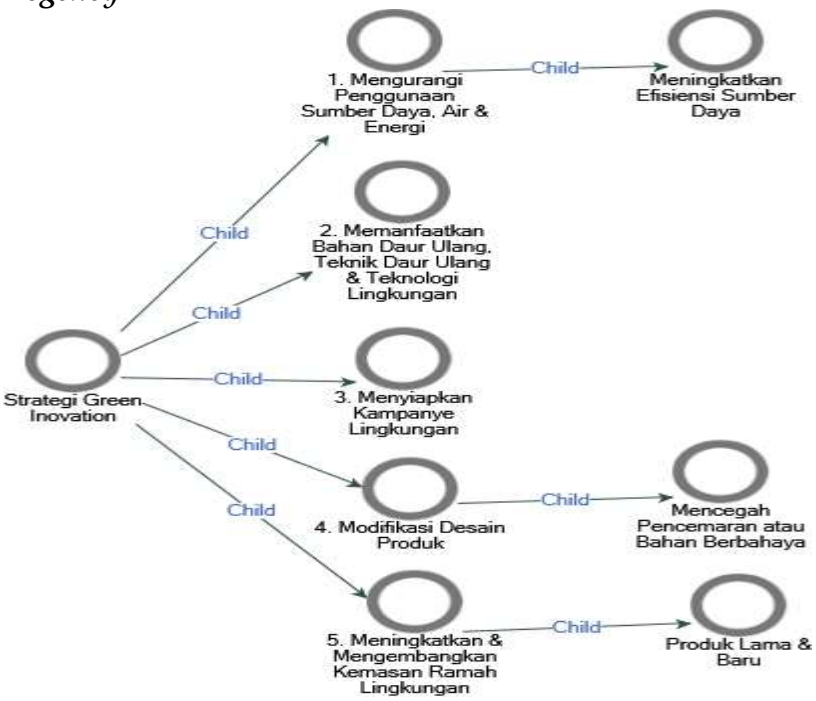

Figure 3. Green Innovation Strategy Project Map
Source: Nvivo Analysis Results 15, 2025

The Project Map generated from NVivo data processing effectively maps the Green Innovation Strategy into five main branches. These five branches represent concrete actions taken by creative MSMEs in Sidoarjo Regency. The following analysis will follow this structure to ensure the discussion aligns with the data findings.

1) Reducing Resource, Water & Energy Usage → Increasing Resource Efficiency

This first strategy is at the heart of the eco-efficiency concept: creating more value with less environmental impact and resource use. Interview findings provide strong evidence for the implementation of this strategy in Sidoarjo Regency. The most transformative example comes from Mr. Tejo Sunaryo, a batik entrepreneur, who innovated his process by replacing kerosene stoves with electric stoves. This decision, born out of a desperate need due to kerosene shortages, directly reduced reliance on fossil fuels and increased energy efficiency in the batik process. This action is a concrete manifestation of green process innovation that not only reduces the carbon footprint but also, as Mr. Tejo explained, impacts the income of the surrounding community.

In a different sector, Mr. Nizar Umarullah, a catfish farmer, implemented the Biofloc System. This is a technological innovation highly relevant to resource efficiency. The Biofloc system significantly reduces the need for water replacement a crucial resource by creating a mini-ecosystem within the pond that recycles nutrients. This reduces nitrogen waste released into the environment and optimizes feed use. These two examples, from batik and catfish farming, demonstrate how resource efficiency principles are creatively applied to their respective industry contexts. Research by Albort-Morant et al. (2016) emphasizes that green process innovation is often the first step companies take due to its dual benefits: reduced operational costs and improved environmental image. Findings in Sidoarjo Regency confirm this, where resource efficiency is a key pillar of the company's strategy. green innovation the easiest to measure and the benefits are felt directly by MSME actors.

2) Utilizing Recycled Materials, Recycling Techniques & Environmental Technologies

This second pillar touches the heart of the circular economy, where waste is no longer viewed as residue, but as a new resource. This practice is particularly prominent among Sidoarjo's creative MSMEs, particularly in the craft sector, which inherently produces waste materials. Ms. Sri Asih, a craft entrepreneur, consistently uses sewing waste to create new products. A similar practice is adopted by Mr. M. Roni Yudianto, a leather craft entrepreneur, who also processes production waste into new products. This innovation, often referred to as upcycling, is the most fundamental form of green product innovation. It not only reduces the volume of waste ending up in landfills but also creates new revenue streams from materials previously considered worthless.

Interestingly, this innovation is not limited to internal waste reuse. There is synergy between MSMEs, as demonstrated by Mr. Haris Sucianto, a molasses agent, who created a "Good Bacteria Feed" to Decompose Both Organic and Non-Organic Waste. This product serves as an environmental technology that can be adopted by other MSMEs to manage their waste more effectively. This demonstrates the formation of a mini-ecosystem where one MSME provides green solutions for another. This concept aligns with the idea

of industrial symbiosis, where waste from one industrial process becomes raw material for another. Although on a micro scale, this practice found in Sidoarjo Regency reflects the same principle and shows great potential for further development. This waste utilization practice is a clear demonstration of the creativity and resilience of MSMEs, which are able to transform environmental challenges into economic opportunities.

3) Preparing an Environmental Campaign

This strategy component, at first glance, may seem less prominent in the interview data than product or process innovation. No interviewees explicitly mentioned launching environmental campaigns in the form of advertising or formal public relations. However, if interpreted more broadly as an effort to communicate and instill green values, traces of it can be found. Mr. Fery Hidayat, the founder of an HR training service, stated that instilling environmental awareness is part of the value he offers his clients. This is a form of campaign or education that targets the broader business ecosystem.

Furthermore, the entrepreneurs' actions themselves can be seen as a form of campaigning through concrete examples. When Mr. Tejo Sunaryo uses ecoprint or Ms. Sri Asih sells recycled products, these products inherently carry an environmental message. Customers who purchase and use these products indirectly participate in a sustainability narrative. The concept of green marketing often focuses on how companies communicate their green credentials to consumers. According to Polonsky (2011), authenticity is key in green marketing. In the context of Sidoarjo's MSMEs, their campaigns may not take the form of slogans, but rather manifest in the authenticity of their products and processes. However, these findings also indicate areas for development. MSMEs can be more proactive in telling the stories behind their products. green innovation them (e.g., through social media or packaging) to build a stronger brand image and educate the market, thereby turning internal practices into powerful marketing assets.

4) Product Design Modification → Prevent Pollution or Hazardous Materials

This strategy focuses on the most upstream stage of the product life cycle, namely design. By modifying designs, MSMEs can proactively prevent pollution. This is the essence of the cleaner production approach. Interview data provides a powerful example of this strategy, particularly from the batik industry. Mr. Tejo Sunaryo went beyond energy source replacement; he also innovated with an environmentally friendly batik dyeing system and the use of ecoprinting. Ecoprinting is a technique that uses natural dyes from leaves and flowers, drastically reducing or even eliminating the use of synthetic dyes, which often contain harmful chemicals and pollute water.

This design modification is a form green innovation. This is because it changes the basic composition of the product itself to eliminate the source of pollution. This goes beyond simply managing waste at the end of the process (end-of-pipe treatment); it is preventing pollution at its root. Research by Tariq et al. (2017) shows that green product innovations, such as replacing hazardous raw materials, have a significant positive impact on environmental performance and corporate image. Mr. Tejo's decision to switch to ecoprinting

is a perfect example of how creative MSMEs can lead the way in adopting more sustainable practices, transforming the traditional aesthetics of batik into a medium for ecological expression.

5) Improving & Developing Eco-Friendly Packaging → Old & New Products

In an era of growing awareness of the plastic waste problem, packaging has become a major focus. This fifth strategy demonstrates that Sidoarjo's MSMEs are aware of this issue. Mr. Darmawan Abbas, an F&B entrepreneur, candidly admits that his green product innovation is still in the research stage, but he has taken concrete steps in the process by using recyclable packaging. This action, while seemingly simple, has a significant impact. It demonstrates an understanding that a producer's responsibility does not end with the sale of a product, but extends to the post-consumer phase.

This step transforms existing products by giving them new, more environmentally friendly attributes through their packaging. It also opens up opportunities for new products that may be specifically designed with minimalist or reusable packaging. The decision to use recycled packaging is a direct response to market demands and increasingly stringent regulations. According to WRAP (2020), a UK-based sustainability nonprofit, smart packaging design can reduce waste, conserve resources, and increase recycling. This initiative by F&B entrepreneurs in Sidoarjo Regency, although still small-scale, represents an important step toward a more circular and responsible business model.

This model is conceptually aligned with Xie et al.'s (2019) Green Innovation theory, which measures green innovation based on processes and products, particularly those that contribute to resource efficiency and reduced environmental impact. This is further supported by Ar's (2012) assertion that green innovation strategygreen innovationcan improve economic performance through energy efficiency, new market creation, and sustainable competitive advantage. Thus, this visualization illustrates a holistic approach to implementing green innovation, starting from the production process to external communications (environmental campaigns). This effort demonstrates how green innovation can be integrated into the MSME value chain to improve business sustainability and competitiveness in the green economy era.

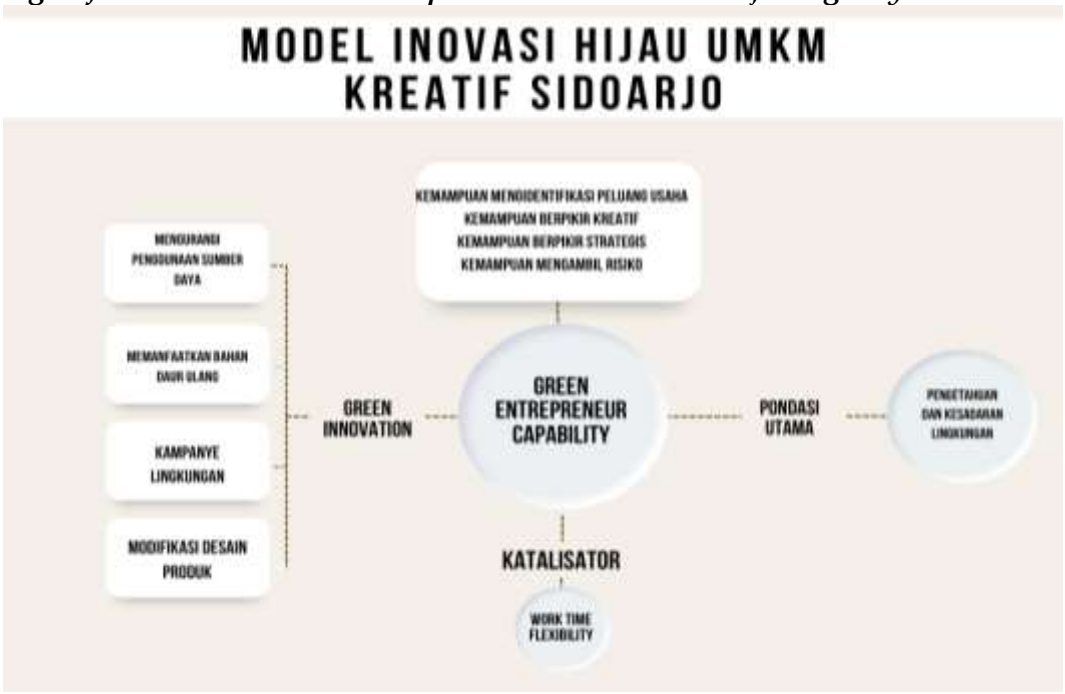

Figure 4 Model design
Source: Author's Analysis Results, 2025

Model green innovation Sidoarjo Creative MSMEs is a comprehensive framework designed to foster the sustainable growth of MSMEs in Sidoarjo. This model integrates environmental, operational, and managerial dimensions, focusing on how the dynamic interactions between components create a resilient and adaptive ecosystem. Essentially, this model starts with a foundation of deep environmental knowledge and awareness. This is a vital cognitive prerequisite; without a solid understanding of sustainability, green practices may be perceived as merely a burden. This awareness encompasses an understanding of the triple bottom line concept (profit, people, planet), shifting the paradigm from mere regulatory compliance to proactive initiatives to seize opportunities in the ever-expanding green market. This foundation serves as the foundation for the entire innovation system.

From this foundation of awareness emerges the Core Pillar: Green Entrepreneur Capability. This is the driving force of the model, comprising five interconnected dimensions. First, Green Alertness is the capacity to identify market gaps in environmental issues, such as converting waste into raw materials or responding to the need for environmentally friendly products. Second, Creative Thinking Capability drives entrepreneurs to generate new ideas, often arising from urgent needs for resource efficiency. Third, Innovation Capability is the concrete implementation of these creative ideas, transforming them into better and more sustainable products, processes, or services. Fourth, Strategic Thinking Capability involves a long-term view, integrating environmental aspects as an integral part of a sustainable value creation model. Finally, Risk Taking Capability acknowledges the inherent uncertainty in every business.

green innovation, but green entrepreneurs are calculated risk-takers who dare to take steps because of the belief in greater long-term benefits.

Next, the Catalyst: Work Time Flexibility acts as a crucial driver. While often viewed as an HR policy, in the context of MSMEs, it is a core strategic capability. Time flexibility enables MSMEs to manage their work-life balance, significantly reducing stress and burnout. This balance fuels productivity, creativity, and innovative capacity. Flexibility also provides the mental space necessary for research, experimentation, continuous learning, and networking, all of which are essential for development. Green innovation Without this flexibility, entrepreneurs may become bogged down in day-to-day operations. Flexibility also increases MSMEs' adaptability, enabling them to respond quickly to market dynamics or government programs, provided they are supported by discipline, thorough work planning, and digital and communication skills.

This model also details Concrete Strategies green innovation which is a concrete manifestation of capabilities supported by flexibility. This strategy covers five main areas: (1) Reducing Resource Use (Water, Energy) through process innovations such as biofloc systems or the use of electric stoves; (2) Utilizing Recycled Materials, Recycling Techniques & Environmental Technologies to encourage a circular economy; (3) Modifying Product Design to prevent pollution from upstream, for example the use of ecoprint coloring; (4) Improving & Developing Environmentally Friendly Packaging in response to the issue of plastic waste; and (5) Preparing Environmental Campaigns to communicate green values through products and business practices, building a strong brand image and educating the market.

Implementing this model will certainly face various obstacles. The most fundamental is capital/financial constraints. Green innovation Often requiring significant initial investment. Difficulty sourcing the right materials (especially sustainable raw materials) and marketing challenges for green products are also obstacles. Furthermore, the lack of effective external support from the government, research institutions, or communities, as well as potential regulatory and licensing constraints for new technologies, can hinder the pace of innovation. However, behind each of these obstacles lies the extraordinary effort and resilience of MSMEs. They use obstacles as a catalyst for innovation ("ilmu kepepet"), utilize their existing environmental knowledge, and even proactively create jobs as a social value-added. These efforts demonstrate that MSMEs are not passive, but rather adaptive and visionary in facing challenges.

All of these components form a synergy and positive feedback loop. Green Entrepreneur Capability is the foundation and main driver, producing green innovation as a concrete output. Work Time Flexibility serves as a catalyst, creating conducive conditions for capabilities to develop and innovation to be realized. Success green innovation A positive market response will, in turn, strengthen Green Entrepreneur Capability, build entrepreneurs' confidence, and encourage further exploration. This is a continuous cycle where each element strengthens the others, enabling MSMEs not only to survive but also to thrive dynamically and sustainably. This model offers a clear roadmap for the government and stakeholders to provide targeted support, building a bridge

between MSMEs' internal capabilities and a responsive supporting ecosystem. By understanding the interdependencies between these components, stakeholders' government, academics, communities, and MSMEs themselves can design more targeted and integrated interventions to optimize the potential of Sidoarjo's creative MSMEs, making them pioneers of economic development that integrates profit, planet, and people for a greener and more prosperous future.

CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis of research results, it can be concluded that;

1) The green entrepreneur capability model significantly increases the competitiveness and sustainability of creative MSMEs in Sidoarjo Regency by raising business awareness of the importance of environmental sustainability as part of their business strategy. The majority of MSMEs understand that green entrepreneurship Sustainability is not only about being environmentally friendly, but also about creating economic and social value through sustainable practices. This capability encourages wiser decision-making, creates jobs, and adds value to products and business image. The application of systems such as biofloc in catfish farming (Nizar Umarullah) and waste processing into new products in the handicraft sector (Sri Asih and M. Roni Yudianto) demonstrate how this capability is realized in the field.
2) Work Time Flexibility positively impacting the competitiveness and sustainability of creative MSMEs in Sidoarjo Regency by enabling entrepreneurs to adjust their work rhythms to market needs and personal circumstances without sacrificing productivity. This is evident in Darmawan Abbas's (F&B) ability to divide his business focus and Fery Hidayat's (HR training) ability to work from anywhere, both of which improve work-life balance and expand opportunities. Green innovation flexibility also helps MSMEs be more responsive to market dynamics and encourages innovation.
3) Green innovation proven to increase the competitiveness and sustainability of creative MSMEs in Sidoarjo Regency through various environmentally friendly product and process innovations. Examples include the use of a biofloc system by Nizar Umarullah, the replacement of kerosene stoves with electric ones and the use of ecoprint by Tejo Sunaryo, and the utilization of production waste into new products by Sri Asih and M. Roni Yudianto. These innovations not only aim to reduce negative environmental impacts but also create added economic value and open up new market opportunities. The market response tends to be positive towards the product green innovation indicates that green innovation can be a competitive advantage for MSMEs.
4) Model Green innovation Sidoarjo Creative MSMEs emphasizes that sustainable MSME development requires a holistic approach. This model integrates Green Entrepreneur Capability as a key driver for identifying and capturing environmental opportunities. Work Time Flexibility serves as an important catalyst that supports creativity and adaptation, enabling green innovation This is realized in environmentally friendly products and processes. Despite facing obstacles such as capital and marketing, MSMEs in Sidoarjo demonstrate resilience and adaptive efforts. The success of this model depends on synergy between components and responsive ecosystem

support from the government and stakeholders. Thus, creative MSMEs will not only grow economically but also become the vanguard of sustainable development.

This study recommends;

1) General Recommendations for Improving the Competitiveness and Sustainability of Creative MSMEs in Sidoarjo Regency:
   a) Local governments, MSME associations, and other stakeholders need to create integrated programs and policies to support the development of green MSMEs. This includes aligning training programs, facilitating access to capital, and marketing support specifically targeting sustainability-oriented MSMEs.
   b) Building a conducive ecosystem for green MSMEs by expanding access to information on environmentally friendly raw materials, relevant technologies, and a network of environmental experts. Collaboration with research institutions and universities can also be facilitated for research and development. Green innovation which is relevant to the needs of local MSMEs.
   c) Although environmental awareness has increased, there is a need for standardization and deepening of concepts. green entrepreneurship through more intensive education. Training covers not only technical aspects of production but also business management, green product marketing, and the development of innovative ideas.
   d) The Sidoarjo Regency Government and MSMEs in Sidoarjo are strongly advised to adopt and implement the Model approach. Green innovation This Sidoarjo Creative MSME is to achieve sustainable and competitive growth in the future.

ADVANCED RESEARCH

Future research should explore the integration of digital technology into the green entrepreneurship model for MSMEs, particularly focusing on how digital platforms, AI, and IoT can enhance environmental performance and market competitiveness. While this study identified the foundational role of entrepreneurial capability, time flexibility, and green innovation in MSME development, the potential of digitalization as a transformative enabler remains underexplored. A mixed-methods approach combining quantitative modeling and digital ethnography could uncover how digital tools not only streamline operations but also strengthen eco-innovation processes, facilitate access to green financing, and enhance market penetration for sustainable products. Moreover, comparative studies across regions or sectors can assess the scalability of the Sidoarjo model in broader contexts, offering insight into how socio-cultural and policy environments mediate the digital-green entrepreneurial nexus.

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