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Green Entrepreneurship and the Circular Economy: A New Framework for Sustainable Business Development

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Abstract

This article examines green entrepreneurship and the circular economy as an integrated pathway for sustainable business development. It argues that growing environmental challenges, including resource depletion, waste generation, pollution, and inefficient production systems, can be transformed into entrepreneurial opportunities through innovation and sustainable business practices. The article explores how green entrepreneurship provides the entrepreneurial mechanism for identifying environmental opportunities, while circular economy principles provide a framework for reducing resource consumption, extending product lifecycles, recovering materials, and eliminating waste. Drawing on the Natural Resource-Based View, Stakeholder Theory, and Dynamic Capabilities Theory, the article develops a conceptual framework linking green opportunity recognition, green innovation, circular resource management, circular business-model innovation, stakeholder collaboration, sustainable value creation, and business resilience. The discussion demonstrates that green innovation serves as a critical bridge between environmental challenges and commercially viable circular solutions, while stakeholder collaboration, supportive institutions, finance, technology, and infrastructure create the enabling conditions for implementation. The article further identifies major barriers, including limited access to finance, technological constraints, inadequate infrastructure, fragmented supply chains, regulatory uncertainty, and consumer resistance. It argues that overcoming these barriers requires coordinated action among entrepreneurs, businesses, governments, financial institutions, consumers, and other stakeholders. The article concludes that integrating green entrepreneurship with circular economy principles can help enterprises create economic, environmental, and social value while strengthening long-term competitiveness and resilience. The proposed framework provides a practical conceptual foundation for advancing sustainable business development in emerging and developing economies.

Keywords: *Green Entrepreneurship; Circular Economy; Green Innovation; Sustainable Business Development; Circular Business Models; Resource Efficiency; Sustainable Value Creation.*

Introduction

The increasing pressure on natural resources, environmental systems, and global production structures has created an urgent need for businesses to reconsider how economic value is created and sustained. Conventional economic and business systems have largely operated through a linear model in which natural resources are extracted, transformed into products, consumed, and eventually discarded. Although this model has contributed significantly to industrialisation, employment creation, technological advancement, and economic growth, its continued dependence on intensive resource extraction and waste generation has created serious environmental consequences. Growing concerns surrounding climate change, resource depletion, pollution, biodiversity loss, and

waste accumulation have consequently strengthened the call for alternative approaches to business development that can reconcile economic prosperity with environmental sustainability. Bocken et al. (2016) argue that the transition from linear to circular economic systems requires significant changes in product design and business-model strategies, particularly in the way resources are used and value is created.

Green entrepreneurship has emerged as an important response to these environmental and economic challenges. Green entrepreneurship refers to entrepreneurial activities that identify and exploit opportunities associated with environmental problems while simultaneously creating economic and social value. Dean and McMullen (2007) explain that environmental degradation can create entrepreneurial opportunities when entrepreneurs identify ways of reducing market inefficiencies associated with environmental problems. From this perspective, environmental challenges are not viewed exclusively as constraints on business activity but can also serve as sources of innovation, new markets, employment, and enterprise development. Green entrepreneurs therefore occupy an increasingly important position in the transition toward more sustainable patterns of production and consumption because they combine entrepreneurial initiative with environmental responsibility.

The emergence of the circular economy has further expanded this transformation in contemporary business thinking. The circular economy challenges the traditional linear model by seeking to maintain the value and utility of products, components, and materials for as long as possible. Instead of designing economic activities around extraction, consumption, and disposal, circular approaches emphasise strategies such as reducing resource use, reusing products, repairing damaged goods, refurbishing components, remanufacturing products, recycling materials, and recovering valuable resources. Geissdoerfer et al. (2017) describe the circular economy as a regenerative system that seeks to minimise resource inputs, waste, emissions, and energy leakage through strategies that slow, close, and narrow material and energy loops. Similarly, Bocken et al. (2016) emphasise that circular business transformation requires organisations to rethink both product design and business models in order to facilitate the effective management of resource flows.

The relationship between green entrepreneurship and the circular economy is therefore becoming increasingly significant within the sustainable business development discourse. Green entrepreneurs can function as important agents of circular transformation because they are capable of recognising opportunities emerging from waste, resource inefficiency, environmental degradation, and changing societal expectations. Through innovation, entrepreneurs can develop enterprises based on waste recovery, renewable resources, sustainable packaging, product-life extension, repair services, remanufacturing, recycling, sharing systems, and product-service models. Circular entrepreneurship consequently extends the traditional understanding of entrepreneurship by incorporating environmental and social value into the process of opportunity identification, value creation, and value capture. Research on circular entrepreneurship indicates that entrepreneurial activity within the circular economy involves both the exploration and exploitation of opportunities while creating value for the broader ecological and social system in which the enterprise operates.

The growing importance of this relationship is also influenced by changing consumer expectations, technological advancement, environmental regulations, and increasing pressure on organisations to demonstrate responsible business practices. Consumers are becoming increasingly aware of the environmental consequences associated with the products and services they purchase, while governments and international institutions are placing greater emphasis on responsible production and consumption. Sustainable business models are therefore becoming increasingly important because they provide mechanisms through which firms can integrate environmental and social considerations into their core value propositions rather than treating sustainability as an external or peripheral activity. Boons and Lüdeke-Freund (2013) argue that business models for sustainable innovation must incorporate sustainability into the value proposition, value creation and delivery, and value capture processes of organisations.

Circularity also provides opportunities for businesses to create economic value without relying exclusively on increased consumption of virgin resources. Bocken et al. (2014) identify sustainable business-model approaches that can contribute to resource efficiency, encourage greater utilisation of existing products and materials, and create alternative forms of value creation. Such models include extending product life, maximising resource efficiency, developing products and services that substitute environmentally harmful alternatives, and encouraging greater utilisation rather than continuous ownership and replacement. These approaches demonstrate that sustainability can become part of business innovation and competitive strategy rather than merely an obligation imposed by environmental regulation.

However, the transition toward green entrepreneurship and circular business models is not without significant challenges. Many businesses continue to experience

difficulties associated with limited access to finance, inadequate technological capabilities, weak recycling infrastructure, insufficient technical expertise, fragmented supply chains, uncertain markets, and regulatory constraints. These challenges can be particularly significant for small and emerging enterprises, which may lack the financial and organisational resources required to redesign products, adopt cleaner technologies, establish reverse logistics systems, or experiment with alternative business models. Geissdoerfer et al. (2018) note that the implementation of circular economy principles requires transformation at multiple organisational and systemic levels, making the transition considerably more complex than simply introducing environmentally friendly products.

Another challenge concerns the difference between sustainability intentions and actual business transformation. Although many organisations increasingly communicate environmental commitments, sustainability cannot be achieved merely through environmental branding or isolated corporate social responsibility initiatives. Genuine transformation requires changes in how enterprises design products, source materials, organise production, engage consumers, manage waste, and create and capture value. Bocken et al. (2014) emphasise the importance of sustainable business-model innovation in moving organisations beyond incremental environmental improvements toward deeper changes in business logic. Consequently, green entrepreneurship must be understood as more than the establishment of environmentally themed businesses; it involves developing entrepreneurial systems in which environmental sustainability becomes an integral component of opportunity recognition and value creation.

The circular economy offers a particularly important pathway for addressing this challenge because it encourages organisations to reconsider the relationship between economic growth and resource consumption. In a circular system, competitive advantage may increasingly derive from resource productivity, product longevity, material recovery, efficient utilisation, and innovative service models rather than from continuous increases in the consumption of virgin materials. Bocken et al. (2016) identify the slowing, closing, and narrowing of resource loops as important strategies for moving businesses toward circularity. Such approaches can potentially reduce waste, improve resource security, stimulate innovation, create new markets, and strengthen long-term business resilience.

The relevance of green entrepreneurship and circular economy principles is especially significant in developing and emerging economies. Rapid urbanisation, population growth, unemployment, industrial expansion, resource pressures, and increasing waste generation create substantial environmental challenges in these economies, but they also present opportunities for entrepreneurial innovation. Waste materials that are treated as economic liabilities can become inputs for new enterprises, while repair, recycling, refurbishment, remanufacturing, and resource-recovery activities can generate employment and support local economic development. Green entrepreneurship can therefore contribute simultaneously to environmental protection, enterprise creation, poverty reduction, and inclusive economic development when supported by appropriate institutional and market conditions.

Despite increasing scholarly and practical interest in green entrepreneurship, sustainable business models, and the circular economy, there remains a need for a more integrated framework explaining how these concepts can collectively support sustainable business development. Existing literature has examined circular business models, sustainable innovation, environmental entrepreneurship, and resource-efficiency strategies from different perspectives (Bocken et al., 2014; Geissdoerfer et al., 2017). However, greater attention is required to the mechanisms through which entrepreneurial opportunity recognition, green innovation, circular resource management, stakeholder collaboration, sustainable value creation, and business performance can be integrated into a coherent framework for enterprise development.

This study therefore examines the relationship between green entrepreneurship and the circular economy and proposes a new framework for sustainable business development. The study seeks to examine how green entrepreneurial activities can facilitate the transition from linear to circular business models, identify the major dimensions through which circular enterprises create economic, environmental, and social value, and establish the organisational and institutional conditions necessary for sustainable business transformation. The proposed framework is intended to contribute to the growing discourse on sustainable entrepreneurship by providing an integrated perspective that connects entrepreneurial opportunity recognition, green innovation, circularity, sustainable value creation, and long-term business development.

Ultimately, the transition toward sustainable business development requires a fundamental reconsideration of how enterprises understand opportunity, resources, innovation, and value. Green entrepreneurship provides the entrepreneurial mechanism for transforming environmental challenges into opportunities, while the circular economy provides a systemic approach for keeping resources in productive use and reducing waste. Their integration therefore offers a promising pathway for developing businesses that are not only economically viable but also

environmentally responsible and socially valuable. As Bocken (2016) observes, circularity can play an important role in the creation of sustainable business models by reshaping the way organisations understand and organise value creation. The convergence of green entrepreneurship and circular economy principles consequently represents an important frontier for the development of resilient, innovative, and sustainable enterprises in the contemporary economy.

Literature Review

Conceptual Clarification

Green Entrepreneurship

Green entrepreneurship refers to entrepreneurial activities that recognise and exploit opportunities arising from environmental challenges while simultaneously creating economic and ecological value. It extends the conventional understanding of entrepreneurship by placing environmental sustainability at the centre of opportunity identification, innovation, resource utilisation, and business development. Dean and McMullen (2007) argue that environmental problems can generate entrepreneurial opportunities when entrepreneurs identify ways of correcting market failures associated with environmental degradation. Green entrepreneurship therefore represents an approach in which environmental challenges are transformed into opportunities for creating innovative products, services, technologies, and business models.

Green entrepreneurship is also associated with the development of enterprises that seek to reduce negative environmental impacts while maintaining commercial viability. Schaltegger and Wagner (2011) describe sustainable entrepreneurship as entrepreneurial activity that contributes to sustainable development by identifying and exploiting opportunities that generate economic, social, and environmental benefits. This perspective demonstrates that green entrepreneurship should not be understood simply as the establishment of businesses that sell environmentally friendly products. Rather, it involves incorporating environmental considerations into the fundamental processes through which enterprises create and capture value.

The concept also emphasises innovation as an essential component of entrepreneurial responses to environmental problems. Green entrepreneurs may introduce cleaner production technologies, renewable-energy solutions, sustainable materials, waste-reduction systems, environmentally efficient logistics, and alternative consumption models. These innovations can enable enterprises to respond to environmental pressures while simultaneously identifying new markets and sources of competitive advantage. Hockerts and Wüstenhagen (2010) explain that sustainable entrepreneurs can contribute to market transformation by introducing innovations that challenge established business practices and create opportunities for more sustainable products and services.

Circular Economy

The circular economy refers to an economic system designed to reduce resource depletion and waste by maintaining products, components, and materials at their highest possible utility and value for extended periods. It represents a departure from the traditional linear model of production and consumption, which generally follows a sequence of resource extraction, production, consumption, and disposal. Kirchherr, Reike, and Hekkert (2017) define the circular economy as an economic system that replaces the end-of-life concept with reducing, alternatively reusing, recycling, and recovering materials and energy throughout production, distribution, and consumption processes.

The circular economy is founded on the principle that economic systems should minimise waste and maximise the productive use of resources. Rather than treating waste as an unavoidable output of economic activity, circular systems seek to prevent waste through product design, resource efficiency, reuse, repair, refurbishment, remanufacturing, recycling, and recovery. Ellen MacArthur Foundation (2013) emphasises that the circular economy is based on designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.

Circularity therefore requires changes not only in production processes but also in the design of products, supply chains, consumption practices, and organisational structures. Geissdoerfer et al. (2017) explain that circular economy strategies seek to create regenerative systems in which resource inputs, waste, emissions, and energy leakage are minimised through slowing, closing, and narrowing resource loops. This makes the circular economy a systemic approach to sustainability rather than a single environmental management technique.

Circular Entrepreneurship

Circular entrepreneurship represents the intersection between entrepreneurial activity and circular economy principles. It involves identifying and exploiting opportunities that enable products, materials, components, and resources to remain within productive economic cycles for longer periods. Circular entrepreneurs therefore develop businesses around activities such as repair, reuse, refurbishment, remanufacturing, recycling, sharing, product-service systems, and resource recovery.

Circular entrepreneurship is important because the transition toward a circular economy requires innovative businesses capable of developing and commercialising new

solutions. Entrepreneurs can identify unused or underutilised resources and transform them into inputs for new products and services. They can also create new markets around waste recovery, product-life extension, resource sharing, and sustainable consumption. The entrepreneurial process consequently becomes a mechanism through which circular economy principles are translated from conceptual objectives into commercially viable activities.

This concept also expands the traditional focus of entrepreneurship from individual economic gain toward broader value creation. Circular entrepreneurs are expected to consider the environmental and social consequences of their activities while pursuing economic sustainability. Geissdoerfer et al. (2018) emphasise that circular business-model innovation requires organisations to reconsider established approaches to value creation, delivery, and capture. Consequently, circular entrepreneurship involves not only creating a profitable enterprise but also contributing to the preservation and regeneration of resources.

Sustainable Business Development

Sustainable business development refers to the process through which enterprises pursue long-term economic viability while simultaneously addressing environmental and social responsibilities. It moves beyond a narrow emphasis on short-term profitability by recognising that business survival and competitiveness are influenced by the availability of natural resources, social legitimacy, stakeholder relationships, and environmental conditions.

Elkington (1997) conceptualised sustainable business performance through the idea of the "triple bottom line," which emphasises the interconnected dimensions of economic prosperity, environmental quality, and social responsibility. Under this perspective, businesses are expected to generate financial value while also contributing positively to society and reducing environmental harm. Sustainable business development therefore requires organisations to integrate sustainability considerations into strategic planning, innovation, operations, supply-chain management, marketing, and stakeholder engagement.

Sustainable business models provide an important mechanism for achieving this objective. Boons and Lüdeke-Freund (2013) argue that sustainable business models must incorporate sustainability into the value proposition, value creation and delivery, and value capture mechanisms of an organisation. This suggests that sustainability should not exist as a separate organisational programme but should become embedded within the logic through which the enterprise operates.

Green Innovation

Green innovation refers to the development or adoption of products, processes, technologies, organisational practices, and business approaches that reduce environmental harm while creating economic value. It can involve improvements in energy efficiency, renewable energy, waste reduction, sustainable materials, cleaner production, pollution prevention, and environmentally responsible product design.

Green innovation is particularly important to green entrepreneurship because environmental entrepreneurs often depend on innovation to transform ecological problems into commercially viable solutions. It can enable enterprises to reduce resource consumption, lower operational costs, comply with environmental regulations, respond to changing customer expectations, and develop new markets. Rennings (2000) argues that environmental innovation can contribute to sustainable development by producing technological and organisational changes that reduce environmental burdens.

Within the circular economy, green innovation becomes even more significant because businesses must redesign conventional production and consumption systems. Innovation may involve developing products that are easier to repair or recycle, designing systems for material recovery, creating new applications for waste materials, or replacing ownership-based models with service-based alternatives. Consequently, green innovation provides an important bridge between entrepreneurial opportunity and circular business transformation.

Circular Business Models

Circular business models are organisational approaches designed to create and capture value while maintaining the circulation of products, components, and materials and reducing the consumption of virgin resources. They differ from conventional business models because they place resource conservation and value retention at the centre of business activities.

Bocken et al. (2014) identify several strategies through which businesses can develop more sustainable models, including maximising resource efficiency, creating value from waste, extending product life, and encouraging greater utilisation of products and services. These strategies demonstrate that circularity can be integrated into different aspects of business operations rather than being limited to recycling activities.

Circular business models may therefore include product-as-a-service arrangements, sharing platforms, leasing systems, repair and maintenance services, refurbishment businesses, remanufacturing enterprises, recycling systems, and industrial symbiosis. These approaches can reduce material consumption while creating alternative revenue streams and strengthening relationships between businesses and consumers.

The development of circular business models is particularly relevant to sustainable business development because it creates opportunities to align profitability with environmental responsibility. When enterprises successfully retain products and materials at higher levels of utility, they may reduce waste and resource costs while developing new sources of revenue. Circular business models can therefore become a strategic mechanism for integrating green entrepreneurship into long-term enterprise development.

Sustainable Value Creation

Sustainable value creation refers to the ability of an organisation to generate economic value while simultaneously producing positive environmental and social outcomes. It recognises that the value generated by businesses extends beyond financial returns to shareholders and may include benefits to customers, employees, communities, ecosystems, and future generations.

In the context of green entrepreneurship and the circular economy, sustainable value creation occurs when entrepreneurial activities generate profitable products or services while reducing resource consumption, environmental degradation, and waste. Boons and Lüdeke-Freund (2013) argue that sustainable business models require organisations to reconsider the traditional assumptions underlying value creation and incorporate sustainability into their core business logic.

Sustainable value creation consequently provides an important foundation for evaluating whether green and circular enterprises are genuinely contributing to sustainable development. A business may be economically profitable but environmentally damaging, while another may produce environmental benefits without sufficient financial viability. The objective of sustainable business development is therefore to establish models capable of balancing these dimensions and creating durable economic, environmental, and social value.

Theoretical Framework

The theoretical framework for this study is anchored primarily in Natural Resource-Based View (NRBV) Theory, complemented by the principles of Stakeholder Theory and Dynamic Capabilities Theory. The combination of these perspectives provides a suitable foundation for explaining how green entrepreneurship and circular economy practices can contribute to sustainable business development. While the Natural Resource-Based View explains the strategic importance of environmental resources and capabilities, Stakeholder Theory highlights the role of different stakeholders in sustainable business decisions, and Dynamic Capabilities Theory explains how organisations can adapt, innovate, and reconfigure their resources in response to changing environmental and market conditions.

Natural Resource-Based View Theory

The Natural Resource-Based View developed by Hart (1995) provides the principal theoretical foundation for understanding the relationship between environmental sustainability and competitive advantage. The theory extends the traditional Resource-Based View by arguing that an organisation's relationship with the natural environment can become an important source of capabilities and competitive advantage. According to Hart (1995), increasing environmental constraints require organisations to develop capabilities that enable them to minimise environmental impacts while maintaining competitive performance.

The Natural Resource-Based View identifies three interconnected strategic capabilities: pollution prevention, product stewardship, and sustainable development. Pollution prevention focuses on reducing waste and emissions within organisational processes, while product stewardship extends environmental responsibility across the life cycle of products. Sustainable development focuses on developing technologies and business activities capable of responding to long-term environmental challenges. These dimensions provide a strong conceptual connection with circular economy principles because circular businesses seek to minimise waste, extend product life, improve resource efficiency, and redesign production systems.

From the perspective of green entrepreneurship, the Natural Resource-Based View suggests that environmental challenges can stimulate the development of unique organisational capabilities. Entrepreneurs who develop expertise in waste reduction, renewable resources, circular product design, recycling technologies, sustainable logistics, and resource recovery may establish capabilities that differentiate their enterprises from competitors. Hart and Dowell (2011) further explain that the natural environment can influence the development of organisational capabilities and strategic resources, particularly as environmental pressures increase.

The theory is therefore particularly relevant to this study because it explains why environmental sustainability should not necessarily be regarded as a cost or external obligation. Instead, environmental responsibility can become a strategic capability through which businesses develop innovation, efficiency, resilience, and competitive advantage. Green entrepreneurship can utilise environmental challenges as opportunities to develop such capabilities, while circular economy practices provide

practical mechanisms through which these capabilities can be implemented.

Stakeholder Theory

Stakeholder Theory provides a second theoretical perspective for understanding sustainable business development. Freeman (1984) argues that organisations should consider the interests and expectations of stakeholders who can affect or be affected by organisational activities. These stakeholders include customers, employees, suppliers, investors, governments, communities, regulators, and other groups connected to the organisation.

The relevance of Stakeholder Theory to green entrepreneurship and the circular economy lies in the recognition that environmental sustainability cannot be achieved by businesses operating in isolation. Circular business models frequently require collaboration among producers, suppliers, consumers, waste-management organisations, governments, financial institutions, and communities. For example, a circular production system may require suppliers to provide recyclable materials, consumers to return used products, and specialised organisations to recover or process discarded materials.

Freeman et al. (2007) emphasise that stakeholder relationships can contribute to the creation of value beyond narrow shareholder interests. In sustainable business development, this broader understanding of value is particularly important because environmental and social outcomes are closely connected to the interests of multiple stakeholder groups. Green entrepreneurs must therefore consider not only the profitability of their enterprises but also the environmental expectations of consumers, regulatory requirements, community interests, and the long-term consequences of resource utilisation.

Stakeholder Theory consequently supports the argument that successful circular businesses require effective stakeholder engagement and collaboration. The ability of an enterprise to create sustainable value depends partly on its capacity to coordinate different interests and establish relationships that support resource circulation, environmental responsibility, innovation, and market acceptance.

Dynamic Capabilities Theory

Dynamic Capabilities Theory provides a further explanation of how enterprises can respond to changing environmental, technological, and market conditions. Teece, Pisano, and Shuen (1997) define dynamic capabilities in terms of an organisation's ability to integrate, build, and reconfigure internal and external competencies in response to rapidly changing environments.

This perspective is important because the transition from linear to circular business models requires organisations to change established routines, technologies, resource structures, supply-chain arrangements, and relationships with customers. Enterprises operating within rapidly changing environmental and technological contexts must continuously identify new opportunities, develop innovative solutions, and reorganise resources to remain competitive.

Teece (2007) later conceptualised dynamic capabilities around three important processes: sensing opportunities and threats, seizing opportunities, and transforming or reconfiguring organisational resources. These processes closely correspond with green entrepreneurship. Entrepreneurs must first sense environmental and market problems that can become business opportunities; they must then seize those opportunities through innovation, investment, and business-model development; and finally, they must transform their organisational systems to sustain the new business model.

Within the circular economy, dynamic capabilities are particularly important because circular transformation often requires substantial organisational change. Businesses may need to redesign products, establish reverse logistics, develop new partnerships, adopt digital technologies, modify revenue models, and create systems for recovering materials. The ability to continuously reconfigure organisational resources can therefore determine whether enterprises are capable of moving beyond traditional linear operations toward circular business systems.

Application of the Theories to the Study

The three theoretical perspectives complement one another in explaining the proposed relationship between green entrepreneurship, circular economy practices, and sustainable business development. The Natural Resource-Based View explains how environmental capabilities can become strategic resources and sources of competitive advantage. Stakeholder Theory explains the importance of collaboration and stakeholder interests in creating sustainable value, while Dynamic Capabilities Theory explains how enterprises can adapt and reconfigure their resources to respond to environmental and market changes.

Within the proposed framework, green entrepreneurship represents the entrepreneurial orientation through which environmental challenges are identified as opportunities for innovation and enterprise development. Circular economy practices represent the operational and strategic mechanisms through which resources are reduced, reused, recovered, recycled, repaired, refurbished, and retained within productive systems. Green innovation functions as an enabling mechanism through which entrepreneurs

develop new technologies, products, services, and processes. Stakeholder collaboration provides the relational foundation necessary for implementing circular systems, while dynamic capabilities enable enterprises to continuously adapt their resources and business models.

The interaction among these elements is expected to contribute to sustainable business development, reflected in economic viability, environmental performance, resource efficiency, innovation, resilience, and social value creation. The theoretical argument is that green entrepreneurial orientation alone may not automatically produce sustainable outcomes. Entrepreneurs require appropriate environmental capabilities, stakeholder relationships, innovative capacity, and organisational adaptability to convert sustainability opportunities into viable circular businesses.

Consequently, the theoretical framework proposes that the transition from conventional linear business models toward sustainable circular enterprises occurs through the interaction of entrepreneurial opportunity recognition, environmental capabilities, green innovation, stakeholder collaboration, and organisational transformation. This integrated perspective provides the theoretical foundation for developing a new framework that connects green entrepreneurship with circular economy principles and sustainable business development.

Conceptual relationship:

Green Entrepreneurship → Green Innovation → Circular Business Practices → Sustainable Value Creation → Sustainable Business Development

This relationship is strengthened by Natural Resource-Based Capabilities, Stakeholder Collaboration, and Dynamic Capabilities, which function as supporting mechanisms for successful circular transformation.

Green Entrepreneurship and Sustainable Business Development

Green entrepreneurship has become increasingly important in the pursuit of sustainable business development because it provides a mechanism through which environmental challenges can be transformed into entrepreneurial opportunities. Entrepreneurs play an important role in identifying unmet needs, developing innovative solutions, and introducing new products and services into the marketplace. When these entrepreneurial activities are directed toward environmental challenges, they can contribute simultaneously to economic development and ecological sustainability. Dean and McMullen (2007) argue that environmental degradation can create entrepreneurial opportunities when entrepreneurs identify ways of overcoming inefficiencies associated with environmental problems. This perspective shifts environmental sustainability from being viewed exclusively as a regulatory responsibility to being recognised as a potential source of innovation and enterprise creation.

The contribution of green entrepreneurship to sustainable business development is particularly evident in the creation of environmentally responsible products and services. Green entrepreneurs may develop enterprises around renewable energy, sustainable agriculture, waste management, clean transportation, environmentally friendly manufacturing, sustainable packaging, water conservation, and resource recovery. Such enterprises respond to environmental problems while also addressing emerging market demands. Schaltegger and Wagner (2011) explain that sustainable entrepreneurship involves entrepreneurial activities that contribute to sustainable development by identifying and exploiting opportunities capable of generating economic and sustainability benefits. Green entrepreneurship can therefore become an important pathway for linking commercial objectives with environmental priorities.

Entrepreneurial innovation is central to this process. Environmental problems frequently require new approaches to production, consumption, technology, and resource management. Green entrepreneurs can introduce innovations that reduce energy consumption, minimise waste, substitute harmful materials, extend product lifecycles, and improve resource efficiency. Rennings (2000) notes that environmental innovation can involve technological and organisational changes that reduce environmental burdens. Such innovations can provide businesses with opportunities to improve operational efficiency while responding to environmental expectations from customers, regulators, investors, and communities.

Green entrepreneurship can also contribute to competitive advantage. The Natural Resource-Based View suggests that organisational capabilities developed in response to environmental challenges can become strategic resources. Hart (1995) argues that pollution prevention, product stewardship, and sustainable development can provide important foundations for organisational competitiveness. Enterprises that develop expertise in sustainable production, resource efficiency, environmental innovation, and responsible supply-chain management may therefore establish capabilities that are difficult for competitors to replicate. Environmental responsibility can consequently move beyond compliance and become part of the strategic identity of an enterprise.

However, green entrepreneurship does not automatically guarantee sustainable business development. An enterprise may offer an environmentally beneficial product while maintaining inefficient internal operations or unsustainable

supply chains. Sustainable entrepreneurship therefore requires alignment between the environmental purpose of an enterprise and the way its products, resources, relationships, and revenue mechanisms are organised. Boons and Lüdeke-Freund (2013) emphasise that sustainability must be integrated into the value proposition, value creation and delivery, and value capture components of a business model. This suggests that green entrepreneurship becomes more effective when sustainability is embedded within the overall business architecture.

The development of sustainable business models is therefore an essential component of green entrepreneurship. Traditional business models frequently depend on increasing sales volumes and continuous consumption of resources. Sustainable business models seek alternative mechanisms for creating value while reducing environmental and social costs. Bocken et al. (2014) identify business-model strategies such as maximising material and energy efficiency, creating value from waste, extending product life, and encouraging greater utilisation of products. These strategies provide opportunities for entrepreneurs to develop businesses that generate revenue while simultaneously reducing environmental pressure.

The circular economy strengthens this entrepreneurial opportunity by providing a framework for redesigning how resources move through economic systems. Green entrepreneurs operating within a circular economy can develop businesses that recover materials, repair products, refurbish equipment, remanufacture components, recycle waste, and provide products through service-based models. Bocken et al. (2016) argue that circular business models can be developed around strategies that narrow, slow, or close resource loops. These strategies provide entrepreneurs with opportunities to create value from resources that conventional linear systems frequently treat as waste.

The relationship between green entrepreneurship and sustainable business development can therefore be understood as a process of opportunity recognition, innovation, business-model transformation, and value creation. Environmental problems create potential entrepreneurial opportunities; entrepreneurs recognise and develop those opportunities; innovation provides solutions; sustainable or circular business models provide mechanisms for commercialisation; and the resulting enterprise can generate economic, environmental, and social value. Schaltegger and Wagner (2011) emphasise that sustainable entrepreneurs can act as agents of change by introducing innovations that contribute to broader sustainability transitions.

Another important contribution of green entrepreneurship is employment and local economic development. Circular and environmentally oriented enterprises can generate employment through recycling, repair, refurbishment, renewable-energy services, sustainable agriculture, waste recovery, and environmentally responsible manufacturing. In developing economies, these activities may be particularly relevant because they can connect environmental improvement with livelihood opportunities. Rather than treating sustainability as a cost that businesses and communities must bear, green entrepreneurship provides an opportunity to connect environmental protection with income generation and enterprise development.

Nevertheless, the expansion of green entrepreneurship requires supportive institutional and market conditions. Entrepreneurs may face barriers involving access to finance, technological knowledge, infrastructure, consumer awareness, market uncertainty, and regulatory complexity. Environmental innovations may also require significant initial investment before their economic benefits become visible. Consequently, governments, financial institutions, research organisations, business associations, and other stakeholders have important roles to play in creating conditions that encourage green entrepreneurial activity.

The sustainable development potential of green entrepreneurship ultimately depends on the ability of enterprises to move from isolated environmental initiatives toward systemic transformation. Green products and technologies are valuable, but their impact becomes greater when they are connected to sustainable supply chains, responsible consumption, circular resource systems, supportive policies, and innovative business models. Geissdoerfer et al. (2017) argue that the circular economy requires systemic changes in the way products, materials, and resources are managed. Green entrepreneurship can provide the entrepreneurial mechanism through which these systemic changes are translated into practical business opportunities.

Therefore, green entrepreneurship should be regarded not simply as a specialised form of entrepreneurship but as an important mechanism for reshaping contemporary business development. Its greatest potential lies in its ability to transform environmental challenges into opportunities for innovation, employment, resource efficiency, and sustainable value creation. When combined with circular economy principles, green entrepreneurship can help enterprises move beyond the traditional linear model and develop business systems capable of generating long-term economic value while reducing environmental pressure.

Circular Economy and Business Model Transformation

The circular economy represents a fundamental transformation in the way businesses understand resources,

production, consumption, and value creation. Unlike the conventional linear economic model, which is largely based on extracting resources, producing goods, consuming them, and disposing of them at the end of their useful life, the circular economy seeks to maintain the value of products, materials, and resources for as long as possible. Kirchherr et al. (2017) explain that the circular economy replaces the traditional end-of-life approach with strategies centred on reducing, reusing, recycling, and recovering materials and energy. This transformation requires businesses to reconsider not only how products are manufactured but also how value is created throughout the entire product and resource lifecycle.

Business-model transformation is therefore central to the successful implementation of circular economy principles. Traditional business models often depend on selling increasing quantities of products, which can encourage continuous resource extraction and consumption. Circular business models, by contrast, seek to generate value through resource efficiency, product longevity, reuse, recovery, and alternative forms of access to products and services. Bocken et al. (2014) argue that sustainable business-model innovation can involve strategies such as maximising resource efficiency, creating value from waste, extending product life, and developing models that encourage greater utilisation of products.

One important dimension of circular business-model transformation is resource efficiency. Businesses can reduce their environmental footprint by using fewer raw materials, reducing energy consumption, minimising production losses, and improving the efficiency of production processes. Resource efficiency can also produce economic benefits because reduced material and energy consumption may lower operating costs. Hart (1995) suggests that pollution prevention and environmental efficiency can become strategic organisational capabilities. Consequently, resource efficiency should not be viewed only as an environmental responsibility but also as a potential source of business competitiveness.

A second dimension is product-life extension. Circular businesses seek to increase the useful life of products through durability, maintenance, repair, upgrading, refurbishment, and remanufacturing. Extending product life reduces the frequency with which new products must be manufactured and consequently reduces demand for virgin resources. Bocken et al. (2016) identify slowing resource loops as an important circular strategy because products can retain their value for longer periods when their useful life is extended. Entrepreneurs can therefore create new markets around repair services, maintenance systems, refurbishment, spare parts, and product upgrading.

A third dimension is waste valorisation. In a linear economy, waste is generally regarded as an output requiring disposal. Circular business models seek to transform waste into a resource that can become an input for another production process. This approach creates entrepreneurial opportunities around recycling, material recovery, industrial symbiosis, composting, and the conversion of discarded materials into new products. Bocken et al. (2014) identify the creation of value from waste as an important strategy for sustainable business-model innovation. Green entrepreneurs can therefore develop businesses that transform environmental liabilities into economic assets.

Another important dimension is the development of product-service systems. Instead of focusing exclusively on selling physical products, businesses can provide access to products through leasing, renting, sharing, subscription, or performance-based arrangements. This approach can change the relationship between producers and consumers because the business may retain ownership and responsibility for the product throughout its lifecycle. Such models can create incentives for producers to design durable, repairable, upgradeable, and reusable products because the long-term performance of the product becomes directly connected to the firm's economic interests.

Circular business-model transformation also requires changes in supply-chain management. Linear supply chains generally move resources from extraction to production and then toward final consumers and disposal systems. Circular supply chains require additional mechanisms for collecting used products, recovering materials, repairing components, and returning resources to productive activities. Geissdoerfer et al. (2018) emphasise that circular economy implementation involves substantial changes in organisational and inter-organisational relationships. Businesses therefore need to develop reverse logistics systems and collaborate with suppliers, customers, recycling organisations, and other partners.

Digital technologies can further support circular business-model transformation by improving the visibility and management of resources and products. Digital platforms can facilitate product sharing, tracking, maintenance, resale, and recovery, while data systems can help businesses monitor material flows and product lifecycles. Although technology alone cannot create circularity, its application can improve coordination among actors and increase the efficiency of circular processes. This reinforces the importance of innovation as a supporting mechanism for green entrepreneurship and circular business development.

The transformation toward circular business models also requires changes in consumer behaviour. Consumers must be willing to participate in systems involving product

return, repair, reuse, sharing, refurbishment, and responsible disposal. Consequently, businesses must communicate the value of circular products and services and create convenient mechanisms through which consumers can participate. Circularity cannot be achieved entirely from the production side because the continued circulation of products and materials depends on consumer participation throughout the product lifecycle.

Furthermore, circular business-model transformation requires businesses to reconsider conventional measures of performance. Financial profitability remains important, but sustainable circular enterprises must also consider resource productivity, waste reduction, product longevity, material recovery, environmental impact, and stakeholder value. Elkington's (1997) triple-bottom-line perspective provides a useful basis for understanding this broader approach because it recognises economic, environmental, and social dimensions of organisational performance.

The transition is nevertheless associated with significant barriers. Businesses may face high initial investment requirements, technological uncertainty, inadequate infrastructure, fragmented supply chains, regulatory limitations, and difficulties in changing established consumer habits. Geissdoerfer et al. (2017) note that circular economy implementation requires changes across multiple levels of the economic system. This means that individual enterprises may find it difficult to achieve circularity without supportive infrastructure, appropriate policies, capable partners, and functioning markets for recovered materials.

The transformation of business models therefore represents one of the most important pathways through which circular economy principles can influence sustainable business development. It requires enterprises to move beyond isolated environmental initiatives and rethink the fundamental logic of value creation. Instead of asking only how more products can be produced and sold, circular businesses must increasingly consider how products can remain useful for longer, how materials can be recovered, how waste can become a resource, and how economic value can be created with fewer environmental inputs.

Consequently, circular economy principles provide green entrepreneurs with a practical framework for developing innovative and sustainable enterprises. By integrating resource efficiency, product-life extension, waste valorisation, product-service systems, reverse logistics, digital innovation, and stakeholder collaboration, businesses can develop models that reduce environmental pressure while creating new sources of economic value. The successful transformation of these principles into viable enterprises represents an important step toward a business economy in which profitability and sustainability are not treated as competing objectives but as interconnected dimensions of long-term business development.

Green Innovation and Circular Value Creation

Green innovation is a critical mechanism through which green entrepreneurship can contribute to circular economy development and sustainable business performance. It involves the development or adoption of new products, processes, technologies, organisational practices, and business solutions that reduce environmental harm while creating economic value. Rennings (2000) explains that environmental innovation encompasses technological and organisational changes that reduce environmental burdens. Within the context of green entrepreneurship, innovation therefore provides the means through which environmental challenges can be transformed into commercially viable opportunities.

The importance of green innovation becomes more pronounced within a circular economy because conventional products and production systems are often designed around linear consumption patterns. Circularity requires businesses to reconsider how products are designed, manufactured, distributed, used, recovered, and reintegrated into economic systems. Bocken et al. (2016) argue that circular business-model strategies involve narrowing, slowing, and closing resource loops. Green innovation supports these strategies by enabling businesses to reduce the quantity of resources required, extend the useful life of products, and recover materials after products have reached the end of their initial use.

One important area of green innovation is eco-design. Eco-design incorporates environmental considerations into product development from the earliest stages of the design process. Products can be designed to use fewer materials, consume less energy, contain safer substances, and facilitate repair, disassembly, reuse, refurbishment, and recycling. By incorporating circularity into product design, businesses can prevent waste before it is generated rather than relying exclusively on recycling or disposal after consumption. Bocken et al. (2016) emphasise that circular strategies require changes in product and business-model design so that resource loops can be maintained more effectively.

Green innovation also contributes to resource efficiency. Businesses can develop technologies and processes that reduce energy consumption, minimise material losses, decrease water use, and improve production efficiency. Such innovations can simultaneously generate environmental and economic benefits because reducing resource consumption may lower operational costs. Hart (1995) suggests that pollution prevention can become an

important organisational capability and source of competitive advantage. This indicates that environmental efficiency can be integrated into strategic business development rather than being treated solely as an environmental compliance activity.

Another significant area is waste-to-value innovation. Circular entrepreneurs can identify materials that conventional businesses regard as waste and develop new applications for them. Agricultural residues, industrial by-products, discarded packaging, used equipment, and other waste materials can become inputs for new products and services. Bocken et al. (2014) identify the creation of value from waste as an important sustainable business-model strategy. This approach changes the economic meaning of waste by transforming it from a cost associated with disposal into a potential source of revenue and enterprise creation.

Green innovation also facilitates product-life extension. Businesses can introduce technologies and services that enable products to remain functional for longer through maintenance, repair, upgrading, refurbishment, and remanufacturing. Product-life extension reduces the need for continuous replacement and can consequently decrease the demand for virgin materials. It can also create new entrepreneurial opportunities in repair services, maintenance, refurbishment centres, spare-parts production, and remanufacturing enterprises. These activities demonstrate how environmental challenges can generate new markets and employment opportunities.

Digital innovation is another important component of circular value creation. Digital technologies can improve the tracking of products and materials throughout their lifecycles, support predictive maintenance, facilitate product-sharing platforms, and connect businesses with consumers involved in resale, repair, recycling, or recovery activities. Digital systems can also improve information about product composition and material availability, thereby supporting more efficient resource management. Although technological innovation alone cannot guarantee circularity, it can strengthen the coordination and visibility required for circular business systems.

The relationship between innovation and circular value creation can also be understood through the concept of **sustainable value**. Traditional business value is often measured primarily through revenue, profitability, and market growth. Circular business models require a broader perspective in which economic performance is considered alongside environmental and social outcomes. Boons and Lüdeke-Freund (2013) argue that sustainable business models must incorporate sustainability into the value proposition, value creation and delivery, and value capture processes. Green innovation can support this integration by enabling businesses to create products and services that simultaneously satisfy customer needs and reduce environmental impacts.

Circular value creation also depends on **collaborative innovation**. Many circular systems require cooperation among organisations because one firm's waste may become another firm's input. Industrial symbiosis provides an example of this relationship, where materials, energy, water, or by-products from one organisation can be utilised by another. Such arrangements can reduce resource consumption and waste while creating economic value for participating organisations. Geissdoerfer et al. (2017) emphasise that circular economy transformation involves systemic changes extending beyond individual organisations. Collaboration is therefore essential where circular resource flows cross organisational boundaries.

Entrepreneurs play an important role in facilitating such collaboration because they can identify connections between environmental problems, unused resources, technologies, and market opportunities. A green entrepreneur may recognise that a material considered worthless by one organisation can serve as a valuable input for another enterprise. Through entrepreneurial innovation, networks can therefore be created around resource recovery and exchange. This demonstrates how entrepreneurial opportunity recognition can support the practical implementation of circular economy principles.

Nevertheless, green innovation can involve significant challenges. New environmental technologies may require substantial investment, specialised knowledge, research and development capacity, and supportive infrastructure. Small businesses may face particular difficulties because they often have limited financial resources and technological capabilities. Furthermore, the commercial success of green innovations depends on consumer acceptance, market demand, regulatory conditions, and the availability of complementary infrastructure. Consequently, green innovation requires an enabling ecosystem involving entrepreneurs, financial institutions, governments, research institutions, consumers, and industry partners.

The role of government is particularly important in creating conditions that encourage green innovation. Environmental regulations, tax incentives, research funding, sustainable procurement policies, infrastructure development, and support for small and medium-sized enterprises can reduce some of the barriers associated with environmental innovation. Rennings (2000) notes that environmental innovation is influenced by both market and regulatory factors. Appropriate public policies can therefore encourage businesses to invest in technologies and business models that might otherwise appear financially uncertain.

From the entrepreneurial perspective, green innovation should also be connected to market opportunity rather than being pursued exclusively for environmental reasons. Entrepreneurs must understand customer needs, identify viable markets, develop appropriate pricing strategies, and create sustainable revenue mechanisms. This is important because environmental innovation that cannot achieve sufficient economic viability may struggle to survive in competitive markets. Sustainable entrepreneurship therefore requires the integration of environmental purpose with commercial logic.

Green innovation ultimately becomes most transformative when it contributes to circular value creation. Rather than simply producing less harmful versions of conventional products, businesses can redesign the underlying systems through which resources are extracted, products are used, and materials are recovered. This represents a shift from incremental environmental improvement toward systemic business-model innovation. Bocken et al. (2014) and Bocken et al. (2016) demonstrate that sustainable and circular strategies can fundamentally alter how organisations create and capture value.

The integration of green innovation with circular economy principles therefore provides an important pathway for sustainable business development. Green innovation generates the technologies, products, processes, and organisational solutions required to reduce environmental impacts, while circularity provides the broader system through which these innovations can retain resources and value. When combined with entrepreneurial opportunity recognition and viable business models, these elements can enable enterprises to transform waste into resources, extend product lifecycles, reduce resource consumption, and create new markets. Green innovation consequently serves as a critical bridge between environmental responsibility and sustainable economic value creation.

Challenges and Barriers to Green Entrepreneurship and Circular Economy Adoption

Despite the increasing recognition of green entrepreneurship and the circular economy as pathways toward sustainable business development, their widespread adoption continues to face significant challenges. The transition from conventional linear business models to environmentally responsible and circular systems requires changes in technology, finance, infrastructure, organisational culture, consumer behaviour, and regulatory structures. Geissdoerfer et al. (2017) observe that the circular economy represents a systemic transformation rather than a simple adjustment to existing business practices. Consequently, enterprises attempting to implement circular strategies may encounter several interconnected barriers that limit their capacity to achieve sustainable transformation.

One of the most significant barriers is limited access to finance. Green and circular enterprises frequently require substantial initial investment in technologies, equipment, research and development, sustainable materials, waste-recovery systems, and new production processes. For small and medium-sized enterprises, these financial requirements can be particularly difficult to meet. Although circular business models may generate long-term economic benefits through resource efficiency and new revenue opportunities, the initial costs and uncertainty associated with implementation may discourage entrepreneurs and investors. Rizos et al. (2016) identify financial limitations as one of the important barriers preventing small and medium-sized enterprises from adopting circular economy practices.

Another important challenge is limited technological capability. Circular business models often depend on technologies capable of improving resource efficiency, recovering materials, monitoring product lifecycles, and facilitating reuse or remanufacturing. Businesses without access to appropriate technologies or technical expertise may struggle to implement circular practices effectively. This problem can be particularly serious in developing economies where access to advanced technologies, research institutions, technical skills, and innovation infrastructure may be limited. Green entrepreneurship therefore requires not only entrepreneurial creativity but also technological capabilities that can convert environmental opportunities into commercially viable solutions.

Inadequate infrastructure represents another major barrier to circular economy adoption. Effective circular systems depend on infrastructure for collection, sorting, transportation, repair, refurbishment, recycling, and recovery of products and materials. Where such infrastructure is weak, recyclable or reusable materials may ultimately enter conventional waste-disposal systems. Kirchherr et al. (2018) emphasise that institutional, cultural, technological, and market conditions influence the implementation of circular economy principles. Without appropriate infrastructure, even businesses with strong sustainability intentions may find it difficult to maintain circular resource flows.

The challenge of **fragmented supply chains** also limits circular business development. Linear supply chains are generally structured around the forward movement of materials from suppliers to producers and consumers. Circular systems require additional relationships for collecting used products, recovering materials, repairing components, and returning resources to productive processes. This creates greater coordination requirements

among suppliers, manufacturers, distributors, consumers, recycling organisations, and other stakeholders. Geissdoerfer et al. (2018) argue that circular business models frequently require changes in organisational and inter-organisational relationships. Consequently, enterprises may need to establish new partnerships and information-sharing systems before circular models can operate effectively.

Consumer behaviour and market acceptance constitute another significant challenge. Circular business models may require consumers to change established patterns of purchasing, ownership, use, disposal, and replacement. For example, consumers may need to accept refurbished products, participate in product-return systems, use shared products, or pay for access to services rather than owning products outright. Although sustainability awareness is increasing, consumers may continue to prioritise price, convenience, product appearance, availability, and perceived quality. Kirchherr et al. (2018) identify cultural barriers, including consumer attitudes and established consumption practices, as important factors affecting the transition toward circularity.

Another challenge is the perceived uncertainty of circular business models. Entrepreneurs and investors may be reluctant to adopt unfamiliar business models when market demand, revenue potential, or long-term profitability remains uncertain. Traditional financial evaluation methods may also favour established linear business models because their revenue structures and performance indicators are easier to understand. Circular enterprises may generate value through multiple mechanisms, including product longevity, service revenue, material recovery, maintenance, resale, and resource efficiency. This complexity can make circular business opportunities more difficult to evaluate using conventional investment criteria.

Regulatory and institutional limitations can further constrain green entrepreneurship. Businesses require clear and consistent regulations concerning waste management, environmental standards, product responsibility, recycling, resource recovery, and sustainable production. Where environmental regulations are weak, poorly enforced, or inconsistent, enterprises may have limited incentives to invest in circular solutions. Conversely, overly complex regulations may increase compliance costs and discourage small entrepreneurs. Kirchherr et al. (2018) emphasise the importance of governmental and institutional conditions in facilitating circular economy transitions. Effective policies should therefore create incentives for sustainable innovation while providing clear rules that support resource recovery and responsible production.

Limited environmental knowledge and entrepreneurial capacity also represent important constraints. Entrepreneurs may recognise environmental problems but lack sufficient knowledge about circular business models, sustainable product design, lifecycle management, or resource recovery. Similarly, conventional business education may place greater emphasis on financial and market performance than on ecological systems and resource management. Developing green entrepreneurial capacity therefore requires education and training that combine entrepreneurship, environmental management, innovation, technology, and sustainability.

Another major concern is the persistence of linear business culture within organisations. Businesses that have operated successfully under traditional production and consumption systems may have limited motivation to fundamentally change their operating models. Organisational routines, established supplier relationships, performance measures, production technologies, and revenue structures can create resistance to transformation. Bocken et al. (2014) argue that sustainable business-model innovation requires organisations to reconsider the underlying logic through which value is created and captured. This means that circular transformation may require organisational change rather than merely the introduction of individual environmental initiatives.

The issue of greenwashing can also undermine the credibility of green entrepreneurship and sustainable business development. Greenwashing occurs when organisations communicate environmental claims that are misleading, exaggerated, or unsupported by actual environmental performance. Such practices can create consumer scepticism and make it more difficult for genuinely sustainable enterprises to distinguish themselves in the marketplace. Delmas and Burbano (2011) explain that greenwashing can arise from organisational, external, and regulatory pressures and can distort the communication of environmental performance. Genuine green entrepreneurs must therefore ensure that environmental claims are transparent, verifiable, and consistent with actual business practices.

Lack of standardisation and measurement systems represents another challenge. Enterprises may find it difficult to determine whether their activities are genuinely circular or sustainable when appropriate indicators and reporting mechanisms are absent. Circularity can involve multiple dimensions, including material efficiency, product longevity, recycling, reuse, resource recovery, and waste reduction. Without clear measurement systems, businesses may focus on isolated indicators while overlooking broader lifecycle impacts. Effective sustainable business development therefore requires reliable metrics capable of assessing both economic performance and environmental outcomes.

The transition can also be affected by skills shortages. Circular enterprises may require professionals with knowledge of sustainable design, materials science, engineering, waste management, digital technologies, environmental management, logistics, and entrepreneurship. A shortage of such interdisciplinary skills can limit the capacity of businesses to develop and implement circular innovations. Green entrepreneurship therefore requires an entrepreneurial workforce capable of understanding both commercial opportunities and ecological systems.

Despite these challenges, the existence of barriers also creates opportunities for innovation and entrepreneurship. Financial constraints can stimulate alternative financing mechanisms, infrastructure gaps can generate opportunities for local waste-recovery enterprises, technological limitations can encourage locally appropriate innovation, and changing consumer expectations can create new markets for sustainable products and services. Dean and McMullen (2007) argue that environmental market failures can themselves create entrepreneurial opportunities. The challenges associated with sustainability can therefore become sources of enterprise development when entrepreneurs develop appropriate solutions.

Addressing these barriers requires a collaborative approach involving entrepreneurs, businesses, governments, financial institutions, research organisations, consumers, and communities. No individual enterprise can independently create all the conditions required for a functioning circular economy. Governments can establish supportive regulations and infrastructure, financial institutions can develop appropriate financing mechanisms, research institutions can support technological innovation, businesses can redesign products and processes, and consumers can participate in circular consumption systems.

Consequently, the successful development of green entrepreneurship and circular business models depends on the creation of an enabling ecosystem. Such an ecosystem must combine access to finance, appropriate technology, supportive infrastructure, entrepreneurial skills, effective regulation, consumer participation, stakeholder collaboration, and credible sustainability measurement. When these conditions are aligned, environmental challenges can be transformed into opportunities for innovation, enterprise creation, employment, and sustainable economic development.

The barriers to green entrepreneurship and circular economy adoption therefore demonstrate that sustainability transformation cannot be achieved through individual environmental initiatives alone. It requires systemic changes in business models, institutional structures, market relationships, consumer behaviour, and resource-management practices. Overcoming these barriers is essential for enabling green entrepreneurs to move from isolated sustainability projects toward scalable circular enterprises capable of generating long-term economic, environmental, and social value.

A New Framework for Sustainable Business Development

The integration of green entrepreneurship and circular economy principles provides an opportunity to develop a more comprehensive approach to sustainable business development. While green entrepreneurship explains how entrepreneurs identify and exploit environmental opportunities, the circular economy provides the operational logic for reducing resource consumption, eliminating waste, and maintaining the value of products and materials. The combination of these perspectives suggests that sustainable business development should not be viewed as a single organisational activity but as a continuous process involving opportunity recognition, green innovation, circular resource management, stakeholder collaboration, sustainable value creation, and long-term business performance.

The proposed framework is based on the assumption that environmental challenges can serve as sources of entrepreneurial opportunity when appropriate capabilities and institutional conditions exist. Dean and McMullen (2007) argue that environmental market failures can create opportunities for entrepreneurs to develop solutions that address ecological problems. Green entrepreneurship therefore represents the starting point of the proposed framework because entrepreneurs identify environmental problems, resource inefficiencies, unmet sustainability needs, and emerging market demands as potential areas for enterprise development.

The first component of the framework is Green Opportunity Recognition. This involves identifying business opportunities associated with environmental challenges such as waste accumulation, resource depletion, pollution, inefficient energy use, unsustainable production, and excessive consumption. Entrepreneurs who can recognise these challenges as market opportunities may develop products, services, and technologies capable of addressing environmental problems while generating economic value. Schaltegger and Wagner (2011) emphasise that sustainable entrepreneurs contribute to sustainability by identifying and exploiting opportunities that produce economic and environmental benefits.

The second component is Green Innovation. Opportunity recognition alone is insufficient unless entrepreneurs can develop practical solutions to identified environmental problems. Green innovation provides the mechanism

through which environmental opportunities are converted into products, services, technologies, processes, and organisational practices. Rennings (2000) explains that environmental innovation can involve technological and organisational changes that reduce environmental burdens. In the proposed framework, green innovation therefore serves as the bridge between entrepreneurial opportunity and circular business development.

The third component is Circular Resource Management. Once an environmental opportunity has been identified and an innovative solution developed, the enterprise must establish systems that reduce resource consumption and maintain products and materials within productive cycles. Circular resource management includes reduction, reuse, repair, refurbishment, remanufacturing, recycling, recovery, and waste prevention. Kirchherr et al. (2017) emphasise that circular economy principles seek to replace the conventional end-of-life approach with strategies that maintain materials and resources within economic systems for longer periods.

The fourth component is Circular Business-Model Innovation. Circular resource practices must be integrated into the fundamental logic of the enterprise if they are to generate lasting economic value. Bocken et al. (2014) explain that sustainable business-model innovation can involve strategies such as creating value from waste, extending product life, improving resource efficiency, and increasing the utilisation of products. The proposed framework therefore requires enterprises to reconsider their value propositions, customer relationships, revenue mechanisms, supply chains, and resource structures in ways that support circularity.

The fifth component is Stakeholder Collaboration. Circular business systems frequently involve multiple actors, including suppliers, manufacturers, consumers, governments, financial institutions, communities, recycling organisations, technology providers, and research institutions. Freeman (1984) argues that businesses must consider the interests of stakeholders who influence or are affected by organisational activities. Within the proposed framework, stakeholder collaboration enables enterprises to establish the relationships necessary for resource recovery, product return, sustainable sourcing, consumer participation, knowledge sharing, and circular supply-chain development.

The sixth component is Sustainable Value Creation. The objective of integrating green entrepreneurship with circular economy principles is not simply to reduce environmental harm but to create economic, environmental, and social value simultaneously. Elkington (1997) conceptualises this broader approach through the triple-bottom-line perspective, which connects economic performance with environmental and social outcomes. Sustainable value creation therefore becomes a central outcome of the proposed framework because it determines whether circular entrepreneurial activities can generate meaningful and lasting benefits.

The seventh component is Business Resilience and Long-Term Competitiveness. Sustainable enterprises must be capable of surviving and adapting to changing market, technological, environmental, and regulatory conditions. Circular business practices can contribute to resilience by reducing dependence on scarce virgin resources, diversifying revenue streams, improving resource productivity, and strengthening relationships with stakeholders. Dynamic Capabilities Theory provides a useful explanation for this dimension because Teece et al. (1997) argue that organisations require the ability to integrate, build, and reconfigure competencies in response to changing environments.

The proposed framework can therefore be represented as an interconnected process:

Environmental Challenges → Green Opportunity Recognition → Green Innovation → Circular Resource Management → Circular Business-Model Innovation → Stakeholder Collaboration → Sustainable Value Creation → Business Resilience and Long-Term Competitiveness

The framework is not intended to represent a strictly linear sequence because the components can influence one another continuously. For example, stakeholder collaboration may generate new entrepreneurial opportunities, while customer feedback may stimulate further green innovation. Similarly, circular business-model implementation may reveal new resource inefficiencies that create additional entrepreneurial opportunities. The framework should therefore be understood as a dynamic system in which businesses continuously learn, innovate, adapt, and improve their sustainability performance.

Enabling Factors of the Framework

The effectiveness of the proposed framework is influenced by several enabling factors. These include access to finance, technological capability, supportive government policies, sustainable infrastructure, entrepreneurial knowledge, market demand, digital technologies, and environmental awareness. These factors do not constitute the central stages of the framework but provide the conditions necessary for successful implementation.

Access to finance is particularly important because green innovation and circular transformation may require substantial initial investment. Entrepreneurs need financial resources to acquire technologies, redesign products,

develop new processes, establish recovery systems, and expand sustainable enterprises. Rizos et al. (2016) identify financial limitations as an important barrier to circular economy implementation among small and medium-sized enterprises.

Technology is another critical enabling factor. Circular enterprises may require technologies for material recovery, product tracking, energy efficiency, recycling, digital marketplaces, predictive maintenance, and sustainable production. Technological capability can therefore determine whether entrepreneurs are able to convert circular opportunities into practical and scalable business solutions.

Government policy also plays an important role. Regulations, environmental standards, tax incentives, sustainable procurement policies, research support, waste-management systems, and infrastructure investment can create an environment in which green enterprises are more likely to emerge and grow. Effective public policy can reduce uncertainty and create market conditions that reward sustainable business practices.

Consumer participation is equally important. Circular business models frequently depend on consumers returning products, accepting repaired or refurbished goods, participating in sharing systems, reducing waste, and making sustainable purchasing decisions. Consequently, businesses must create convenient and economically attractive mechanisms that encourage consumers to participate in circular systems.

Expected Outcomes of the Framework

The proposed framework is expected to generate outcomes across three interconnected dimensions: economic sustainability, environmental sustainability, and social sustainability.

From an economic perspective, green and circular enterprises can create new markets, diversify revenue streams, improve resource efficiency, reduce material costs, stimulate innovation, and strengthen long-term competitiveness. From an environmental perspective, they can reduce waste, minimise resource extraction, lower emissions, extend product lifecycles, and encourage the recovery and reuse of materials. From a social perspective, green entrepreneurship can contribute to employment creation, skills development, community enterprise, inclusive innovation, and improved quality of life.

The framework consequently moves away from the assumption that environmental sustainability represents a cost that businesses must simply absorb. Instead, it proposes that sustainability can become a source of entrepreneurial opportunity and strategic value. Hart (1995) argues that environmental capabilities can become important sources of competitive advantage, while Bocken et al. (2016) demonstrate how circular strategies can transform the ways businesses create and capture value.

The major contribution of the proposed framework is therefore its integration of entrepreneurial opportunity, innovation, circularity, stakeholder engagement, and sustainable value creation into one interconnected model. Green entrepreneurship provides the entrepreneurial driver; green innovation provides the mechanism for developing solutions; circular economy principles provide the resource-management system; stakeholder collaboration provides the supporting network; and sustainable value creation represents the broader objective.

This framework suggests that sustainable business development should be understood as a continuous process of identifying environmental opportunities, innovating solutions, redesigning business models, circulating resources, engaging stakeholders, creating sustainable value, and strengthening organisational resilience. Such an approach can enable enterprises to move beyond conventional linear business practices and contribute more effectively to the transition toward a sustainable and circular economy.

Discussion

The proposed framework demonstrates that green entrepreneurship and the circular economy should not be treated as separate approaches to sustainability. Rather, they represent complementary dimensions of a broader transformation in the way enterprises identify opportunities, organise resources, develop innovations, and create value. Green entrepreneurship provides the entrepreneurial orientation required to recognise environmental problems as opportunities, while the circular economy provides the systemic principles through which those opportunities can be converted into sustainable business activities. This relationship is consistent with the argument of Dean and McMullen (2007) that environmental market failures can generate entrepreneurial opportunities and with the circular business-model perspective advanced by Bocken et al. (2014).

A major implication of the framework is that environmental challenges can become drivers of entrepreneurial innovation. Problems such as excessive waste, resource scarcity, pollution, inefficient energy consumption, and short product lifecycles represent significant environmental concerns, but they also reveal unmet market needs. Entrepreneurs who are capable of identifying these needs can develop innovative products and services that address environmental problems while generating economic returns. This creates a shift from viewing environmental

sustainability primarily as a constraint on business activity toward recognising it as a potential source of innovation and competitive advantage.

The framework further suggests that green innovation is the critical connecting mechanism between opportunity recognition and circular business development. Identifying an environmental problem does not automatically produce sustainable value. Entrepreneurs must possess the capacity to transform identified problems into commercially viable solutions. Green innovation enables this transformation through new technologies, sustainable materials, cleaner production processes, circular product designs, and alternative service models. Rennings (2000) explains that environmental innovation can involve technological as well as organisational changes, indicating that innovation for sustainability extends beyond the development of new physical products.

Another implication concerns the need to move from product-centred thinking to system-centred thinking. Conventional businesses often focus on producing and selling individual products, whereas circular businesses consider the entire lifecycle of products and materials. This requires attention to sourcing, design, production, distribution, consumption, maintenance, recovery, and reuse. Bocken et al. (2016) emphasise that circular business strategies involve narrowing, slowing, and closing resource loops. Consequently, enterprises seeking to become circular must consider what happens to products and materials beyond the point of sale.

The framework also highlights the importance of business-model innovation. Sustainability cannot be achieved simply by adding environmentally friendly features to an otherwise conventional business model. A business may manufacture a recyclable product while continuing to operate a resource-intensive supply chain. Genuine circular transformation requires changes in the underlying logic of value creation and capture. Boons and Lüdeke-Freund (2013) argue that sustainability needs to be incorporated into the value proposition, value creation and delivery, and value capture mechanisms of an organisation. This means that environmental sustainability should become part of the core business model rather than remaining an isolated corporate initiative.

A further implication is the importance of stakeholder collaboration. Circular systems are inherently interconnected because materials and products frequently move across organisational boundaries. A manufacturer may depend on suppliers for sustainable materials, consumers for product returns, recycling firms for material recovery, technology providers for tracking systems, and government agencies for regulatory support. Freeman (1984) provides a foundation for understanding this interdependence by emphasising the importance of stakeholders in organisational value creation. The success of circular entrepreneurship therefore depends partly on the ability of entrepreneurs to build networks and partnerships capable of supporting continuous resource circulation.

The framework also has important implications for small and medium-sized enterprises (SMEs). SMEs constitute a significant part of entrepreneurial activity and can be particularly important in local green innovation and circular resource management. However, their limited financial, technological, and human resources can restrict their capacity to implement complex sustainability initiatives. Rizos et al. (2016) identify financial, technological, and organisational factors among the barriers affecting circular economy adoption by SMEs. Consequently, policies supporting green entrepreneurship should not focus exclusively on large corporations but should also provide appropriate financing, training, technological assistance, and market opportunities for smaller enterprises.

For policymakers, the framework suggests that environmental regulation should be accompanied by measures that encourage entrepreneurial innovation. Regulations can establish environmental standards and discourage harmful practices, but entrepreneurs also require incentives and enabling conditions to develop alternative solutions. Governments can support green entrepreneurship through research and development incentives, sustainable procurement, access to finance, environmental infrastructure, entrepreneurship education, waste-management systems, and policies that encourage resource recovery and reuse.

The framework also has implications for business education and entrepreneurial training. Traditional entrepreneurship education frequently emphasises opportunity recognition, financial management, marketing, business planning, and enterprise growth. While these competencies remain important, the emerging sustainability environment requires entrepreneurs to understand resource systems, environmental impacts, lifecycle thinking, circular business models, green technologies, and stakeholder engagement. Sustainable entrepreneurship education should therefore integrate commercial and environmental knowledge so that future entrepreneurs can identify opportunities within emerging sustainability challenges.

For investors and financial institutions, the framework highlights the need to recognise the long-term economic potential of green and circular enterprises. Traditional investment assessments may focus heavily on immediate financial returns, whereas circular enterprises may generate value through resource savings, product-life extension, recurring service revenues, material recovery, and resilience against resource price volatility. Financial

institutions may therefore need broader approaches to assessing the potential of sustainability-oriented enterprises.

The framework further suggests that consumer behaviour is an essential component of circular transformation. Businesses cannot achieve complete circularity without consumer participation. Product return systems, repair services, sharing platforms, refurbished goods, and leasing arrangements depend on consumer willingness to participate in alternative forms of consumption. Consequently, enterprises must make circular options accessible, convenient, trustworthy, and economically attractive. Consumer education and transparent environmental communication can also help strengthen market acceptance.

An important implication for business strategy is the development of resource resilience. Enterprises operating in resource-intensive industries may face increasing uncertainty due to resource scarcity, changing environmental regulations, climate-related disruptions, and fluctuating material prices. Circular practices can help organisations reduce their dependence on virgin resources by increasing material efficiency, recovering valuable resources, and developing alternative supply arrangements. In this sense, circularity can contribute not only to environmental sustainability but also to organisational resilience and long-term competitiveness.

The framework also reinforces the importance of measuring sustainable performance. If green entrepreneurship and circular business models are to become meaningful components of business strategy, organisations need to measure both financial and sustainability outcomes. Conventional performance indicators should therefore be complemented by measures of resource efficiency, waste reduction, product longevity, material recovery, energy efficiency, environmental impact, and social value. This broader approach is consistent with Elkington's (1997) argument that organisational performance should consider economic, environmental, and social dimensions.

For developing economies, the implications may be particularly significant. Green entrepreneurship and circular business models can support employment creation, local innovation, waste management, resource recovery, and community development. Waste materials can become inputs for new enterprises, while repair, recycling, refurbishment, and renewable-energy activities can create livelihood opportunities. This suggests that circular entrepreneurship can contribute not only to environmental sustainability but also to inclusive economic development.

However, the framework also demonstrates that green entrepreneurship alone cannot produce systemic sustainability transformation. Entrepreneurs require supportive institutions, functioning markets, infrastructure, finance, technology, skills, and stakeholder cooperation. The transition toward a circular economy is therefore a shared responsibility involving businesses, governments, consumers, financial institutions, educational organisations, researchers, and communities. Geissdoerfer et al. (2017) emphasise the systemic character of circular economy transformation, reinforcing the argument that individual organisational initiatives must be connected to wider economic and institutional changes.

Overall, the proposed framework suggests that sustainable business development emerges from the interaction of entrepreneurial opportunity recognition, green innovation, circular resource management, business-model transformation, stakeholder collaboration, and sustainable value creation. These components reinforce one another rather than functioning independently. Green entrepreneurship generates the initiative, green innovation provides the solutions, circularity provides the resource logic, stakeholder collaboration enables implementation, and sustainable value creation provides the desired economic, environmental, and social outcomes.

The central implication is therefore that the future of sustainable business development should not be defined merely by how much less harm businesses create, but also by how effectively they redesign economic systems to create value with fewer resources and lower environmental impacts. The integration of green entrepreneurship and the circular economy provides a pathway toward such transformation by turning environmental challenges into opportunities for innovation, enterprise development, resource efficiency, resilience, and sustainable value creation.

Conclusion

The transition toward sustainable business development requires a fundamental reconsideration of the relationship between entrepreneurship, economic growth, resource utilisation, and environmental sustainability. The traditional linear model of production and consumption has generated substantial economic benefits, but its dependence on continuous resource extraction and waste generation presents significant environmental and economic challenges. In this context, the integration of green entrepreneurship and circular economy principles offers an important pathway for developing business models capable of creating value while reducing environmental pressure.

This article has established that green entrepreneurship provides an important entrepreneurial mechanism for identifying and exploiting opportunities arising from environmental challenges. Through opportunity

recognition, innovation, and enterprise development, green entrepreneurs can transform problems such as waste, resource scarcity, pollution, and inefficient production into new products, services, technologies, and markets. Dean and McMullen (2007) demonstrate that environmental market failures can create opportunities for entrepreneurial action, while Schaltegger and Wagner (2011) emphasise the contribution of sustainable entrepreneurship to broader sustainability transitions.

The circular economy complements this entrepreneurial process by providing a framework for redesigning how resources, products, and materials move through economic systems. Rather than following a linear process of extraction, production, consumption, and disposal, circular approaches emphasise reduction, reuse, repair, refurbishment, remanufacturing, recycling, and recovery. Kirchherr et al. (2017) and Geissdoerfer et al. (2017) demonstrate that circularity involves systemic changes in the way economic value and resources are managed. The integration of these principles into entrepreneurial activity can therefore support the development of enterprises that create economic value while maintaining resources within productive cycles.

The proposed framework contributes to this discussion by connecting green opportunity recognition, green innovation, circular resource management, circular business-model innovation, stakeholder collaboration, sustainable value creation, and business resilience. These components provide an integrated pathway through which entrepreneurs and organisations can move from identifying environmental problems to developing commercially viable and environmentally responsible enterprises. The framework further recognises that sustainable business development is not a linear process but a dynamic system in which innovation, stakeholder relationships, market conditions, organisational capabilities, and environmental pressures continuously interact.

A key conclusion of the study is that sustainability should not be positioned simply as an additional responsibility imposed upon businesses. Instead, sustainability can become an important source of entrepreneurial opportunity, innovation, competitive advantage, and organisational resilience. Hart (1995) demonstrates that environmental capabilities can become strategic resources, while Bocken et al. (2014) show how sustainable business-model innovation can create new approaches to value creation. This suggests that businesses capable of integrating environmental responsibility into their core strategies may be better positioned to respond to emerging environmental, regulatory, technological, and market pressures.

The study also concludes that circular transformation cannot be achieved by individual businesses operating independently. Circular systems require collaboration across supply chains and stakeholder networks. Producers, suppliers, consumers, governments, financial institutions, technology providers, research organisations, and communities all have roles to play in maintaining products and resources within productive systems. Stakeholder collaboration is therefore an essential element of the proposed framework because the success of circular business models frequently depends on relationships that extend beyond organisational boundaries.

Despite the opportunities presented by green entrepreneurship and circularity, significant barriers remain. Limited access to finance, inadequate infrastructure, technological constraints, insufficient skills, regulatory uncertainty, fragmented supply chains, and consumer resistance can restrict implementation. These challenges demonstrate the importance of an enabling ecosystem in which governments provide appropriate policies and infrastructure, financial institutions support sustainable enterprises, educational institutions develop relevant skills, and markets reward credible environmental innovation.

The implications are particularly important for developing economies, where environmental challenges coexist with substantial needs for employment, enterprise creation, infrastructure development, and inclusive economic growth. Green entrepreneurship and circular business models can contribute to these objectives by creating enterprises around waste recovery, recycling, repair, refurbishment, renewable energy, sustainable agriculture, resource efficiency, and other environmental solutions. Circular entrepreneurship can therefore serve as both an environmental strategy and a mechanism for economic empowerment.

Ultimately, the future of sustainable business development depends on the capacity of enterprises to move beyond incremental environmental improvements toward deeper transformation of their business models and resource systems. Green entrepreneurship supplies the entrepreneurial initiative required to identify and exploit sustainability opportunities, while the circular economy provides the systemic principles necessary to retain value, minimise waste, and reduce dependence on virgin resources. Their integration creates the possibility of a new generation of enterprises that are economically viable, environmentally responsible, socially relevant, and resilient.

The proposed framework therefore positions green entrepreneurship and the circular economy as mutually reinforcing drivers of sustainable business development. Its central proposition is that environmental challenges can become sources of enterprise innovation when supported by

appropriate capabilities, technologies, institutions, markets, and stakeholder relationships. Future empirical research should test the proposed framework across different industries, enterprise sizes, and geographical contexts to determine the extent to which its components influence sustainability performance, innovation, competitiveness, and long-term business resilience.

In conclusion, sustainable business development should no longer be understood simply as achieving economic growth with fewer environmental consequences. It should increasingly be understood as the creation of economic systems in which enterprises generate value by solving environmental problems, extending resource productivity, reducing waste, and creating positive social outcomes. The convergence of green entrepreneurship and the circular economy provides a practical and strategic foundation for achieving this transformation.

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