sustainability

MDPI

Article

Physical and Technological Capital Efficiency for Profit Growth in Small and Medium Enterprises in Gauteng, South Africa: A Descriptive Qualitative Study

Boysana Lephoi Mbonyane [1,*], Charles Mbohwa [2] and Jan Harm Christiaan Pretorius [3]

[1] Department of Operations Management, University of South Africa, Nkoana Simon Radipere Building 4-55, Preller Street, Muckleneuk, Pretoria P.O. Box 27392, South Africa
[2] Department of Quality and Operations Management, Faculty of Engineering and the Built Environment, University of Johannesburg, APB Campus, Johannesburg P.O. Box 524, South Africa
[3] Postgraduate School of Engineering Management, University of Johannesburg, APB Campus, Johannesburg P.O. Box 524, South Africa
* Correspondence: mbonybl@unisa.ac.za

Abstract: The increasing number of businesses closing down and the persistent slow growth of small and medium enterprises (SMEs) within the manufacturing sector is a serious concern globally, including in South Africa. The SMEs that are currently existing are operating below the required efficiency level. Physical and technological capital efficiency integrating manufacturing systematic planning, work study, standardisation and inventory management to improve the profit of SMEs in Gauteng South Africa is inadequate, which is a major concern. This study aimed to explore the physical and technological capital constraints affecting SMEs' profit growth and develop the physical and technological capital efficiency adoption model merging manufacturing systematic planning, work study, standardisation and inventory management for SME profit growth in Gauteng. The study was qualitative, exploratory and descriptive in nature. Face-to-face interviews were conducted targeting 15 owners/managers amongst SMEs in Gauteng. The findings show the most common causes of slow profit growth, which involve poor material handling, unfavourable workplace layout, unscheduled machine maintenance, network challenges, failure to adhere to workplace standards, insufficient product and material recording systems and poor work methods and procedures. The study revealed major concerns for SMEs that required intervention for these enterprises to sustain their profit growth. Thus, the adoption of the model concerning the incorporation of physical and technological capital efficiency tools to advance manufacturing operations be considered as the contributing insight into the profit growth of SMEs in Gauteng. Thus, this study recommends that the government creates an enabling environment for the adoption of this model for SMEs.

Keywords: manufacturing SMEs; efficiency; physical capital; technological capital; profit growth; sustainability

Citation: Mbonyane, B.L.; Mbohwa, C.; Pretorius, J.H.C. Physical and Technological Capital Efficiency for Profit Growth in Small and Medium Enterprises in Gauteng, South Africa: A Descriptive Qualitative Study. *Sustainability* **2023**, *15*, 6621. https://doi.org/10.3390/su15086621

Received: 9 January 2023
Revised: 4 April 2023
Accepted: 10 April 2023
Published: 13 April 2023

1. Introduction

SMEs are regarded as the key players in economic growth as well as in creating jobs worldwide [1–3]. The size of the SMEs is based on the number of employees hired not exceeding 20 for micro or very small businesses, between 20 and 50 for small businesses and less than 250 for medium enterprises, which also supports the 2019 amendment of the National Small Enterprises Act No. 102 of 1996 [4] For SMEs to grow the economy in the country and globally, various stages of the business are followed, namely start-up, growth, maturity and decline or rejuvenation (renewal) stages [5]. During the start-up, stage SMEs introduce their businesses bringing their product ideas into the market [5,6]. In the growth stage, SMEs are bound to improve product quality by exploiting their innovation skills to grow their business profit [5,7]. As these SMEs mature, they can seek credit from

financial institutions or banks and have insurance coverage and their operational processes regulated [5].

Due to the customers' demand for product variety, SMEs in a mature stage face the challenge of uncertainty concerning their business success which forces them to have flexibility in terms of customisation [7]. As sales drop at these SMEs, they may fail to grow their profit and some may become insolvent [5,7]. The challenge for these SMEs to rejuvenate and grow profits is to consider identifying new markets for the products they sell currently and or opt to design new products and services to sustain the profit growth of their businesses to meet the current market demand [5,8]. According to [9], to be sustainable, SMEs must invest in physical capital involving the government building infrastructure, social capital focusing on government agency involvement, and information and communication technology skills, which will help them maintain adequate business relationships with suppliers and customers.

Profit growth in SMEs means subtracting the previous period's revenue from the current period's revenue [10]. Ref. [11] further describe profit growth in SMEs as profit attributed to continuously satisfying customers' demands, considering improved quality products, services and capacity, reducing variability, managing inventory and investing constantly in the manufacturing of the business.

SMEs are at present faced with slow profit growth in South Africa [3,12], causing them to operate below workforce competency and at inappropriate standard operating procedures. This applies to developing countries globally, including South Africa [13,14]. Over seventy-five per cent (75%) of new SMEs, in particular manufacturing businesses, fail to grow in their first three years of existence in South Africa [12,15,16]. To begin with, SMEs endure capital challenges which involve the disruption of the value added to material, machinery and energy comprising electricity, water, gas and chemical emissions and other challenges impacting the health and well-being of employees [13]. In addition, the value assigned to the location for material and product storage and plant or workspace to ensure proper inventory for delivery on time to the customer is also negatively affected [17]. Finally, technological capital challenges also result in distractions on value added to tangible and intangible assets (62).

SMEs in South Africa still fail to upgrade tangible assets including barcoding, computers, use of smartphones, scanners of computers and printers [18] as well as intangible assets involving employee and management exposure to new technology through training [15,18,19].

The empirical study done by [20] reports that the use or purchase of a printer for an SME is costly and a waste to operate the business. The scanner is the better option to take as it would no longer need to print any document. Not forgetting that the lack of software to ensure flexible manufacturing in businesses is also a crisis in SMEs [21]. The absence of network systems such as the internet and Wi-Fi also delays the communication process in the business and with their suppliers and customers in South Africa [20,22]. According to the literature reviewed, SMEs that embrace social media networking technologies can save money and help them communicate and interact with their customers more effectively. The absence of this networking system can cause communication delays and compromise SMEs' costs [23].

SMEs in the country also lack financial access to the government to have tangible and intangible assets upgraded to grow their businesses and meet the current market demand [3,24].

The wide range of these challenges is attributed to ill-defined communication prevailing between supply-to-SMEs and SMEs-to-customer resulting in poor quality products generated and poor customer relationships [3,13]. Poor quality products and services continue to prevail because of the inefficient manufacturing operations negatively impacting the supply chain and long lead times as well as high costs incurred in SMEs [13,25]. The results for the SME production output in South Africa are depicted in Figure 1 below.

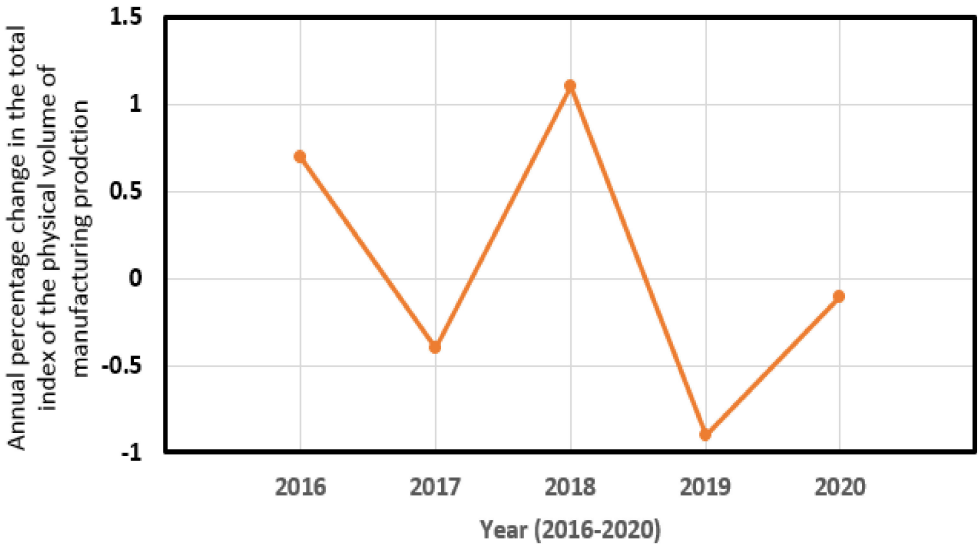

Figure 1. Annual Percentage Change-Volume of Manufacturing Production Output [26].

The statistical report ratio of the SMEs' production output in South Africa has decreased from 0.7 in 2016 to −0.11 in 2020 [26]. This report also shows a slight change of a negative proportion of −8.8 in October 2021 to −0.8. in March 2022, which is still not favourable for SMEs [27]. For the SMEs not to be insolvent and grow in profit, there is a need for these enterprises to have an in-depth understanding of the physical and technological capital constraints affecting their businesses.

Although this paper addressed the information concerning the prevalence of the input resource challenges of both physical [13,28] and technological [3,13,24] nature impacting on the profit growth of SMEs, limited literature has been discovered on the merging of efficiency tools involving manufacturing systematic planning, work study, standardisation and inventory management towards physical and technological capital for the profit growth of SMEs, which is a growing concern.

Secondly, there are currently limited empirical studies on the adoption of the merging of physical and technological capital efficiency tools involving manufacturing systematic planning, work study, standardisation, and inventory management to sustain the profit growth of SMEs in Gauteng, South Africa.

Thus, this paper was prompted by the existing theory and literature to investigate the impact of an efficient approach to physical and technological capital for the profit growth of SMEs in Gauteng, South Africa. Two research questions were identified. The first research question was "How do physical and technological capital constraints impact the SMEs' profit growth?" The final research question was "How a model will be developed regarding the use of physical and technological capital efficiency to ensure SMEs' sustainable profit growth?" To answer these research questions, two objectives were formulated. Firstly, this study used this model to investigate the physical and technological capital constraints affecting SMEs' profit growth. The ultimate goal was to encourage the adoption of the physical and technological capital efficiency model through manufacturing systematic planning, work study, standardisation and inventory management to sustain the profit growth of these SMEs.

The subsequent area of this research presents the literature on the physical and technological capital challenges impacting the profit growth of SMEs followed by the merging of efficiency tools comprising manufacturing systematic planning, work study, standardisation and inventory management in physical and technological capital for the profit growth of SMEs. The methodology is also presented to provide data extracted from the responses of the participants concerning their experiences and the findings are analysed and discussed. Finally, the conclusions are drawn and managerial implications are provided to support the

main research objective followed by the limitations, contributions and recommendations for future research.

2. Literature Review

This paper built the theory from various literature sources involving physical and technological capital challenges impacting the profit growth of SMEs. This study was followed by the merging of manufacturing systematic planning, work study, standardisation and inventory management in physical and technological capital for the profit growth of SMEs. The purpose of building this theory from various literature sources is to explore literature that exists and to identify gaps in the literature.

2.1. Physical and Technological Capital Challenges Impacting on the Profit Growth of SMEs

2.1.1. Physical Capital Challenges in SMEs

The location of SMEs can be either external or internal in nature. The external location for SMEs is considered as a location or geographical area chosen by these SMEs to ensure that customers can have access to buy their goods and experience excellent service [28]. An internal location involves storage available to deposit material before use and a product are stored ready to be delivered by SMEs to customers [29]. Exposure of the SMEs to inappropriate locations and poor infrastructure involving roads that are unpleasant with poor sanitation and electricity supply that unpredictably discourages customers to come and buy their products [20]. 60 confirms that failure to do material quality checks before the material is used during the work in process and after the completion of the product results in excessive inventory leading to waste, high costs and long lead times in SMEs as does poor material handling [30].

Late delivery of material by suppliers delays the production line of SMEs and affects the lead time to deliver the products to customers on time [31]. Exposure to unscheduled or irregular maintenance in the manufacturing process results in machine downtime, bottlenecks, wasted time and high costs delaying the profit and the productivity growth of manufacturing SMEs [32]. Ref. [33] believe that failure to use safety measures and appropriate work methods and standard operating procedures in the workplace exposes employees to unnecessary injuries and accidents leading to high costs in SMEs. Inefficient use of energy involving frequent electricity power cuts results in consistent disruption of the manufacturing process resulting in product damage, long cycles and lead times in SMEs [13]. The most striking negative factor impacting the profit growth of SMEs is load-shedding, which contributes to machine downtime and delayed production resulting in wasted time and high costs for SMEs [34,35].

2.1.2. Technological Capital Challenges in SMEs

SMEs fail to adopt smart manufacturing to sustain profit growth of SMEs [21,36]. Ref. [21] define smart manufacturing as "the integration of information technology and data with different manufacturing technologies." Failure to empower employees through technology training used in manufacturing is also a barrier to improved operations leading to the lack of profit growth of SMEs [36].

Since barcoding is used to track work orders, the orders prepared for the manufacturing process without any of these systems are a serious challenge to trace the correct order in SMEs [37]. In this regard, the lack of barcoding and the sketch representing a product directs employees not to manufacture the correct and quality products [37,38]. Fatorachian and Kazemi (2018) state that SMEs with technology not updated in the workplace experience a low-storage capacity in their computers and printers where not all data and information required can be accessed. Low-storage data or information capacity of computers in SMEs delay the communication and supply chain process within the departments and with their suppliers and customers [39]. Furthermore, the use and maintenance of printers are costly which hinders the sustainable profit growth of SMEs [20].

Failure to use software and networking involving wireless communication in SMEs delays the communication process and operational performance for smart manufacturing resulting in waste, high costs, poor quality services and not delivering on time to customers [21]. These SMEs are also faced with employees who lack knowledge, skills and exposure to technology [19]. Numerous SMEs have a shortage of management and innovative employee skills hampering their operations, which delays the growth of their businesses [15,24]. It is the responsibility of the human resources unit or department in an organisation to ensure the human resources processes are followed for a qualified person to be hired for every position [15,40].

Most of the aforementioned physical and technological challenges can be overcome by adopting physical and technological capital efficiency in the operational process of the SMEs to sustain profit growth in their business, which is addressed in the next section.

2.2. Merging Efficiency Tools to Physical and Technological Capital for the Profit Growth of SMEs

Efficiency means "doing the job well with a minimum of resources and waste" (Heizer et al., 2016:64) [41]. Goshime et al. (2019) [42] explain that efficiency involves eliminating non-value-adding activities such as excessive process inventory, cost reduction, unscheduled downtime, an inflexible workforce; long cycle time; poor quality and late delivery to improve the profit growth of SMEs. The adoption and use of the efficiency tools involving manufacturing systematic planning, work study, standardisation and inventory management on physical and technological capital are addressed below which plays an important role in the profit growth of SMEs in countries globally [22,43–46].

2.2.1. Manufacturing Systematic Planning in Physical and Technological Capital for Profit Growth of Manufacturing SMEs

Manufacturing Systematic Planning in Physical Capital for Profit Growth of Manufacturing SMEs

Manufacturing systematic planning refers to planning set by management to ensure that there are appropriate manufacturing systems involving skilled and competent employees engaged in an optimal supplier-input-process-output-customer approach in place to deliver a quality product and service to the customers [44,47]. The type of production systems used in manufacturing SMEs involves mass production [44,47,48], assembly line, continuous, batch, project, or a combination of these systems [44,48].

Project systems in SMEs entail a specific or new blueprint of an item or object planned to be achieved to meet the market's current demand [44]. As confirmed by [49], an assembly line in SMEs means several parts, objects, or items are gathered by a sequence of employees, machines, or workstations to generate a final product. Ref. [50] regard mass production in manufacturing SMEs as a production system yielding products in large numbers of standardised items or objects using assembly lines or automation. Batch production in SMEs involves the approach followed by employees to generate a set of similar products concurrently [51].

With these systems, continuous monitoring and control of the process from the material preparation, work in process, completion of the products, packaging and storage is essential for the customer to receive a quality product and service [44,52]. Formal and internal training is required to ensure the employees' flexibility and improve labour productivity in the workplace resulting in cost savings and the profit growth of SMEs [44,45,47].

Manufacturing Systematic Planning in Technological Capital for Profit Growth of Manufacturing SMEs

At this juncture positions for skilled workers in production tasks involving technology in the machine operation or process are vacant delaying the profit growth of SMEs [53]. Refs. [45,47,50] encourage the merging of technology into machinery, equipment, plant and manufacturing systems, as this incorporation improves performance and enables SMEs to sustain their profit growth in the competitive market. Lifelong learning of modern technology and novelty or innovative work methods and procedures is significant to

removing barriers to labour productivity and improving the overall manufacturing process for sustainable profit growth of SMEs [21,44,53].

2.2.2. Work Study in Physical and Technological Capital for Profit Growth of Manufacturing SMEs

Work Study in Physical Capital for Profit Growth of Manufacturing SMEs

Work study is "the systematic examination of the methods of carrying out activities to improve the effective use of resources and to set up standards of performance for the activities being carried out" [54]. A lack of appropriate work methods and procedures used by employees and effective machine usage in the workplace amongst SMEs prevails. This results in machine downtime, and inefficient cycle times leading to waste and excessive manufacturing costs among SMEs [55,56]. To improve work methods and standard operating procedures, work study is the key efficiency tool that is introduced to ensure the optimal machine utilisation or operational processes in the workplace [46,47,57].

With work study, existing and proposed form flow charts, flow process charts, outline process charts, two-handed process charts and multiple activity charts incorporated into the flow diagram are used to identify problem areas in the workplace that need improvement [46,57]. Work study in SMEs does not only focus on the recovery of the employees' working methods and procedures but also on the improvement of the process and cycle times for the job being carried out to improve performance in the workplace [55,57].

Work Study in Technological Capital for Profit Growth of Manufacturing SMEs

Merging work study by focusing on method study and work measurement with the recent technology enables SMEs to sustain the efficient use of work methods and cycle times for improved operations resulting in profit and productivity growth of SMEs [46,57]. Using videos with time-measuring devices when conducting work study investigations, managers can retrieve the information and see the activities of the operations to identify shortcomings that need improvement urgently [41,58,59]. If managers rely on manual information recorded using a traditional stopwatch, it can be time-consuming to retrieve and at times cannot be recovered [60].

2.2.3. Standardisation in Physical and Technological Capital for Profit Growth of Manufacturing SMEs

Standardisation in SMEs is a form of agreement within an organisation where relevant parties adhere to rules regarding the creation of goods or performance of a service within set guidelines [61].

Standardisation in Physical Capital for Profit Growth of Manufacturing SMEs

From the literature studied the majority of manufacturing industries, in particular, SMEs, are certified with ISO 9001 quality and ISO 14001 environmental management standards. They are, therefore, able to improve their workplace environment concerning employees' performance [30,47,57].

Furthermore, complying with ISO 9001 quality and ISO14001 environmental standards in SMEs has also been a key to using resources efficiently, ensuring that there is a conducive environment for employees and materials and delivering quality services for customers [30,46,57]. Standards concerning good housekeeping and safety amongst SMEs aid management to eliminate operational process challenges involving delays, underutilised workspace and lack of adherence to conformance involving safety [33,57]. SMEs certified with ISO 50001 energy standards can empower their employees to ensure that they take responsibility for using energy cost-effectively [30,62].

Standardisation in Technological Capital for Profit Growth of Manufacturing SMEs

SMEs need to operate in line with the ISO 9001, ISO 14001, OHSAS 18001 and ISO 50001 certification standards and involve employees in decision-making to be competitive

with and relevant to the current market involving the Fourth Industrial Revolution. Integrating these standards involving employees will assist these SMEs to improve efficiency through cost and waste reduction, energy saving as well as generating quality service to the customers [30,62]. Business-to-business strategy still plays an important role in SMEs by ensuring that they interact or build a good relationship with suppliers distributing energy systems such as inverters and solar panels to aid these SMEs to minimise downtime on the electricity usage and cost saving in their businesses [13,32].

To ensure flexibility in their factories or plants, SMEs need to consider using solar energy to facilitate the operational process and supply chain and by doing so reduce pollution and improve employees' health leading to cost savings in their businesses [63,64]. Although solar energy for SMEs may be expensive, not sufficient during cloudy and rainy days and requires sufficient space, its advantage is that it is renewable and free and not exposing humanity to pollution [65]. Finally, solar energy in these SMEs is a better alternative against global warming which causes climate change and benefits SMEs' competitiveness [65]. Furthermore, SMEs need to have access to low-cost energy use and be allowed to have an agreement with the solar suppliers as service providers without the control of Eskom to assist these SMEs with the regular maintenance of these solar panels in a case where solar usage challenges occur [66].

There is a lack of environmental standards in place in the country to improve the supply chain and employees' performance for cost-saving in SMEs [43]. It is essential to incorporate environmental standards in technology to ensure the optimal monitoring and traceability of products, improvement of energy and resource usage as well as the health and safety of employees in the workplace of SMEs. Doing so will improve labour productivity which is essential [30,43].

2.2.4. Inventory Management in Physical and Technological Capital for Profit Growth of Manufacturing SMEs

Inventory Management in Physical Capital for Profit Growth of Manufacturing SMEs

Inventory management in manufacturing SMEs means ensuring that "the correct order of material is retained at the given time to generate products that will achieve the satisfactory current customer demand at an economical cost" [67]. For SMEs to be competitive, material requirement planning is the key to determining the period and the amount of material needed from the suppliers [31]. The ability of management and employees to reduce the cost of holding stock in storage results in an appropriate production schedule and improved lead times allowing SMEs to deliver quality products on time to the customer [67,68]. As [68] discovered, management with inventory management knowledge and skills in SMEs ensures that the correct order for material is made and reliable suppliers are identified to avoid overstocking and queues resulting in waste and high costs in their businesses. Not only should overstocking be avoided but understocking should also be done away with to ensure that material is available to achieve product orders on time. This approach builds up reliability and the reputation of the business to retain customers [42,68,69].

Although understocking may prevent the business from having excessive costs of keeping capital tied up in stock, SMEs need to avoid this approach as their business may lack reserves for items that are in demand [31,69]. Furthermore, SMEs using understocking as an option may be faced with a situation where no suppliers are available to assist with materials to generate products that will meet the current market demand. In this regard, SMEs' understocking may have no discounts in cases where specials are done in bulk [69]. A make-to-order model is also a tool aiding managers or owners of SMEs to ensure they acquire the material capacity level required to generate the products for the customer [70].

Inventory Management in Technological Capital for Profit Growth of Manufacturing SMEs

One of the growth features concerning the improvement of assets of SMEs is the use of inventory tracking systems to ensure optimal traceability of material and products in

storage and across the supply chain for improved efficiency in the plant or factory [71]. Traceability means "the ability to locate inventory and access information related to their lifecycles across the entire supply chain and to ensure product quality and safety" [72]. The use of upgraded tangible assets involving computers, phones, printers, cash in terms of saving in a safe deposit box and intangible assets including innovation, networking incorporated into machines and processes in the factory, shop floor or plant facilitates supply chain and inventory control in SMEs [20]. Optimal supply chain and inventory reduction result in smart manufacturing for cost saving and profit growth of SMEs (62). Introducing just-in-time systems in SMEs aid managers and owners to ensure that the correct quantity and quality of the product are generated and waste is eliminated for cost saving [73]. As was discovered by [22,37,74], using just-in-time via Enterprise Resource Planning (ERP) systems enables SMEs to work cost-effectively within departments by minimising material kept in storage, ease communication and aids SMEs to respond quickly to the customers' needs.

Familiarising SMEs with E-commerce facilitates the ordering and communication between these SMEs, suppliers, and customers and for these SMEs to receive material from suppliers and deliver customers' products on time. The emergence of E-commerce, radio frequency identification (RFID) and industrial robotics reduce the process, cycle, lead- and downtime to deliver quality products on time to the customers [22]. In response to gaps in the literature to answer research objectives, this paper explores the experience of SMEs using the methodology of how physical and technological capital factors influence the profit growth of SMEs as well as the merging of efficiency tools in physical and technological capital for the profit growth of SMEs.

2.2.5. The Role of Physical and Technological Capital Efficiency for Profit Growth of SMEs

The study has shown in the literature that SMEs are the core of economic growth globally. The SMEs' realisation to understand the aforementioned phenomenon and improve profit growth in their businesses, may contribute to economic growth and improve the standard of living by creating jobs worldwide [33,60,63]. As a result, the literature motivates this study to adopt the use of physical and technological capital efficiency merging manufacturing systematic planning, work study, standardisation, and inventory management in the operational process for SMEs profit growth, which is currently lacking. A framework for the conceptual model proposed in this study is tailored in the next section, which allows the causal relationship between physical and technological capital efficiency and SMEs profit growth.

3. Methodology

The goal of this research was to identify the physical and technological constraints affecting the profit growth of SMEs in Gauteng, South Africa. Since SMEs growth is a challenge globally, South African SMEs are also faced with the physical and technological capital constraints failing these enterprises to grow. SMEs are regarded as having a high business failure rate, resulting in some of them failing to sustain profit growth in their business [12,15,16]. The scrutiny of the broad content examining and probing further these constraints and the reasons for their businesses' failure to sustain profit growth were advocated by the Gauteng owners/managers.

3.1. Developing the Physical and Technological Capital Efficiency Model for Profit Growth of South African SMEs

The adoption of the conceptual model is depicted in Figure 2 below, which supports the use of physical and technological capital efficiency to ensure SMEs sustainable profit growth in Gauteng, South Africa. To adopt this model, the first objective was to investigate the perception of the participants attitudes concerning the physical and technological capital challenges impacting the profit growth of SMEs. The final objective was to use manufacturing systematic planning, work study, standardization, and inventory manage-

ment as physical and capital efficiency tools to alleviate physical and technological capital constraints and sustain the profit growth of their businesses in the Gauteng Region in South Africa. The use of this model depicted in Figure 2 below, was to ensure that these constraints are not overlooked.

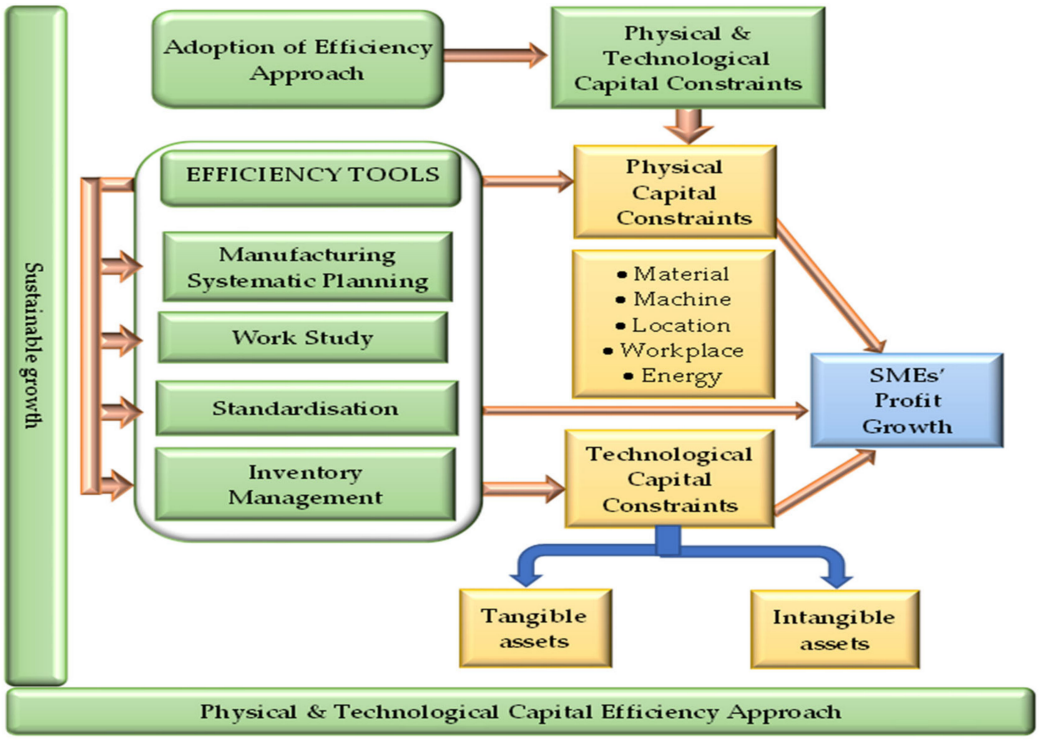

Figure 2. Conceptual Model of Physical and Technological Capital Efficiency for the profit growth of SMEs. Source: adapted from the literature.

The model in Figure 2 above, is extracted from the literature debated comprising physical capital constraints involving the material flow, machine utilisation, location, workplace environment and use of energy as well as technological capital constraints including tangible and intangibles negatively impacting on the profit growth of SMEs. In this study, tangible assets included equipment such as a desktop computer, laptop, printer scanner, phone, and smart phone, while intangible assets included employees' knowledge and skills, internet, Wi-Fi, and software to connect their technological devices. This model reflects the literature discussed concerning the physical and technological capital factors hindering SMEs profit growth and how the physical and technological capital efficiency can contribute to the sustainable profit growth of SMEs in Gauteng South Africa.

3.2. Research Design

The study was qualitative and descriptive in nature using exploratory design to provide an understanding of the experience and perception of participants concerning the impact of an efficient approach in physical and technological capital for the growth of SMEs in Gauteng, South Africa [75]. For the study under time horizon, a cross-sectional study was used, which described the incidence of the phenomenon regarding efficiency into physical and technological capital for growth in the manufacturing SMEs in Gauteng at a single point in time.

3.3. Research Methods

3.3.1. Ethical Consideration

Before conducting the study amongst SMEs in Gauteng, South Africa, an ethical clearance certificate was granted by the Research Committee at the University of Johannesburg.

The purpose was for the researcher to adhere to the ethical principles in terms of confidentiality, informed consent, anonymity/privacy, the prevention of conflict of interest and to ensure that the participants are not harmed. Pseudo-characters were used to protect the identity of participants.

3.3.2. Population

This study targeted the population of SME owners or managers operating in the cities located in Gauteng, South Africa. Generalisation was not advised because the study did not use random samples or statistical rules, necessitating the use of a qualitative method [75].

3.3.3. Sampling and Data Collection

The minimum acceptable sample size for non-probability sampling involving purposive sampling is between five (5) and 25; ethnographic, between 35 and 36; grounded theory, between 20 and 35; homogeneous population, between 4 and 12; and heterogeneous population, between 12 and 30 when conducting a semi-structured interview [75]. An acceptable minimum purposive sample size for conducting a qualitative study using semi-structured interviews for SMEs with similar characteristics should be small and this instrument cannot be considered to be statistically representative of the target population [75,76]. The purpose of selecting a purposive sample was to collect data from a very small sample and obtain informative responses from potential and experienced participants in manufacturing within the stratum of SMEs in order to answer the research question(s) asked and meet research objectives in accordance with the study [75].

A purposive sample of 15 owners/managers in SMEs was selected as shown in Table 1 below. Face-to-face interviews were conducted and a response rate of 100 per cent was obtained from a total sample of 15 SMEs in Gauteng, South Africa. Data from Table 1 reports on the 15 participants interviewed, clustered into three SMEs of which five (5) are from very small, small and medium enterprises respectively. The first brief interview was conducted to determine which enterprises fall into the very small, small and medium-sized categories, as shown in Table 1.

Of the 15 participants indicated in Table 1 below, three (3) SMEs were doing business making cupboards, five (5) focused on steel work followed by one (1) each making masks, caps, packaging boxes for pens, disposables, beds, cables and rubber respectively. Some participants were approached through email with the support of calls and others were contacted in person to participate in the study.

Table 1. The cluster of Five Geographical Areas and Five Strata of SMEs in Gauteng.

Cluster	SMEs Strata			
	Very Small	**Small**	**Medium**	**Total**
Ekurhuleni	1 Cupboard (Wood)	1 Cable	1 Disposable Food Containers	3
Johannesburg	1 Gate (Steel)	1 Face Mask (Textile)	1 Packaging Box (Pens)	3
Pretoria (Tshwane)	1 Cupboard (Wood)	1 Bakkie Liner (Rubber)	1 Textile (Embroidery & Caps)	3
Vaal (Sedibeng)	1 Steel Cutting	1 Cupboard (Wood)	1 Printer Roller (Steel)	3
West Rand	1 Bed	1 Drill Bit (Steel for Mines)	1 (Steel Tanks)	3
Total	**5**	**5**	**5**	**15**

The same researcher interviewed all participants using the same interview guide and the location for the interview between the researcher and the participant. Each participant was given a consent letter to sign in accordance with the two parties' agreement. This letter stated the purpose of the interview as well as the participant's contribution to the study. This study used the interview guide encompassing examples of questions asked, which included the "physical and technological capital challenges impacting on profit growth of

SMEs, how manufacturing systematic planning, work study, standardisation and inventory management impact on physical and technological capital for profit growth of SMEs in the manufacturing sector".

The study period to collect data from the participants took place from September 2020 to May 2021. One-on-one communication with the participants was conducted using a semi-structured interview of 10 open-ended questions to explore further information that is of value to the study. The duration of the interview was 45 to 60 min. In terms of gender, only men were identified in this study. In terms of race, the study targeted one white male, one Indian male and 13 black males. Of the 15 participants concerning ordinal interval, 27% were owners and 73% were managers in SMEs

From the responses of the 15 participants indicated in Table 2 above, only one (1) SME had been in business for less than 5 years and one (1) SME exceeded 40 years in the business. Five (5) SMEs had been operating for a period of six (6) to 10 years followed by six (6) SMEs, which have been in business for 11 to 20 years. The merging of the anticipated efficiency tool based on the subject was seen as revealing SMEs' opportunities for sustainable growth in their businesses. These participants were voice-recorded and verbatim responses were transcribed for each participant. During the study, these interviews were conducted until data was saturated due to new information on other interviews that could not be generated [75].

Table 2. SMEs Years in Operation in Gauteng.

Classification of SMEs	Frequencies						
	1–5 years	**6–10 years**	**11–20 years**	**21–30 years**	**31–40 years**	**<40 years**	**Total**
Very Small	0	4	1	0	0	0	5
Small	0	1	3	1	0	0	5
Medium	1	0	2	1	0	1	5
Total	1	5	6	2	0	1	15

3.3.4. Data Analysis

Content analysis was used to provide central information about the SMEs' background in a data set and to draw and verify conclusions concerning the study [75,77]. Data collected was then analysed to discover any physical and technological constraints as well as positive or negative influences of the physical and capital efficiency tools impacting on profit growth of SMEs [75]. Of the 15 participants, 27% were owners and 73% were managers in SMEs. The study led to findings and a discussion to answer the research objectives.

4. Findings and Discussion

Findings in numerous figures below address the experiences of the participants on the physical and technological capital factors influencing the profit growth of SMEs in Gauteng, South Africa. From the finding of the results analysed, the following outcomes were attained as indicated in Figures 3–5, below.

4.1. Physical Capital Factors Impacting on the Profit Growth of SMEs in Gauteng

Physical capital factors used in this study entail material, machinery, and location in terms of storage, layout and energy. The challenges concerning material were based on material, processes and product quality checks including mate rial handling.

4.1.1. Material

From the responses of 15 participants in Figure 3 below, only 14 SMEs did material quality checks before using the material in the production line. In contrast, all SMEs did product quality checks before packaging and delivery to the customer. Concurring with the literature, the results reported that it is important for SMEs to do the material quality check, even though suppliers provide material with test certificates. There may

be errors that suppliers could not notice when delivering the materials to SMEs as their customers. [28,30].

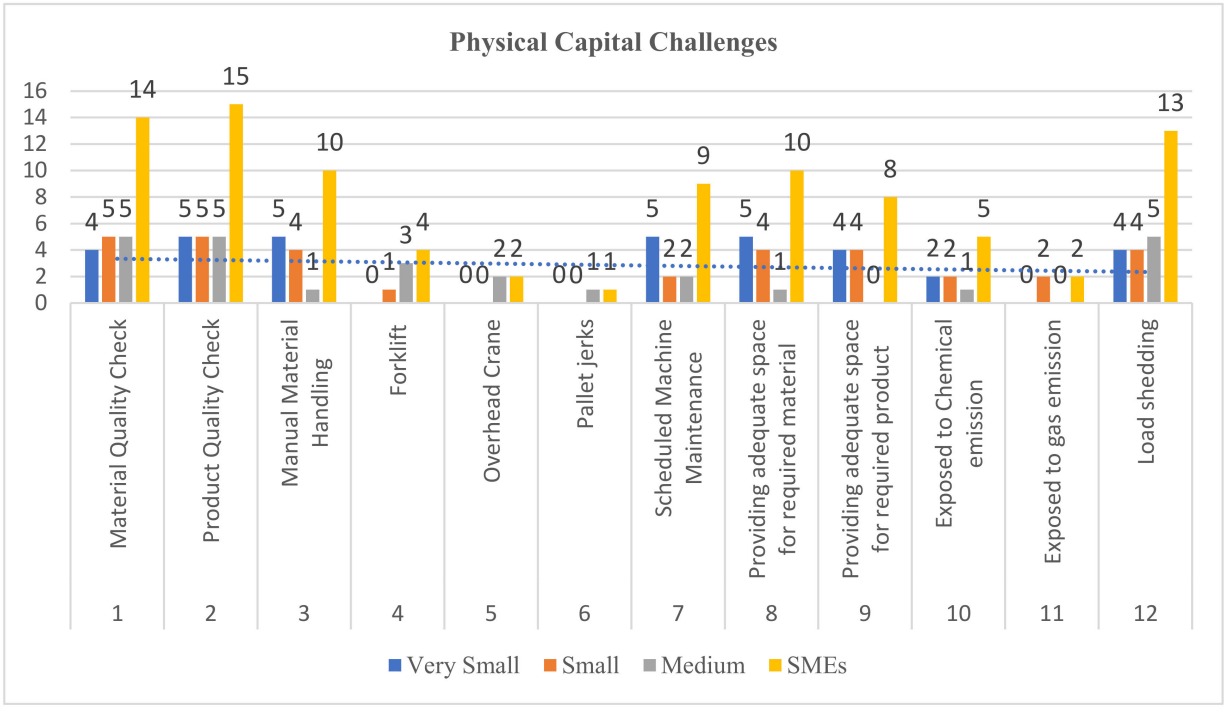

Figure 3. Physical Capital Challenges in SMEs in Gauteng, South Africa.

Of the 15 participants, 10 SMEs used manual handling, two (2) had overhead cranes, four (4) a forklift and one (1) pallet jerks to move material and products to a storage warehouse and the respective workplaces for the production line. To clarify, employees in SMEs differed in the way they handle material. From the responses of the participants, SMEs which were exposed to material handling not using any mechanical system were four (4) very small and five (5) small enterprises. Some used forklifts, and overhead cranes and others focused on the pallet jerks as their mechanical means to handle material. A deduction is made using the findings to justify the literature that the challenges facing SMEs involve poor material handling, which could result in excessive inventory, waste, and long lead times leading to excessive costs in SMEs [25].

4.1.2. Machine

It is evident from the responses of the 15 participants in Figure 3 above, that about nine (9) SMEs adhered to scheduled machine maintenance and three (3) small and three (3) medium enterprises failed to maintain their machines regularly. The outcome of the findings is provided which supports the literature. Failure to maintain machines regularly resulted in frequent machine breakdowns due to poor planning by the management of SMEs. Poor planning caused backlogs in manufacturing, waste and high costs are incurred negatively impacting the profit growth of SMEs [13,32].

4.1.3. Location

In terms of storage space, as indicated in Figure 3, about 10 of the 15 participants reported that SMEs had space provided for the material. Of the 15 participants, only eight (8) were able to provide space for the products. Most SMEs that were negatively affected regarding the storage space for both the material and products were medium enterprises. The relevance of these findings to the literature studied and discussed is that inventory in SMEs is properly monitored if there is sufficient storage to cater to both material and products [17].

4.1.4. Workplace Layout

Data from Figure 3 above indicates that employees of some of the SMEs do not want to comply with the safety measures put in place by SMEs. Of the 15 participants, about five (5) SMEs were exposed to chemicals and two (2) small enterprises incurred gas emission challenges that affected their well-being. These findings concur with the literature that SMEs are not complying with safety standard regulations. Not adhering to the efficient use of work methods and standard operating procedures results in injuries and accidents and high costs for SMEs [13,33].

4.1.5. Energy

Data shown in Figure 3 above concerning electricity indicates that SMEs were faced with downtime and production delays which resulted in waste and high costs. Of the 15 participants, 13 SMEs experienced backlogs and network challenges caused by load-shedding. These findings concur with the literature that load-shedding has a direct negative impact on the operations of businesses as it disturbs the sales, profitability and productivity growth of SMEs [34,35].

4.2. Technological Capital Factors Impacting on the Profit Growth of SMEs in Gauteng

The technological capital factors consisted of tangible and intangible assets. Engaging with the participants in SMEs concerning the type of tangible and intangible issues contributing to SMEs' profit growth is very important. This conversation helped SMEs to be aware of what influences the profit growth of their businesses. Without knowing their challenges when interacting with suppliers and customers it will be impossible to know what input resources they should use to meet the current market demand and what frustrates them not to sustain the profit growth of their businesses.

4.2.1. Tangible Assets

Tangible assets are indicated in Figure 4 below. From the responses of the 15 participants as indicated in Figure 3 below, about eight (8) SMEs reported that they are still using desktops or personal computers. Three (3) of the SMEs operated laptops. Only three (3) SMEs used both desktops and laptops. The findings support the literature that the challenges amongst these enterprises are that the delay in their communication process and lead times using desktops to interact with their customers on product orders prevails [3,39].

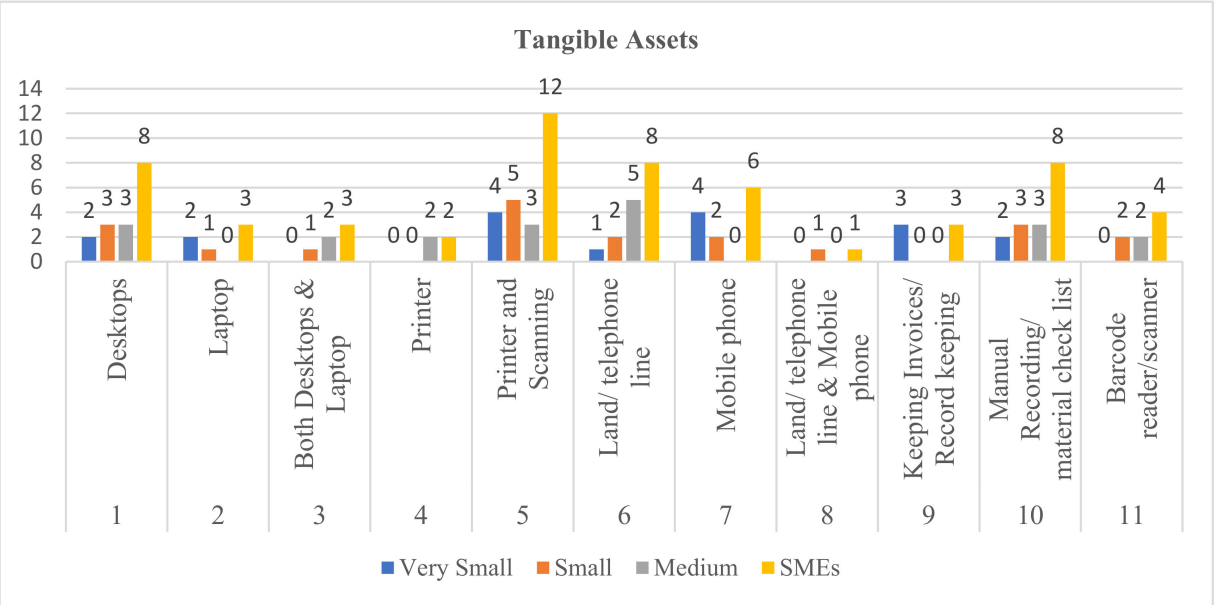

Figure 4. Technological Capital Challenges in SMEs in Gauteng, South Africa.

Of the 15 participants, only two (2) medium enterprises are using printers and 12 of these SMEs have both scanners and printers. These findings agree with the literature that using a scanner rather than a printer contributes to saving time and cost rather than printing on paper [20]. From the responses of 15 participants, as indicated in Figure 4 above, eight (8) SMEs were using landlines and six (6) of them had smartphones to communicate within the business, with suppliers and customers. Only one (1) SME used both a landline and a smartphone in their business. The significance of these findings to the literature studied and discussed is that if landline phones are affected by load-shedding the communication process between SMEs and their customers is delayed [34]. Of the 15 participants as indicated in Figure 4 above, four (4) SMEs are using a barcoding system to scan each label into each item separately. Only three (3) SMEs depended on the invoices they receive from suppliers and eight (8) SMEs recorded manually to determine the amount of material they must use on the production line to generate the products and services for the customers. The findings concur with the literature that barcoding systems allow the rapid and accurate recording and transfer of information to track the material at a time, work-in-process and completed product within the workplace to deliver the products on time to the customer [37,38].

4.2.2. Intangible Elements

It is apparent in Figure 5 below, that none of the employees in very small enterprises were hired with knowledge and skills. Instead, they engaged these employees in training to do specific work. What is interesting is that about 80% (n = 5) of small and medium enterprises respectively were hired with knowledge, skills and experience from their previous employer. These employees would go through screening providing the relevant documents for the task and the owner or manager would ensure the candidates are fit for the position applied for. These findings justify information in the literature that the appropriate recruitment processes must be followed by small and medium enterprises to hire the right candidates with the knowledge, skills and experience for the jobs being carried out in their businesses (5, 44].

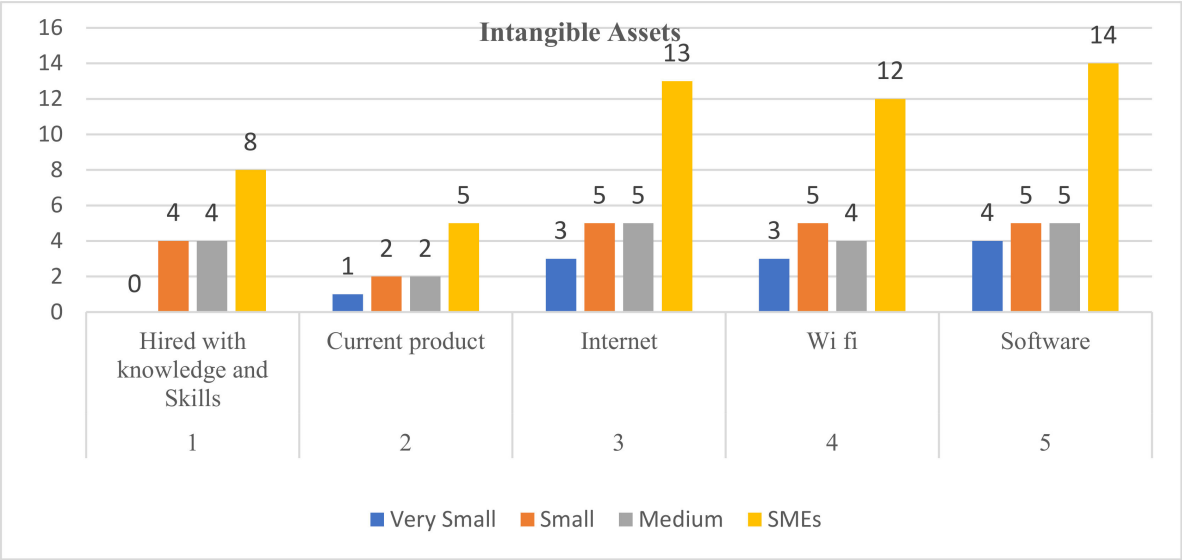

Figure 5. Technological Capital Challenges in SMEs in Gauteng, South Africa.

The following participants representing SMEs were required to express their understanding of the type of technology device they used when networking with suppliers and customers. Of the 15 participants in Figure 5 above, 13 SMEs reported that they used the internet followed by 12 SMEs that used Wi-Fi as well as 14 of these SMEs have software to connect their technological devices.

The findings regarding the internet, Wi-Fi and software [21] used in SMEs concur with the literature that without these networks, communication is delayed amongst parties involved and customers' requirements are not met [20].

4.3. Merging Manufacturing Systematic Planning, Work Study, Standardisation and Inventory Management in Physical and Technological Capital for Profit Growth of SMEs

4.3.1. The Analysis of Manufacturing Systematic Planning for Profit Growth of SMEs in Gauteng

The analysis of manufacturing systematic planning for profit growth of SMEs in Gauteng is summarised in Figure 6 below.

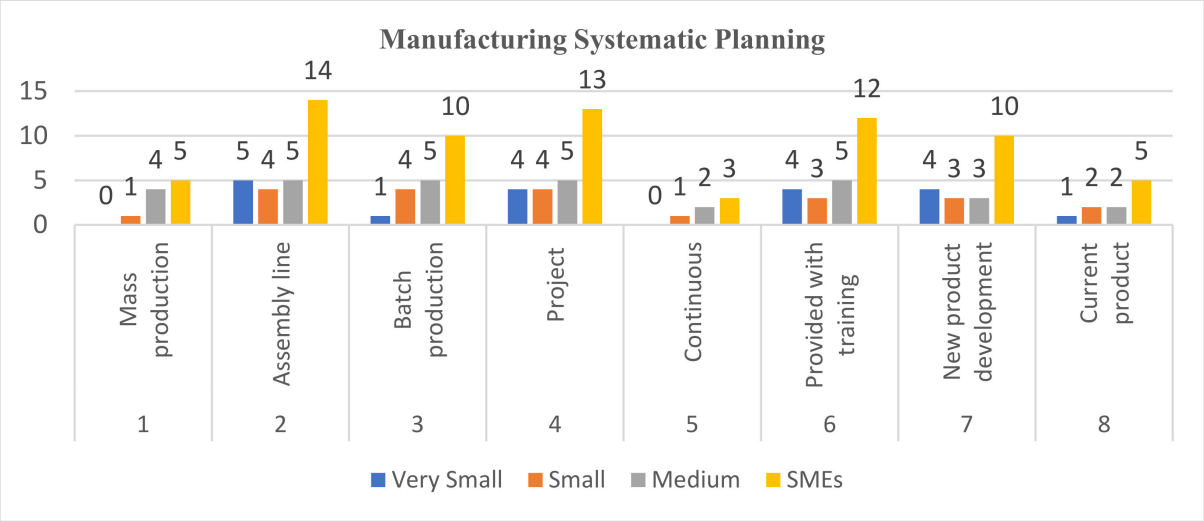

Figure 6. The Analysis of Manufacturing Systematic Planning (MSP) for Profit Growth of SMEs in Gauteng.

It is also evident in Figure 6 that 12 of the 15 SMEs were provided with training and 10 of them developed new products for customisation. Motivating employees through empowerment based on the work itself and technology introduced in manufacturing to improve the supply chain and operation in the workplace was important [36]. Of the 15 participants, about 10 SMEs were involved in new product development. New product development differs from one SME to the other. Some of these SMEs designed new products using their innovativeness without relying on what is required by the customers to attract them. The findings concur with the literature that other SMEs design a new product depending on the order and manufacture of what is required by the customers (74, 77). Only five (5) SMEs generated the old-fashioned and usual products for customers. Findings regarding new product development support the literature that SMEs are not yet ready to engage their employees in new projects of developing a new product for the current market demand [15,24].

All areas investigated using manufacturing systematic planning, which involves the production systems used, training and engaging in new product development were seen by most of the participants as positive and contributing to the profit growth of SMEs. Mass production was mainly used in medium enterprises as they operated on a large scale compared to very small and small enterprises. Numerous conversations were identified by various participants regarding the types of manufacturing systems used in the businesses although some had combinations of these systems to generate products. The findings analysed concur with the literature that failure to empower employees through the training needed in manufacturing is a barrier to improved operation hampering the profit growth of SMEs [36].

4.3.2. The Analysis of Work Study for Profit Growth of SMEs in Gauteng

The analysis of the work study for profit growth of SMEs in Gauteng is summarised in Figure 6 below.

From the responses of 15 participants, the results in Figure 7 above, indicate that about 13 SMEs ensured that good housekeeping is kept in their workplace. There are different ways in which the area should be conducive for employees to walk and work, including customers. Various conversations were presented as responses from the participants. A cause-and-effect diagram was not used by all SMEs to indicate areas of manufacturing that needed improvement. Only seven (7) SMEs, including small and medium enterprises, used process charts to record all activities that needed recovery.

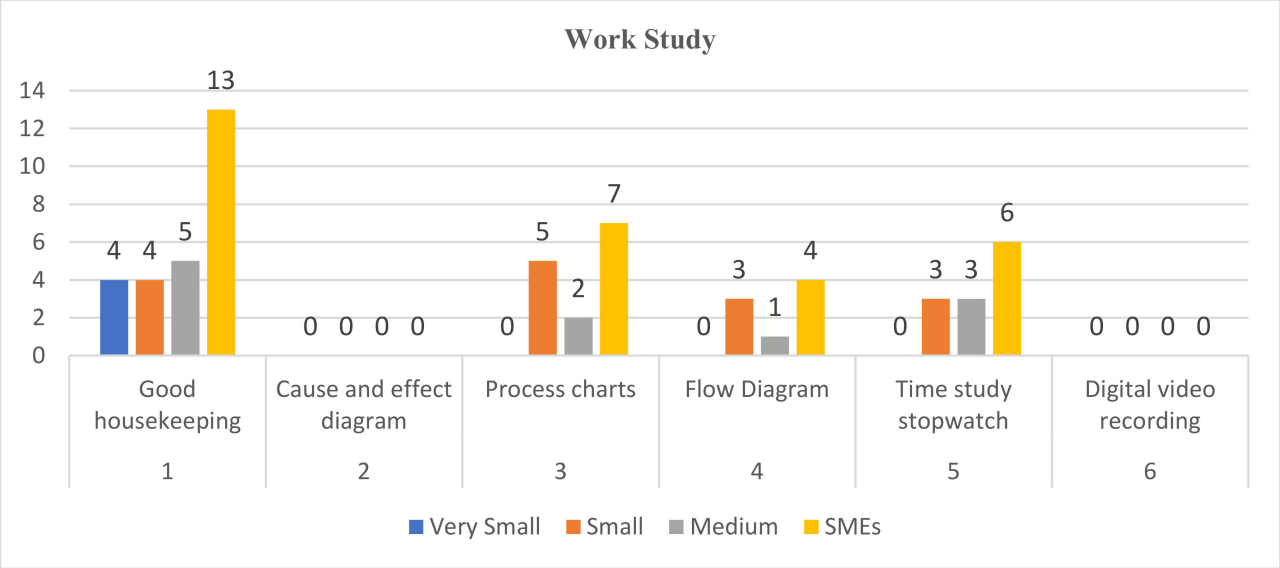

Figure 7. The Analysis of Work Study for Profit Growth of SMEs in Gauteng.

Of the 15 participants, the results further reported that four (4) SMEs used a flow diagram to indicate the movement of employees, materials and equipment or machinery in the workplace. Only three (3) small and medium enterprises respectively used time study stopwatches to measure work and identify the appropriate standard time for the job being carried out. None of these SMEs used digital video cameras for recording. The findings agree with the literature video application when conducting work study investigations, which can assist managers to recover information on the operational activities that need improvement urgently [58,59].

4.3.3. The Analysis of Standardisation for Profit Growth of SMEs in Gauteng

The analysis of standardisation for profit growth of SMEs in Gauteng is summarised in Figure 8 below.

Of the 15 participants involved in the study as indicated in Figure 8 above, close to five (5) SMEs were certified with the ISO 9001 Quality Management System, four (4) with the ISO 14001 Environmental Management System and three (3) with the OHSAS 18001 Safety Management System. None of these SMEs was certified with the ISO 50001 Energy Management System. Of the 15 participants, 12 complied with ISO 9001 quality, and nine (9) ISO14001 environmental and OHSAS safety standard regulations respectively. Only two very small enterprises complied with ISO 50001 energy standard regulations.

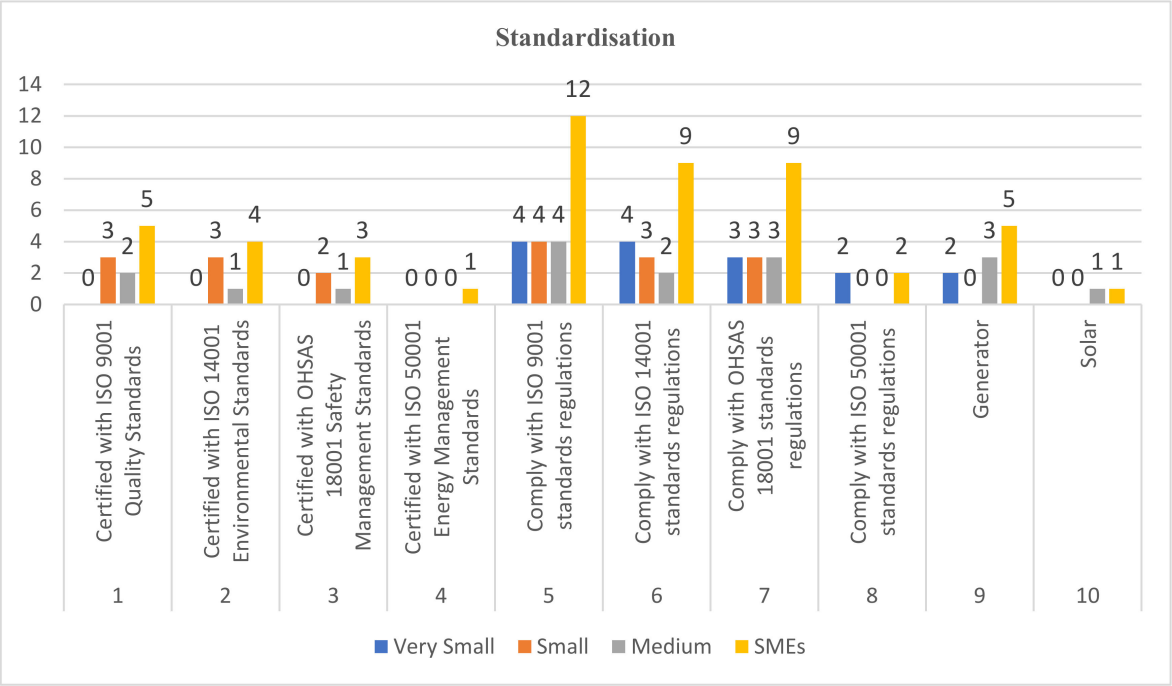

Figure 8. The Analysis of Standardisation for Profit Growth of SMEs in Gauteng.

The findings concur with the literature that SMEs need to be certified with standard regulations about manufacturing to ensure that employees are working in a healthy, safe and comfortable environment [33,57,62]. They must not only be certified but also adhere to the standard regulations required in the workplace. As indicated by Participant 2, SMEs may not be ready for new energy systems due to a lack of financial capacity to purchase solar panels for the sustainability of their businesses [13,32,57,63,64].

4.3.4. The Analysis of Inventory Management for Profit Growth of SMEs in Gauteng

The results are reported in Figure 8 below and discussed in detail how inventory impacts physical and technological capital for the profit growth of SMEs.

It is very interesting that in Figure 9 above, all SMEs prepared orders according to customer specifications and 12 SMEs used more than one supplier to order material. The majority of the SMEs mainly affected by product waste were small and medium enterprises. In terms of storage space, as indicated in Figure 9 above, about 10 of the 15 participants reported that SMEs were able to provide space for the material. However, of the 15 participants, only eight (8) were able to provide space for the products. Most SMEs affected regarding the storage space for both the material and products were medium enterprises.

Two (2) participants are from medium enterprises, one of which used SAP and the other focused on Microsoft dynamics ERP systems to facilitate the supply chain and operations process for cost saving and profit growth of their businesses.

Of the 15 participants, about four (4) SMEs used just-in-time through the ERP system to achieve their organisation functions and respond faster to the current market demand. Each SME decided individually as to which type of ERP system to use to improve their supply chain and operations for the profit growth of their businesses. It is evident from the responses made by Participant 13 that most of these SMEs who did not use E-commerce that unsophisticated internet sites, which involved telephone and emails were the routes that they used to interact with their customers. Of the 15 participants who reported, only one (1) SME, in particular the small enterprise, used industrial robotics to assemble bakkie liners. Of the 15 participants that reported, only one (1) SME used RFID to instantly track and identify multiple labels or codes attached to the items they have in storage to be used for the assembly of light delivery van liners.

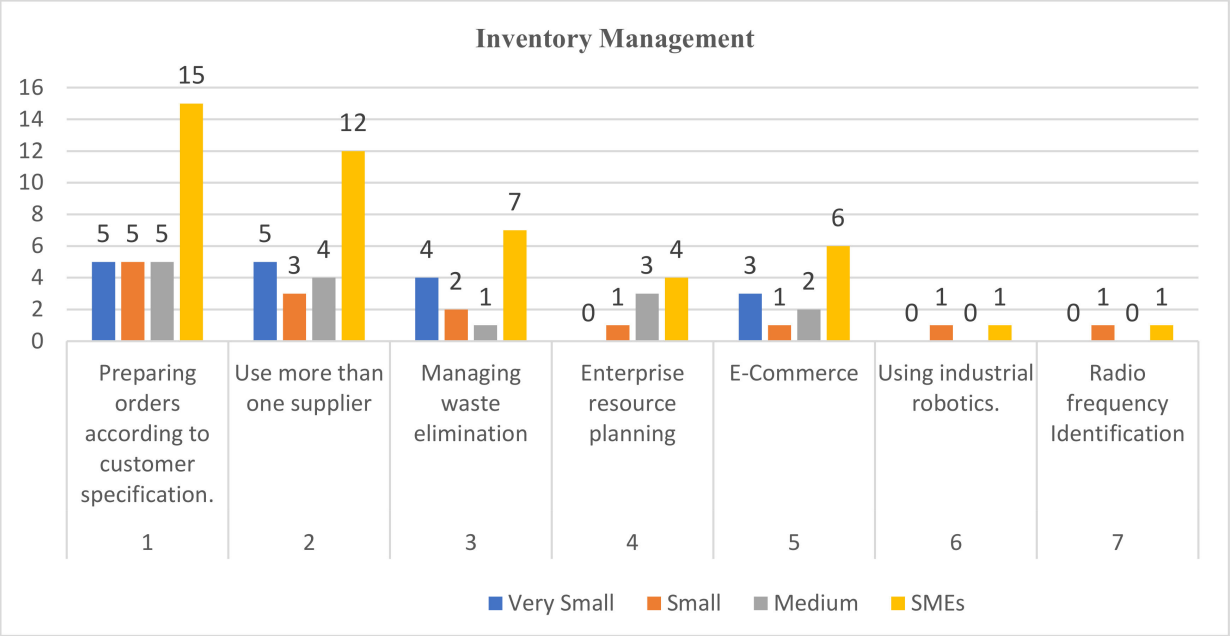

Figure 9. The Analysis of Inventory Management for Profit Growth of SMEs in Gauteng.

The findings support the literature that inventory management was found to be the key efficiency tool to ensure that there is an appropriate order of material, the cost of holding stock is reduced and lead time is improved [67–70]. These findings support the literature. These findings further concur with the literature that states that introducing the inventory tracking system aids SMEs to trace material and products in storage optimally and ensures the product quality before it is delivered to the customer [71,72].

The findings support the literature that upgrading assets in the SMEs' operations facilitates the communication and supply chain process to ensure optimal inventory control in their businesses [62]. Incorporating technology systems in manufacturing involving just-in-time systems [73], ERP [22,37], E-commerce, RFID and industrial robotics [22], improves the communication and supply chain process to deliver products and services to the customer on time [22,37,73].

Since the study reported the aforementioned findings and the literature on how physical and technological capital constraints have a negative impact on the profit growth of SMEs, the progress of SMEs is dependent on the adoption of physical and technological capital efficiency as the driving force of profit growth in their businesses.

5. Concluding Remarks and Managerial Implications

This paper explored the literature regarding the physical and technological capital challenges in SMEs impacting on profit growth of SMEs coupled with how profit growth can be sustained by merging manufacturing systematic planning, work study, standardisation and inventory management in physical and technological capital. From the literature discovered and the gaps identified numerous objectives supporting the literature were formulated and a qualitative empirical study was conducted.

For this paper to answer the first objective, numerous conclusions were drawn. Firstly, the study focused on the physical capital constraints impacting the profit growth of SMEs. The affected SMEs regarding manual material handling involved very small and small enterprises. The failure of these enterprises to handle material is due to incorrect methods resulting from poor planning by management. Secondly, these challenges may be attributed to these enterprises being small-scale enterprises with less financial capacity to purchase the appropriate mechanical tools for handling the material. Small and medium enterprises are faced with unscheduled machine maintenance resulting in frequent breakdowns affecting the production line. The lack of adequate storage space for materials and products

experienced by medium enterprises may result in capital tied up in stock and may result in damage incurred and economic losses. Prolonged periods of load-shedding affect the SMEs' production line, and the status of the business may be ascribed to the countries' poor financial state. Employees faced with gas and chemical emissions resulted from either lack of management commitment to providing personal protective equipment or employees not adhering to safety standard regulations.

Secondly, the study focused on the technological capital constraints impacting the profit growth of SMEs. The use of desktop computers consumes more electricity and results in taking longer due to low data storage and may cost the company more money, especially in cases when there is a power cut. Secondly, printers cost SMEs more money in terms of printing. Manual recording/material checklists and lack of barcoding delay the production flow and communication process leading to backlogs impacting the customers' requirements. Lack of employee knowledge in very small enterprises is due to the lack of these enterprises' financial capacity as well as being a small-scale sector.

For this paper to respond to the second objective, several conclusions were drawn focusing on the merged physical and technological efficiency tools `to sustain the profit growth of their SMEs`. Currently, new product development is in high demand. Small and medium enterprises show no sign of engaging in the design of new products. Failure to develop a new product for customers results from a lack of innovation in small and medium enterprises. SMEs' inability to use cause-and-effect diagrams results in the SMEs struggling to identify non-value-adding activities for improvements in the workplace. The SMEs' inability and lack of commitment to use video recordings wasted time and money and the absence of this device using manual recordings may lead to the information getting lost.

A lack of exposure to the use of the flow diagram and flow process charts hampers very small and medium enterprises' ability to identify the movement and work activities carried out by employees and machinery. Once the flow process chart and diagrams are made, specific positions and operations would be assigned to relevant employees and appropriate machines. Although time study stopwatches are regarded as traditional, failure to use the device leads to very small enterprises not measuring work and identifying the proper standard time for the job being carried out. The hesitance to use digital cameras when conducting work study may delay the investigative process, is time-consuming to document the information and at times fails to gather other information significant to the investigation of employees, machines and operational process improvement.

SMEs' failure to certify and comply with standard regulations involving ISO 9001, ISO 14001, OHSAS 18001 and ISO 50001 results in poor quality service delivered to the customers. Poor quality service may be due to failure to involve employees in decision-making and not providing new knowledge thereof. Most of the small and medium enterprises failed to manage waste. An inability to manage waste may be due to poor planning and control, and failure to adhere to required work methods and standard working procedures. Not all SMEs could afford to use enterprise resource planning, E-commerce, robotics and RFID in the manufacturing or production process. Not using these systems may be due to a lack of capacity to purchase this kind of technology to run production, resistance to change and not knowing thereof as well as a lack of support from the government.

Regarding the managerial implications, there are respective technological training that SMEs owners or managers need to go through, which are recent for practice which is where these SMEs are lacking. The findings encourage owners or managers in SMEs to adopt the model focusing on the profit growth using physical and technological capital efficiency merging these tools as well as involving the suppliers, customers, the government and relevant business stakeholders.

6. Research Limitations

The following study limitations related to the literature and findings were addressed:

The literature on how physical and technological capital efficiency tools such as manufacturing systematic planning, work study, standardization, and inventory management can help

SMEs grow their profits is limited. The framework developed for this model only depended on the response of the owners and managers located in Gauteng rather than all regions in South Africa. A cross-sectional study was chosen as the time horizon for data collection because the information was collected all at once. As opposed to longitudinal studies, which have the comparison of information for SMEs profit performance that could be investigated before, during, and after to determine the variation of the SMEs profit growth, this tool would be sufficient to provide proper results for the profit growth of SMEs.

7. Research Contributions

This paper provides a constructive background to the empirical interrelationships found between efficiency, physical and technological factors, and profit growth of manufacturing SMEs.

What is different from previous studies is that research that has specified the use of physical and technological capital efficiency merging manufacturing systematic planning, work study, standardisation and inventory management for SMEs profit growth could not be discovered.

This study contributes to the body of knowledge of the profit growth challenges that SMEs face in South Africa, and how these pitfalls could be minimised by incorporating these efficiency tools.

The findings of this study contribute to the existing literature in two ways. First, this study provides empirical evidence of the positive impact of physical and technological capital on SMEs' profit growth. Profit growth has been found to be significant for the long-term survival of SMEs because they are seen as contributing to economic growth and creating jobs [1–3].

The ultimate contribution is that this research developed the physical and technological capital efficiency model which uncovered the main pointers that could significantly improve the profit growth of SMEs.

Measuring the integrated efficiency tools involving manufacturing systematic planning, work study, standardisation and inventory management in physical and technological capital for SMEs' profit growth is essential. This study could be replicated in SMEs in other provinces in South Africa to verify whether similar findings could be attained to validate the conceptual model.

8. Recommendations and Future Research

This paper recommends that the government be involved and committed to these SMEs by providing training, access to financing, appropriate business areas and structures and another business acumen. Based on the literature and empirical information presented, conclusions drawn, and contributions made, it is anticipated that the model will be of value to academics, researchers, students, including SME owners in business growth. This paper proposes a conceptual model to address the physical and technological capital factors impacting SMEs profit growth incorporating manufacturing systematic planning, work study, standardisation and inventory management. The collaboration of SMEs, including employees with the government agencies, suppliers and customers on the adoption of the physical and technological efficiency model for profit growth should be considered.

Author Contributions: Conceptualization, B.L.M.; Methodology, B.L.M.; Formal analysis, B.L.M.; Investigation, B.L.M.; Writing—Original draft, B.L.M.; Writing—Review & editing, B.L.M.; Supervision, J.H.C.P. and C.M. All authors have read and agreed to the published version of the manuscript.

Funding: The APC will be funded by Masters and Doctorate Committee at the University of South Africa.

Institutional Review Board Statement: Ethical clearance was granted by the University of Johannesburg for the author to proceed with the study.

Informed Consent Statement: An informed consent letter was prepared and the purpose of the study was explained and clarified.

Data Availability Statement: The data has been included in the article.

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

References

1. Liu, Y.; Dilanchiev, A.; Xu, K.; Hajiyeva, A.M. Financing SMEs and business development as new post COVID-19 economic recovery determinants. *Econ. Anal. Policy* **2022**, *76*, 554–567. [CrossRef]
2. Roman, T.; Marcu, N.; Rusu, V.D.; Doacă, E.M.; Siriteanu, A.A. Tax Payment and the Performance of SMEs: A Longitudinal Analysis on EU Countries. *Sustainability* **2023**, *15*, 927. [CrossRef]
3. Serumaga-Zake, J.M.; van der Poll, J.A. Addressing the impact of Fourth Industrial Revolution on South African manufacturing small and medium enterprises SMEs). *Sustainability* **2021**, *13*, 11703. [CrossRef]
4. Republic of South Africa. *National Definition of Small Enterprise Act 26 of 1996 in South Africa*; Government Printer: Pretoria, South Africa, 2019.
5. Zhang, Y.; Wei, F. SMEs' charismatic leadership, product life cycle, environmental performance, and financial performance: A mediated moderation model. *J. Clean. Prod.* **2021**, *306*, 127147. [CrossRef]
6. Chege, S.M.; Wang, D.; Suntu, S.L. Impact of information technology innovation on firm performance in Kenya. *Inf. Technol. Dev.* **2020**, *26*, 316–345. [CrossRef]
7. Yu, G.J.; Park, M.; Hong, K.H. A strategy perspective on total quality management. *Total Qual. Manag. Bus. Excell.* **2020**, *31*, 68–81. [CrossRef]
8. Wale, E.; Chipfupa, U. Entrepreneurship concepts/theories and smallholder agriculture: Insights from the literature with empirical evidence from KwaZulu-Natal, South Africa. *Trans. R. Soc. S. Afr.* **2021**, *76*, 67–79. [CrossRef]
9. Jo, D.; Kwon, C. Structure of green supply chain management for sustainability of small and medium enterprises. *Sustainability* **2021**, *14*, 50. [CrossRef]
10. Sharma, R.K.; Bakshi, A.; Chhabra, S. Determinants of behaviour of working capital requirements of BSE listed companies: An empirical study using co-integration techniques and generalised method of moments. *Cogent Econ. Financ.* **2020**, *8*, 1720893. [CrossRef]
11. Nwokocha, V.C.; Nwankwo, C.; Madu, I.A. The role of subcontracting on innovation: An assessment of small and medium enterprises in Nigeria. *Prod. Manuf. Res.* **2019**, *7*, 88–108. [CrossRef]
12. Nieuwenhuizen, C. The effect of regulations and legislation on small, micro and medium enterprises in South Africa. *Dev. S. Afr.* **2019**, *36*, 666–677. [CrossRef]
13. Bag, S.; Pretorius, J.H.C. Relationships between industry 4.0, sustainable manufacturing and circular economy: Proposal of a research framework. *Int. J. Organ. Anal.* **2020**, *30*, 864–898. [CrossRef]
14. Mashavira, N.; Chipunza, C.; Dzansi, D.Y. Managerial political competencies and the performance of small and medium-sized enterprises in South Africa. *Acta Commer.* **2021**, *21*, 1–13. [CrossRef]
15. Asoba, S.N.; Patricia, N.M. The primacy of effective human capital management to the growth of entrepreneurship ventures. A study of cases from the fast-food restaurant sector in Cape Town. *Acad. Entrep. J.* **2021**, *27*, 1–9.
16. Maliwichi, L.L.; Manenzhe-Ramarope, M.; Strydom, M. The role of small-scale apparel manufacturing businesses in the provision of employment and income generation. *Dev. S. Afr.* **2023**, 1–15. [CrossRef]
17. Kaplinsky, R.; Kraemer-Mbula, E. Innovation and uneven development: The challenge for low-and middle-income economies. *Res. Policy* **2022**, *51*, 104394. [CrossRef]
18. Smidt, H.J.; Jokonya, O. Towards a framework to implement a digital agriculture value chain in South Africa for small-scale farmers. *J. Transp. Supply Chain. Manag.* **2022**, *16*, 746. [CrossRef]
19. Kruger, S.; Steyn, A.A. Enhancing technology transfer through entrepreneurial development: Practices from innovation spaces. *J. Technol. Transf.* **2020**, *45*, 1655–1689. [CrossRef]
20. Bvuma, S.; Marnewick, C. Sustainable livelihoods of township small, medium and micro enterprises towards growth and development. *Sustainability* **2020**, *12*, 3149. [CrossRef]
21. Mittal, S.; Khan, M.A.; Purohit, J.K.; Menon, K.; Romero, D.; Wuest, T. A smart manufacturing adoption framework for SMEs. *Int. J. Prod. Res.* **2020**, *58*, 1555–1573. [CrossRef]
22. Mathu, K.M. The information technology role in supplier-customer information-sharing in the supply chain management of South African small and medium-sized enterprises. *S. Afr. J. Econ. Manag. Sci.* **2019**, *22*, 1–8. [CrossRef]
23. Al Halbusi, H.; Alhaidan, H.; Abdelfattah, F.; Ramayah, T.; Cheah, J.H. Exploring social media adoption in small and medium enterprises in Iraq: Pivotal role of social media network capability and customer involvement. *Technol. Anal. Strateg. Manag.* **2022**, 1–18. [CrossRef]
24. Lose, T.; Mapuranga, M. Antecedents that inhibit the performance of business incubators in South Africa. *Acad. Entrep. J.* **2022**, *28*, 1–13.
25. Makinde, O.; Selepe, R.; Munyai, T.; Ramdass, K.; Nesamvuni, A. Improving the supply chain performance of an electronic product-manufacturing organisation using DMAIC approach. *Cogent Eng.* **2022**, *9*, 2025196. [CrossRef]
26. Statistics SA. *Manufacturing: Production and Sales (Preliminary)*; Statistical Release: Pretoria, South Africa, 2021.
27. Statistics SA. *Manufacturing: Production and Sales (Preliminary)*; Statistical Release: Pretoria, South Africa, 2022.

28. Sahoo, S. Lean practices and operational performance: The role of organizational culture. *Int. J. Qual. Reliab. Manag.* **2021**, *39*, 428–467. [CrossRef]
29. Stadnicka, D.; Litwin, P. Value stream mapping and system dynamics integration for manufacturing line modelling and analysis. *Int. J. Prod. Econ.* **2019**, *208*, 400–411. [CrossRef]
30. Mahmood, N.S.; Ajmi, A.A.; Sarip, S.B.; Kaidi, H.M.; Jamaludin, K.R.; Talib, H.H.A. Modeling the sustainable integration of quality and energy management in power plants. *Sustainability* **2022**, *14*, 2460. [CrossRef]
31. Bag, S.; Gupta, S.; Kumar, S. Industry 4.0 adoption and 10R advance manufacturing capabilities for sustainable development. *Int. J. Prod. Econ.* **2021**, *231*, 107844. [CrossRef]
32. Bosman, L.; Garcia-Bravo, J. Lessons learned: Research benefits and beyond associated with participating in the NSF I-Corps™ Customer Discovery Program. *Technol. Innov.* **2021**, *22*, 41–54. [CrossRef]
33. Sukdeo, N.; Ramdass, K.; Petja, G. Application of 7s methodology: A systematic approach in a bucket manufacturing organisation. *S. Afr. J. Ind. Eng.* **2020**, *31*, 178–193. [CrossRef]
34. Ateba, B.B.; Prinsloo, J.J.; Gawlik, R. The significance of electricity supply sustainability to industrial growth in South Africa. *Energy Rep.* **2019**, *5*, 1324–1338. [CrossRef]
35. Umar, B.B.; Kunda-Wamuwi, C.F. Socio-Economic effects of load shedding on poor urban households and small business enterprises in Lusaka, Zambia. *Energy Environ. Res.* **2019**, *9*, 20–29. [CrossRef]
36. Narwane, V.S.; Raut, R.D.; Yadav, V.S.; Singh, A.R. Barriers in sustainable industry 4.0: A case study of the footwear industry. *Int. J. Sustain. Eng.* **2021**, *14*, 175–189. [CrossRef]
37. Erkayman, B. Transition to a JIT production system through ERP implementation: A case from the automotive industry. *Int. J. Prod. Res.* **2019**, *57*, 5467–5477. [CrossRef]
38. Adam, M.H. Use of Electronic Supply Chain Management in Overcoming Uncertainty Constraints: South African Textile Industry. Ph.D. Thesis, University of Kwazulu-Natal, Durban, South Africa, 2020.
39. Ferretti, L.; Longo, F.; Merlino, G.; Colajanni, M.; Puliafito, A.; Tapas, N. Verifiable and auditable authorizations for smart industries and industrial internet-of-things. *J. Inf. Secur. Appl.* **2021**, *59*, 102848. [CrossRef]
40. Mokomane, S.E.; Potgieter, I.L. Implementation of human resource management functions in selected small manufacturing companies in Ga-Rankuwa industrial area, Gauteng, South Africa. *SA J. Hum. Resour. Manag.* **2020**, *18*, 1–11. [CrossRef]
41. Heizer, J.; Reder, B.; Muson, C. *Operations Management: Sustainability and Supply Chain Management*; Pearson Publishing: New York, NY, USA, 2016; p. 64.
42. Goshime, Y.; Kitaw, D.; Jilcha, K. Lean manufacturing as a vehicle for improving productivity and customer satisfaction: A literature review on metals and engineering industries. *Int. J. Lean Six Sigma* **2019**, *10*, 691–714. [CrossRef]
43. Agrawal, R.; Wankhede, V.A.; Kumar, A.; Luthra, S.; Huisingh, D. Progress and trends in integrating industry 4.0 within Circular Economy: A comprehensive literature review and future research propositions. *Bus. Strategy Environ.* **2022**, *31*, 559–579. [CrossRef]
44. Matt, D.T.; Orzes, G.; Rauch, E.; Dallasega, P. Urban production–A socially sustainable factory concept to overcome shortcomings of qualified workers in smart SMEs. *Comput. Ind. Eng.* **2020**, *139*, 105384. [CrossRef]
45. Piwowar-Sulej, K. Human resources development as an element of sustainable HRM–with the focus on production engineers. *J. Clean. Prod.* **2021**, *278*, 124008. [CrossRef] [PubMed]
46. Sookdeo, B. Using method analysis to improve productivity: Case of a tap manufacturer. *Int. J. Product. Perform. Manag.* **2020**, *70*, 1470–1486. [CrossRef]
47. Vaszkun, B.; Tsutsui, W.M. A modern history of Japanese management thought. *J. Manag. Hist.* **2012**, *18*, 368–385. [CrossRef]
48. Oluyisola, O.E.; Bhalla, S.; Sgarbossa, F.; Strandhagen, J.O. Designing and developing smart production planning and control systems in the industry 4.0 era: A methodology and case study. *J. Intell. Manuf.* **2022**, *33*, 311–332. [CrossRef]
49. Andronas, D.; Arkouli, Z.; Zacharaki, N.; Michalos, G.; Sardelis, A.; Papanikolopoulos, G.; Makris, S. On the perception and handling of deformable objects–A robotic cell for white goods industry. *Robot. Comput.-Integr. Manuf.* **2022**, *77*, 102358. [CrossRef]
50. Leng, J.; Liu, Q.; Ye, S.; Jing, J.; Wang, Y.; Zhang, C.; Zhang, D.; Chen, X. Digital twin-driven rapid reconfiguration of the automated manufacturing system via an open architecture model. *Robot. Comput.-Integr. Manuf.* **2020**, *63*, 101895. [CrossRef]
51. Kinkel, S.; Baumgartner, M.; Cherubini, E. Prerequisites for the adoption of AI technologies in manufacturing–Evidence from a worldwide sample of manufacturing companies. *Technovation* **2022**, *110*, 102375. [CrossRef]
52. Villalonga, A.; Negri, E.; Biscardo, G.; Castano, F.; Haber, R.E.; Fumagalli, L.; Macchi, M. A decision-making framework for dynamic scheduling of cyber-physical production systems based on digital twins. *Annu. Rev. Control.* **2021**, *51*, 357–373. [CrossRef]
53. Chakravarty, S. Resource constrained innovation in a technology intensive sector: Frugal medical devices from manufacturing firms in South Africa. *Technovation* **2022**, *112*, 102397. [CrossRef]
54. Kanawaty, G. *Introduction to Work Study*; Skotaville Publishers: Geneva, Switzerland, 1995; p. 9.
55. Malatji, T.; Muyengwa, G. Productivity improvement in a vegetable canning manufacturing facility. *MATEC Web Conf.* **2020**, *312*, 05004. [CrossRef]
56. Maware, C.; Okwu, M.O.; Adetunji, O. A systematic literature review of lean manufacturing implementation in manufacturing-based sectors of the developing and developed countries. *Int. J. Lean Six Sigma* **2021**, *13*, 1–36. [CrossRef]

57. Munyai, T.T.; Mbonyane, B.L.; Mbohwa, C. *Productivity Improvement in Manufacturing SMEs: Application of Work Study*; CRC Press: Boca Raton, FL, USA, 2017.
58. Fantoni, G.; Al-Zubaidi, S.Q.; Coli, E.; Mazzei, D. Automating the process of method-time-measurement. *Int. J. Product. Perform. Manag.* **2020**, *70*, 958–982. [CrossRef]
59. Gašpar, T.; Deniša, M.; Radanovič, P.; Ridge, B.; Savarimuthu, T.R.; Kramberger, A.; Priggemeyer, M.; Roßmann, J.; Wörgötter, F.; Ivanovska, T.; et al. Smart hardware integration with advanced robot programming technologies for efficient reconfiguration of robot workcells. *Robot. Comput.-Integr. Manuf.* **2020**, *66*, 101979. [CrossRef]
60. Rajpathak, D.; Xu, Y.; Gibbs, I. An integrated framework for automatic ontology learning from unstructured repair text data for effective fault detection and isolation in automotive domain. *Comput. Ind.* **2020**, *123*, 103338. [CrossRef]
61. Brunsson, N.; Rasche, A.; Seidl, D. The dynamics of standardization: Three perspectives on standards in organization studies. *Organ. Stud.* **2012**, *33*, 613–632. [CrossRef]
62. Machado, C.G.; Winroth, M.; Almström, P.; Öberg, A.E.; Kurdve, M.; AlMashalah, S. Digital organisational readiness: Experiences from manufacturing companies. *J. Manuf. Technol. Manag.* **2021**, *32*, 167–182. [CrossRef]
63. Obaideen, K.; AlMallahi, M.N.; Alami, A.H.; Ramadan, M.; Abdelkareem, M.A.; Shehata, N.; Olabi, A.G. On the contribution of solar energy to sustainable developments goals: Case study on Mohammed bin Rashid Al Maktoum Solar Park. *Int. J.* **2021**, *12*, 100123. [CrossRef]
64. Wohlfarth, K.; Worrell, E.; Eichhammer, W. Energy efficiency and demand response–two sides of the same coin? *Energy Policy* **2020**, *137*, 111070. [CrossRef]
65. Sun, Y. The achievement, significance and future prospect of China's renewable energy initiative. *Int. J. Energy Res.* **2020**, *44*, 12209–12244. [CrossRef]
66. Bloem, S.; Swilling, M.; Koranteng, K. Taking energy democracy to the streets: Socio-technical learning, institutional dynamism, and integration in South African community energy projects. *Energy Res. Soc. Sci.* **2021**, *72*, 101906. [CrossRef]
67. Muchaendepi, W.; Mbohwa, C.; Hamandishe, T.; Kanyepe, J. Inventory management and performance of SMEs in the manufacturing sector of Harare. *Procedia Manuf.* **2019**, *33*, 454–461. [CrossRef]
68. Nemtajela, N.; Mbohwa, C. Relationship between inventory management and uncertain demand for fast moving consumer goods organisations. *Procedia Manuf.* **2017**, *8*, 699–706. [CrossRef]
69. Guluma, D.A. Inventory management practices, challenges and prospects-the case of Asella Malt Factory. *ICTACT J. Manag. Stud.* **2019**, *5*, 1095–1107. [CrossRef]
70. Firat, M.; de Meyere, J.; Martagan, T.; Genga, L. Optimizing the workload of production units of a make-to-order manufacturing system. *Comput. Oper. Res.* **2022**, *138*, 105530. [CrossRef]
71. Kayikci, Y.; Subramanian, N.; Dora, M.; Bhatia, M.S. Food supply chain in the era of industry 4.0: Blockchain technology implementation opportunities and impediments from the perspective of people, process, performance, and technology. *Prod. Plan. Control.* **2022**, *33*, 301–321. [CrossRef]
72. Rejeb, A.; Rejeb, K.; Zailani, S.; Treiblmaier, H.; Hand, K.J. Integrating the internet of things in the halal food supply chain: A systematic literature review and research agenda. *Internet Things* **2021**, *13*, 100361. [CrossRef]
73. Reyes, J.; Mula, J.; Díaz-Madroñero, M. Development of a conceptual model for lean supply chain planning in industry 4.0: Multidimensional analysis for operations management. *Prod. Plan. Control.* **2021**, 1–16. [CrossRef]
74. Fatorachian, H.; Kazemi, H. A critical investigation of industry 4.0 in manufacturing: Theoretical operationalisation framework. *Prod. Plan. Control.* **2018**, *29*, 633–644. [CrossRef]
75. Saunders, M.; Lewis, P.; Thornhill, A. *Research Methods for Business Students*; FT Prentice Hall: Cape Town, South Africa, 2016.
76. Obermayer, N.; Kővári, E.; Leinonen, J.; Bak, G.; Valeri, M. How social media practices shape family business performance: The wine industry case study. *Eur. Manag. J.* **2022**, *40*, 360–371. [CrossRef]
77. Cooper, D.R.; Schindler, P.S. *Business Research Methods*; McGraw-Hill: London, UK, 2014; pp. 384–387.