sustainability

MDPI

Review

Technological Innovation in Start-Ups on a Pathway to Achieving Sustainable Development Goal (SDG) 8: A Systematic Review

Lilian Danil [1,2,*], Siti Jahroh [1], Rizal Syarief [1] and Asep Taryana [1]

[1] School of Business, IPB University, Bogor 16151, Indonesia; mslilian@apps.ipb.ac.id (L.D.) sitijahro@apps.ipb.ac.id (S.J.); rsyarief@apps.ipb.ac.id (R.S.); kang.astar@apps.ipb.ac.id (A.T.)
[2] Faculty of Vocational Studies, Parahyangan Catholic University, Bandung 40141, Indonesia
* Correspondence: liliandanil@unpar.ac.id

Abstract: In a start-up, the level of technological innovation is crucial to the start-up's competitiveness, especially in the digital age; as a result, high-tech start-ups stand a better chance of being more profitable than middle-tech and low-tech start-ups. The aim of this study is to identify and examine research papers regarding the role of technological innovation in advancing Sustainable Development Goal 8 (SDG) in the current context. This study intends to fill research gaps by performing a systematic literature review and meta-analysis following the PRISMA guidelines on the subject. To investigate advancements in the use of start-up technologies, scientific publications were obtained from the Scopus database, yielding a total of 384 entries for the preferred reporting items for systematic reviews and the meta-analyses identification stage. The findings indicate that high technology encompasses artificial intelligence (AI), blockchain, the Internet of Things (IoT), and collaborative robots; medium technology comprises mobile applications, big data, and cloud computing; and low technology consists of software and connectivity. Each of the technological innovations plays a significant role in advancing SDG 8, encompassing aspects such as economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and business growth.

Keywords: entrepreneurship; SDGs; start-ups; systematic review; technological innovation

Academic Editor: Harris Wu

Received: 16 November 2024
Revised: 29 January 2025
Accepted: 31 January 2025
Published: 3 February 2025

Citation: Danil, L.; Jahroh, S.; Syarief, R.; Taryana, A. Technological Innovation in Start-Ups on a Pathway to Achieving Sustainable Development Goal (SDG) 8: A Systematic Review. *Sustainability* **2025**, *17*, 1220. https://doi.org/10.3390/su17031220

1. Introduction

1.1. Background

Entrepreneurship research highlights the significance of art, science, and technology in entrepreneurship, emphasising the need for a multidimensional approach to product offerings [1]. Entrepreneurship is the key to a sustainable future (as are social, economic, and ecological goals) and ecological entrepreneurship. Entrepreneurship has provided access to the newest technology and services, allowing people to equip and use them to boost efficiency and production [2]. The level of entrepreneurial activity of individuals has a direct impact on society and the economy as a whole, making it a key player in the innovation system [3]. The practices of entrepreneurship involve strategic management characteristics and innovation with the purpose of enhancing stability and surviving in a setting that is extremely competitive [4]. Circular start-ups typically recognise sustainability and circularity as competitive strengths and migrant entrepreneurs appear to be more optimistic about launching a profitable circular business [5]. Governments have continually failed to fulfil the goal of encouraging the growth of start-ups and ensuring their competitiveness due to a lack of comprehensive knowledge of the factors that fortify their sustainability [6]. Synergies between governments and other start-up ecosystems need to be created to boost the growth of start-ups, which are obviously expected to experience sustainability in business and the economy.

Entrepreneurs and their start-ups encounter novel technology and obstacles in an increasingly digitalised society [7]. Small-scale entrepreneurs have greatly benefited from recent advancements in point-of-sale and inventory technology, which they can obtain at a minimal cost or access through mobile applications on newer mobile devices [8]. The study of the usage of information sources by start-up company managers reveals that entrepreneurs regard clients and technology as critical external elements influencing their enterprises. Start-ups have adopted new approaches to tackling complex societal challenges through the use of digital technology [9]. Innovative people are intrinsically interested in technology and find it more engaging and enjoyable to use [10]. The interdependent development of digital technologies, innovation, and skills necessitates a restructuring of productive and innovative processes, both internally within organisations and externally across enterprises [11]. However, there are concerns about the impact of technological innovation on job displacement. High-level technologies such as AI and the IoT have the potential to replace both physical and intellectual work [12]. On the other hand, in the information technology (IT) start-up industry, high birth rates are associated with a high probability of failure; as a matter of fact, only one in every three survives the first three years [13].

The definitions, applications, and comprehension of technology have significantly differed since Jacob Bigelow's publication of *Elements of Technology* in 1829 [14]. According to Ref [15], there was an association between the pre-Socratic Greek philosophers' introduction of the principle of creation known as "logos" and the concept of "techne." The significant neglect of metaphysics suggests that technological thinking has largely shaped our approach to technology. Technology focuses our attention on specific aspects, details, structures, and functions. During the British Industrial Revolution, financial intermediation became politicised, while the 1980s buyout wave demonstrated the positive correlation between technological innovation and financial intermediation [16]. A "high technology" or "technology-intensive" industry is characterised by above-average levels of investment in research and development and the employment of scientific and technical personnel [17]. Consider the late-2000s electric vehicle business and the opposing practices of start-ups Better Place and Tesla. On the one hand, both Better Place and Tesla built their innovation strategies around the prospective use of lithium-ion batteries, which were widely perceived to be undergoing tremendous technological improvement [18].

In a start-up business, the level of technology plays a crucial role in the start-up's competitiveness, especially in the digital age, so that start-ups with a high-tech level stand a chance to earn more profits compared to those with low-tech levels. Companies' varying levels of innovation capacity within a given technical intensity tier can be better understood by examining how well they have balanced and developed their technological, operational, managerial, and transactional capacities [19]. Different innovative technological innovations serve as an intermediary for promoting the entrepreneurial framework via the emerging digital economy [20]. Technological intensity is defined as the extent to which scientific research efforts lead to increased production and revenue [21]. Technological innovation has the potential to reduce this impact by creating new markets, lowering the cost of consumer goods, and offering highly profitable investment opportunities [22]. Some of the key elements that can affect agility in Industry 4.0 start-ups are technologies such as AI, cloud computing, networking and connectivity, and digital twins, which serve as critical drivers. This study fills the research gap in understanding the agility of start-up operations within the framework of Industry 4.0 and emphasises the importance of technological innovation for the sustainability and operational agility of start-ups [23]. Key technologies such as artificial intelligence (AI) [24], digital platforms [25], mobile applications [26], blockchain [27], the Internet of Things (IoT) [28], collaborative robots [29], web platforms [30], cloud computing [31], data analytics [32], software [33], and connectivity protocols such as the internet [34] are being leveraged by start-ups for economic growth, productivity, creativity, entrepreneurship, innovation, development policies, and business growth.

Entrepreneurs must address potential risks in order to stimulate innovation in start-ups. In start-ups, risk analysis is proposed through the calculation of net current value adjusted to the risk of new product development, the analysis of decisions made by entrepreneurs, and the business communication and product development processes [35]. However, the heterogeneity of the economic activities involved in innovation risk explains why there is currently no unequivocal understanding of its content in the scientific literature [36]. Entrepreneurship and start-up businesses play an essential role in accelerating businesses' transformation towards sustainable development [37] to increase environmental sustainability, decrease poverty, maintain economic growth [38], and encourage inclusive employment and decent work for all. The field of sustainability science has made significant progress, particularly in establishing indicators to measure sustainable development. The article by Copper examining this sustainability has become a modern business semantic [39]. Economies and businesses recognise sustainability as both a requirement for survival and a potential opportunity for investment [40].

There are three primary factors contributing to the complexity of sustainable development: the lack of clarity in its definition, the diversity of objectives used to describe and assess it, and the misunderstanding that has arisen in the vocabulary, data, and measurement methodologies associated with it [41]. These days, "sustainable" means more than just "respectful"; it also means "viable" [42]. Impact start-ups are innovative emerging businesses that scale solutions with a sustainable net benefit [43]. The United Nations has prioritised strengthening entrepreneurial interventions to inspire passionate young people to start their own enterprises and create jobs for themselves and others [44]. Entrepreneurs prioritise SDGs such as excellent education, gender equality, economic development, and innovation. The importance of these concerns for sustainable entrepreneurship relative to other SDG targets may help policymakers and decision-makers [45]. In developing countries, policymakers are increasingly recognising science, technology, and innovation (STI) in the pursuit of the SDGs, with STI-based businesses serving as a critical component of these endeavours [46].

This research aims to fill the research gaps on how innovative start-ups are adopting technology to meet the SDGs by conducting a literature analysis of the topic. Previous discussions suggested that the implementation of technological innovation could enable certain risks in addition to creating benefits for achieving the SDGs. Indeed, there is a connection between technological innovation in start-ups, sustainability, and the Sustainable Development Goals. Therefore, we systematically reviewed the level of adoption of these technological innovations, specifically focusing on SDG 8.

During the period from 2019 to 2024, a comprehensive and relevant literature review and bibliometric analysis employing a multi-industry strategy have had a significant influence on the Scopus database. According to bibliometric analysis using VOSviewer of entrepreneurial innovation in start-ups, there is research analysing technology (Figure 1).

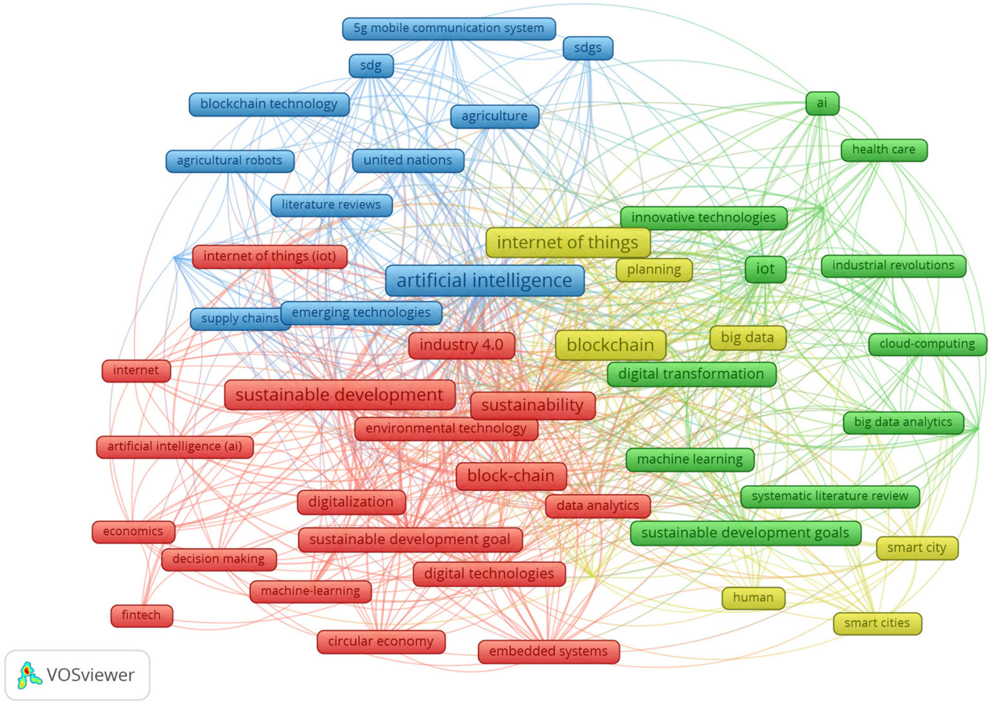

Figure 1. Cluster analysis of knowledge history, developed by VOSviewer (source: own source).

The results show the number of publication clusters. The bibliometric results illustrated in Figure 1 indicate that earlier studies in the domain of technological innovation and sustainability or Sustainable Development Goals have used a network visualisation approach organised into distinct clusters, each comprising multiple items. Cluster 1 encompasses elements such as artificial intelligence, blockchain, digitalization, economics, data analytics, digital economics, Internet of Things, sustainability, Sustainable Development Goals, internet, etc. Cluster 2 encompasses elements such as big data analytics, cloud computing, digital transformation, industrial revolutions, innovative technologies, sustainable development, machine learning, etc. Cluster 3 includes components such as 5G mobile communication, agricultural robots, augmented reality, emerging technologies, SDGs, United Nations, etc. Cluster 4 includes elements like big data, enabling technologies, human, planning, smart cities, etc. The bibliometric results indicate that there are no overlapping items, with each item assigned to a single cluster. We also reviewed 384 articles on start-up innovations for achieving sustainability and found that India and the United States outperformed other countries in terms of article publication. Other authors who published on start-up technological innovation to attain sustainability came from Australia, Canada, the United Kingdom, France, Italy, Singapore, South Africa, the United Arab Emirates, Spain, and the Netherlands. This study identifies a research gap, indicating that there have been no previous studies analysing the application of technological innovation in start-ups in relation to Sustainable Development Goal 8 (SDG 8).

1.2. Research Objectives

Previous discussions suggested that implementing technological innovation could enable certain risks and create benefits for achieving the SDGs. Therefore, this study employs a multilevel perspective to report and discuss literature findings about technological innovation in start-ups on a pathway to achieving SDG 8. The research objective is to investigate how the application of technological innovation in start-ups contributes to SDG 8 through the Preferred Reporting Items for Systematic Review and

Meta-Analyses (PRISMA). With this objective, the specific objectives of this research are as follows:

1. Analysing the implementation of digital transformation innovation in start-ups to achieve SDG 8;
2. Analysing the implementation of high-tech innovations in start-ups to achieve SDG 8;
3. Analysing the implementation of medium technology innovation in start-ups to achieve SDG 8;
4. Analysing the implementation of low-tech innovations in start-ups to achieve SDG 8.

SDG 8 focuses on promoting development policies; creating decent jobs; fostering entrepreneurship; encouraging creativity, productivity, and innovation; and enhancing business growth of start-ups, including access to financial services. Hence, this study deems it imperative to investigate the correlation between technological innovation and SDGs. This review substantially contributes to theoretical and practical frameworks for developing technological innovation to achieve sustainability. This comprehensive review provides evidence-based insights for business founders and managers, academics as knowledge providers and advocates for start-up creation, and the government as policymakers to help them establish effective policies. By highlighting the impact of technological innovation, we can progress towards change and achieve SDG 8.

2. Technological Innovation Implementation in Start-Ups to Achieve SDG 8

This study examined the implementation of technological transformation and innovation in start-ups to achieve Sustainable Development Goal 8, with a particular focus on target 8.3. Nevertheless, the majority of organisations lack familiarity with and experience in utilising novel digital technologies. Therefore, even modest instances of digitalisation might give rise to difficulties that could impact both the overall welfare and productivity prior to, during, and following the adoption of the new digital technology [47]. The Valley of Death (VoD) represents a set of problems that technology-based businesses face throughout their early development stages. Despite many attempts to solve this issue, more and more businesses are still failing to make it past the so-called Valley of Death, which holds particularly [48] true for deep-tech developments that are the product of technological advances [49].

Ref [50] introduced a unique and all-encompassing structure for high-tech start-ups. With their nimble methods and creative and innovative ideas, entrepreneurs provide a wealth of new technology [51]. Start-ups, which are recently established companies that develop advanced technology, are pivotal in driving technological innovation and significantly influence the ongoing process of digital transformation. This is an ingenious invention—to build sustainability, one requires not only the technology but also the business model [52]. Opportunities for entrepreneurs have expanded thanks to developments in IT, the internet, and the increasing use of satellites and AI. These pioneers propel economic, social, and cultural development through a trifecta of innovation, knowledge, and entrepreneurship, which in turn has far-reaching effects on public policy. Start-ups rely heavily on Industry 4.0 technologies such as AI, blockchain technology (BCT), the IoT, big data, and cloud computing, among others, to overcome numerous challenges and ensure sustainability. Now, there is a shift from Industry 5.0 to Industry 6.0. Industry 6.0 incorporates technological advancements to create fully integrated, intelligent manufacturing systems that are capable of operating with human intervention, encompassing more than just factory automation. This integration facilitates more intelligent decision-making and increased productivity.

The personal strategies of owners/founders of small business start-ups are linked to performance and environmental uncertainty [53]. It is possible for technology and market conditions to change slowly. Nevertheless, the standard for determining technology levels remains particularly confusing. For instance, Denmark appears to have a competitive advantage in sectors with low growth, such as processed food, despite its production tending to be at a much more advanced technological level. In this instance, biotechnology finds its way into food production [54]. The present study investigates various levels of technology adoption in start-up businesses, classifying them into three distinct categories: high technology, middle technology, and low technology. The primary focus of classifying each "industry" as high- or low-tech is to assess its potential for growth.

2.1. Start-Up

The start-up industry is currently in the midst of a dynamic period known as start-up 5.0, in which technology is rapidly altering the way it conducts business. Start-ups are at the forefront of this change. In academic works, the term "start-up" is defined in several ways [55]. Start-ups are emerging companies that concentrate on technology and have a high level of innovation and growth potential [56,57]. They offer an opportunity for established firms to explore innovative ideas for their corporations. There are phenomena that have contributed to the development of both traditional and technology-based start-ups, with the former being more significant for the nation's economic growth because they help to establish a high-tech job industry [58]. The McKinsey & Co. study reveals that many executives regard the commercialisation of technology-based goods as one of the most difficult aspects of innovation [59]. Innovation is a strategic instrument that entrepreneurs can utilise to capitalise on chances for new products or services. Entrepreneurs can also implement it in business operations to boost productivity, reduce expenses, or improve overall quality [60]. These entrepreneurs' diverse range of business ventures eventually gave rise to terms such as business enterprises and start-ups.

The disparities encompass distinct business goals, risks, funding, and products [61]. Start-ups have prioritised high business growth goals, while other companies prioritise maintaining business stability; start-ups tend to carry greater risks than business enterprises; in terms of funding, start-ups frequently engage angel investors, venture capitalists, initial public offerings (IPOs), and other large-scale funding streams, unlike other businesses, which normally rely on their own cash, family, friends, or bank loans; product start-ups are usually related to technology, while other businesses are not necessarily technology-related. Compared to other small firms, a wider variety of external knowledge sources positively impacts innovation performance in small start-ups [62]. In establishing a digital technology start-up, the entrepreneurial landscape consistently shapes the process in terms of economic growth [63].

2.2. Technological Innovation

Researchers conduct research on innovation using technology, which includes the following areas:

- Ref [64] looked at how innovation processes have changed over time across the first to fifth generations and found that they went from rigid, linear methods to more adaptable, collaborative, and networked ones. This illustrates the increasing complexity and interconnectedness of innovation in today's business environments.
- Ref [65] argues that internal and external technology bases, technology spin-offs, and insourcing play a role in the open innovation model.

Table 1 outlines the technological change and innovation adopted by start-ups at every level.

Table 1. Characteristics of technological innovation in start-ups (source: own source).

Item	High Technology	Middle Technology	Low Technology
Technological change and innovation	Faster	More moderate	Slower
Market opportunities	There probably exists a stronger correlation between market opportunities and technical opportunities.	Enhanced connection between technological opportunities and market demands.	Technological opportunities and market demands are equally important.
Skill level	Competency levels in the high-tech sector can be more complex and significantly diverse in comparison to the middle-tech sector.	Competencies in the medium technology sector may be more advanced and diverse than those in the low technology sector.	The skill levels required in the low-tech sector are typically homogenous and show little variation in comparison to the middle-tech sector.
Outsourcing of technology development	High-tech companies may have the most advancements and innovations in their technology.	Middle-tech businesses may have more control over technology development and innovation.	Companies adopting low-tech methods generally outsource the development of new technologies, limiting their potential to benefit from innovation.

2.2.1. High Technology

Governments have been attracted towards high-tech industries for their potential for growth and structural change [54]. High-technology businesses face complex and uncertain situations, which are characterised by short product and process life cycles, fast technological advancements, and limited market opportunities. Manoeuvres in the high-tech industry include making a system or product upgradeable to accommodate future user needs or technological advancements [66]. In terms of corporate strategy and technology, it is critical to consider the interconnections [67].

Around the world, an increasing number of countries are adopting technologies that leverage technological advancements in digital technology to manage resources sustainably in many fields, such as medicine [68,69], education [70,71], life science [72], law [73], and business [74]. According to CB insights data for 2019, high-technology-based start-ups have improved the efficiency of their production processes and changed the way they operate [58].

Blockchain

The increasing volume of research on blockchain development indicates that blockchain technology has considerable potential for applications in e-health [75], the furniture industry [76], public–private partnerships, and energy trading [77], providing solutions and aiding in the advancement of a sustainable technological future. For instance, blockchain in learning and sustainable education indicates that marketing strategies ought to focus on the possibilities of blockchain technology in higher education [78].

Businesses have benefited from blockchain because it has improved the efficiency of data collection, stakeholder, and consumer interaction [79]. Blockchain-based technology has been identified for achieving sustainability for a variety of purposes, including energy systems supply chain management [80]. Blockchain can conceptually define a framework for sustainability through the life cycle phases, thus providing a reference for researchers and policymakers in important sectors to facilitate sustainable development [76]. Researchers and industry practitioners can use blockchain technology to develop more efficient and effective supply chain procedures that promote sustainability [81]. Blockchain can assist in attaining the SDGs established by the United Nations [82].

Artificial Intelligent (AI)

What is the definition of AI? Currently, there is no universally accepted definition for this phrase. In common parlance, artificial intelligence refers to machines that can perceive, learn, solve problems, and even show some talent for creativity. In practice, AI is a body of knowledge in the scientific and technological realms concerned with the automation, improvement, and massive scalability of human perception (e.g., the capacity to perceive, comprehend, and communicate) and decision-making processes [83]. While artificial intelligence (AI) is growing in popularity, few realise that it necessitates knowledge engineering, information architecture, and reliable data sources [84]. Combining data and AI capabilities changes the focus of human–computer communication from the interface to the interaction [85]. Sydney's start-ups appear to focus on machine learning-powered data analytics and visualisation platforms, with a diverse range of AI-related business models. The most funded start-up is, unsurprisingly, in the financial technology industry [86]. Successful start-ups will be well positioned to take on established players in the healthcare industry and overcome the obstacles posed by more conventional businesses that have been slow to adopt digital transformation [69]. AI's pivotal role in digital transformation encourages an integrated approach to AI adoption that goes beyond simple technology upgrades to include paradigm shifts towards embracing a culture of sustainable learning and innovation [87]. Profit-driven enterprises strategically implement AI states in their endeavours to achieve sustainable business growth [88].

While AI has many potential benefits, it also has certain potential drawbacks, such as the potential to magnify human bias, heighten cybersecurity risk, and cause undesirable changes in employment opportunities [83]. According to Ref [89], strategic decisions contributed to successful AI and digital transformation start-up and implementation. Despite the significance of technology quality, direct technological aspects like patent protection and technology support do not play a significant role.

Internet on Things (IoT)

As businesses develop and technological innovation emerges, the demand for network resources changes, either systematically or erratically. Furthermore, addressing the challenge of accommodating the dynamic and diverse business requirements in IoT is still a significant issue [90]. The Industrial Internet Consortium asserts that the IoT is a third significant shift, building upon the advancements of cloud computing, mobile internet, big data, and other related technologies [91]. IoT is a novel concept that has transformed the conventional way of living into a technologically advanced lifestyle [92]. It is interconnected digital technologies that could bring about enormous social and technological changes and new possibilities [93].

IoT is a network of ordinary objects equipped with pervasive intelligence. IoT will enhance the internet's pervasiveness by connecting all objects for interaction through embedded systems. This will lead to a broadly distributed network of devices that interact with both devices and humans [94]. An emerging technology, the IoT is already present in the majority of processes and equipment, enabling the improvement of people's quality of life and the facilitation of specialised information and service access [95]. There has been a recent uptick in the number of nations embracing IoT and other tech-driven solutions for resource management sustainability across a variety of industries, including agriculture [96]. The term IoT refers to a network of interconnected physical items such as sensors, actuators, appliances, and more that purposes to enable the connection of physical objects and their communication and data exchange capabilities. The inclusion of IoT can provide significant scope for predicting, processing, and analysing circumstances, as well as improving real-time activities [96]. Additionally, in order to successfully adopt the IoT, proactive leadership is required to identify and account for stakeholders' diverse viewpoints and technological capabilities, and the use of blockchain and IoT technology in business process management has a significant impact on corporate innovation [97].

Collaborative Robots (Cobots)

Cobots are a category of Industry 4.0 technology that was specifically developed to assist workers in production and establish intelligent working environments. They are sometimes referred to as Industry 5.0 [29]. Industry 5.0 emphasises mass personalisation by combining sustainability and human collaboration with Cyber-Physical Systems (CPSs), primarily collaborative robots [98]. By enhancing their data analysis with the help of edge computing, cobots can accomplish tasks with more precision and less room for error [55].

The ideal human partner, along with cobots and human resources, is the basis of Industry 5.0, a strategy that aims to enable independent, personalised production across corporate social networks. Consequently, this will pave the way for machines and humans to work together. Even though they cannot be programmed, cobots are able to recognise and comprehend human beings [99]. Intuitive and human-aware programming tools are key enablers for facilitating intelligent and adaptive collaboration between cobots and human operators [100]. The implementation of cobots has the potential to enhance productivity [100,101] and the economy [101].

2.2.2. Middle Technology

Middle technology, also known as "mid-tech," refers to a type of technology that is more sophisticated than conventional or low-tech approaches but less complex or capital-intensive than high-technology solutions. The tools, techniques, and processes used are usually moderately advanced, but they are affordable and accessible for start-ups, especially in developing countries or countries with middle incomes [102].

Mobile Applications

Mobile applications or apps, are a relatively new and widely used type of mobile technology. In addition to shattering the mobile industry's long-established revenue model, this innovative artefact opens up a whole new potential for the mobile market [103]. The App Store, launched in July 2008, is a platform where both Apple and independent developers can distribute and sell apps. In approximately the same period, Google began working on Android, an open-source mobile operating system [104]. Mobile applications facilitate real-time data collection and sharing, thereby improving accountability and transparency in the accomplishment of initiatives to foster development [105].

Mobile applications are progressively emerging as a significant resource for ensuring the accessibility of public health services and other healthcare sectors [106]. Analysing the role and concept of culture is essential when investigating the use of mobile applications. Examining the role of culture in the acceptance and utilisation of mHealth applications provides significant insight for stakeholders, allowing them to organise strategies to address potential low adoption possibilities. Focusing on effort targets enhances a user-centred approach, whereas performance expectations shape the application's functionality [107].

Big Data

A data-driven revolution in management has recently swept over companies, forcing them to cope with significant changes in customer, business model, and operational management. The rapid development of big data technology and the abundance of big data have brought about this revolution [108]. Society 5.0 encompasses a wide range of wireless technology areas, including communication, computation, sensing, and more. By embracing supporting technologies such as big data analytics, blockchain, cobots, and 6G, among others, Society 5.0 plays a significant role in numerous applications [109].

Big data technologies have demonstrated significant efficacy in the assessment and development of predictive models aimed at sustainability [110]. Big data offers a fresh perspective on old problems with environmental sustainability. However, the environmental costs, ethical concerns, and regulatory complexities of these technologies are not without their challenges. In addition to assisting legislators create environmentally friendly regulations, the information in Ref [111] is useful for academics and practitioners looking for data-driven technological solutions.

Cloud Computing

Businesses can improve their operations and help create a more sustainable future by taking advantage of the numerous benefits that cloud computing offers [112]. Cloud computing is an important part of software and data engineering. Data mining and machine learning heavily utilise the yellow nodes on the left side of the picture [86]. Innovation in business is entering a new era through the combination of cloud computing and mobile applications. In addition, the UN's Sustainable Development Goals provide a comprehensive outline of Society 5.0's function [113].

The integration of cloud computing is the process of adopting cloud-based technology and services in company operations [114]. This integration may include integrating cloud-based software applications, cloud storage solutions, and other cloud-based services to increase the effectiveness and efficiency of a variety of company activities. In the long run, cloud computing's sustainable advantages can help ensure financial sustainability, and, in the short term, it can assist in saving costs [115]. One of the most important factors propelling businesses forward is the possibility that cloud computing services will greatly improve organisational productivity and business performance [116].

2.2.3. Low Technology

Low technology refers to the scenario where start-up companies maintain and supervise technology with limited expenses or by alternative methods to improve the delivery of public services [117]. Other research has shown that the implementation of low-tech solutions has significant potential to revolutionise the agricultural sector [118].

Software

In recent years, the emergence of digital technology has brought unprecedented changes to the workplace and business. This technology allows software to automate an increasing number of processes in the service sector [119]. This software can assist managers working, for example, in various fields of intellectual property in support of decision-making [33]. In order to generate the desired value, many organisations' proprietary software still necessitates assistance from other participants in the business network in the form of information, expertise, and data collection pertaining to particular operations [120]. The adoption of software-driven technology is critically important, especially in the field of technology-enhanced education. In the context of the fast-expanding digital landscape, it is essential for students entering society and the business sector to have unobstructed access to and the ability to acquire expertise in software-based instructional tools. Software-focused educational technology promotes the cultivation of digital competencies, encompassing relevant mindsets and attitudes, while continually instilling a sense of purpose in its use. It excels at fostering a genuine digital generation that is knowledgeable about sustainability [121].

Ref [122] examines the indicators used in the software industry, categorising 50 proposed indicators into three dimensions: environmental, economic, and social. The economic dimension includes one verified policy item, seven items connected to product and economic aspects, one item on financial management, two items on contract management, two items on corporate environmental management, and one item on data management. This indicates that investors are inclined to seek out companies whose strategies prioritise operational sustainability. Therefore, start-ups must adopt sustainable practices to enhance operational performance and attract investments for business expansion, thereby creating value for stakeholders. The development of localised SDG indicator systems, a comprehensive assessment of SDG progress, and the creation of policy tools have increasingly emerged as focal points in scientific research and practical applications related to the SDGs [123].

Connectivity

The internet's development began in the innovation stage between 1961 and 1974, followed by the institutional stage from 1975 to 1995, and the final stage of commercialisation from 1995 to the present [104]. The incorporation of connectivity opens up enough opportunities to enhance real-time activities through processing and analysis [96]. In particular, internet connectivity is an excellent communication tool, giving farmers new ways to interact with local and global markets, allowing producers to engage directly with local and foreign buyers while also selling their products through internet platform connectivity [124]. Another illustration of this phenomenon is the optimistic outlook for healthcare services enabled by 5G connectivity, which includes the availability of high-level wireless connectivity and the democratisation of computing [125].

Connectivity technology has the potential to completely transform the maintenance of connections in terms of operational efficiency and environmental impact [126]. The suggested connectivity system aims to ensure correct functioning and have an impact on business performance [127]. Strategic investments in innovation and technology, connectivity, and inclusivity can address specific challenges and support broader global objectives, thereby improving global competitiveness and economic resilience [128].

2.3. Sustainable Development Goal 8: Decent Work and Economic Growth

The perception of an entrepreneur's ability to provide sustainability and economic growth has evolved into a global entrepreneurship phenomenon. Increased efforts within the entrepreneurial ecosystem are required to improve entrepreneurial performance, resulting in the Sustainable Development Goals [129]. In recent decades, ecological degradation has emerged as the most significant threat to humanity. Green technological innovation, environmental legislation, and renewable energy usage are potentially significant contributors to the attainment of ecological sustainability [130]. Green technologies might contribute to the evolution towards sustainable development by mitigating threats to the environment and improving resource productivity [131]. Technology plays a crucial role in achieving the SDGs by enhancing data-driven decision-making and efficiency, promoting sustainable practices, fostering collaboration, increasing access to services, and addressing environmental challenges [132].

SDG 8 aims to achieve sustained economic growth, productive employment, and decent work for all individuals. Ref [133] examined and categorised the dimensions of sustainability into three distinct categories: economic, social, and environmental. These objectives outlined in Agenda 21 are designed to guide the intervention of governments, organisations, and civil society in critical areas for the planet and humanity. These areas include the planet, people, peace, prosperity, and global partnership for sustainable development [134]. More specifically, Goal 8.3 is to implement development-orientated policies that promote employment, entrepreneurship, creativity, productivity, innovation, and business development. The persistent COVID-19 pandemic has severely impeded progress towards SDG 8. There have been 255 million job losses as a result of the pandemic, and the United Nations predicts that the youth unemployment rate will remain on the rise [135].

2.3.1. Economic Growth

The challenge of formulating national economic policies that promote economic growth while also facilitating the attainment of the SDGs is significant [136]. Strong economic growth allows the countries to increase capital, labour, and technology, which supports the SDG agenda (including innovation, social welfare, and responsible consumption); therefore, there is a strong correlation between economic growth and the SDGs. An additional factor driving the attainment of SDGs through the generation of employment opportunities and the enhancement of net national income is foreign direct investment [137].

2.3.2. Employment

Technologies and applications exist that replicate human cognitive functions and execute tasks independently. This innovation has the potential to greatly assist individuals, particularly in employment, by offering considerable advantages for economic growth [138]. The correlation between blockchain technology and employment can be seen in its potential to enhance access to job opportunities and resources for marginalised individuals [139]. The widespread adoption of technology in business and management raises concerns about its impact on the welfare of humanity. Many people are concerned that artificial intelligence could one day displace them from the workforce, which is a major concern for employment opportunities [140].

2.3.3. Productivity

Productivity is defined as the ability to produce excellent output more efficiently, especially in a reprocessing and digital technology implementation environment [141]. Automation and digitalisation are examples of Industrial Revolution 4.0 technologies that can help maintain and boost production in a variety of industries, allowing employees to work from home instead of having to commute [142]. Implementing technology transformations such as robots, artificial intelligence, and data analytics in the agriculture sector has the potential to significantly impact its productivity and efficiency, which is crucial for its long-term sustainability [143].

2.3.4. Creativity

The term "creativity" refers to the products of collaborative processes in which different people work together to generate several possible understandings of a given concept. In the context of technology in particular, this approach of co-creative collaboration opens up opportunities for innovation [144]. The integration of technology transformation into the financial technology industry not only improves security and transparency but also fosters creativity, leading to the creation of more inclusive and sustainable financial solutions and products [145]. Another benefit of the adoption of digital technology transformation is that it enhances creativity through developing applicable resources and tools that facilitate innovation, the sharing of diverse knowledge among businesses, and access to the potential market [146].

2.3.5. Innovation

Innovation refers to the capacity for continuous adaptation and learning in response to change and the integration of technological advancements with human values along with sustainability to promote the welfare of society [147]. Innovation significantly impacts the evolution of technology, as it encompasses not only enhancements in productivity and effectiveness but also the advancement of sustainable practices [148].

2.3.6. Entrepreneurship

Technology and entrepreneurship are related, especially for energy efficiency and sustainable economic growth [149]. The entrepreneurial ecosystem is able to grow and innovate because of technology, which in turn allows entrepreneurs to create innovations in products and services [150]. Technology supports sustainable entrepreneurship, whereas innovative entrepreneurship promotes sustainability through technological adoption and improvement [151]. The significant effect of technology on entrepreneurship involves the development of business models. Technological innovation empowers entrepreneurs to innovate and achieve social and environmental value, aligning with the Sustainable Development Goals, particularly Agenda 8 [152].

2.3.7. Development Policies

Measures in development policy aim to improve the quality of life in urban areas by integrating technology transformation, environmental preservation, and citizen participation [153]. Development policies focused on data-driven methodologies, especially those utilising big data technologies, have the potential to improve sustainability in urban development [154]. Development policies must incorporate technology, especially its dual usage in legal and illegal operations. Policymakers can profit from these technologies while reducing their hazards by addressing regulatory ethical issues and security [155].

2.3.8. Business Growth

Business growth refers to the systematic process through which an entity or organisation enhances its operational productivity, fosters innovation, and strengthens competitive advantages in the global market. This progress includes both financial elements, the advancement of innovations, which are primarily facilitated by technology, and the potential to leverage existing regional cultures [156]. In keeping with the SDG agenda, technology promotes corporate growth by making processes more efficient, offering new opportunities, and encouraging sustainable growth [157].

3. Methods

The present research objective is to examine how the implementation of technological innovation in start-ups, such as digital transformation technology, along with high technology, middle technology, and low technology, contributes to the achievement of SDG 8. To answer our study question, we conducted a thorough PRISMA SLR. This study used content analysis to analyse data from a systematic literature review. A systematic literature review is a transparent and replicable process that consists of a sequence of phases that assists researchers in establishing the objective of their research and organising the retrieval and reporting of articles [59]. To provide a comprehensive overview of start-ups' technological innovation and risk, the author defines “high technology,” “middle technology,” and “low technology” in relation to entrepreneurship and SDG 8. Moreover, Boolean logic was employed to choose keywords and search queries for the examination of scientific publications [158].

This review collected scientific studies that discuss advancements in the use of start-up technologies. The authors of the systematic review detailed the 384 databases and supplementary sources used in their search for each reference, which comprised (1) Scopus https://www.scopus.com/ (Accessed 27 October 2023) and (2) Google Scholar https://scholar.google.com (Accessed 27 November 2023). We updated our searches to reflect the date of 24 June 2024. To address the implementation of technological innovation in start-ups to achieve SDG, the key terms used were “technology” OR “innovation” AND “start-ups” AND “SDG.” To address the implementation of high technology to achieve SDG, the key terms used were “high technology” AND “blockchain” AND “artificial intelligence" OR "collaborative robots" AND "Internet of Things" AND "sustainable development goals". To address the implementation of middle technology to achieve SDG, the key terms used were "technology" OR "innovation" AND "mobile application" OR "big data" AND "cloud computing" AND "sustainable development goals". To address the implementation of low technology to achieve SDG, the key terms used were "technology" AND "software" AND "connectivity" AND "sustainable development goals". There are no restrictions on the types of reports eligible for inclusion (i.e., in any language, regardless of publication date, and covering any subject), according to a review assessing the impact of technological innovation on the attainment of SDG 8.

The matrix arranges the selected report for discussion, ensuring a smooth and easy-to-understand issue. The key findings from the research projects are presented, with a focus on the phases leading to practical application. The identification step of the PRISMA approach is illustrated in (Figure 2), which entails selecting the most relevant research. The authors present the comprehensive search strategy they used across all examined databases.

Using the Microsoft Excel application, this study eliminated six papers that contained duplicate information and nine papers that were ineligible. In the second step, known as screening, the researchers examined the study titles and abstracts to examine if they were eligible for inclusion or not. The results showed that 210 documents were missing pivotal data and 67 documents were unretrieved. Hence, the researchers moved on to the second round of screening and gave each of the 101 documents a thorough once-over. In the third step, 50 studies were not eligible for inclusion and were thus removed. Finally, the systematic review selected 60 items that met the inclusion criteria.

The authors performed a review of the systematic review study to verify that all primary components are consistent with the model and research objectives. We performed this review by detailing the sampling method, implementing dual screening, and reaching a consensus for study selection. Two researchers, LD and SJ, independently reviewed the titles, abstracts, and keywords of the initial 200 results, engaging in discussions to resolve inconsistencies until they reached a consensus. The researchers independently reviewed the titles, abstracts, and keywords of all obtained articles in pairs. Consensus on the articles to be fully screened was achieved through discussion in the event of disagreement. Whenever necessary, we consulted the third and fourth researchers (AT and RS) to reach the final decision. Additionally, three researchers (LD, SJ, and AT) conducted independent screenings of full-text articles for inclusion. When disagreements arose, we reached a consensus on inclusion or exclusion through discussion, and, if necessary, we consulted the fourth researcher (RS).

The authors developed a standardised data extraction form to extract study characteristics related to technological innovation in start-ups to achieve SDG 8. The standardised form underwent pilot testing by all researchers, utilising ten randomly selected studies. This review analyses the impact of manually produced and paper-delivered technological innovation in start-ups on business practices and sustainability, noting the consistency of effect directions across studies as reported by the authors. Scholars have conducted research on high-technology innovations in start-ups such as AI, blockchain, IoT, and collaborative robots; middle-technology innovations such as mobile applications, big data, and cloud computing; and low-technology innovations such as software and connectivity. The elements of the impact of SDG 8 include economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and business growth. To standardise the effect direction, we defined all process compliance outcomes so that higher values indicate improvement.

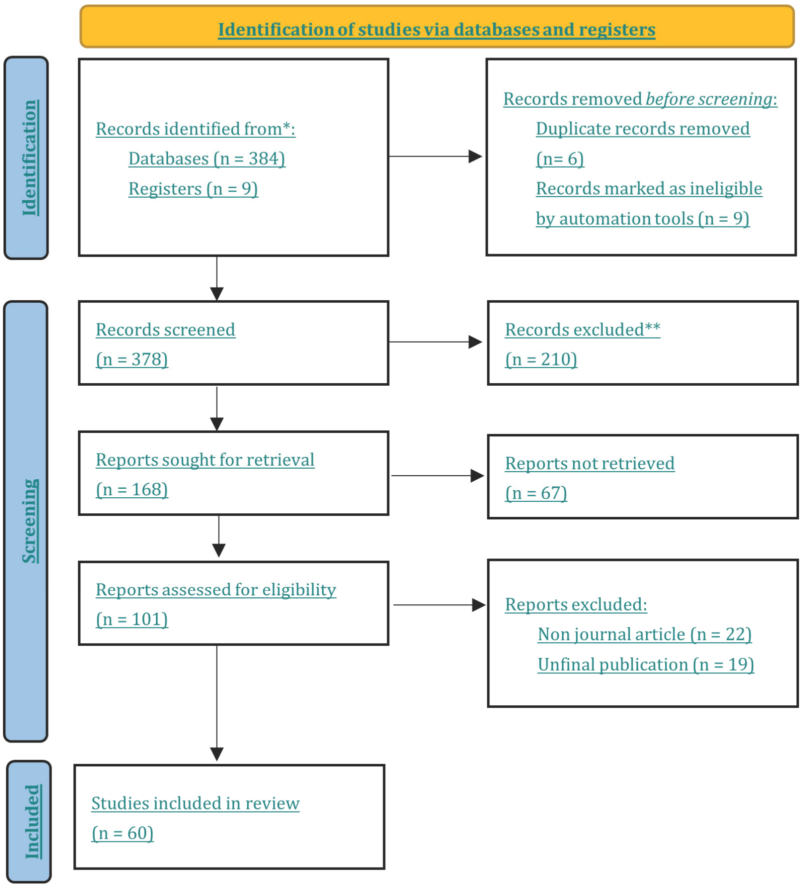

Figure 2. PRISMA flow chart (source: own source). * Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers). ** If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

The authors also listed and defined every variable they collected data for, including report characteristics, study design, and intervention specifics. This study collected data on the level of technological innovation, characteristics of each technology, definitions, and elements of SDG 8, as well as the report's author, year, methods, and publication limitations. The document outlines the methodical steps used to evaluate research for each systematic review synthesis. 1. Study Identification: We searched Scopus to identify technological innovation and SDG 8 studies. We identified, collected, and de-duplicated 384 records. 2. Dual Screening: We screened the titles, abstracts, and keywords of discovered studies. LD and SJ independently examined the initial 200 findings. The researchers settled on full-text screening studies by addressing inconsistencies. 3. Full-Text Review: After screening, the team reviewed the selected studies in total. We thoroughly examined the substance of each study to determine its inclusion. To resolve conflicts, we consulted a third party. 4. To collect data on start-up technological innovation study characteristics, we built a standardised data extraction form. We included details on technical advancement, technology qualities, and SDG 8 definitions and components. 5. Tabulation and Comparison: We entered the gathered data into tables to compare the study intervention with the intended groups for each synthesis. We categorised the studies based on their technical innovation level (high, middle, and low) and their relevance to SDG 8. 6. Final Pick: The researchers chose 60 studies for the systematic review after screening and data extraction. The team chose papers that met the goals and shed light on how technology progress affects SDG 8. For a full literature synthesis, this methodical approach to study selection was apparent and replicable.

In order to prepare the data for the systematic review presentation and synthesis, we employed a variety of methods to address issues, such as missing summary statistics and data conversions. The following methods were used most: (1) We designed a standard data extraction form to gather pertinent data from each study. This form has study qualities, technological innovation levels, and SDG 8 components. This standard facilitated the uniform collection of data for investigations. (2) Addressing Insufficient Data: We contacted writers of articles without data or summary statistics for more information. This proactive method addressed data inadequacies and ensured a more complete dataset for analysis. (3) Data Conversion: The team classified technological innovation into high, midrange, and low categories for entrepreneurship and SDG 8. This classification allowed study comparison and a more cohesive synthesis across technology categories. (4) Direction of Effect Standardisation: To ensure that all SDG 8 results had the same direction of effect, the authors configured all process compliance outcomes to indicate improvements. Standardisation helped synthesise the results from different investigations for meaningful comparisons. (5) Matrix Arrangement: We placed the selected reports in a matrix arrangement to encourage discussion and clarify the key results. This matrix showed study relationships and their contributions to the investigation. (6) Data-Inclusion Agreement: In the data preparation phase, the team discussed whether to include or eliminate research based on relevance and quality. This collaborative approach made the final dataset robust and met this study's goals. A thorough and meticulous approach to data preparation for presentation and synthesis strengthened reliability and validity of this review's findings.

The systematic review used several techniques to investigate potential reasons for the heterogeneity in study findings, particularly with regard to how start-ups' technological innovation affects the achievement of SDG 8. The researchers hoped to improve the validity and applicability of their findings about technological innovation and SDG 8 by better understanding the variables causing heterogeneity in study outcomes. Methods to evaluate the risk of bias resulting from missing results, especially those caused by reporting biases, were probably used in the systematic review to guarantee the robustness of the synthesis. Although the specific literature does not delve deeply into these methods, we can infer the following common procedures in systematic reviews by using the PRISMA guidelines approach, which emphasises reporting transparency and encourages authors to identify any potential biases, including those linked to missed results. The researchers may have synthesised the findings from the included studies, classifying outcomes according to the strength and consistency of the evidence. This synthesis conveys confidence in the findings and emphasises regions with robust evidence.

4. Result

To address the research questions, the 60 selected papers, which went through various steps in the PRISMA approach, included important material for each sub-item of the study issue. These articles provided information and statistics on the academic and entrepreneurial consequences of SDGs. Our comprehensive literature study objectives are to better understand the impact of technological innovation for Sustainable Development Goal 8 on start-up performance, including a review of digital transformation (Table 2); high technology (Table 3); middle technology (Table 4); low technology (Table 5); and a review of selected studies (Table 6). We analysed the publications that met the researcher's criteria for digital transformation and technological innovation in high technology, mid technology, and low technology to achieve SDG 8 features such as economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and business growth. Subsequently, we examined documents that referenced any of the studies initially included and the references from those studies.

This research addressed the first research objective, which is the implementation of digital transformation innovation in start-ups to achieve SDG 8 by analysing 12 papers. Based on the systematic literature review, digital technology transformation to achieve SDG 8 in start-ups impacts economic growth, employment, productivity, entrepreneurship, development policies, and business growth.

In addition, this research addressed the second research objective, which is the implementation of high-technology innovation in start-ups to achieve SDG 8 by analysing 29 papers. Based on the systematic literature review, the process of high technology in start-ups impacts productivity and business growth. More specifically, the application of blockchain technology can positively impact economic growth, innovation, and development policies. Meanwhile, the application of artificial intelligence technology positively affects all aspects of SDG 8, namely economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and business growth. Meanwhile, implementing Internet of Things technology in start-ups can impact economic growth, productivity, and innovation. Applying cobot technology in start-ups also positively affects economic growth, productivity, and creativity.

Furthermore, this study examined seven publications to achieve the third research purpose: to integrate middle-technology innovation in start-ups to accomplish SDG 8. Implementing medium technology in start-ups to achieve SDG 8 encourages economic growth, productivity, and company growth. Implementing mobile application technology may improve employment, entrepreneurship, and business growth. Meanwhile, implementing big data technology enhances productivity, innovation, and business growth. Finally, the implementation of cloud computing technologies in start-ups can have an impact on productivity and business growth.

Lastly, this study examined eighth publications to achieve the third research purpose: integrating middle-technology innovation in start-ups to accomplish SDG 8. The systematic literature review results indicate that implementing low technology in start-ups to achieve SDG 8 has a positive impact, primarily in the aspect of productivity. Low-tech applications, especially software, may improve economic growth, productivity, and innovation. Afterwards, implementing connectivity technology in start-ups positively impacts economic growth, employment, productivity, and innovation.

Several publications resulting from PRISMA also correlate with technological factors affecting SDG 8. Seventeen publications were analysed where technology quality, investment, knowledge, applicative domains, human resources, law/policies, quality of service, and telework can influence SDG 8.

Afterwards, potential threats to validity exist in the systematic review of technologies utilised by start-ups to achieve SDG 8.3. This systematic literature review is subject to various potential threats to validity. (1) Selection bias: When limited to a few databases, the chosen studies may not be generalisable to a broader or more specific domain. (2) Publication bias: We exclusively used certified articles from publications indexed in Scopus Quartiles 1 to 4. (3) Temporal bias: This review may have omitted earlier studies presented as reports and significant research about technological innovation in start-ups, concentrating instead on publications from a defined timeframe. (4) Limitations of technology and methodology: The technology domain rapidly evolves, rendering methodologies or technologies from previous years potentially obsolete.

Table 2. Review of digital transformation innovation (source: own source).

Technology	Sustainable Development Goal 8.3							
	Economic Growth	**Employment**	**Productivity**	**Creativity**	**Innovation**	**Entrepreneurship**	**Development Policies**	**Business Growth**
Digital Transformation Technology	Digital transformation technology enhances sustainable economic growth [28,112,159]	Digitalisation has a significant impact on employment [98]	Technology transformation leads to positive impacts on productivity improvements [160–165]			Technology democratises entrepreneurship for marginalised communities and makes market adaptation faster [152]	Digital transformation technology creates development policies [112]	The benefits of digital technology to improve business growth and success are significant [112,117,163]

Table 3. Review of high technology innovation (source: own source).

Technology	Sustainable Development Goal 8.3							
	Economic Growth	**Employment**	**Productivity**	**Creativity**	**Innovation**	**Entrepreneurship**	**Development Policies**	**Business Growth**
High Technology			To boost productivity, the government and public entities must provide enough subsidies to encourage high technology [166]					High-tech industries have a potential impact on business growth [54]
Blockchain	Blockchain algorithms may be effectively implemented in real-time settings, providing economic growth [77]				The distinctive component provides a platform for future innovation [48,167]		Blockchain technology can assist policymakers and support development policies [76]	
Artificial Intelligence (AI)	The adoption of AI has the potential to increase economic growth [138,168]	AI has the potential to assist humanity, particularly in the realm of employment [138,169]	AI can drive organisational growth through productivity [170–172]	Artificial intelligence can address challenges and develop creativity [173]	AI-driven innovation and development of innovative products [48,68,87,130,174,175]	Integrating the entrepreneurial process both theoretically and practically [175,176]	Identification of regulatory classification [68]	Frame of opportunity for changing continuous stakeholders in the financial sector [175]

Internet of Things (IoT)	IoT allows for continuous tracking and encourages expansion in economic growth [168]		IoT drives organisational growth through productivity [50,92,170]		IoT can drive organisational growth through innovation [168]			
Collaborative Robots (Cobots)	A detailed parametric analysis using cost models to identify the economic growth generated by cobots [101,177]		The implementation of cobots has the potential to enhance productivity [29,100,101,142,143,178]	Cobots are capable of fostering creativity [98]				

Table 4. Review of middle technological innovation (source: own source).

Technology	**Sustainable Development Goal 8.3**							
	Economic Growth	**Employment**	**Productivity**	**Creativity**	**Innovation**	**Entrepreneurship**	**Development Policies**	**Business Growth**
Middle Technology	Leads to more sustainable farming methods and better economic results for start-ups [102]		Middle technology has the ability to significant enhance productivity [102]					Decreases resource use and costs, and encourages sustainable business [102]
Mobile Applications		The successful implementation of a mobile application can create significant employment [105]				The effective execution of a mobile application has the potential to enhance entrepreneurship [105]		
Big Data			Big data applications drive organisational growth through productivity [108,170]		Big data analytics in a metaverse setting may improve innovation [170]			The dynamics of quality in the big data environment are associated with enhancing business value [179]

Cloud Computing			A bibliometric analysis that leverages web frameworks and cloud services significantly enhances productivity [113,116]					Cloud computing will significantly increase business performance [116]

Table 5. Review of low technological innovation (source: own source).

Technology	Sustainable Development Goal 8.3							
	Economic Growth	Employment	Productivity	Creativity	Innovation	Entrepreneurship	Development Policies	Business Growth
Low Technology			The performance of low-technology scenarios involves understanding the potential for technological productivity advancements [73,166]					
Software	Software provides improved cooperation and lower operating expenses, resulting in increased production and economic growth [180]		Software offers significant advantages in management by enhancing productivity, especially in office-related tasks [119]	Software can foster a sense of adventure and creativity in taking advantage of technology [121]				
Connectivity	Connectivity technology has the ability to significantly boost economic growth [126]	The potential benefits of connectivity technology include the generation of employment opportunities [126]	Connectivity proved that advances in management strategies and sustainability have significant impacts on the productivity of technological innovation [124]		The distinctive component provides a platform for future innovation [48]			

Table 6. Review of selected studies (source: own source).

Technological Factors Influencing SDG 8.3.	Sustainable Development Goal 8.3							
	Economic Growth	**Employment**	**Productivity**	**Creativity**	**Innovation**	**Entrepreneurship**	**Development Policies**	**Business Growth**
Technology Quality [89]			System availability and reliability may improve productivity [161]				Provides an opportunity to influence the mindset of stakeholders and create a new form of regulation [175]	
Investment [89]	Investing in infrastructure has the potential to increase economic growth [88,89,173,181]							
	Investing in IT applications may improve economic performance [182]							
Knowledge	Knowledge of technology has a positive significant impact on economic growth [183]							
Applicative Domains [184]				Solutions to algorithms such as intelligent data and language processing may stimulate creativity [85]				
Human Resource			The workforce's digital skills may improve productivity [74]					

		The workforce's technical competence may improve productivity [120,185]	
		The platform resource management framework, utilises software-defined networking technology to enhance productivity [186]	
Law/Policies	Policies that promote the advancement of technology can boost economic growth [183]	Policies that promote the advancement of technology can stimulate productivity [183]	
Quality of Service		Machine learning and learning processes make a positive contribution to productivity [187]	
		Service in 5G environment can increase productivity [162]	
Telework	Remote sensing, especially in developing nations, would boost global economic growth [164]		Digital technology allows for remote work and may stimulate innovation [33]

Insights and Future Directions

According to the findings of this research, technology has the ability to contribute significantly to SDG 8.3, which includes economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and company growth. The authors have summarised the impact of varying levels of technology, whether low, medium, or high, on the achievement of SDG 8.3. Although the use of technology in various studies has resulted in positive outcomes for SDG 8.3, there are certain limitations in this research. These limitations allow for suggestions or solutions to maximise the efficacy of the achievements and address these constraints. Table 7 summarises the methods and constraints of each reviewed study and provides more specific implementation information.

Here is a brief summary of the features and the risk of bias among the participating papers based on the details provided:

(1) Research on Big Data Technologies: Characteristics: This study examines the adoption and effect of big data technologies in medium- and large-sized organisations in France, using self-reported data from CIOs and quantitative approaches such as PLS-SEM and fsQCA. Bias Risk: Using self-reported data may result in bias or inaccuracy. Furthermore, the emphasis on specific company sizes and geographical locations limits generalisability, and the small sample size (132 respondents) may reduce the robustness of the findings. (2) AI and SDGs: Characteristics: This study uses secondary analysis and content evaluation to investigate AI's impact on fulfilling the SDGs, namely in poverty alleviation and infrastructure improvement in developing countries. Bias Risk: This research is limited by a lack of significant studies on the hazards of AI, worries about data quality, and service providers' technical skill, all of which may affect the trustworthiness of the conclusions. (3) Connectivity Technology: Characteristics: This study evaluates how connection technologies reduce water scarcity in Asian agricultural areas using literature studies and ANN modelling. Bias Risk: Possible data biases and the fact that ANN models cannot fully capture the complexity of agricultural systems are some of the problems that could make the results less useful in other situations. (4) AI in Entrepreneurship: Characteristics: This study used a multiple-case study technique to investigate AI's influence on venture formation, combining theoretical arguments with empirical data from a variety of sources. Bias Risk: Using secondary data may ignore the whole context of AI implementations, and focusing on European start-ups may limit the findings' application to other locations or sectors. In conclusion, while these studies provide useful insights into their respective domains, they all face similar risks of bias due to sample size, reliance on self-reported data, and contextual limitations that may impair the generalisability and reliability of their results. The document does not include particular results from statistical syntheses or meta-analyses, such as summary estimates, confidence ranges, or statistical heterogeneity indicators. However, it does state that the systematic evaluation included a detailed examination of selected research and categorization based on technical innovation levels and relevance to SDG 8.

Table 7. Summary of the methods and constraints of selected studies (source: own source).

Technology	Type of Technology	Ref	Year	Methodology	Limitation
High-Tech	Blockchain	[86]	2024	The methodology for blockchain technology includes a structured literature study, data compilation, research classification, application analysis, critical problems, and future prospects. This comprehensive approach seeks to comprehend blockchain's significance in Peer-to-Peer (P2P) energy trade, notably for electric vehicles.	Significant limitations limit blockchain technology's viability and scalability. Scalability is a problem since the system cannot handle many transactions at once, slowing them down and raising fees. Performance limitations may make blockchain systems less efficient than conventional databases for data processing.
		[50]	2021	Blockchain methodology includes distributed ledgers, smart contracts, cryptographic security, consensus mechanisms, AI, and 5G integration. This holistic strategy lets blockchain deliver secure, transparent, and efficient solutions across applications, notably in the Fourth Industrial Revolution.	Many limitations slowed blockchain adoption. Privacy breaches are conceivable, as all transactions are public. Scalability issues can slow processing and raise costs. Performance issues may slow data processing. Blockchain's limited applicability outside of Bitcoin stems from its difficult incorporation.
		[167]	2022	The methodology involves a comprehensive approach that integrates various components, including the Hierarchical Content Identifier Mechanism, Decentralised Applications, smart contracts, and InterPlanetary File System, to create a secure framework for manufacturing systems.	Scale, energy consumption, implementation complexity, regulatory ambiguity, data privacy, interoperability, security, development costs, and governance concerns are some of the drawbacks of blockchain. Optimising blockchain technology's benefits and ensuring its efficient rollout across varied sectors requires reducing these limits.
		[76]	2023	The mixed-methods approach produced a conceptual framework for Blockchain-Enhanced Product and Service Systems (BC-PSSs) for sustainable furniture. This study used VOSviewer to quantify blockchain, product–service systems, and sustainability.	The limitation stems from our reliance on a small number of expert interviews, which may not represent the organisation's diverse opinions. The rapid growth of blockchain technology means that results may quickly become outdated, needing constant framework updates to stay relevant in sustainable practices.
	Artificial Intelligence (AI)	[138]	2024	This methodology involves a comprehensive approach that includes data collection, econometric modelling, causality analysis, and examination of interaction effects on governance quality. The goal of this methodology is to shed light on how AI can effectively drive employment and economic growth, especially in Brazil, Russia, India, China, and South Africa (BRICS).	The limitations of AI include data quality, governance, economic inequities, job displacement, ethical and privacy issues, talent gaps, unpredictable outcomes, higher prices, and poor AI comprehension. Reducing these constraints is necessary to maximise the benefits of AI and ensure its responsible and effective implementation across industries, including the employment and economic development of BRICS.
		[168]	2024	The methodology for AI technology includes identifying innovative domains, building integrated systems with AI and the IoT, acquiring and analysing data, real-time monitoring, measuring	The limitations of AI encompass hurdles associated with data dependency, integration complexity, ethical dilemmas, talent

		performance, and supporting iterative development. This extensive methodology aims to achieve AI-efficient urban innovation.	deficiencies, elevated costs, outcome unpredictability, regulatory obstacles, potential job displacement, and inadequate comprehension of AI.
[169]	2021	The study employed secondary analysis and content analysis to explore how AI influences the SDGs, focusing on poverty reduction and infrastructure improvement in disadvantaged nations. Authors evaluated government records, global statistics, and peer-reviewed studies using non-intrusive research methods to establish common themes and ideas related to AI's effects.	There is a lack of extensive research regarding the possible risks and disruptions linked to AI, especially in urban environments. Concerns around data quality and accessibility, along with the embryonic phase of AI technology, diminished the reliability of the results. The inadequate technical proficiency of financial service providers impeded the effective implementation of AI in specific areas.
[170]	2024	The study examined how Artificial Intelligence Usage, Internet of Things Usage, Big Data Analytics Usage, and Metaverse Environment Efficacy drive organisational innovation and productivity using Partial Least Squares Structural Equation Modelling, fuzzy-set Qualitative Comparative Analysis, and Artificial Neural Networks.	The survey was limited to 132 responses, which may have reduced its generalisability. The study's quantitative approach may overlook important qualitative insights, and AI's rapid evolution may prevent its findings from fully addressing future advancements and challenges in organisational applications.
[172]	2022	The researchers used secondary research and content analysis to examine how AI influences the SDGs of poverty reduction and infrastructure improvement. Through government papers and peer-reviewed studies, researchers have identified key themes and analysed AI technology's impacts on emerging economies.	Insufficient extensive study on AI threats may limit our understanding of its ramifications. Data availability, quality, and the evolution of AI technology may also influence the findings' reliability and applicability in various contexts.
[173]	2022	Researchers employed a qualitative case study technique to evaluate how AI affects Design Thinking. To evaluate AI's impact on digital transformation, researchers examined 80 start-ups in a database and chose 20 that were the most capitalised for in-depth analysis.	The focus on a specific sample of firms, which might not accurately reflect Design Thinking's AI usage, is one of its limitations. Qualitative data may bias findings, and AI is rapidly evolving, making them obsolete.
[48]	2021	Large datasets teach algorithms how to identify and predict patterns through data collection, preprocessing, model training, and validation. AI uses supervised, unsupervised, and reinforcement learning to enhance performance with training data and feedback.	Data reliance limits AI, requiring vast amounts of high-quality data for learning and performance. Biases in training data can also affect AI results. The intricacy of AI models can also make decision-making opaque. We must address ethical issues such as privacy, security, and employment displacement as AI evolves.
[174]	2022	AI for biodiversity conservation and forest management requires a comprehensive approach and peer-reviewed data. Authors prediction algorithms use satellite images, sensor data, and biological data to automate species identification, deforestation monitoring, and resource management. Conservation benefits from real-time analysis and decision-making.	AI in this application relies on large, high-quality datasets, which may be unavailable in developing countries. AI models' complexity can make interpretation and transparency challenging, impeding stakeholders' understanding of decision-making. Data privacy and AI algorithm biases could affect conservation programmes and have unintended repercussions.

	[68]	2023	Clinical AI methodology is qualitative and includes early-stage digital health and AI entrepreneurs' accounts. Thematic analysis helps researchers understand technological integration issues. The paper suggests healthcare providers, regulators, and technology developers work together to understand health technology acquisition and validation.	The sample size is a limitation that may hinder digital health and AI generalisability. Focusing on cardiovascular medicine, pre-profit companies may miss other healthcare technology sector issues. Businesses may be reluctant to discuss sensitive sales strategies and issues, biassing participants' responses.
	[87]	2024	The study uses extensive literature review and experience-driven research. The study methodically evaluates AI, innovation, and digital transformation academic research to construct a theory. Qualitative data from field workers' observations, interviews, and surveys inform the experience-driven approach.	This study's limitations include the experience-driven approach's subjectivity, which may skew outcomes. Current literature may overlook undocumented AI technology trends and breakthroughs. Focusing on certain industry applications may not reflect the challenges and opportunities AI faces across different areas.
	[130]	2024	This study uses Panel Quantile Regression fully modified ordinary least squares Dynamic OLS and Fixed Effect OLS to examine how new green technologies, environmental policies, and renewable energy affected the G-7 countries' long-term environmental health from 1994 to 2018.	Historical data may not reflect environmental and technological changes, limiting the research. Highlighting G7 states may exclude other regions or growing economies. Complex econometric models may limit interpretation and applicability, and omitted variables may be biassed by not analysing all ecological sustainability aspects.
	[175]	2024	It employs a detailed literature review and empirical analysis to analyse AI's impacts on many businesses. The empirical study uses case studies and qualitative data from industry professionals and stakeholders, while the literature review synthesises AI applications, problems, and regulatory frameworks.	Subjective interpretations during interviews may lead to bias in qualitative data. Furthermore, the swift progression of AI technology indicates that discoveries may rapidly become obsolete as new advancements arise.
	[176]	2022	To assess how AI affects venture development in four AI-driven companies, the methodology employs a multiple case study approach. It used modern research theories and secondary data from the internet, video, and founder and client interviews. This method offers a comprehensive analysis of how AI technologies affect entrepreneurship prospecting, production, development, and exploitation.	Secondary data may not capture the full context or complexities of start-up AI solutions. Limited to European start-ups, the findings may not apply to other sectors. As AI technology advances, insights may quickly become outdated, and the complexity of AI systems can complicate the assessment of their impact on entrepreneurship.
Internet of Things (IoT)	[168]	2024	The methodology uses IoT and AI data to visualise Chengdu's innovation scene. For system scale and complexity, inventive components, network connections, and sensor deployment density are performance analysis criteria.	Creative competencies, higher education and research institutions, and entrepreneurship comprise the innovation ecosystem. This narrow focus may miss infrastructure and policy, which profoundly affect innovation.
	[50]	2022	The methodology used a mixed-research approach to investigate the Valley of Death (VoD) experienced by high-tech entrepreneurs,	The research's focus on Finnish companies may not accurately represent IoT's global challenges. Self-reported data from interviews may

			notably in the Internet of Things sector. Authors qualitatively interviewed senior managers from 30 Finnish enterprises about their VoD strategy and experiences.	also be biassed, as individuals may exaggerate their experiences. The study's findings might not apply to other high-tech sectors due to variations in organisational challenges and solutions.
	[103]	2019	The multi-tiered IoT architecture uses distinct security and data management protocols. Gateways, adapters, and Secure Socket Layer and Datagram Transport Layer Security ensure device interoperability. Big data analytics is prioritised to handle and evaluate IoT device data in real time and increase system performance.	Due to authentication and data transmission concerns, the IoT poses security and privacy risks. Due to IoT devices' features, platform communication may be difficult. Scalability and resource availability issues may limit IoT systems, especially as device numbers rise. Ethics and law constrain IoT technologies.
	[170]	2024	Partial Least Squares Structural Equation Modelling, fuzzy-set Qualitative Comparative Analysis, and Artificial Neural Networks are used to find linkages between Artificial Intelligence Usage, Internet of Things Usage, Big Data Analytics Usage and Metaverse Environment Efficiency.	The study's 132-person sample may limit its usefulness. The absence of research on moderating variables and contextual factors may limit their applicability to other areas.
	[168]	2024	The study uses a unique Chengdu space system combining Internet of Things Usage (IoTU) and internet worms. It uses 500 sensors per square km to collect and assess innovation and network data. IoT measures real-time recognition rates, communication quality, and sensor fault detection to ensure accurate data processing and visualisation.	The drawback of this approach is that it primarily concentrates on innovative individuals, higher education and research institutions, and entrepreneurial firms, often neglecting infrastructure and policy analysis. This tight focus may disregard innovation space system components.
Collaborative Robots (Cobots)	[101]	2020	The methodology uses parametric analysis of tactical-level factors, including throughput, operator costs, and operation timeframes, to determine when cobots can enhance productivity. By comparing cost per product among assembly configurations, the decision support system lets practitioners evaluate the benefits of integrating cobots with Digital Instructions (DIs).	Lack of balance and operational-level components limit assembly system efficiency. The decision support system prioritises cost models over task sequencing and workstation balancing; therefore, theoretical predictions may differ from reality. The research's single-product model may misrepresent multi-product assembly line dynamics.
	[177]	2019	With cobots and humans, the methodology balances the assembly line. Ergonomics, processing times, and resource capacities determine cost-effective assembly job arrangements. A real-world case study optimises assembly line jobs and resource allocations to test the concept using labour, COBs, energy, and station layouts.	People's differences in cobot processing speeds pose a significant disadvantage. Additionally, the model disregards jobs that might not be suitable for cobot execution, thereby restricting its application in the assembly context. Ergonomic risk assessment may overlook other worker well-being and productivity factors.
	[29]	2023	It studies how cobots affect manufacturing workers' skills qualitatively. This requires reading 200 COB reports from 138 organisations and interviewing both the implementation team and	Early-stage cobot implementations may not adequately capture the long-term effects on workers' skills as organisations enhance human–cobot interaction. Interviewee viewpoints may inject biases into the

				consumers. In-depth interviews with two cobot competitors examine the technology's impact on labour skills.	qualitative study, reducing its generalisability across industries or countries.
		[111]	2019	The methodology for producing cobots involves communication, optimisation, and education. Cobots obey human commands through both verbal and nonverbal communication. Optimisation of algorithms adapts cobot activity to human and environmental conditions for efficiency and security. To adapt to changing industrial situations, cobots can learn from demonstration by watching human operators.	Accurate perception systems are crucial for human–robot interaction, but illumination and occlusion might limit them. Programming complexity and the necessity for human operators to comprehend algorithms can also hinder adoption. Learning algorithms are probabilistic; therefore, cobot's behaviour may be unpredictable, posing safety and trust concerns among industrial operators.
		[142]	2024	Semi-structured online interviews with construction business management, government agency staff, IT specialists, and academics collected qualitative data using an exploratory and phenomenological method. Saturation after 10 interviews indicated no fresh ideas.	Virtual interviews may reduce interaction and non-verbal clues that could provide greater insights. South Africa's distinct geographical environment may limit the findings' applicability to other locations or nations with different building industry dynamics and technological adoption levels.
		[143]	2024	Developing the agricultural rover involves building a six-DOF arm robot for autonomous vegetable harvesting and soil analysis. While an NPK sensor evaluated soil nutrients, You Only Look In real-time, deep learning algorithms of version 5 identified ripe tomatoes. The microprocessor and microcontroller allowed remote operations and dynamic customization.	Navigation and detection of cobots may pose challenges in unstructured conditions such as sunlight and changing terrain. One deep learning model may limit the rover's ability to identify and classify crop varieties obscured by foliage or at different growth stages. Onboard hardware may not support real-time processing, affecting autonomy.
		[178]	2021	The methodology for deploying cobots entails evaluating their capabilities. This includes specifying the cobot's tasks, assessing the operating environment, and statistically predicting productivity benefits.	The limited range of capabilities of cobots can impact their performance in various jobs and environments. Operational factors may constrain the cobot's efficacy in unpredictable scenarios.
		[98]	2024	The methodology for investigating cobot technology includes a literature review and expert surveys to determine how cobots align with Industry 5.0. Search Scopus and Web of Science for human–robot collaboration, workplace safety, and implementation skills articles. This study uses standardised cobot adoption surveys to evaluate collaborative robots' human–machine interactions.	The literature review reveals that a limited number of cobot technology studies concentrate on Industry 5.0. This scarcity may limit cobot efficacy and safety data in various industrial applications. Expert opinions may be biassed since they may not represent the larger workforce or the different industries that could benefit from cobot integration.
Mid-Tech	Mobile application	[105]	2022	The methodology inventoried Indian afforestation assets using the Mahatma Gandhi National Rural Employment Guarantee Act mobile application. The Indian Space Research Organisation Bhuvan web-enabled Geographic Information System tool collected real-	The skill levels of ground people and the conditions of afforestation may affect data quality. Mobile technology may also cause network concerns in remote places, which could slow real-time data entry and reduce dataset completeness.

				time and geo-tagged afforestation data from over 200,000 field workers.	
	Big Data	[108]	2018	The methodology surveyed 200 businesses of French Chief Information Officers to assess the risks and advantages of adopting big data technology. Authors used Kruskal–Wallis and chi-square tests to identify significant business size and industrial sector differences after randomly selecting a larger sample.	The study's reliance on self-reported data from French Chief Information Officers (CIOs) may introduce bias or inaccuracies in responses about the adoption and impact of big data technologies. The study's focus on medium and large companies in France may limit its generalisability to smaller firms or different economic environments.
		[170]	2024	Multiple methodologies investigate the impacts of AI, IoT, big data analytics utilisation, and Metaverse Environment Efficiency on organisational innovation and productivity by using PLS-SEM and fsQCA hypothesis testing.	Generalisability is limited by 132 respondents. The research uses quantitative methodologies, which may miss qualitative insights that explain complex technology linkages. Lack of contextual and moderating variable analysis limits industry use.
		[179]	2016	This study used quantitative cross-sectional poll surveys of big data analytics-experienced IT managers and business analysts. The authors tested the study model using PLS-SEM.	Cross-sectional data may not account for technology use's dynamic effects, restricting the study. Self-reported data from one method may be biassed and not generalisable across sectors or situations.
	Cloud Computing	[113]	2024	A bibliometric analysis of 391 peer-reviewed Web of Science publications examined cloud computing in Web GIS frameworks. This study exhibited author, journal, keyword, and collaborative network data using R, Bibliometrix, and Biblioshiny.	Limitations like using only Web of Science could exclude important Scopus or Institute of Electrical and Electronics Engineers publications. Review articles may outweigh conference papers. The issue changes frequently.
		[116]	2019	The quantitative study explored how prolonged Cloud-Based Business Services (CBSSs) use affects Malaysian entrepreneurs. On a five-point Likert scale, 24 items assessed persistent CBBS use and financial and non-financial performance. PLS-SEM confirmed measurement and structural models and analysed linkages.	The study's focus on Malaysian entrepreneurs may limit its application to other emerging economies. The research model included two independent factors and one dependent variable, indicating the need for additional variables in future investigations.
Low-Tech	Software	[180]	2024	This study used qualitative and quantitative methods. Through focus groups and technical acceptability reviews, five industry professionals generated hypotheses. The result presented a structured questionnaire with these attributes to 145 respondents and used IBM Statistical Package.	The 145 respondents in the study may not accurately represent technical energy utility workers. United Arab Emirates research may not be applicable to other fields or businesses. Self-reported data may be biassed since respondents may have selected socially desirable answers over their true feelings.
		[130]	2023	This study utilises a unique panel of 10,000 Japanese workers' pre-COVID-19 to late 2022 questionnaires and assesses the viability of occupational telework and automation technology using Dingel–Neiman and Frey–Osborne criteria.	Early research lacks statistics on the number of workers replaced by automation technology, making it impossible to assess AI's influence on job displacement. Self-reported survey answers may be biassed due to workers' present employment position.

	[121]	2023	South Korea deployed the qualitatively studied "3D Time Machine" EdTech course. Students conducted semi-structured face-to-face interviews and produced reflections throughout two semesters.	One study limitation is the limited sample size, with only 20 students in the course and 9 interviewed. The study's concentration on one course at one university limits its applicability to other educational settings or fields.
Connectivity	[137]	2021	A detailed study examines how 5G affects port productivity and sustainability. The economic, social, and environmental benefits of extended port connectivity options are examined utilising literature, case studies, and empirical data.	Unfortunately, it fails to consider the environmental and social externalities associated with the adoption of connection technology. Visually, it neglects infrastructure improvements such as 5G antennas and automation-induced job losses.
	[124]	2024	This study used literature reviews and ANN models to draw conclusions in order to examine management strategy, green innovation, and sustainability-related input and output parameters using a SPANN.	Networking technology has significant limitations. Asian countries' digital readiness may hinder internet-based agriculture. Data biases and unreliability may affect the model's agricultural predictions and generalisability.
	[48]	2021	The methodology for examining connectivity technologies, particularly in the context of the 4IR, entails analysing the convergence of AI, blockchain, and 5G.	Blockchains have more transactions than databases, making scaling difficult. Blockchain transactions can divulge sensitive data and raise privacy worries.

5. Discussion and Recommendation

This research analyses the implementation of technological innovation, including digital transformation, high technology, middle technology, and low technology, which have facilitated the attainment of Sustainable Development Goal 8. The objective was not to enumerate all available studies but to encapsulate the most recent findings and extract insights for forthcoming studies. According to the literature review, the methodology of data-driven technologies makes it easier to reach these goals and could become more important in the future, but only if these technologies can be employed to their fullest potential [135]. Refer to Figure 3 for the presentation and illustration of the content analysis findings.

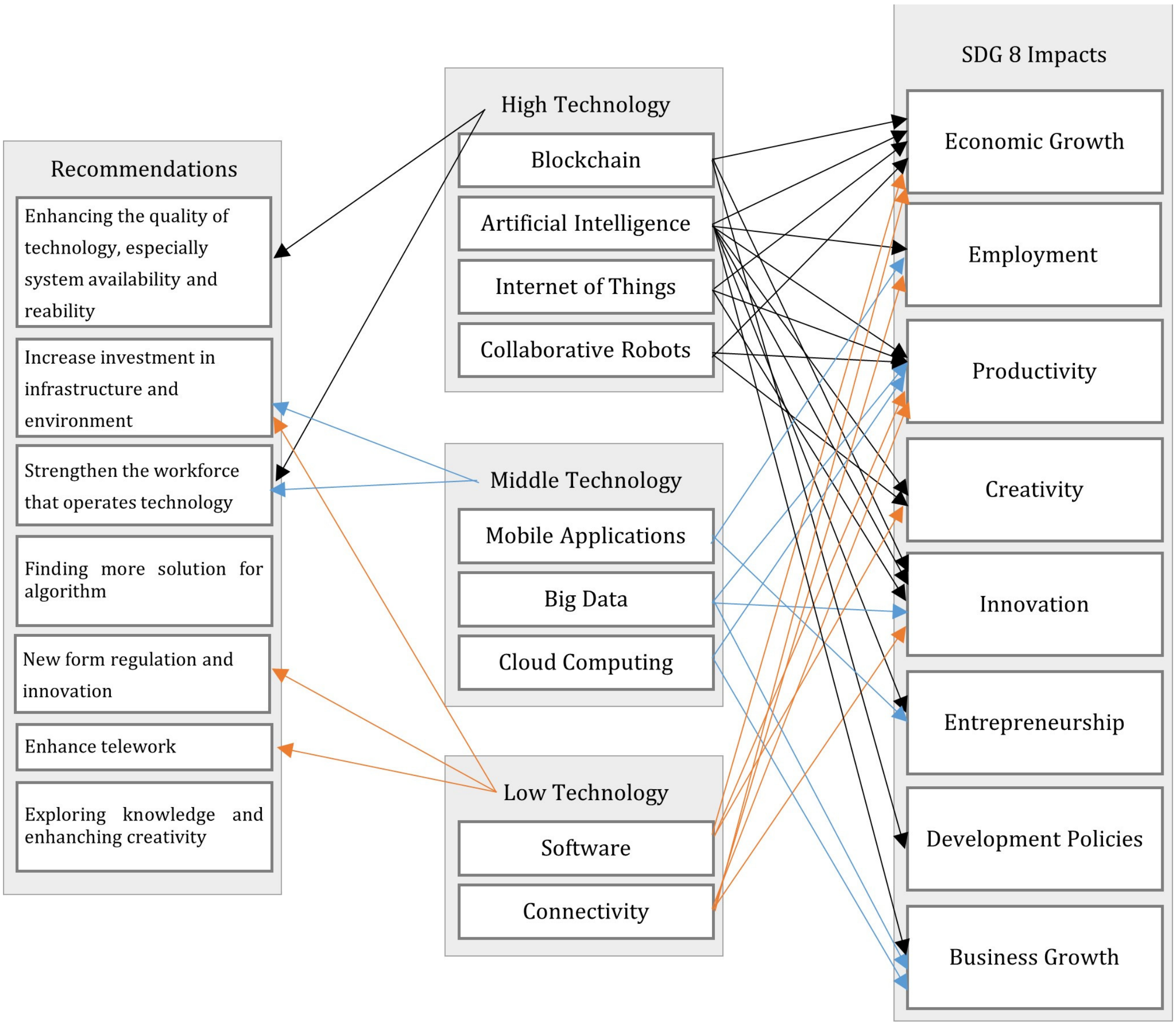

Figure 3. Analysis findings (source: own resource).

The introduction of technological innovation enhances the breadth, effectiveness, and clarity of social assistance services. Incorporating technology into the system can also encourage beneficiaries and stakeholders to participate more effectively. This study's objective is to enhance technological innovation in start-ups to facilitate the attainment of SDG 8. This study examines the attainment of objectives related to economic growth, employment, productivity, creativity, entrepreneurship, innovation, development policies, and business growth. Furthermore, this study provides recommendations to support the achievement of this goal, including a. enhancing the quality of technology, particularly system availability and reality; b. increasing investment in infrastructure and environments by start-up stakeholders; c. strengthening the workforce that operates technology. In the case of sequential investment, it would be advantageous for start-up founders to select external investors who share similar opinions about the start-up's features [188]. Investment in technology is required for infrastructure, instant tools [88], IT applications, and 5G environments [187]. Additionally, this study aims to d. seek additional solutions for algorithms; e. formulate new forms of regulation and innovation; f. enhance telework; and g. explore knowledge and foster creativity.

The findings of this study on technological innovation by start-ups in reaching Sustainable Development Goal (SDG) 8 show a strong link between the adoption of sophisticated technologies and better economic outcomes. This is consistent with the existing research, which focuses on the role of technology in promoting sustainability.

1. Technological Innovation and SDG 8: The findings indicate that start-ups that use high-tech breakthroughs like blockchain, AI, IoT, and collaborative robots can improve economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and business growth. This is consistent with prior research, which has shown that technology adoption can boost entrepreneurial performance, sustainable entrepreneurship, and SDG 8, particularly in growing areas.
2. Contextual Factors: This study's focus on contextual aspects, such as the economic situation and regulatory landscape, is critical. Previous research has demonstrated that the effectiveness of technology adoption is frequently dependent on external factors such as government policy and market conditions. This emphasises the importance of a support ecosystem that encourages innovation and caters to the unique demands of start-up companies.
3. Future Directions: While present technologies show promise, this study concludes that further research is necessary to investigate emerging patterns and their implications for sustainability. The literature reflects this, advocating for continuous monitoring of technological breakthroughs and their potential impact on various sectors to maintain the relevance and effectiveness of initiatives in achieving the SDGs.

This study's key findings add to an expanding body of research emphasising the role of technological innovation in SDG 8. However, this study emphasises the importance of examining the intricacies and contextual aspects in order to fully comprehend the dynamics at play in distinct businesses.

6. Conclusions

While start-up studies have contributed to applying technological innovation, including digital transformation, high technology, middle technology, and low technology, research into its effects on Sustainable Development Goal 8, particularly point 8.3, remains incomplete. This paper addresses the gaps in previous research by examining digital transformation and three types of technological innovation—high-tech, mid-tech, and low-tech—affecting economic growth, productivity, creativity, innovation, entrepreneurship, development policies, and business growth.

This review demonstrates that technological transformation at low, medium, and high levels significantly enhances the attainment of Sustainable Development Goal 8.3, particularly concerning economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and business expansion. The progression of technology in start-ups, encompassing low-tech technology such as software and connectivity; middle-tech innovations such as mobile applications, big data, and cloud computing; and high-tech advancements such as artificial intelligence, blockchain, the Internet of Things, and collaborative robots, spans diverse sectors such as e-health, public–private partnerships, energy trading, law, education, forestry, electricity, biology, vehicles, business, and science, technology, and engineering, fostering essential practical and theoretical knowledge to promote sustainable transformation.

A quantitative analysis of the 60 reviewed articles indicates that advanced technologies, such as blockchain, significantly enhance economic growth, innovation, and development policies; artificial intelligence notably contributes to economic growth, employment, productivity, creativity, innovation, entrepreneurship, development policies, and business expansion; the Internet of Things markedly improves productivity and innovation; and collaborative robots substantially influence economic growth, productivity, and creativity. This study has identified substantial positive effects of mid-tech, including mobile applications, on employment and entrepreneurship; big data on productivity, innovation, and business expansion; and cloud computing on productivity and business growth. Low-tech significantly influences SDG 8.3 as software enhances economic growth, productivity, and creativity, whereas connection fosters economic growth, employment, productivity, and innovation. This study identified several more elements that may influence SDG 8.3. These factors encompass the quality of technology, investments in infrastructure and applications, technological knowledge and its applications, human resources (including digital competencies and management frameworks), legal and policy frameworks, service quality in the learning process, 5G environments, and telework or remote sensing capabilities. All of these supporting variables can facilitate the attainment of SDG 8.3.

7. Limitations

This systematic review of the role of technological innovation in advancing SDG 8 shows some problems with the evidence that was used. These problems may affect how strong and useful the results are. This review highlights several significant limitations.

1. Sample Size and Diversity: The evaluation analysed 384 items in total, but only 60 full-text papers met the requirements after screening and removing duplicates. This small sample size may not accurately reflect the broader landscape of technical progress in many fields. Furthermore, the emphasis on specific businesses, such as digital health and AI, may neglect the distinct obstacles and opportunities that exist in other sectors, thereby skewing the conclusions.
2. Temporal Context: The evaluation may fail to account for the rapid evolution of technology and its uses. As new technologies emerge and existing ones evolve, the findings may quickly become obsolete. This study's emphasis on existing research may ignore emerging technological trends and advancements that could have a substantial impact on the relationship between innovation and SDG 8 attainment.
3. Methodological Limitations: It can be challenging to synthesise conclusions due to the significant differences in the methodology used in the evaluated papers. Differences in research design, data-gathering methods, and analytical procedures might produce discrepancies that make it difficult to understand results. The assessment notes that, while it attempted to synthesise findings, the variety of techniques may restrict the capacity to draw firm conclusions about the overall influence of technological innovation on SDG 8.
4. Generalisability of Findings: Because this research evaluated focused on specific geographical regions or economic circumstances, the applicability of the findings to other regions or developing countries may be limited. Each country's distinct economic, cultural, and regulatory settings can influence the success of technology breakthroughs in accomplishing sustainable development goals.

While this review provides useful insights into the role of technological innovation in promoting SDG 8, its limits underscore the importance of exercising caution when interpreting the findings. Future research should seek to fill these gaps by combining a broader range of studies, sectors, and methodologies to improve the robustness and applicability of findings in the context of sustainable development.

8. Implications

The findings of this systematic study regarding the impact of technological innovation in start-ups on the progression of Sustainable Development Goal (SDG) 8 carry significant implications for practice, policy, and future research. Here is a comprehensive examination of these implications.

8.1. Practical Implications

1. Technology Adoption by Start-ups: Start-ups must prioritise integrating advanced technologies, such as artificial intelligence, blockchain, and the Internet of Things, to augment productivity and stimulate economic growth. The results indicate that utilising these technologies can enhance operational efficiency and provide a competitive edge—essential for survival and development in a swiftly changing market.
2. Capacity Building: Many organisations are unfamiliar with digital transformation technologies, necessitating training and capacity-building activities. Start-ups ought to invest in upskilling their workers and management to leverage these technologies proficiently, alleviating the obstacles linked to digital transformation and augmenting overall productivity.
3. Collaboration and Networking: This research underscores the significance of cooperation among start-ups, existing enterprises, and academics. By cultivating partnerships, start-ups can obtain resources, information, and expertise to enhance the successful implementation of breakthrough technologies and aid in attaining the SDGs 8.

8.2. Policy Implications

1. Supportive Regulatory Frameworks: Policymakers must provide an atmosphere that fosters technical innovation within start-ups. This entails formulating conducive legislative frameworks that diminish entry obstacles, offer incentives for technology adoption, and encourage research and development initiatives. Such measures can foster entrepreneurship and propel economic progress.
2. Investment in Technical Infrastructure: Governments ought to allocate resources toward technical infrastructure, including broadband internet and digital platforms, to equip start-ups with essential tools for harnessing technological advancements. This investment can improve access to technology and promote the development of digital economies, especially in disadvantaged areas.
3. Emphasise Sustainable Development: Policymakers must synchronise technological endeavours with sustainable development objectives. This entails advocating for technology that fosters economic development while simultaneously tackling social and environmental issues. Policies ought to promote the advancement of sustainable business practices and technology that enhance long-term economic resilience.

Author Contributions: Conceptualisation, L.D., S.J., and A.T.; methodology, L.D., S.J., and R.S.; formal analysis, L.D. and S.J.; investigation, L.D.; resources, S.J. and R.S.; writing—original draft preparation, L.D. and A.T.; writing—review and editing, L.D., S.J., and A.T.; visualisation, A.T.; supervision, S.J. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable

Informed Consent Statement: Not applicable

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Acknowledgments: We extend our sincere gratitude to the authorities Sigit Pranowo Hadiwardoyo, Arman Faslih, Maulana Agung, and Frank Landsman for constructive comments on and suggestions for the research.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Remund, M.C.; Peris-Ortiz, M.; Gehrke, H.-J. The Vitruvian Man of Leonardo Da Vinci as a Model of Innovative Entrepreneurship at the Intersection of Business, Art and Technology. *J. Innov. Entrep.* **2017**, *6*, 17.
2. Philip, L.D.; Emir, F.; Udemba, E.N. Investigating Possibility of Achieving Sustainable Development Goals through Renewable Energy, Technological Innovation, and Entrepreneur: A Study of Global Best Practice Policies. *Environ. Sci. Pollut. Res.* **2022**, *29*, 60302–60313.
3. Satalkina, L.; Steiner, G. Digital Entrepreneurship and Its Role in Innovation Systems: A Systematic Literature Review as a Basis for Future Research Avenues for Sustainable Transitions. *Sustainability* **2020**, *12*, 2764.
4. Dinesh, K.K.; Sushil, N.A. Strategic Innovation Factors in Startups: Results of a Cross-Case Analysis of Indian Startups. *JGBA* **2019**, *12*, 449.
5. Van Opstal, W.; Borms, L. Startups and Circular Economy Strategies: Profile Differences, Barriers and Enablers. *J. Clean. Prod.* **2023**, *396*, 136510.
6. Adjei, E.K. Surviving Start-Ups: The Importance of Entrepreneurial Capital. *Reg. Stud. Reg. Sci.* **2021**, *8*, 239–258.
7. Becker, F.S.R.; Escoz Barragan, K.; Huge Sive Huwe, D.; Ernst, B.S.; Strina, G. The Interplay of Entrepreneurial Personality and Startup Innovativeness—the Mediation Effect of Technology Adoption. *Eur. J. Innov. Manag.* **2023**, *28*, 656–680.
8. Si, S.; Ahlstrom, D.; Wei, J.; Cullen, J. Business, Entrepreneurship and Innovation Toward Poverty Reduction. *Entrep. Reg. Dev.* **2020**, *32*, 1–20.
9. George, G.; Merrill, R.K.; Schillebeeckx, S.J.D. Digital Sustainability and Entrepreneurship: How Digital Innovations Are Helping Tackle Climate Change and Sustainable Development. *Entrep. Theory Pract.* **2021**, *45*, 999–1027.
10. Blut, M.; Wang, C. Technology Readiness: A Meta-Analysis of Conceptualizations of the Construct and Its Impact on Technology Usage. *J. Acad. Mark. Sci.* **2020**, *48*, 649–669.
11. Ciarli, T.; Kenney, M.; Massini, S.; Piscitello, L. Digital Technologies, Innovation, and Skills: Emerging Trajectories and Challenges. *Res. Policy* **2021**, *50*, 104289.
12. Choi, D.S.; Sung, C.S.; Park, J.Y. How Does Technology Startups Increase Innovative Performance? The Study of Technology Startups on Innovation Focusing on Employment Change in Korea. *Sustainability* **2020**, *12*, 551.
13. Santisteban, J.; Mauricio, D. Systematic literature review of critical success factors of information technology startups. *Acad. Entrep. J.* **2017**, *23*, 1–35.
14. Carroll, L. A Comprehensive Definition of Technology from an Ethological Perspective. *Soc. Sci.* **2017**, *6*, 126.
15. Skrbina, D. *The Metaphysics of Technology*, 0 ed.; Routledge: London, UK, 2014; ISBN 978-1-134-75735-0.
16. Wadhwani, R.D.; Kirsch, D.; Welter, F.; Gartner, W.B.; Jones, G.G. Context, Time, and Change: Historical Approaches to Entrepreneurship Research. *Strateg. Entrep.* **2020**, *14*, 3–19.
17. Salomon, J. What Is Technology? The Issue of Its Origins and Definitions*. *Hist. Technol.* **1984**, *1*, 113–156.
18. Gans, J.S.; Kearney, M.; Scott, E.L.; Stern, S. Choosing Technology: An Entrepreneurial Strategy Approach. *Strategy Sci.* **2021**, *6*, 39–53.
19. Zawislak, P.A.; Fracasso, E.M.; Tello-Gamarra, J. Technological Intensity and Innovation Capability in Industrial Firms. *Innov. Manag. Rev.* **2018**, *15*, 189–207.
20. Su, J.; Su, K.; Wang, S. Does the Digital Economy Promote Industrial Structural Upgrading?—A Test of Mediating Effects Based on Heterogeneous Technological Innovation. *Sustainability* **2021**, *13*, 10105.
21. Palda, K.S. Technological Intensity: Concept and Measurement. *Res. Policy* **1986**, *15*, 187–198.
22. Omri, A. Technological Innovation and Sustainable Development: Does the Stage of Development Matter? *Environ. Impact Assess. Rev.* **2020**, *83*, 106398.
23. Sreenivasan, A.; Ma, S.; Rehman, A.U.; Muthuswamy, S. Assessment of Factors Influencing Agility in Start-Ups Industry 4.0. *Sustainability* **2023**, *15*, 7564.

24. Nam, J.; Jung, Y.; Kim, J. Understandings of the AI Business Ecosystem in South Korea: AI Startups' Perspective. *Telecommun. Policy* **2024**, *48*, 102763.
25. Thuong, L.V.; Sinh, B.T. Science, Technology and Innovation (STI) and Startup Ecosystem in Vietnam. *Sci. Technol. Soc.* **2024**, *29*, 140–159.
26. Tritoasmoro, I.I.; Ciptomulyono, U.; Dhewanto, W.; Taufik, T.A. Determinant Factors of Lean Start-up-Based Incubation Metrics on Post-Incubation Start-up Viability: Case-Based Study. *J. Sci. Technol. Policy Manag.* **2024**, *15*, 178–199.
27. Ahluwalia, S.; Mahto, R.V.; Guerrero, M. Blockchain Technology and Startup Financing: A Transaction Cost Economics Perspective. *Technol. Forecast. Soc. Chang.* **2020**, *151*, 119854.
28. Skawińska, E.; Zalewski, R.I. Success Factors of Startups in the EU—A Comparative Study. *Sustainability* **2020**, *12*, 8200.
29. Dornelles, J.D.A.; Ayala, N.F.; Frank, A.G. Collaborative or Substitutive Robots? Effects on Workers' Skills in Manufacturing Activities. *Int. J. Prod. Res.* **2023**, *61*, 7922–7955.
30. Aldianto, L.; Anggadwita, G.; Permatasari, A.; Mirzanti, I.R.; Williamson, I.O. Toward a Business Resilience Framework for Startups. *Sustainability* **2021**, *13*, 3132.
31. Ornston, D.; Camargo, L. The Large Firm Dilemma: Anchor Embeddedness and High-Technology Competition. *Socio-Econ. Rev.* **2024**, *22*, 61–80.
32. Sharma, A.; Sharma, B.K.; Rajput, S.; Mehra, A.; Gulati, U. Digital Branding Adoption by Specialty Eatery Start-Ups in the Post-Pandemic Environment in India. *Cogent Bus. Manag.* **2023**, *10*, 2196043.
33. Freitas, R.A.B.D.; Oliveira Junior, A.M.D. Assessment and Valuation of Technologies, Development and Application of Valorativo Software. *Innov. Manag. Rev.* **2023**, *20*, 331–352.
34. Sanasi, S.; Ghezzi, A.; Cavallo, A. What Happens after Market Validation? Experimentation for Scaling in Technology-Based Startups. *Technol. Forecast. Soc. Chang.* **2023**, *196*, 122839.
35. Teberga, P.M.F.; Oliva, F.L. Identification, Analysis and Treatment of Risks in the Introduction of New Technologies by Start-Ups. *Benchmarking Int. J.* **2018**, *25*, 1363–1381.
36. Bielialov, T. Risk Management of Startups of Innovative Products. *J. Risk Financial Manag.* **2022**, *15*, 202.
37. Trautwein, C. Sustainability Impact Assessment of Start-Ups—Key Insights on Relevant Assessment Challenges and Approaches Based on an Inclusive, Systematic Literature Review. *J. Clean. Prod.* **2021**, *281*, 125330.
38. Rashid, L. Entrepreneurship Education and Sustainable Development Goals: A Literature Review and a Closer Look at Fragile States and Technology-Enabled Approaches. *Sustainability* **2019**, *11*, 5343.
39. Taticchi, P.; Demartini, M. *Corporate Sustainability in Practice: A Guide for Strategy Development and Implementation*, Management for Professionals, Ed.; Springer International Publishing: Cham, Switzerland, 2021; ISBN 978-3-030-56343-1.
40. Thrassou, A.; Festa, G. Contemporary Organizational Sustainability: The Symbiotic Relationship Between Business and Society. *FIIB Bus. Rev.* **2023**, *12*, 115–119.
41. Parris, T.M.; Kates, R.W. Characterizing and m easuring s ustainable d evelopment. *Annu. Rev. Environ. Resour.* **2003**, *28*, 559–586.
42. Smyczek, S.; Festa, G.; Rossi, M.; Monge, F. Economic Sustainability of Wine Tourism Services and Direct Sales Performance—Emergent Profiles from Italy. *Br. Food J.* **2020**, *122*, 1519–1529.
43. Horne, J.; Fichter, K. Growing for Sustainability: Enablers for the Growth of Impact Startups—A Conceptual Framework, Taxonomy, and Systematic Literature Review. *J. Clean. Prod.* **2022**, *349*, 131163.
44. United Nations. *World Youth Report. 2018: Youth and the 2030 Agenda for Sustainable Development*; World Youth Report; UN: New York, NY, USA, 2019; ISBN 978-92-1-363256-7.
45. Akkuş, Y.; Çalıyurt, K. The Role of Sustainable Entrepreneurship in UN Sustainable Development Goals: The Case of TED Talks. *Sustainability* **2022**, *14*, 8035.
46. Surana, K.; Singh, A.; Sagar, A.D. Strengthening Science, Technology, and Innovation-Based Incubators to Help Achieve Sustainable Development Goals: Lessons from India. *Technol. Forecast. Soc. Chang.* **2020**, *157*, 120057.
47. Kadir, B.A.; Broberg, O. Human Well-Being and System Performance in the Transition to Industry 4.0. *Int. J. Ind. Ergon.* **2020**, *76*, 102936.
48. French, A.; Shim, J.P.; Risius, M.; Larsen, K.R.; Jain, H. The 4th Industrial Revolution Powered by the Integration of AI, Blockchain, and 5G. *Commun. Assoc. Inf. Syst.* **2021**, *49*, 266–286.
49. Romme, A.G.L.; Bell, J.; Frericks, G. Designing a Deep-Tech Venture Builder to Address Grand Challenges and Overcome the Valley of Death. *J. Org. Des.* **2023**, *12*, 217–237.

50. Gbadegeshin, S.A.; Natsheh, A.A.; Ghafel, K.; Mohammed, O.; Koskela, A.; Rimpiläinen, A.; Tikkanen, J.; Kuoppala, A. Overcoming the Valley of Death: A New Model for High Technology Startups. *Sustain. Futures* **2022**, *4*, 100077.
51. Anthony, S.D. The New Corporate Garage. *Harv. Bus. Rev.* **2012**, *90*, 44–53.
52. Pransky, J. The Pransky Interview: Dr Hod Lipson, Professor at Columbia University; Robotics, AI, Digital Design and Manufacturing Innovator and Entrepreneur. *Ind. Robot. Int. J. Robot. Res. Appl.* **2019**, *46*, 568–572.
53. van Gelderen, M.; Frese, M.; Thurik, R. Strategies, Uncertainty and Performance of Small Business Startups. *Small Bus. Econ.* **2020**, *15*, 165–181.
54. Von Tunzelmann, N.; Acha, V. *Innovation In "Low-Tech" Industries*; Oxford University Press: Oxford, UK, 2006.
55. Sreenivasan, A.; Suresh, M. Enabling Technologies Influencing the Start-up Operations 5.0. *Oper. Manag. Res.* **2024**, *17*, 1–22.
56. Kohler, T. Corporate Accelerators: Building Bridges between Corporations and Startups. *Bus. Horiz.* **2016**, *59*, 347–357.
57. Weiblen, T.; Chesbrough, H.W. Engaging with Startups to Enhance Corporate Innovation. *Calif. Manag. Rev.* **2015**, *57*, *66–90*.
58. Silveira, G.B.; Farina, M.C.; Santos, I.C.D. High-Technology Based Startup in Agribusiness Sector: Mapping Linkages, Products and Services. *Rev. Econ. Sociol. Rural.* **2023**, *61*, e246210.
59. Ardito, L.; Messeni Petruzzelli, A.; Albino, V. From Technological Inventions to New Products: A Systematic Review and Research Agenda of the Main Enabling Factors. *Eur. Manag. Rev.* **2015**, *12*, 113–147.
60. Drucker, P.F. *Innovation and Entrepreneurship: Practice and Principles*; Reprint; HarperBusiness: New York, NY, USA, 2006; ISBN 978-0-06-085113-2.
61. Nguven-Duc, A.; Dahle, Y.; Steinert, M.; Abrahamsson, P. Towards Understanding Startup Product Development as Effectual Entrepreneurial Behaviors. In *Product-Focused Software Process Improvement*; Felderer, M., Méndez Fernández, D., Turhan, B., Kalinowski, M., Sarro, F., Winkler, D., Eds.; Lecture Notes in Computer Science; Springer International Publishing: Cham, Switzerland, 2017; Volume 10611, pp. 265–279, ISBN 978-3-319-69925-7.
62. Gimenez-Fernandez, E.M.; Sandulli, F.D.; Bogers, M. Unpacking Liabilities of Newness and Smallness in Innovative Start-Ups: Investigating the Differences in Innovation Performance between New and Older Small Firms. *Res. Policy* **2020**, *49*, 104049.
63. Lammers, T.; Rashid, L.; Kratzer, J.; Voinov, A. An Analysis of the Sustainability Goals of Digital Technology Start-Ups in Berlin. *Technol. Forecast. Soc. Chang.* **2022**, *185*, 122096.
64. Rothwell, R. Towards the Fifth-generation Innovation Process. *Int. Mark. Rev.* **1994**, *11*, 7–31.
65. Chesbrough, H. Open Innovation: Where We've Been and Where We're Going. *Res.-Technol. Manag.* **2012**, *55*, 20–27.
66. Evans, J.S. STRATEGIC FLEXIBILITY FOR HIGH TECHNOLOGY MANOEUVRES: A CONCEPTUAL FRAMEWORK. *J. Manag. Stud.* **1991**, *28*, 69–89.
67. Fuentes, R.; Chen, D.; Felder, F.A. Systematically Mapping Innovations in Electricity Using Startups: A Comprehensive Database Analysis. *Technol. Soc.* **2023**, *74*, 102282.
68. Olaye, I.M.; Seixas, A.A. The Gap Between AI and Bedside: Participatory Workshop on the Barriers to the Integration, Translation, and Adoption of Digital Health Care and AI Startup Technology Into Clinical Practice. *J. Med. Internet Res.* **2023**, *25*, e32962.
69. Garbuio, M.; Lin, N. Artificial Intelligence as a Growth Engine for Health Care Startups: Emerging Business Models. *Calif. Manag. Rev.* **2019**, *61*, 59–83.
70. Chen, Y.; Albert, L.J.; Jensen, S. Innovation Farm: Teaching Artificial Intelligence through Gamified Social Entrepreneurship in an Introductory MIS Course. *Decis. Sci. J. Innov. Educ.* **2022**, *20*, 43–56.
71. Han, L.; Long, X.; Wang, K. The Analysis of Educational Informatization Management Learning Model under the Internet of Things and Artificial Intelligence. *Sci. Rep.* **2024**, *14*, 17811.
72. Gbadegeshin, S.A. The Effect of Digitalization on the Commercialization Process of High-Technology Companies in the Life Sciences Industry. *Technol. Innov. Manag. Rev.* **2019**, *9*, 49–63.
73. Campbell, J. Ex Machina: Technological Disruption and the Future of Artificial Intelligence in Persuasive Legal Writing. *U. Bologna L. Rev.* **2020**. *5*, 294.
74. Giuggioli, G.; Pellegrini, M.M. Artificial Intelligence as an Enabler for Entrepreneurs: A Systematic Literature Review and an Agenda for Future Research. *Int. J. Entrep. Behav. Res.* **2023**, *29*, 816–837.
75. Hameed, K.; Naha, R.; Hameed, F. Digital Transformation for Sustainable Health and Well-Being: A Review and Future Research Directions. *Discov. Sustain.* **2024**, *5*, 104.

76. Liu, J.; Liu, Z.; Yang, Q.; Osmani, M.; Demian, P. A Conceptual Blockchain Enhanced Information Model of Product Service Systems Framework for Sustainable Furniture. *Buildings* **2022**, *13*, 85.
77. Khan, S.; Amin, U.; Abu-Siada, A. P2P Energy Trading of EVs Using Blockchain Technology in Centralized and Decentralized Networks: A Review. *Energies* **2024**, *17*, 2135.
78. Altamimi, A.; Al-Bashayreh, M.; AL-Oudat, M.; Almajali, D. Blockchain Technology Adoption for Sustainable Learning. *Int. J. Data Netw. Sci.* **2022**, *6*, 983–994. https://doi.org/10.5267/j.ijdns.2022.1.013
79. Bosona, T.; Gebresenbet, G. The Role of Blockchain Technology in Promoting Traceability Systems in Agri-Food Production and Supply Chains. *Sensors* **2023**, *23*, 5342.
80. Mulligan, C.; Morsfield, S.; Cheikosman, E. Blockchain for Sustainability: A Systematic Literature Review for Policy Impact. *Telecommun. Policy* **2024**, *48*, 102676.
81. Yadav, S.; Singh, S.P. Blockchain Critical Success Factors for Sustainable Supply Chain. *Resour. Conserv. Recycl.* **2020**, *152*, 104505.
82. Chandan, A.; John, M.; Potdar, V. Achieving UN SDGs in Food Supply Chain Using Blockchain Technology. *Sustainability* **2023**, *15*, 2109.
83. Lauterbach, A. Artificial Intelligence and Policy: Quo Vadis? *Digit. Policy Regul. Gov.* **2019**, *21*, 238–263.
84. Earley, S. There Is No AI Without IA. *IT Prof.* **2016**, *18*, 58–64.
85. Golan, M.; Cohen, Y.; Singer, G. A Framework for Operator—Workstation Interaction in Industry 4.0. *Int. J. Prod. Res.* **2020**, *58*, 2421–2432.
86. Cetindamar, D.; Lammers, T.; Zhang, Y. Exploring the Knowledge Spillovers of a Technology in an Entrepreneurial Ecosystem—The Case of Artificial Intelligence in Sydney. *Thunderbird Int. Bus. Rev.* **2020**, *62*, 457–474.
87. Aldoseri, A.; Al-Khalifa, K.N.; Hamouda, A.M. AI-Powered Innovation in Digital Transformation: Key Pillars and Industry Impact. *Sustainability* **2024**, *16*, 1790.
88. Jankovic, S.D.; Curovic, D.M. Strategic Integration of Artificial Intelligence for Sustainable Businesses: Implications for Data Management and Human User Engagement in the Digital Era. *Sustainability* **2023**, *15*, 15208.
89. Lee, B.; Kim, B.; Ivan, U.V. Enhancing the Competitiveness of AI Technology-Based Startups in the Digital Era. *Adm. Sci.* **2023**, *14*, 6.
90. Firouzi, R.; Rahmani, R. Delay-Sensitive Resource Allocation for IoT Systems in 5G O-RAN Networks. *Internet Things* **2024**, *26*, 101131.
91. Jacobson, I.; Spence, I.; Ng, P.-W. Is There a Single Method for the Internet of Things? *Commun. ACM* **2017**, *60*, 46–53.
92. Kumar, S.; Tiwari, P.; Zymbler, M. Internet of Things Is a Revolutionary Approach for Future Technology Enhancement: A Review. *J. Big Data* **2019**, *6*, 111.
93. University of Turku, Finland; Baiyere, A.; Topi, H.; Bentley University; Venkatesh, V.; University of Arkansas; Wyatt, J.; Redline Design; Donnellan, B. Maynooth University Internet of Things (IoT)—A Research Agenda for Information Systems. *Commun. Assoc. Inf. Syst.* **2020**, *47*, 524–549.
94. Xia, F.; Yang, L.T.; Wang, L.; Vinel, A. Internet of Things. *Int. J. Commun.* **2012**, *25*, 1101–1102.
95. Villamil, S.; Hernandez, C.; Tarazona, G. An Overview of Internet of Things. *TELKOMNIKA* **2020**, *18*, 2320.
96. Kour, V.P.; Arora, S. Recent Developments of the Internet of Things in Agriculture: A Survey. *IEEE Access* **2020**, *8*, 129924–129957.
97. Westergren, U.H.; Mähler, V.; Jadaan, T. Enabling Digital Transformation: Organizational Implementation of the Internet of Things. *Inf. Manag.* **2024**, *61*, 103996.
98. Saniuk, S.; Grabowska, S.; Thibbotuwawa, A. Challenges of Industrial Systems in Terms of the Crucial Role of Humans in the Industry 5.0 Environment. *Prod. Eng. Arch.* **2024**, *30*, 94–104.
99. Ikenga, G.U.; Van Der Sijde, P. Twenty-First Century Competencies; about Competencies for Industry 5.0 and the Opportunities for Emerging Economies. *Sustainability* **2024**, *16*, 7166.
100. El Zaatari, S.; Marei, M.; Li, W.; Usman, Z. Cobot Programming for Collaborative Industrial Tasks: An Overview. *Robot. Auton. Syst.* **2019**, *116*, 162–180.
101. Peron, M.; Sgarbossa, F.; Strandhagen, J.O. Decision Support Model for Implementing Assistive Technologies in Assembly Activities: A Case Study. *Int. J. Prod. Res.* **2022**, *60*, 1341–1367.
102. Serrano-Carreón, L.; Aranda-Ocampo, S.; Balderas-Ruíz, K.A.; Juárez, A.M.; Leyva, E.; Trujillo-Roldán, M.A.; Valdez-Cruz, N.A.; Galindo, E. A Case Study of a Profitable Mid-Tech Greenhouse for the Sustainable Production of Tomato, Using a Biofertilizer and a Biofungicide. *Electron. J. Biotechnol.* **2022**, *59*, 13–24.

103. Wang, H.-Y.; Liao, C.; Yang, L.-H. What Affects Mobile Application Use? The Roles of Consumption Values. *IJMS* **2013**, *5*, p11.
104. Laudon, K.C.; Traver, C.G. *E-Commerce: Business, Technology, Society*; 15th ed.; Pearson: Hoboken, NJ, USA, 2018; ISBN 978-0-13-499845-9.
105. Pujar, G.S.; Pasha, S.V.; Balaji, Y.; Reddy, K.M.; Kalyandeep, K.; Lesslie, A.; Ravishankar, T.; Singh, R.P. National Assessment of Afforestation Activities in India, a Key SDG Target, Under the World's Largest Social Safety Scheme. *J. Indian. Soc. Remote Sens.* **2022**, *50*, 1423–1436.
106. Nyapwere, N.; Dube, Y.P.; Makanga, P.T. Guidelines for Developing Geographically Sensitive Mobile Health Applications. *Health Technol.* **2021**, *11*, 379–387.
107. Jacobs-Basadien, M.; Pather, S. The Role of Culture in User Adoption of Mobile Applications for Self-Management of Health: A Conceptual Framework. In *Proceedings of the 8th International Conference on Information and Communication Technologies for Ageing Well and e-Health*; SCITEPRESS Science and Technology Publications LDA: Setúbal, Portugal, 2022; pp. 37–49.
108. Raguseo, E. Big Data Technologies: An Empirical Investigation on Their Adoption, Benefits and Risks for Companies. *Int. J. Inf. Manag.* **2018**, *38*, 187–195.
109. Mishra, P.; Thakur, P.; Singh, G. Sustainable Smart City to Society 5.0: State-of-the-Art and Research Challenges. *SAIEE Afr. Res. J.* **2022**, *113*, 152–164.
110. Abouchabaka, J.; Bentaleb, A. The Impact of Big Data on the Sustainable Development Goals Water and Energy. *E3S Web Conf.* **2024**, *477*, 00062.
111. Bibri, S.E.; Alexandre, A.; Sharifi, A.; Krogstie, J. Environmentally Sustainable Smart Cities and Their Converging AI, IoT, and Big Data Technologies and Solutions: An Integrated Approach to an Extensive Literature Review. *Energy Inf.* **2023**, *6*, 9.
112. Costa Melo, I.; Alves Junior, P.N.; Queiroz, G.A.; Yushimito, W.; Pereira, J. Do We Consider Sustainability When We Measure Small and Medium Enterprises' (SMEs') Performance Passing through Digital Transformation? *Sustainability* **2023**, *15*, 4917.
113. Vinueza-Martinez, J.; Correa-Peralta, M.; Ramirez-Anormaliza, R.; Franco Arias, O.; Vera Paredes, D. Geographic Information Systems (GISs) Based on WebGIS Architecture: Bibliometric Analysis of the Current Status and Research Trends. *Sustainability* **2024**, *16*, 6439.
114. Al-Sharafi, M.A.; Iranmanesh, M.; Al-Emran, M.; Alzahrani, A.I.; Herzallah, F.; Jamil, N. Determinants of Cloud Computing Integration and Its Impact on Sustainable Performance in SMEs: An Empirical Investigation Using the SEM-ANN Approach. *Heliyon* **2023**, *9*, e16299.
115. Subramanian, N.; Abdulrahman, M.D.; Zhou, X. Integration of Logistics and Cloud Computing Service Providers: Cost and Green Benefits in the Chinese Context. *Transp. Res. Part. E Logist. Transp. Rev.* **2014**, *70*, 86–98.
116. Al-Sharafi, M.A.; Arshah, R.A.; Abu-Shanab, E.A.; Alajmi, Q. The Effect of Sustained Use of Cloud-Based Business Services on Organizations' Performance: Evidence from SMEs in Malaysia. In Proceedings of the 2019 5th International Conference on Information Management (ICIM), Cambridge, UK, 24–27 March 2019; pp. 285–291.
117. Debnath, S.; Nilayamgode, M.; Sekhri, S. Information Bypass: Using Low-Cost Technological Innovations to Curb Leakages in Welfare Programs. *J. Dev. Econ.* **2023**, *164*, 103137.
118. Donovan, J.; Stoian, D.; Hellin, J. *Value Chain Development and the Poor: Promise, Delivery, and Opportunities for Impact at Scale*; Practical Action Publishing: Rugby, UK, 2020; ISBN 978-1-78853-057-6.
119. Baldwin, R.; Okubo, T. Are Software Automation and Teleworker Substitutes? Preliminary Evidence from Japan. *World Econ.* **2024**, *47*, 1531–1556.
120. Sabatini, A.; O'Toole, T. Technological Co-Development Competence: A Longitudinal Case of a Software Development Spinout. *Technovation* **2024**, *135*, 103054.
121. Choi, W.; Kim, S. Curriculum Development of EdTech Class Using 3D Modeling Software for University Students in the Republic of Korea. *Sustainability* **2023**, *15*, 16605.
122. Machado, M.C.; Carvalho, T.C.M.D.B. Maturity Models and Sustainable Indicators—A New Relationship. *Sustainability* **2021**, *13*, 13247.
123. Xin, S.; Dong, R.; Cui, C.; Yang, T.; Zhan, X.; Wang, F.; Shao, C. Bibliometric Analysis of Research Hotspots and Frontiers in Progress towards the Sustainable Development Goals. *Sustainability* **2024**, *16*, 2005.
124. Sheng, X.; Liu, G. Investigating the Impact of the Internet on Managing Green Financial Innovation and Improving Agricultural Conditions in Water-Scarce Asian Regions Using ANN Modeling. *Sci. Rep.* **2024**, *14*, 22365.

125. Latif, S.; Qadir, J.; Farooq, S.; Imran, M. How 5G Wireless (and Concomitant Technologies) Will Revolutionize Healthcare? *Future Internet* **2017**, *9*, 93.
126. Cavalli, L.; Lizzi, G.; Guerrieri, L.; Querci, A.; De Bari, F.; Barbieri, G.; Ferrini, S.; Di Meglio, R.; Cardone, R.; Tardo, A.; et al. Addressing Efficiency and Sustainability in the Port of the Future with 5G: The Experience of the Livorno Port. A Methodological Insight to Measure Innovation Technologies' Benefits on Port Operations. *Sustainability* **2021**, *13*, 12146.
127. Colmenares-Quintero, R.F.; Baquero-Almazo, M.; Kasperczyk, D.; Stansfield, K.E.; Colmenares-Quintero, J.C. Analysis of IoT Technologies Suitable for Remote Areas in Colombia: Conceptual Design of an IoT System for Monitoring and Managing Distributed Energy Systems. *Clean. Eng. Technol.* **2024**, *21*, 100783.
128. Ryan, M.; Noonan, L.; Doyle, E.; Linehan, D. Cork City, Ireland: A Blueprint for Transformation in Second-Tier Urban Centres. *Cities* **2024**, *153*, 105289.
129. Danil, L.; Fordian, D. Does Rural Entrepreneurship Performance Support Sustainable Development Goals (SDGs) and Sustainable Entrepreneurship? *Rev. Integr. Bus. Econ. Res.* **2022**, *11*, 145–165.
130. Javed, A.; Rapposelli, A.; Khan, F.; Javed, A.; Abid, N. Do Green Technology Innovation, Environmental Policy, and the Transition to Renewable Energy Matter in Times of Ecological Crises? A Step towards Ecological Sustainability. *Technol. Forecast. Soc. Chang.* **2024**, *207*, 123638.
131. Wu, H.; Li, Y.; Hao, Y.; Ren, S.; Zhang, P. Environmental Decentralization, Local Government Competition, and Regional Green Development: Evidence from China. *Sci. Total Environ.* **2020**, *708*, 135085.
132. Zejjari, I.; Benhayoun, I. The Use of Artificial Intelligence to Advance Sustainable Supply Chain: Retrospective and Future Avenues Explored through Bibliometric Analysis. *Discov. Sustain.* **2024**, *5*, 174.
133. Amaliah, S.N.; Najib, M.; Jahroh, S. Sustainability Analysis of KPBS Pangalengan Milk Processing Business Unit Using Flourishing Business Canvas Method. *J. Manaj. Agribisnis* **2019**, *16*, 160.
134. United Nations. *Tranforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015; p. 16301.
135. Bachmann, N.; Tripathi, S.; Brunner, M.; Jodlbauer, H. The Contribution of Data-Driven Technologies in Achieving the Sustainable Development Goals. *Sustainability* **2022**, *14*, 2497.
136. Basheer, M.; Nechifor, V.; Calzadilla, A.; Ringler, C.; Hulme, D.; Harou, J.J. Balancing National Economic Policy Outcomes for Sustainable Development. *Nat. Commun.* **2022**, *13*, 5041.
137. Hieu, V.M.; Hai, N.T. The Role of Environmental, Social, and Governance Responsibilities and Economic Development on Achieving the SDGs: Evidence from BRICS Countries. *Econ. Res.-Ekon. Istraživanja* **2023**, *36*, 1338–1360.
138. Saba, C.S.; Ngepah, N. The Impact of Artificial Intelligence (AI) on Employment and Economic Growth in BRICS: Does the Moderating Role of Governance Matter? *Res. Glob.* **2024**, *8*, 100213.
139. Sharifi, A.; Allam, Z.; Bibri, S.E.; Khavarian-Garmsir, A.R. Smart Cities and Sustainable Development Goals (SDGs): A Systematic Literature Review of Co-Benefits and Trade-Offs. *Cities* **2024**, *146*, 104659.
140. Borsatto, J.M.L.S.; Marcolin, C.B.; Abdalla, E.C.; Amaral, F.D. Aligning Community Outreach Initiatives with SDGs in a Higher Education Institution with Artificial Intelligence. *Clean. Responsible Consum.* **2024**, *12*, 100160.
141. Pratapa, P.; Subramoniam, R.; Gaur, J. Role of Standards as an Enabler in a Digital Remanufacturing Industry. *Sustainability* **2022**, *14*, 1643.
142. Ebekozien, A.; Ahmed, M.A.H.; Thwala, W.D.; Aigbavboa, C.; Samsurijan, M.S. Investigating the Impacts of COVID-19 on the Built Environment: The Fourth Industrial Revolution Application's Role via Unexplored Approach. *J. Infras. Policy. Dev.* **2024**, *8*, 4967.
143. Das, B.; Sayor, T.Z.U.H.; Nijhum, R.J.; Tishun, M.T.; Sakib, T.H.; Karim, M.E.; Uddin, A.J.; Islam, A.; Mohsin, A.S.M. Designing and Development of Agricultural Rovers for Vegetable Harvesting and Soil Analysis. *PLoS ONE* **2024**, *19*, e0304657.
144. Li, G.; Guo, X. A Framework for Extending Co-Creative Communication Models to Sustainability Research. *Front. Artif. Intell.* **2024**, *7*, 1236310.
145. Hasan, M.; Hoque, A.; Abedin, M.Z.; Gasbarro, D. FinTech and Sustainable Development: A Systematic Thematic Analysis Using Human- and Machine-Generated Processing. *Int. Rev. Financ. Anal.* **2024**, *95*, 103473.
146. Elfaki, K.E.; Ahmed, E.M. Digital Technology Adoption and Globalization Innovation Implications on Asian Pacific Green Sustainable Economic Growth. *J. Open Innov. Technol. Mark. Complex.* **2024**, *10*, 100221.
147. Ramírez-Márquez, C.; Posadas-Paredes, T.; Raya-Tapia, A.Y.; Ponce-Ortega, J.M. Natural Resource Optimization and Sustainability in Society 5.0: A Comprehensive Review. *Resources* **2024**, *13*, 19.

148. Shabur, M.A. A Comprehensive Review on the Impact of Industry 4.0 on the Development of a Sustainable Environment. *Discov. Sustain.* **2024**, *5*, 97.
149. Zaghdoud, O. Technological Progress as a Catalyst for Energy Efficiency: A Sustainable Technology Perspective. *Sustain. Technol. Entrep.* **2025**, *4*, 100084.
150. Aman, R.; Elo, M.; Ahokangas, P.; Zhang, X. Empowering Migrant Women's Entrepreneurship: Stakeholder Perspectives from the Entrepreneurial Ecosystem. *Int. J. Entrep. Behav. Res.* **2024**, *30*, 1698–1724.
151. Gambarotto, F.; Rangone, M.; Solari, S. Moral and Institutional Foundations of Sustainable Technological Entrepreneurship. *Sustainability* **2023**, *15*, 13796.
152. Fernandes, C.; Pires, R.; Gaspar Alves, M.-C. Digital Entrepreneurship and Sustainability: The State of the Art and Research Agenda. *Economies* **2022**, *11*, 3.
153. Supangkat, S.H.; Firmansyah, H.S.; Kinanda, R.; Rizkia, I. Smarter World Living Lab as an Integrated Approach: Learning How to Improve Quality of Life. *IEEE Access* **2024**, *12*, 62687–62708.
154. Ma, X.; Li, J.; Guo, Z.; Wan, Z. Role of Big Data and Technological Advancements in Monitoring and Development of Smart Cities. *Heliyon* **2024**, *10*, e34821.
155. Raman, R.; Kumar Nair, V.; Nedungadi, P.; Ray, I.; Achuthan, K. Darkweb Research: Past, Present, and Future Trends and Mapping to Sustainable Development Goals. *Heliyon* **2023**, *9*, e22269.
156. Katimertzopoulos, F.; Vlados, C.; Koutroukis, T. Business and Regional Innovation Culture: An Overview of the Conceptualization of Innovation Culture. *Adm. Sci.* **2023**, *13*, 237.
157. Yasmeen, R.; Tian, T.; Yan, H.; Shah, W.U.H. A Simultaneous Impact of Digital Economy, Environment Technology, Business Activity on Environment and Economic Growth in G7: Moderating Role of Institutions. *Heliyon* **2024**, *10*, e32932.
158. Bonilla-Jurado, D.; Zumba, E.; Lucio-Quintana, A.; Yerbabuena-Torres, C.; Ramírez-Casco, A.; Guevara, C. Advancing University Education: Exploring the Benefits of Education for Sustainable Development. *Sustainability* **2024**, *16*, 7847.
159. Bai, C.; Dallasega, P.; Orzes, G.; Sarkis, J. Industry 4.0 Technologies Assessment: A Sustainability Perspective. *Int. J. Prod. Econ.* **2020**, *229*, 107776.
160. Pwc 2017 report_What's the Real Value of AI for Your Business and How Can You Capitalise? **2017**. https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf.
161. DeLone, W.H.; McLean, E.R. The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *J. Manag. Inf. Syst.* **2003**, *19*, 9–30.
162. Szalavetz, A. Artificial Intelligence-Based Development Strategy in Dependent Market Economies—Any Room amidst Big Power Rivalry? *CEBR* **2019**, *8*, 40–54.
163. Chowdhury, T.; Adafin, J.; Wilkinson, S. Review of Digital Technologies to Improve Productivity of New Zealand Construction Industry. *ITcon* **2019**, *24*, 569–587.
164. Martos, V.; Ahmad, A.; Cartujo, P.; Ordoñez, J. Ensuring Agricultural Sustainability through Remote Sensing in the Era of Agriculture 5.0. *Appl. Sci.* **2021**, *11*, 5911.
165. Dinis-Carvalho, J.; Sousa, R.M.; Moniz, I.; Macedo, H.; Lima, R.M. Improving the Performance of a SME in the Cutlery Sector Using Lean Thinking and Digital Transformation. *Sustainability* **2023**, *15*, 8302.
166. D'Amico, A.; De Boni, A.; Ottomano Palmisano, G.; Acciani, C.; Roma, R. Environmental Analysis of Soilless Tomato Production in a High-Tech Greenhouse. *Clean. Environ. Syst.* **2023**, *11*, 100137.
167. Chen, H.-C.; Irawan, B.; Hsu, P.-Y.; Su, J.-S.; Lin, C.-W.; Prayitno; Putra, K.T.; Damarjati, C.; Weng, C.-E.; Liang, Y.-H.; et al. An Implementation of Trust Chain Framework with Hierarchical Content Identifier Mechanism by Using Blockchain Technology. *Sensors* **2022**, *22*, 4831.
168. Gao, Y. Design of Urban Innovation Space System Using Artificial Intelligence Technology and Internet of Things. *Heliyon* **2024**, *10*, e25396.
169. Mhlanga, D. Artificial Intelligence in the Industry 4.0, and Its Impact on Poverty, Innovation, Infrastructure Development, and the Sustainable Development Goals: Lessons from Emerging Economies? *Sustainability* **2021**, *13*, 5788.
170. Samadhiya, A.; Agrawal, R.; Kumar, A.; Luthra, S. Bridging Realities into Organizations through Innovation and Productivity: Exploring the Intersection of Artificial Intelligence, Internet of Things, and Big Data Analytics in the Metaverse Environment Usinga Multi-Method Approach. *Decis. Support. Syst.* **2024**, *185*, 114290.
171. Nahar, S. Modeling the Effects of Artificial Intelligence (AI)-Based Innovation on Sustainable Development Goals (SDGs): Applying a System Dynamics Perspective in a Cross-Country Setting. *Technol. Forecast. Soc. Chang.* **2024**, *201*, 123203.

172. Amani, M.A.; Sarkodie, S.A. Mitigating Spread of Contamination in Meat Supply Chain Management Using Deep Learning. *Sci. Rep.* **2022**, *12*, 5037.
173. Cautela, C.; Mortati, M.; Dell'Era, C.; Gastaldi, L. The Impact of Artificial Intelligence on Design Thinking Practice: Insights from the Ecosystem of Startups. *Strateg. Des. Res. J.* **2019**, *12*, 114–134.
174. Shivaprakash, K.N.; Swami, N.; Mysorekar, S.; Arora, R.; Gangadharan, A.; Vohra, K.; Jadeyegowda, M.; Kiesecker, J.M. Potential for Artificial Intelligence (AI) and Machine Learning (ML) Applications in Biodiversity Conservation, Managing Forests, and Related Services in India. *Sustainability* **2022**, *14*, 7154.
175. Fenwick, M.; Vermeulen, E.P.M.; Corrales, M. Business and Regulatory Responses to Artificial Intelligence: Dynamic Regulation, Innovation Ecosystems and the Strategic Management of Disruptive Technology. In *Robotics, AI and the Future of Law*; Corrales, M., Fenwick, M., Forgó, N., Eds.; Perspectives in Law, Business and Innovation; Springer: Singapore, 2018; pp. 81–103, ISBN 9789811328732.
176. Schiavone, F.; Pietronudo, M.C.; Sabetta, A.; Bernhard, F. Designing AI Implications in the Venture Creation Process. *IJEBR* **2023**, *29*, 838–859.
177. Weckenborg, C.; Spengler, T.S. Assembly Line Balancing with Collaborative Robots under Consideration of Ergonomics: A Cost-Oriented Approach. *IFAC-Pap.* **2019**, *52*, 1860–1865.
178. Cohen, Y.; Shoval, S.; Faccio, M.; Minto, R. Deploying Cobots in Collaborative Systems: Major Considerations and Productivity Analysis. *Int. J. Prod. Res.* **2022**, *60*, 1815–1831.
179. Ji-fan Ren, S.; Fosso Wamba, S.; Akter, S.; Dubey, R.; Childe, S.J. Modelling Quality Dynamics, Business Value and Firm Performance in a Big Data Analytics Environment. *Int. J. Prod. Res.* **2017**, *55*, 5011–5026.
180. Albastaki, F.M.; Ubaid, A.M.; Rashid, H. Developing a Practical Framework for Applying the Work from Home Concept to Technical Jobs in Electricity Utilities Using the Unified Theory of Acceptance and Use of Technology. *Sustainability* **2024**, *16*, 4610.
181. Gwala, R.S.; Ijaz, S. The Role of Artificial Intelligence in FinTech as a Catalyst of the Economic Growth Drive in Africa: In *Advances in Finance, Accounting, and Economics*; Irfan, M., Elmogy, M., Shabri Abd. Majid, M., El-Sappagh, S., Eds.; IGI Global: Hershey, PA, USA, 2024; pp. 77–95, ISBN 9798369300824.
182. Byrd, T.A.; Turner, D.E. Measuring the Flexibility of Information Technology Infrastructure: Exploratory Analysis of a Construct. *J. Manag. Inf. Syst.* **2000**, *17*, 167–208.
183. CheSuh, L.N.; Fernández-Diaz, R.Á.; Alija-Perez, J.M.; Benavides-Cuellar, C.; Alaiz-Moreton, H. Improve Quality of Service for the Internet of Things Using Blockchain & Machine Learning Algorithms. *Internet Things* **2024**, *26*, 101123.
184. Barboza, G.; Capocchi, A.; Trejos, S. Knowledge Spillover Effects and Employment Productivity in the Innovative Startups: Evidence from Italy. *Rev. Reg. Stud.* **2023**, *53*, 156–181.
185. Samal, A.; Radhakrishna, H.; Rajimol, K.P.; Lakshmi, S.R.; Mehrotra, D.; Girish, H.S. An Investigation into the Role of AI-Based Innovation in Supporting the Next Generation of Startup Entrepreneurs. *Nanotechnol. Percept.* **2024**, *20*, 548–555.
186. Miao, S.; Zhu, S.; Tang, Z.; Zhu, C.; He, J.; Zhu, Y.; Zhang, X. A Novel Smart Grid Simulation Framework Based on Software Defined System and Cloud Computing. In Proceedings of the 2020 IEEE 4th Conference on Energy Internet and Energy System Integration (EI2), Wuhan, China, 30 October–1 November 2020; 733–738.
187. Nakazato, J.; Nakagawa, K.; Itoh, K.; Fontugne, R.; Tsukada, M.; Esaki, H. WebRTC over 5 G: A Study of Remote Collaboration QoS in Mobile Environment. *J. Netw. Syst. Manag.* **2024**, *32*, 1.
188. Conti, A.; Thursby, M.; Rothaermel, F.T. Show Me the Right Stuff: Signals for High-Tech Startups. *Econ. Manag. Strategy* **2013**, *22*, 341–364.