

2022

Strategies Small Business Owners Use to Improve Profitability in the Plastic Recycling

Chukwudi Alexander Amene
Walden University

Follow this and additional works at: <https://scholarworks.waldenu.edu/dissertations>



Part of the [Business Commons](#)

This Dissertation is brought to you for free and open access by the Walden Dissertations and Doctoral Studies Collection at ScholarWorks. It has been accepted for inclusion in Walden Dissertations and Doctoral Studies by an authorized administrator of ScholarWorks. For more information, please contact ScholarWorks@waldenu.edu.

Walden University

College of Management and Technology

This is to certify that the doctoral study by

Chukwudi Amene

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee

Dr. Thomas Schaefer, Committee Chairperson, Doctor of Business Administration
Faculty

Dr. Gregory Uche, Committee Member, Doctor of Business Administration Faculty

Dr. Alexandre Lazo, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2022

Abstract

Strategies Small Business Owners Use to Improve Profitability in the Plastic Recycling

Industry

by

Chukwudi Amene

MBA, University of Detroit Mercy, 1995

BMech Eng, University of Nigeria Nsukka, 1990

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

October 2022

Abstract

Low plastic recycling levels impact the profitability of plastic recycling businesses. Business owners of small plastic recycling businesses have limited resources, and the plastic recycling industry is still in its developmental stages. Grounded in transformational leadership theory, the purpose of this qualitative multiple case study was to explore strategies used by owners of small plastic recycling businesses to improve their profitability. The participants were nine small business owners of the plastic recycling sector of southwest Nigeria who successfully improved their business profitability. Data were collected using semistructured interviews. Through thematic analysis, three themes were identified: (a) develop strategies for sourcing quality plastic waste, (b) manage workers to improve profitability, and (c) establish an effective business strategy. A key recommendation is that business owners locate their plastic recycling business close to sources of plastic waste, process their waste, and increase their transformational leadership style with workers. The implications for positive social change include the potential to provide employment opportunities with improved wages, undertake social projects, create communal wealth, and conserve the environment from plastic waste dumping.

Strategies Small Business Owners Use to Improve Profitability in the Plastic Recycling

Industry

by

Chukwudi Amene

MBA, University of Detroit Mercy, 1995

BMech Eng, University of Nigeria Nsukka, 1990

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

October 2022

Dedication

I thank God for giving me the ability to complete the doctoral study. I dedicate the study to my wife, Evelyn-Noelle, and children, Chukwuebuka, Ifunanyachukwu, and Iwuchukwu, for their understanding throughout the doctoral program. I also dedicate my study to my parents for their encouragement. My completion of the doctoral study demonstrates that nothing is impossible and that it is never too late in life to achieve anything.

Acknowledgments

I want to acknowledge the support of people who contributed to this study's success. My first acknowledgment goes to my Committee Chair, Dr. Thomas Schaefer, for his unique guidance, encouragement, expertise, and prompt responses to my reviews. My second acknowledgment goes to the second committee member Dr. Gregory Uche whose depth in the subject area provided good guidance on concept and rubric compliance. My third acknowledgment goes to Dr. Alexandre Lazo (University Research Reviewer) and my former URR, Dr. Diane Dusick, for their timely and detailed reviews. These committee members' contributions enabled me to achieve the highest standards of academic rigor at Walden University. Finally, I acknowledge the Program Director, Dr. Susan Davis. Also, I thank my Walden colleagues for sharing their experiences on the doctoral journey.

Table of Contents

List of Tables	iv
Section 1: Foundation of the Study.....	1
Background of the Problem	1
Problem Statement	2
Purpose Statement.....	2
Nature of the Study	3
Research Question	5
Interview Questions	5
Conceptual Framework.....	6
Operational Definitions.....	7
Assumptions, Limitations, and Delimitations.....	7
Assumptions.....	8
Limitations	8
Delimitations.....	8
Significance of the Study	9
Value to Business.....	9
Contribution to Business Practice.....	9
Contribution to Positive Social Change.....	10
A Review of the Professional and Academic Literature.....	10
Transformational Leadership Theory	13
Related and Contrasting Theories.....	16

Impact of Plastic Recycling on Recycling Businesses	27
Circular Economy Framework.....	31
Generated Plastic Waste	35
Plastic Waste Segregation.....	37
Plastic Recycling Policies.....	40
Recycling Behavior.....	43
Challenges of Plastic Recycling.....	46
Business Strategies.....	50
Alternatives to Plastic Recycling	53
Analysis of Plastic Recycling Themes.....	60
Transition	64
Section 2: The Project.....	65
Purpose Statement.....	65
Role of the Researcher	65
Participants.....	67
Research Method and Design	68
Research Method	68
Research Design.....	70
Population and Sampling	73
Ethical Research.....	76
Data Collection Instruments	78
Data Collection Technique	79

Data Organization Technique	81
Data Analysis	81
Reliability and Validity.....	84
Reliability.....	85
Validity	85
Transition and Summary.....	87
Section 3: Application to Professional Practice and Implications for Change	88
Presentation of Findings	88
Theme 1: Sourcing Quality Plastic Waste is a Challenge.....	90
Theme 2: Managing Workers Improves Profitability.....	103
Theme 3: Develop Effective Business Strategies	112
Application to Professional Practice.....	128
Implications for Social Change.....	130
Recommendations to Action.....	132
Recommendations for Further Research.....	134
Reflections	135
Conclusion	137
References.....	139
Appendix A: Interview Protocol.....	175
Appendix B: Interview Questions.....	176
Appendix C: Introductory Letter	177

List of Tables

Table 1 Participant References to Strategies for Sourcing Plastic Waste.....	91
Table 2 Participant References to Subtheme Plastic Waste Collection.....	92
Table 3 Participant References to Subtheme Processing and Transporting Plastic Waste.....	97
Table 4 Participant References to Strategies for Managing Workers.....	104
Table 5 Participant References to Subtheme Training	105
Table 6 Participant References to Subtheme Motivation	108
Table 7 Participant References to Business Strategies	113
Table 8 Participant References to Subtheme Machines and Technology.....	114
Table 9 Participant References to Subtheme Periodic Business Reviews	120
Table 10 Participant References to Subtheme Marketing.....	124

Section 1: Foundation of the Study

Plastic recycling is in its developmental stages in Nigeria (Babayemi et al., 2019). The percentage of plastic waste recycled is low in Nigeria, at 9%, indicating a small number of plastic recycling businesses (Akan et al., 2021). The population is growing, bringing about an increase in plastic waste. Private businesses will need to get into plastic recycling to address the environmental pollution created by plastic waste disposal. Since plastic recycling businesses are few, the communities and business owners lose wealth creation opportunities (Kehinde et al., 2020). Plastic recycling businesses that are profitable can drive efficiencies in the waste management system and instill recycling behavior in the populace. The improvement in profitability of plastic recycling businesses can encourage reduced pollution of water bodies and the environment with plastic waste by communities.

Background of the Problem

Environmental pollution and degradation from plastic waste disposal are growing in developing countries due to increased population, industrialization, and urbanization (Babayemi et al., 2019; Olukanni et al., 2020). The state governments of Nigeria are not providing efficient waste disposal services, and waste disposal businesses provide disposal services at a cost that everybody cannot afford (Olukanni et al., 2020). Evinemi and Afon (2016) stated that the percentage of private waste collectors is up by 77.1%. The designated sites for waste disposal have no requisite capacity to contain the disposed waste plastics, and there is no plastic waste segregation system in place in Nigeria (see

Evinemi & Afon, 2016; Morgan, 2018; Okpara et al., 2021). Consequently, people dispose of waste plastics indiscriminately in water bodies, streets, and drainages.

There is a need to increase the amount of plastic waste recycled to reduce plastic waste disposal in landfills and the resulting environmental pollution (Babayemi et al., 2018). Accordingly, plastic recycling should be profitable for plastic recycling businesses to be sustainable businesses (Dhanalakshmi, 2019). The improvement in the profitability of plastic recycling businesses can lead to cleaner streets, create job employment, and produce high-quality recycled plastic pellets that plastic manufacturers can use.

Problem Statement

Plastic recycling in African countries is in its infancy stage, even though it is a viable solution for plastic waste management challenges (Babayemi et al., 2019). The total amount of plastic imported into Nigeria from 1990 to 2017 in primary and secondary plastics is 39,000,000 tons (Babayemi et al., 2019). Also, Geyer et al. (2017) projected that less than 12% of generated plastic waste would be recycled globally in 2022. The general business problem was low profitability negatively affects the percentage of generated waste plastic recycled. The specific problem was that some small business managers in the plastic recycling industry of Nigeria lack strategies for improving the profitability of the plastic recycling business.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies small business owners in plastic recycling businesses use to improve profitability. The target population consisted of nine business owners of nine small plastic recycling businesses in

Lagos state of Nigeria who successfully implemented strategies to improve their business profitability. The implication for positive social change includes the potential to improve plastic recycling business practices in Nigeria. Consequently, improving business practices should positively impact profitability, expand existing businesses, and lead to more job opportunities. Likewise, increased profitability creates more wealth for the plastic recycling businesses to contribute to society through community projects, sponsorship for social entrepreneurship programs, and the potential to support educational scholarship programs in the businesses' communities.

Nature of the Study

The research methods are qualitative, quantitative, and mixed (Strijker et al., 2020). I used the qualitative method to collect rich data on strategies for improving the profitability of plastic recycling businesses. A researcher uses qualitative research to acquire rich data on the research question (Nascimento et al., 2019). A researcher also uses qualitative research to explore a phenomenon to understand the intrinsic reasons for a phenomenon in a manner that a numeric empirical method may not address (Kegler et al., 2019). Qualitative research is interpretive because the researcher needs to elucidate the subjective and socially constructed meanings expressed about the studied phenomenon (Saunders et al., 2019). Qualitative research can also be inductive and naturalistic because the researcher conducts their research in a natural setting (Saunders et al., 2019). A researcher uses the quantitative method to characterize variables or examine the degree of relationship between independent variables and dependent variables (Maciąg, 2019) by defining a hypothesis to prove or disprove characteristics or

relationships. Hence, a quantitative method was not suitable for this study because I did not intend to examine variables' characteristics or the relationship between independent variables and a dependent variable. Mixed methods research is a blend of qualitative and quantitative approaches, which combines the analysis of numeric data with rich data (Meister, 2018). Similarly, a mixed-method approach was not suitable for this research because there was no reason for combining qualitative and quantitative methods for the study. Thus, I did not select the quantitative or mixed-method approaches for this study.

Anderson (2017) identified some qualitative designs such as (a) case study, (b) phenomenology, (c) ethnography, and (d) narrative. A researcher uses a multiple case study to triangulate data across multiple case studies to compare findings and collaborate (Cakmak, 2018). Also, a researcher uses a multiple case study to achieve data saturation (Gaskins, 2019). Equally, the researcher chooses a multiple case study to improve the validity and reliability of his research. Saunders et al. (2019) mentioned that a single case design is suited to large businesses that are critical, extreme, or unique. Therefore, I did not use a single case because the small plastic recycling business does not meet critical, extreme, or unique criteria. Also, Saunders et al. (2019) stated that single case studies do not allow the literal replication of findings across cases. Hence, I did not use a single case study due to the limitation of literal replication across cases but instead chose a multiple case study. Engward and Goldspink (2020) stated that a phenomenological design focuses on the meanings of participants' lived experiences. Hence, I did not select a phenomenological design because the personal meanings of participants' lived experiences are not the focus of my study. The researcher uses the ethnography design to

study a group of people and their culture (Saunders et al., 2019). Researchers use an ethnography design to explore and document a people or ethnic group's culture, beliefs, values, and experiences through a written account of observations captured while living among the ethnic group (Saunders et al., 2019). Therefore, I did not select ethnography design because I did not study people's cultures or how organizational ethnic groups interact. Furthermore, I did not select a narrative design for my study because obtaining information on participants' real-life stories is not the purpose of this study.

Research Question

What strategies do small business owners in the plastic recycling industry use to improve profitability?

Interview Questions

1. What strategies do you use to improve profitability in your plastic recycling business?
2. What key challenges did you encounter in using the strategies?
3. How did you overcome the key challenges?
4. How did you assess the effectiveness of the strategies for improving the profitability of your plastic recycling business?
5. What strategies have been most effective in improving profitability in your organization's plastic recycling business?
6. What other information on strategies for improving your organization's plastic recycling business's profitability can you provide?

Conceptual Framework

I used transformational leadership theory as the conceptual framework for my study. The originator of transformational leadership theory was Burns (1978). Burns developed transformational leadership along with transactional leadership. Transformational leaders inspire followers to excel, while transactional leadership drives followers by a reward system (Burns, 1978). The transformational leadership style is relationship-oriented, while transactional leadership is task-oriented. Bass (1985) extended the work of Burns (1978). The extension of transformational leadership by Bass in 1985 identified some key elements. Bass stated that transformational leaders affect idealized influence, have inspirational motivation, stimulate followers intellectually, and show individualized consideration. Yulianeu et al. (2020) applied a transformational model to improve the performance of micro, small and medium enterprises (MSME) in Indonesia. Townsend (2019) used transformational leadership as the conceptual framework for her study on waste management sustainability in Liberia. Consequently, owners of small plastic recycling businesses can use transformational leadership strategies to improve their profitability by inspiring workers to be more productive and innovative in their work. Transformational leadership is also associated with the profitability of businesses (Bonsu & Twum-Danso, 2018). Therefore, I applied transformational leadership theory in this study to identify and understand the strategies that small plastic recycling business owners use to improve their profitability.

Operational Definitions

Circular economy: Circular economy is an economic system where waste managers practice the principles of reducing plastic waste by reusing, remaking, and recycling, thereby curbing environmental pollution through plastic waste disposal and incineration (Ezeudu & Ezeudu, 2019; Huang et al., 2020).

Life cycle assessment: Life-cycle assessment or life cycle assessment is a methodology for assessing environmental impacts associated with all the life-cycle stages of a commercial product, process, or service (Chen et al., 2019).

Municipal solid waste: Municipal solid waste is a mixed stream of waste consisting of various types of plastic waste, kitchen waste, industrial waste, glass, some bits of metal objects, and house waste disposed of in dedicated trash bins (Genc et al., 2019).

Plastic recycling: Plastic recycling is reusing plastic through a recycling process that can be mechanical or chemical (Jiang et al., 2020; Sikdar et al., 2020).

Assumptions, Limitations, and Delimitations

Researchers use the assumptions, limitations, and delimitations to establish the research borders and uncover shortcomings, which the researcher could have better handled (Theofanidis & Fountouki, 2018). Delimitations require challenging the limitations of the research. Researchers need to be aware of the assumptions, limitations, and delimitations early in the research and report them to improve the findings and interpretations (Theofanidis & Fountouki, 2018). Sometimes, it is difficult to differentiate between the research's assumptions, limitations, and delimitations.

Assumptions

A researcher makes assumptions when they cannot verify facts he deems true (Murchison et al., 2019). An assumption for this study was that a qualitative methodology researcher could explore the strategies to improve the profitability of plastic recycling in Nigeria. I also assumed that the selected participants for my semistructured interviews answered interview questions honestly. Furthermore, I assumed business owners are interested in strategies to improve their profitability.

Limitations

Limitations refer to the areas where the study is weak, and the researcher cannot do anything about these areas of weakness (Vargas & Mancina, 2019). A limitation of the study was that I may have failed to include an interview question that would provide more vital information on the strategies leaders of plastic recycling businesses used to improve their profitability levels. A second limitation is generating data from nine plastic recycling businesses' selected small sample size. Additionally, an extension of the second limitation was if the selected sample is enough to validate the study's findings from nine business owners in plastic recycling businesses. The last limitation of the study results was the participants' honesty and interest in sharing their knowledge.

Delimitations

Delimitations deal with the study's constraints or boundaries (Theofanidis & Fountouki, 2018). This study's delimitation was selecting my target sample from southwest Nigeria, with a higher concentration of plastic recycling businesses. Participants must be business owners of plastic recycling plants with work experience of

no less than 5 years or younger than 25 years. The business owner must also be a strategic decision-maker in the plastic recycling business. The plastic recycling plants must have an established supply chain for sourcing plastic waste and clients to sell their recycled products. I did not consider plastic manufacturing businesses or waste management businesses.

Significance of the Study

Value to Business

Business owners can use discovered strategies that encourage businesses to adopt cost-cutting initiatives, and revenue growth can reduce production costs, thereby increasing profits (Šupuković et al., 2019). The strategies emerging from this study could enable plastic recycling businesses to improve their profitability by increasing the effectiveness and efficiencies of key processes and the percentage of generated waste recycled towards increased profitability. The research strategies can also lead business owners to automate their plastic recycling businesses and adopt modern technologies to improve plastic recycling businesses' environmental quality in developing nations.

Contribution to Business Practice

The findings of this study may improve business practice by strengthening the existing processes for plastic waste disposal and reuse. The strategy for successful plastic recycling businesses can be documented and replicated by struggling businesses.

Entrepreneurs can have a blueprint for starting a plastic recycling business and managing it successfully in Nigeria. For example, De Lucia and Paziienza (2019) found that tax credits, subsidies, and proximity of disposal sites positively impacted Italian farmers'

plastic waste recycling process. The federal and state governments can apply this research strategy to improve and develop the sustainability of small recycling businesses.

Contribution to Positive Social Change

Improving profitability brings better use of waste plastics and may reduce indiscriminate plastic waste dumping. Also, improving the profitability of the plastic recycling business may offer employment opportunities in the plastic recycling business. A profitable plastic recycling business could volunteer services to the community, such as entrepreneurship training. It may also perform social projects by developing infrastructural growth in its communities, such as a health center (Lumpkin et al., 2018). Subsequently, businesses can create jobs and give back to communities (Lumpkin et al., 2018). By creating additional employment opportunities, living standards can improve the communities where these plastic recycling businesses operate through corporate social responsibility (Bello et al., 2019). When plastic recycling businesses improve their profitability, they can have more available finances to grow their business and increase their sphere of influence (d'Ambrières, 2019). Also, by creating additional employment opportunities, the individuals' quality of life may improve in the communities where these plastic recycling businesses operate.

A Review of the Professional and Academic Literature

The purpose of this qualitative case study was to explore the strategies used by business owners of small plastic recycling businesses to improve profitability. I focused my study on addressing the gap in the literature on the profitability strategies of small plastic recycling businesses. According to my literature review, there are not many plastic

recycling studies in Nigeria, so I expanded my search to waste management because plastic recycling is an aspect of waste management. The peer-reviewed articles by Ezeudu and Ezeudu (2019), Babayemi et al. (2018), Evinemi and Afon (2016), Horvath et al. (2018), Kehinde et al. (2020), Okpara et al. (2021), Olusunmade et al. (2019), Owojori et al. (2020), Oyake-Ombis et al. (2015), and Townsend (2019) provide some regional research on plastic waste management. I also reviewed the literature on plastic waste management and business strategies for small businesses in developing and developed countries.

In this section, I analyze the literature on plastic recycling, waste management, and business strategies. The organization of this literature review is as follows: (a) the circular economy framework, (b) generated waste plastics, (c) plastic waste segregation system, (d) plastic waste recycling policies, (e) recycling behavior, (f) business strategies, (g) alternatives to plastic recycling, and (h) challenges of plastic recycling. I applied the concept of timeline maps in the literature review to locate plastic recycling themes. Tang et al. (2019) used timeline maps to identify themes and compare them across disciplines in their literature review. I also reviewed the theoretical and conceptual frameworks other researchers have used in related studies and transformational leadership's conceptual framework for this study. Research based on transformational leadership may help researchers understand how small business owners in the plastic recycling sector improve profitability.

To find relevant journal articles, academic books, and dissertations for the literature review, I searched the Walden University Library databases Business Source

Complete, Academic Search Complete, Medline, ProQuest Central, and ProQuest Science Journals. I also searched ProQuest Dissertations, Theses Global, Abi/Inform Collection, Sage Premier, Thoreau Multi-Database Search, and Google Scholar. When searching the databases, the keywords and phrases included *plastic recycling, waste management, generated waste, recycling behavior, challenges, policies, economic, circular economy, segregation, strategies, and alternatives*. I further sorted search results to select what was suitable for my topic of plastic recycling. I carried out this second-level sorting using filters for literature in Africa, and Nigeria, relevant work from developing and developed nations, and business strategies for small businesses in Nigeria and the rest of the world.

I reviewed more than 500 resources and identified 218 references for this study. The literature review contains 224 references consisting of 205 peer-reviewed journals, two articles, four books, and 13 dissertations. The literature review resulted in 205, or 97%, of referenced sources published within 5 years from the expected completion date of my study and seven, or 3%, of references, published more than 5 years from my anticipated graduation date. These 3% references include seminal publications from Burns in 1978, Bass in 1985 on transformational leadership, and the Belmont report of 1979. I also included four peer-reviewed journals in 2015, such as the research by Hassanpour (2015), Oyake-Ombis et al. (2015), Nnaji (2015), and Subin et al. (2015), which provide indispensable information on plastic recycling in Iran, Kenya, Nigeria,, and technology application to plastic waste segregation respectively.

Transformational Leadership Theory

Transformational leaders' style consists of four primary aspects. The first aspect is idealized influence, or charisma, a quality that leaders demonstrate that allows their followers to trust them (Bass, 1985). The second aspect is inspirational motivation, which encompasses leaders' ability to communicate a vision to inspire others. The third aspect is intellectual stimulation, which refers to leaders' challenge to their followers to look at different perspectives to innovate and think outside the box. The fourth aspect is individualized consideration stimulation. This aspect refers to leaders identifying with their followers' needs and addressing them to further followers' development (Bass, 1985). Therefore, the transformational leadership style can bring about innovation in a business, help workers be more productive, and increase profits for the business.

Transformational leadership can impact workers to perform with qualities that drive business profitability. Boukamcha (2019) performed quantitative research using a theoretical framework of transformational leadership to show that transformational leadership positively influences corporate entrepreneurship patterns in Tunisia. Corporate entrepreneurship is a construct with many facets and consists of new business venturing, innovativeness, self-renewal, and proactiveness (Boukamcha, 2019). Boukamcha found that when transformational leaders stimulate and motivate workers intellectually through inspiration, they demonstrate innovativeness, proactiveness, and new business venturing. Hence, intellectual stimulation and inspirational motivation positively impact workers' new business venturing, innovativeness, and proactiveness, and these aspects of corporate entrepreneurship can lead to increased business profitability.

Transformational leadership has a positive influence on service quality and team performance. Andersen et al. (2018) found that transformational leadership has a positive association with the degree of shared understanding of professional quality, positively associated with a high level of professional quality. Mahdikhani and Yazdani (2020) found that transformational leadership positively impacts service quality and improves team performance. Mahdikhani and Yazdani also found that improved performance positively impacts service quality. Roibu et al. (2019) explained that the efficiency of transformational or transactional leadership styles in Romanian hotels affects the business's profitability. Roibu et al. also found that even though transactional leadership is more prevalent, transformational leadership is desirable for the innovation and sustainability of Romanian hotels in the long term. Tănase (2020) found that transformational leadership affects organizational innovation components of creativity, employee voice, and knowledge sharing. Similarly, Ghasabeh (2021) showed that transformational leadership positively contributes to knowledge management. These studies reinforce that business owners can use transformational leadership to improve the profitability of their business. Good business service quality, knowledge management, and innovation positively impact business profitability. Therefore the use of transformational leadership by business owners improves business profitability.

Transformational leadership may provide a lens for clarifying how leaders of plastic recycling businesses inspire and intellectually stimulate their employees. Townsend (2019) used transformational leadership as the conceptual framework for a study on leadership strategies to reduce Liberian waste management businesses'

operational costs. Townsend found that recycling was an emerging theme for waste management in Liberia and suggested that increasing recycling might reduce some of the challenges and obstacles experienced in waste management. One block is that plastic waste is a problematic waste stream to dispose of because it is not biodegradable (Mazhandu et al., 2020). Bush (2019) used a transformational leadership construct in his study of reducing operations and increasing profitability in the trucking industry. Bush found that transformational leadership inspires the workers to work at their best during downsizing exercises. Transformational leadership by business owners gives workers a vision of where the organization is heading and a sense of ownership in the business restructuring stages towards increased profitability (Bush, 2019). Therefore, the transformational leadership theory construct is an appropriate construct for my study and enabled me to discover the strategies that business leaders use to inspire and motivate workers to improve their business profitability.

Business leaders reduce worker turnover by using a transformational leadership style. McManus (2019) used a transformational leadership framework to identify hospital managers' strategies to reduce employer turnover for environmental services. The author identified the themes of communication, leadership, training, development, employee engagement, and profitability. McManus indicated that a transformational leadership framework may be applicable for studying strategies to improve a plastic recycling business's profitability. Azizah et al. (2020) discovered that employee optimism partially mediated the idealized influence of transformational leader behavior on innovative capability in batik small and medium enterprises in Indonesia. Miftari (2018) further

stated that most leaders in small and medium enterprises in Kosovo do not use emotional intelligence to build strong interpersonal communication and organizational structure regarding employee performance. Therefore, using transformational leadership by business leaders can improve the profitability of plastic recycling businesses.

Related and Contrasting Theories

There are many related and contrasting theories that I could have used for my conceptual framework. In this section, I examine these frameworks and posit why they were not suited to my research topic. The frameworks I considered in this section are (a) the interpretive structural model (ISM), (b) product lifetime distribution, (c) the circular economy, (d) the life cycle assessment model, (e) European Union policies on plastic recycling, (f) educational models, (g) the biodegradation model, (h) the green supply chain model, (i) economic models, (j) reverse logistics, and (i) multiple level perspective theory.

Environmental Models

The environmental models from the list of possible frameworks are circular economy, life cycle assessment, biodegradation, green supply chain, and reverse logistics. The main focus of these models was to reduce or eliminate environmental pollution from plastic waste. Researchers used these models in studies that had a focus on environmental pollution (e.g., Ezeudu & Ezeudu, 2019; Huang et al., 2020; Nascimento et al., 2019; Neto & Correia, 2019; Noorhan et al., 2016; Paço et al., 2019; Ren et al., 2020; Ribeiro et al., 2021; Wei & Zimmermann, 2017; Zhen, 2020; Zheng et al., 2021).

Therefore, these models satisfy the environmental conservation criteria of reuse, reduce, and recycle.

A circular economy is an economic system where waste managers practice the principles of reducing plastic waste by reusing, remaking, and recycling, thereby curbing environmental pollution through plastic waste disposal and incineration (Ezeudu & Ezeudu, 2019; Huang et al., 2020). Nascimento et al. (2019) used the circular economy's conceptual framework integrated with Industrial 4.0 and supported by sustainable supply chain management for their research. Industry 4.0 is the fourth industrial revolution in automation manufacturing. It refers to the internet of things (IIoT) or smart manufacturing, physical production with smart digital technology, machine learning, big data, and Cloud to manufacture eco-friendly goods (Zheng et al., 2021). Also, they proposed integrating smart production systems (SPS) and automated manufacturing (AM) into a circular economy. The authors interviewed a focus group in operations management, managers, researchers, and professors. Nascimento et al. found that adopting a circular business model encourages three-dimensional (3D) printing technologies and Industry 4.0, such as AM and SPS, in urban waste management. The study's weakness was that it did not have numeric data to support its recommendations, and its strength was the focus group's diverse composition and technical competence. A researcher applying the circular framework focuses on reducing plastic waste, and a researcher using the Industry 4.0 framework focuses on smart manufacturing.

Furthermore, a researcher in waste management used a circular economy's conceptual framework to study four different industrial sectors in Nigeria for solid waste

generation and disposal (Ezeudu & Ezeudu, 2019). The authors recommended that a circular economy bring about industry entrepreneurship. The authors found no existing framework for solid waste management in Nigeria. The strength of this study is that the findings apply to any research on plastic recycling in Nigeria. Evinemi and Afon (2016) used a quantitative methodology, questionnaire, and direct observation to study solid waste generation in Ibadan, Nigeria. Evinemi and Afon discovered improper handling of solid health waste, substandard waste disposal facilities, and an inadequate disposal system. I did not use the circular economy or Industry 4.0 as the framework of my study because my study's focus is not on reducing plastic waste or the automation of plastic recycling businesses. Additionally, small plastic recycling businesses may not have the financial capabilities to use Industry 4.0 in their recycling process.

A researcher uses the life-cycle assessment model for measuring the environmental impacts involved in all the stages of the life-cycle of a commercial product (Noorhan et al., 2016). Noorhan et al. (2016) used a conceptual framework of life-cycle assessment (LCA) and life-cycle software MiLCA to conduct a study. The study is mixed-method research. The authors carried out data selection using agent-based modeling. Noorhan et al. found that landfills are no longer sustainable for plastic waste disposal and that plastic recycling and incineration are more suited to plastic waste disposal in Bandung, Indonesia. The study's strength is the combination of numeric data with rich data, and the weakness is that it is limited to Bandung. I did not use this model because the focus of my study was not the recycled product but the strategies to improve the profitability of the plastic recycling business.

The biodegradation model uses microbial enzymes to degrade plastics (Paço et al., 2019; Wei & Zimmermann, 2017). Wei and Zimmermann (2017) researched plastic degradation using microbial enzymes. The theoretical framework used for this research is the biodegradation model. Wei and Zimmermann tested the degrading effects of microbial biocatalysts on the different strains of plastics such as polyethylene (PE), polystyrene (PS), polyurethane (PUR), and polyethylene terephthalate (PET). The impact of this is worthy of note because if the degradation of plastics becomes economically viable, it will affect the collection of plastic waste. I did not use the biodegradation model because the focus of my study was not on alternative forms of plastic recycling, such as microbial degradation of plastic waste.

The green supply chain model incorporates environmental conservation practices into supply chain management geared toward environmental sustainability, such as green purchasing, green distribution, warehousing, green transportation using biofuels, green manufacturing, and product end-of-life disposal (Zhen, 2020). Ren et al. (2020) accounted for carbon price uncertainty by combining green supply chain and geographic information systems (GIS). Ren et al. evaluated their effects on the closed-loop supply chain of plastic recycling. The maturity model's use assists managers of SME businesses in the plastic sector in determining how maturity levels match reverse logistics and the sustainable solid waste management model (Maghmoumi et al., 2020). These studies buttress the point that a theoretical framework of the supply chain, reverse logistics, geographic information systems, and maturity models apply to plastic recycling research.

The reverse logistics model is for all activities associated with reusing products and materials and involves moving goods from their normal final destination to add value to the good or environmentally safe disposal (Ribeiro et al., 2021). Neto and Correia (2019) assessed the economic and environmental advantages of implementing reverse logistics to recycle solid waste from construction companies. Neto and Correia used a reverse logistics theoretical framework and a mixed research methodology. The target sample was the Brazilian construction and recycling sector. Neto and Correia discovered that reverse logistics positively impacted the return on investment (ROI), internal rate of return (IRR), and discounted payback of the construction companies involved in the target sample. I did not use the reverse logistics model for my conceptual framework because my research does not focus on reusing recycled products or adding value to recycled plastic waste and the disposal of recycled plastic at the end of life.

I did not focus on preserving the environment in my study but on the strategies business owners use to improve the profitability of their businesses. If I used environmental models, the focus of my study would change from leadership techniques that business managers use to inspire their workers to improve the profitability of their businesses to environmental conservation strategies. Consequently, the environmental models were unsuitable for this study's conceptual framework.

Product Oriented Models

The production-oriented models I considered for this study are product lifetime distribution, European Union policies on plastic recycling, and educational and economic models. I classify these models as product oriented because other researchers using these

models focused on reusing or reducing plastic waste to reduce environmental pollution (see Cheung et al., 2017; Faisal et al., 2018, Geyer et al., 2017; Hassanpour, 2015; Kerscher, 2019; Nakatani et al., 2017; Milios, Christensen, et al., 2018; Milios et al., 2018; Rowe et al., 2017; Torres & Cornejo, 2016; Warren & Szostek, 2017). The economic model focuses on the profitability of recycled plastic waste products. The educational model teaches students recycling behavior on how to dispose of plastic waste for recycling. The main focus of these models was on how to dispose of plastic waste sustainably for the environment.

Product Lifetime distribution describes statistical probability distribution collections researchers use in product life data analysis (see Badr & Ijaz, 2021; Ross & Cheah, 2019). These distributions could be wholesalers, retailers, and direct-to-consumer sales (see Geyer et al., 2017; Torres & Cornejo, 2016). Geyer et al. (2017) carried out a document review of statistics from three plastic market research groups to arrive at the 18% global plastic recycling rate. The author established that plastic recycling rates are low globally. For their study, Geyer et al. used the theoretical framework of product lifetime distribution and applied the log-normal distribution (LTD) to analyze their data. The study's strength was the first global analysis of plastic generation and disposal from 1950 to 2015, with projections on global plastic recycling statistics up to 2050. Torres and Cornejo (2016) studied plastic recycling in Peru and collected data from the environment, statistics, customs, and government agencies. The author analyzed the data using linear regression. The strength of the study was that it analyzed historical data from

Peru. I did not use the product life distribution framework because these statistical probability distributions on plastic recycling businesses in Nigeria were not available.

The European policies established a legal framework for plastic waste treatment in the EU (Milius, Christensen, et al., 2018; Milius et al., 2018). The main objective is to protect the environment and human health by implementing recovery, recycling, and reducing waste. Foschi and Bonoli (2019) used the European Commission's communique on waste management as their theoretical framework in a study on a policy review of all related European policies on plastic manufacturing and disposal. The policy review's fundamental theoretical construct is a circular economy and sustainable development education on plastics and disposal based on the EU policies on plastic recycling. Milius et al. (2018), in their study on plastic recycling in Sweden, used the theoretical framework of EU policy on plastic recycling. Milius et al. found that adapting to the EU targets on plastic recycling plus a ban on plastics incineration brought about the best optimal economic benefit combined with low carbon emission for Sweden. The EU policy framework does not apply to my study because the regional focus of my study was on Nigeria, where the waste management legal framework for plastic waste disposal is underdeveloped.

Implementing the EU policy can increase plastic recycling and profitability for plastic recycling businesses (Milius et al., 2018). Milius, Christensen, et al. (2018) used the theoretical framework of the EU policy for plastic waste management and the circular economy model for their sustainability impact assessment of increased plastic recycling. The target sample was plastic recycling actors in three countries Denmark, Sweden, and

Norway. Nakatani et al. (2017) presented a variability-based optimal design framework for constructing a robust recycling system that considers external changes such as fluctuations in material prices. Therefore, a circular economy in the EU policy and variability-based optimal design are other frameworks for plastic recycling studies. However, the framework was not suited to my study on plastic recycling in Nigeria because plastic waste management policies in Nigeria are less developed than in the EU. Also, the variability-based optimal design was not a suitable framework for my study because plastic recycling statistics were not readily available in Nigeria.

The train-the-trainer model is an educational system where a resource person trains students who get certified to train and certify other students (Cheung et al., 2017). The more trainers train other students, the more there is growth in the knowledge of plastic recycling. Also, it included a curriculum on plastic recycling in schools that teaches students recycling behavior (Faisal et al., 2018; Kerscher, 2019). Cheung et al. (2017) suggested that primary schools include the train-the-trainer plastic recycling curriculum in their general study course to encourage students' plastic recycling behavior. Implementing topical plastics at the primary and secondary levels of German schools can strengthen sustainable development education (Kerscher, 2019). Faisal et al. (2018) taught K-12 students entrepreneurship in plastic recycling in India. Applying the results could empower these kids with a consciousness that plastic waste can make wealth. The study provided strategies for teaching kids how to dispose of plastic responsibly and make money from plastic recycling. Faisal et al. used a waste management information model as the conceptual framework for this study. The focus of my research was not on

increasing knowledge of plastic recycling behavior in the citizenry. Thus, I did not use any educational models, such as the train-the-trainer model, curriculum on plastic recycling, or waste information model, in my research on the strategies business owners use to improve the profitability of their plastic recycling business.

Business owners can use economic models as frameworks to determine the profitability of a plastic recycling business, such as profit analysis models, breakeven analysis, optimization models, and analysis of unit and production costs (Hassanpour, 2015; Rowe et al., 2017). Hassanpour (2015) studied the plastic waste recycling industry's economic indices using a value-added percent theoretical framework of 62%. The author also used the theories of profit, annual income, breakeven point, value-added, output value, data value, the variable cost of a good unit, and production costs. The target sample was small plastic recycling businesses in Tehran, Iran. Rowe et al. (2017) used combined theoretical models of the manufacturer's profit formulation, sole-sourcing optimization, and dual-sourcing optimization to study recycling procurement strategies with variable yield suppliers. Using the sourcing optimization models, business owners ensure that goods from one or two suppliers are at optimal market prices. The authors' target sample was the expanded polystyrene (EPS) packaging industry in the United States. In their research on the sustainability of small businesses, Warren and Szostek (2017) used the conceptual framework of the triangulation of data from cash flow statements and profit and loss statements. The target sample was eight small businesses in the southeastern United States. I did not use economic models such as profit analysis,

breakeven analysis, sole-sourcing optimization, or dual-sourcing models because my study was not on the economics of plastic recycling.

The focus of my study was not on the recycling of plastic products or on how the populace can exhibit recycling behavior. Also, the focus of my study was not on how recycled products could be more profitable. These product-oriented models did not give insight into the strategies business managers of plastic recycling businesses use to improve profitability. Thus, the product-oriented models were not suitable for my study.

Interpretive Models

The interpretive model involves understanding a problem and arriving at solutions. Researchers can combine the interpretive model with other models to analyze the identified problems (Kumar et al., 2019; Satapathy, 2017). The multiple-level transition theory is a transition framework. However, the transition framework tries to understand the problem in a sector and how it interacts with the stakeholders technically and socially (Bilali, 2019; Oyake-Ombis et al., 2015). Therefore, I have grouped the interpretive structural models and multiple-level transition theories into interpretive models.

Interpretive structural modeling (ISM) is a method for identifying relations between items that make up the problem (Kumar et al., 2019; Satapathy, 2017). The process starts with identifying the variables related to the problem, which is the interpretive stage. The next stage involves contextualizing meaningful subordinate relationships and is the structural stage (Kumar et al., 2019; Satapathy, 2017). Once the researcher establishes the contextual relation, they develop a structural self-interaction

matrix (SSIM) based on comparing pairwise variables (Kumar et al., 2019; Satapathy, 2017). The SSIM is the modeling stage. The ISM, therefore, interprets a problem and analyzes the problem with supporting models such as SSIM to determine which problem has the highest impact.

There are 23 barriers to plastic recycling in India, which Satapathy (2017) found using an ISM framework. Satapathy (2017) combined the interpretive structural modeling (ISM) with the structural self-integration matrix model (SSIM) and the impact matrix cross-reference multiplication applied to a classification model (MICMAC) to arrive at these 23 barriers to plastic recycling. Satapathy used the MICMAC to cluster the barriers into categories to determine their relative driving and dependence powers. Consequently, Satapathy determined the three most significant plastic recycling factors in India: (a) the scarcity of plastic waste, (b) the use of additives, the amount of scrap, and (c) toxic gases. The target sample of the study was from the plastic industry in India. I did not use the interpretive structural model because the focus of my study was not to identify the relations among challenges encountered by plastics recycling businesses to improve their profitability.

The multiple-level perspective (MLP) is a transition framework. The MLP transitions occur through processes interacting in and among the niche, socio-technical regime, and socio-technical landscape levels (Bilali, 2019). The researcher can perform analysis at any of these levels. Oyake-Ombis et al. (2015) used a conceptual framework of multiple level perspective, a transition theory combined with a strategic niche management model. Oyake-Ombis et al. found no government support and policies for all

innovation actors to harmonize plastic production and waste handling. The target sample was the actors in Kenya's plastic waste management industry. Therefore, I did not use the MLP theory because my study was not on the interaction of the plastic recycling businesses with a niche market, socio-technical interaction with the existing regime, and the national landscape.

My study did not aim to identify the plastic recycling industry's problem and proffer solutions. Identifying the plastic recycling industry problems did not give me the strategies that business owners of plastic recycling businesses use to improve profitability. The interpretive models do not reveal the leadership styles of business owners that can contribute to increased profitability. Hence, I did not use the interpretive models for my study since they were more suitable for identifying problems and finding solutions.

Impact of Plastic Recycling on Recycling Businesses

The market demand for recycled products impacts the profitability of small plastic recycling businesses (Nakatani et al., 2017). The pricing of recycled products for small plastic recycling businesses is also affected by the demand for recycled products (Nakatani et al., 2017). Small plastic recycling businesses must have high enough revenues to accommodate plastic recycling's additional processing efforts to be profitable (Ragossnig & Schneider, 2017). Applying supply chain loop principles by small plastic recycling businesses will attract additional investment and operational costs from reverse logistics (Ren et al., 2020). Therefore, small plastic recycling businesses must consider the demand for recycled products and plastic waste collection before designing the

recycling process for their plastic recycling business (Nakatani et al., 2017). When there is an increasing demand for recycled products, and the level of plastic recycling is low, small plastic recycling businesses will encounter a price increase for their recycled products (Tansel, 2020). Plastic recycling businesses should align recycling and material recovery with supply chain operations (Tansel, 2020). Consequently, the demand for recycled products, plastic waste availability, and high production revenues impact plastic recycling profitability.

Plastic recycling targets established in the EU Policy and a ban on exporting recycled plastics gave rise to plastic recycling businesses experiencing increased profits (Milius, Christensen, et al., 2018). Also, Milius, Christensen, et al. (2018) found that EU plastic recycling targets, coupled with limited plastic waste exports, gave rise to average revenues amongst plastic recycling businesses. Additionally, an increase in the amount of generated plastics recycled leads to higher profitability for plastic recycling businesses (Genc et al., 2019). Furthermore, Genc et al. (2019) found in Turkey that plastic recycling can only be profitable if the recovery of plastics is improved. Developing nations with cheap recycling costs may become manufacturing hubs concurrently with countries such as China, resulting in more economical and convenient reusing of recycled materials (Qu et al., 2019). Hence, policies, increased recycled waste, recovery of plastics, and cheap recycling costs positively impact small recycling businesses.

Business leaders of a construction company in Brazil that applied reverse logistics for solid waste management experienced increased profit (Neto & Correia, 2019). Neto and Correia found that construction companies made over \$450,000 annually while

recycling businesses made over \$250,000 annually in Brazil. The implementation of e-commerce strategies in small and medium-scale businesses positively impacted their profitability (Alzahrani, 2019). Small plastic recycling businesses can also improve profitability through an e-commerce strategy. Maghmoumi et al. (2020) stated that waste managers need to institute a robust organizational vision, improving decision-making on reverse logistics to result in sustainable solid waste management. Thus, e-commerce and organizational vision to utilize reverse logistics positively impact the profitability of small plastic recycling businesses.

Recycled plastic demand impacts plastic recycling businesses' profitability and the price of resource materials such as plastic waste (Nakatani et al., 2017). Plastic recyclers can optimally design a plastic recycling plant to accommodate the resource price and demand, thereby creating maximum profits for the plastic recycling business (Nakatani et al., 2017). Kehinde et al. (2020) stated that plastic recycling provides employment opportunities in developing countries for numerous families, including office jobs, to informal economic activities. Kehinde et al. also mentioned that plastic recycling helps conserve nonrenewable resources, such as the nation's oil and gas reserves. Ren et al. (2020) showed that maintaining relatively lower carbon volatility is essential to industrial stakeholders' investment decision-making, the main long-term participants in carbon markets, into low-carbon supply chains. Therefore, pricing and demand for recycled products and a stable low oil price create higher profitability for plastic recycling businesses, providing employment opportunities.

Gall et al. (2020) found that a high quality of plastic mechanical recycling was achievable with the informal sector of waste pickers and brought some socio-economic benefits. Using informal waste pickers brought about some socio-economic benefits, demonstrating that they could source quality plastic waste, resulting in high-quality plastic mechanical recycling (Gall et al., 2020). This quality plastic recycling provides economic benefits, establishes trust, and develops a dependable supply-buyer relationship with the waste pickers (Gall et al., 2020). An environmental tax can lead to higher material recycling than countries with low environmental taxes and material recycling rates (Nastase et al., 2019). Hence, informal waste pickers make a living through their informal activity of picking, separating waste, and selling plastic waste to plastic recyclers. Also, there is more material recycling in countries with environmental taxes.

Biorefinery makes the plant more profitable by optimizing inputs from other processes (Satchatippavarn et al., 2016). The biorefining process converts plastic waste to oil and promotes more recycling than other stand-alone recycling techniques (Satchatippavarn et al., 2016). Dhanalakshmi (2019) reported that Ernakulam, India generated 26.56 tons of plastic waste per day and could earn \$57,491 per day by producing brick tiles from plastic waste. Santander et al. (2020) used a closed-loop supply chain model for a distributed plastic recycling network of 3D printers in France's northeast. Santander et al. found that this approach leads to positive environmental and economic benefits. Hence, small businesses adopting the principles of reuse and recycling can make more profits. If the particle sizes of plastic waste fractions were standardized, the preprocessors could minimize their transport costs, and recyclers could

avoid fine particles and shredder steps (Maisel et al., 2020). Kim and Jeong (2017) found that refuse plastic fuel (RPF) has high associated transportation costs, requiring dedicated boilers. RPF's treatment paths need to be simplified to reduce environmental costs (Kim & Jeong, 2017). Consequently, improving the plastic recycling processes can reduce overhead costs, translating to more profits.

Circular Economy Framework

A circular economy is an economic system where waste managers practice the principles of reducing plastic waste by reusing, remaking, and recycling, thereby curbing environmental pollution through plastic waste disposal and incineration (Ezeudu & Ezeudu, 2019; Huang et al., 2020). Cheung et al. (2017) discussed the circular economy principles using train-the-trainer techniques. The authors showed that students imbibing the circular economy principles could positively impact plastic recycling behavior early. Ezeudu and Ezeudu (2019) used circular economy techniques in waste management in Nigeria to improve waste management businesses' working conditions. A circular economy's philosophy is to maximize value by using a resource, reusing, and regenerating the material at the end of service life (Mrowiec, 2018). Ezeudu and Ezeudu also applied the circular economy in Nigeria's waste management sector to improve workers' safety and increase waste recovery. The increased closed-loop recycling of PET bottles in the United States resulted in environmental benefits from a product-level assessment basis (Lonca et al., 2020). Hence, education on circular economy develops recycling behavior. Also, waste managers apply a circular economy to achieve workers' safety and to gain environmental benefits in the waste management sector.

Students' education in primary and secondary schools in Germany helped align the plastic recycling behavior of students to the circular economy's aspirations in the EU policy (Kerscher, 2019). Furthermore, Kerscher (2019) showed that plastic recycling behavior in EU countries like Germany would lead to sustainable development in the EU's plastic recycling businesses. As a country transitioning to a circular economy, the focus should be on reducing impurities and losses through product innovation, technology improvement, and focused plastic waste management (Eriksen et al., 2019). Therefore, the circular economy model aligns with plastic recycling goals of reuse and reduction in carbon footprint.

Lower carbon price facilitates decision-making in reverse logistics (Ren et al., 2020). A sound market condition could result in an optimal balance that encourages a closed-loop supply chain without putting additional burdens on plastic recycling businesses (Ren et al., 2020). Horvath et al. (2018), in their study on business solutions for transitions to a circular economy, found that the linear application of circular economy in developed nations does not apply in its entirety to developing countries. Business solutions, such as the business model canvas, provide a holistic business solution to sustainability in Kenya's circular economy (Horvath et al., 2018). Horvath et al. (2018) considered plastic recycling a low priority in implementing a circular economy because it does not provide complete material recovery. A circular economy can reduce carbon footprint and is sustainable when combined with business solutions. However, the linear application of circular economy in developed nations does not apply in developing countries.

An estimated 3.6 million tons of CO₂eq was generated from 2.7 million tons of plastic waste by incineration in 2017 in South Korea (Jang et al., 2020). Jang et al. (2020) found that South Korea could avoid approximately 6.6 million tons of CO₂eq gaseous emission to the environment through material recycling. South Korea is engaging in discussions to better recycle plastic packaging with a circular economy aspiration (Jang et al., 2020). The recycling process is material, energy, and emission-intensive compared to the supply of virgin material (Lonca et al., 2020). Consequently, using a circular economy leads to fewer carbon emissions and better energy optimization, bringing about higher profits for plastic recycling businesses.

The circular framework involves using and disposing of legacy additives in plastic waste. Legacy additives are heavy metals such as lead and cadmium, which the European Chemical Agency (ECHA) discontinued in producing PVC. Hence the old stock of recycled PVC contains legacy additives. The use of legacy additives and their disposal in plastic recycling poses several issues that the ECHA addresses in regulating the disposal of legacy additives in plastic waste (Wagner & Schlummer, 2020). According to environmental regulations, legacy additives are disposed of because of their toxic nature and stipulated regulatory levels in plastic wastes with legacy additives (Wagner & Schlummer, 2020). The environmentally sensitive nature of plastic waste containing legacy additives means that they are tricky to dispose of and are complex to segregate for plastic recycling. Therefore, a circular framework for legacy additives in plastic waste is difficult to implement and is challenging for developing nations with weak plastic recycling policies.

The European Commission (EC), on December 2, 2015, adopted a circular economy framework that involves a roadmap for new legislation on waste management in the EC toward a circular economy (Mrowiec, 2018). The recycling rates approved by the European Commission (EC) are a minimum of 50% up to 2025 and 55% till 2030 (Mrowiec, 2018). Baran (2020) stated that EU countries apply their circular economy strategy for environmental and economic benefits. Hence, the EU circular economy policy on plastic recycling engenders more profitability for plastic recycling businesses.

In the EU, plastic waste management's efficiency improved between 2006 and 2016 (Baran, 2020). Additionally, the amount of plastic waste collected for recycling increased by 79.0%, energy recovery by 61.0%, and landfill waste decreased by 43.0% (Baran, 2020). Market conditions' stability is necessary for recycled plastics and enables recyclers to invest in capacities and new technology (Baran, 2020). Baran (2020) stated that a comprehensive regulatory framework would drive accountability and transparency in the data collection of recycling rates and their calculation. Furthermore, Kerdlap et al. (2020) found that for a small distributed recycling system compared to large centralized recycling systems, the life cycle and greenhouse gas emissions are sensitive to the distance traveled by waste trucks and the trucks' size. Thus, stable market conditions, a comprehensive regulatory framework, and distributed recycling systems can improve plastic waste management efficiency.

The circular economy principles consist of three main ambitions: (a) achieve a robust after-use plastic economy where recycling, reuse, and focused biodegradation thrive; (b) significantly arrest leaks of plastic waste into the natural systems such as the

ocean, landfills, and the environment in general, and (c) separate plastics from fossil feedstocks by addressing cycle losses, through material transformation, option consideration for renewable sourced feedstocks (Mrowiec, 2018). Rhodes (2018) stated that due to the high population around urban centers, there is a need to utilize an integrated system such as the circular economy and permaculture in current urban infrastructure design. In South Korea, the plastic recycling industry must implement strategies and prioritize plastic packaging to transform the linear economy into a circular economy (Jang et al., 2020). Consequently, the circular economy principles encourage recycling, reusing, strategies for disposal of plastic packaging, and reducing environmental plastic waste pollution.

Generated Plastic Waste

There is a supply chain shortage of plastic waste in some regions for plastic recycling businesses (Satapathy, 2017). Due to the supply shortage for plastic waste, waste managers should pay attention to the supply chain for plastic waste, such as suppliers of plastic waste and people that generate plastic waste. The percentage of generated waste that is recycled is low (Geyer et al., 2017). In 2015, the plastic waste generated was approximately 6300 million tons (Mt), and globally recyclers recycled 9% of the amount (Geyer et al., 2017). Rhodes (2018) stated that China, Indonesia, the Philippines, Vietnam, and Sri Lanka as the heaviest plastic polluters contributing 56% of the global plastic waste. Plastic recyclers need to increase the volume of recycled plastic waste, and there is a shortage of quality plastic waste for plastic recycling businesses.

Furthermore, the public awareness campaign can positively impact plastic recycling in developing countries (Oyake-Ombis et al., 2015). Statistics show the need to improve generated waste recycled in developing countries (Babayemi et al., 2018; Geyer et al., 2017). Babayemi et al. (2018) presented that the total volume of imported plastic, newly produced plastic, and plastic components going into the Nigerian technosphere from 1996 to 2014 was 23,400,000 tons. The authors also stated that only 12% of this amount of plastics entered the recycling stream in the Nigerian technosphere. Zhang et al. (2020) found that the annual growth of GDP per capita in the past 5 years is an important influencing factor of food waste on the university campus, whether a low-income or a higher-income country. Governments in developing countries should create more public awareness on recycling generated waste through media and regulations.

The ban by the Chinese government in January 2018 on the importation of plastic waste has a global impact on globally generated waste plastic (Huang et al., 2020). Due to this new Chinese policy, globally exported plastic waste to China will displace an estimated 111 million metric tons of plastic waste by 2030 (Brooks et al., 2018). The Chinese government's import ban has necessitated other economies' need to increase their waste treatment capacity and increase local plastic waste recycling (Huang et al., 2020). Olusunmade et al. (2019) calculated plastic waste's energy potential in Nigeria and recommended that waste recyclers treat plastic waste as a resource. Olusunmade et al. also concluded that plastic recycling businesses should use thermo-chemical approaches to recover plastic waste. Developing nations need to increase the quantity of plastic waste recycled and approach plastic waste recycling as a profitable business venture.

Gabriel et al. (2018) concluded that the popular use of material value conservation design in plastic packaging saves manufacturers from consuming virgin plastic.

Ultimately, this reduces the plastic waste generated in the plastic packaging industry and leads to higher quality plastic waste for the recycling industry (Gabriel et al., 2018).

Therefore, material value conservation design can positively impact the waste generated from plastic packaging by reducing the volume generated and improving plastic waste quality.

Plastic Waste Segregation

Cheung et al. (2018) found that plastic recycling bins (PRB) and posters helped improve recycling behavior. People will segregate their waste in recycling bins because recycling behavior has helped shape their plastic disposal actions. Cioca et al. (2018) found out that a mechanical separation facility (MRF) is more advantageous because they bring about more economic benefits by reducing operating costs and improving return on investment (ROI). Lebreton and Andrady (2019) showed that plastic waste growth could reduce when developing countries build waste management infrastructures. In 84 recovery scenarios, Eriksen et al. (2019) found that a higher recovery rate could be achieved with increased source segregation and MRF efficiencies to about 17% out of 100% plastic waste. The authors also show that reducing plastic waste growth can happen if developing countries reduce plastic waste in their municipal solid waste. Hence, plastic waste segregation helps the plastic recycling process and creates a plastic recycling culture.

Using automated plastic waste segregation systems can improve the efficiency of the sorting system for plastic recycling businesses, which can translate to improved business profitability. Tarun et al. (2019) presented their research on convolutional neural networks (CNN), which sorts waste materials into plastic and nonplastic. CNN is an efficient machine learning technique that maximizes learning efficiency (Tarun et al., 2019). Such a sorting system can reduce the associated costs of sorting plastic and nonplastic material and the human effort required at this stage of the plastic recycling process. The implication is that automatic sorting systems are essential in improving the profitability of plastic recycling businesses. Subin et al. (2015) presented another technique applicable to plastic waste segregation: the gray level co-occurrence matrix (GLCM). The GLGM technique is applied to a robotic arm to improve efficiency by bringing about an automated sorting system (Subin et al., 2015). Therefore, plastic recycling businesses' automated waste segregation systems contribute to their profitability. However, the cost of utilizing such a computerized sorting system may not be affordable for small and medium enterprises.

The segregation of plastic waste with toxic substances represents another challenge for waste disposal. The United Nations Industrial Development Organization (UNIDO) discussed the segregation of plastic components and e-wastes contaminated with polybrominated diphenyl ethers ("Austria, Philippines," 2018). The integrated recycling industry (IRI) was the company nominated by UNIDO to dispose of this waste was the integrated recycling industry (IRI). IRI carries out a further sorting of e-wastes to segregate poisonous polybrominated diphenyl ethers (PBDEs), which they dispose of in

cement kilns to prevent re-entry into the recycling stream ("Austria, Philippines," 2018). Hence, toxic substances such as PBDEs in plastic e-waste impact the procedures for segregation and cost implications.

A well-established and efficient waste-sorting system is instrumental in achieving success with CO₂ reduction and preventing marine debris's harmful effects on ocean life (Lin & Nakamura, 2019). Owojori et al. (2020) recommended using three or more color-coded bins for recyclable, compostable, and trash at the academic and administrative buildings to facilitate recycling and partnering with waste recyclers to collect recycled waste. Zhang et al. (2020) found waste characterization to be an influencing factor of recycling potential. Particle size between 10-20 mm increases the sorting efficiency and recyclability of the plastic fractions and minimizes the losses to fine fractions (Maisel et al., 2020). The sorting technologies such as the air table, the wet shaking table, triboelectric sorting, magnetic, eddy current sorting, flotation, and centrifugal sorting are applicable for small sizes. Thus, the waste manager can use an automatic waste segregator system to improve plastic recycling rates.

Additionally, the automated waste segregator separates dry, wet, and metallic plastic waste without needing personal attention, and it is a cost-effective management system. (Mapari et al., 2020). The automated waste segregation system can be intelligent by adopting artificial intelligence (AI), machine learning (ML), and the internet of things (IoT) (Mapari et al., 2020). The segregation system consists of an inductive proximity sensor, capacitive proximity sensor, and moisture sensor to sense the type of waste

(Mapari et al., 2020). Accordingly, systems and automation can significantly improve plastic waste segregation capabilities and efficiencies.

Smart tools such as blockchain smart contracts, powered by multi-sensor data-fusion algorithms using artificial intelligence, help efficiently segregate commingled plastics (Chidepatil et al., 2020). Waste managers also use near-infrared laser sensors to differentiate six types of waste plastics in plastic waste segregation (Chidepatil et al., 2020). Using artificial intelligence and multi-sensors, the waste manager can reduce uncertainties and allow efficient and intelligent waste segregation (Chidepatil et al., 2020). Waste managers can reduce waste by separating and recycling waste (Xin et al., 2020). The manufacturer can use recycled products to replace raw materials leading to an overall reduction in energy consumption, equivalent to energy savings (Xin et al., 2020). Therefore, technology application to plastic segregation improves plastic waste management efficiency, increasing business profitability.

Plastic Recycling Policies

Policies enabling plastic recycling are lacking in some nations. Noorhan et al. (2016) recommended for plastic recycling policy that will allow the industry to develop. These two mentioned studies are coming more from developing nations with weak and underdeveloped plastic recycling industries. The EU policies on plastic recycling enable plastic recycling and a circular economy framework (Milios, Christensen, et al., 2018; Milios et al., 2018). Khoo (2019) recommended that waste planning policies include incentives to encourage environmentally responsible investments in innovative technologies that offer the dual benefit of minimizing waste and, simultaneously,

satisfying the need for renewable fuels. Thus, the studies of the mentioned authors show that developed nations focus more on plastic recycling technological innovations.

On the contrary, developing countries need enabling plastic recycling policies, infrastructures, and strategic partnerships to encourage plastic recycling business leaders. De Lucia and Pazienza (2019) found that plastic waste is dependent on the type of generated waste plastic. For example, plastic packaging and plastic films suggest using subsidies (De Lucia & Pazienza, 2019). Alternatively, De Lucia and Pazienza posited that the types of plastic waste generated by cereal crop activities favor adopting a tax-credit mechanism. Kodzhebash and Krivence (2018) identified reforms involving solutions to an organization's economic structure, resource-saving managerial structure, and environmental protection policy in Ukraine. Hence, developing nations need to develop policies that target the different types of plastic waste streams, direct businesses to recycle their plastic waste by restructuring, and reduce plastic waste production.

Some states in the United States have laws enabling single plastic use, such as banning plastic bags (King, 2019). Similarly, these states in the United States also have laws stipulating that plastic recycling centers' locations must be close to business centers (King, 2019). The Chinese government's policy initiatives to close down the informal sector plastic recycling sector in Wenan County, China, in 2011 due to environmental pollution led to many plastic recycling industries going underground to operate in other parts of China (Goldstein, 2017). An appropriate developed global policy framework will enable the global community to reap the benefits of China's new policies for environmental sustainability and social justice by mitigating unintended consequences

(Qu et al., 2019). Accordingly, plastic recycling policies will help standardize plastic recycling globally and make plastic recycling more profitable.

Additionally, a superior approach would have been to formalize the informal sector of plastic recycling businesses, which would have created an opportunity to standardize business practices and processes (Goldstein, 2017). Actors in waste management should view transportation as an integral part of logistics operations for an excellent attitude to effective waste management policy in Ukraine (Kodzhebash & Krivence, 2018). Therefore, plastic recycling policies impact plastic recycling by dictating the type of plastics to use and the location of plastic recycling plants.

Waste management policymakers should put laws in place that allow the use of plastic waste for electricity generation, using biorefinery recycling methods by policymakers in Nigeria (Ayodele et al., 2020). Ayodele et al. (2020) stated that Nigeria has the potential for electricity generation from plastic waste to about 87.5 megawatts. Asari et al. (2019) recommended integrating policies to improve plastic waste collection and recycling plastics in Samoa, a Pacific island country. Wang et al. (2020) discussed that the ban on plastic waste imports would cause other developed countries to ban plastic waste exports. Consequently, import bans from developed nations will drive developing nations' plastics recycling industry's growth. Alternatively, the developing nations which do not have strict waste management policies will become dumping grounds for solid waste from developed countries (Qu et al., 2019). Thus, the policy ban on nations that import plastic waste, such as China, impacts plastic recycling growth in developing countries.

Policymakers have a critical role in formulating and implementing environmental regulations and establishing a clean environment through national legislation (Khoo, 2019). Waste planning policies should have inbuilt incentives to encourage investments targeted at environmental sustainability, yielding innovative technologies that achieve the dual purpose of minimizing waste and meeting renewable fuels' needs (Khoo, 2019). Consequently, waste management actors can view plastic recycling policies as catalysts for developing plastic recycling, minimizing plastic waste generation, meeting renewable fuel objectives, and establishing a clean environment.

Recycling Behavior

Plastic recycling education of the populace is another identified theme in the literature review. Cheung et al. (2018) presented the positive impact on recycling behavior, including a train-the-trainer plastic recycling curriculum in primary school. Faisal et al. (2018) concluded that students could learn recycling behavior using training strategies for K-12 students for plastic recycling entrepreneurship. Evinemi and Afon (2016) recommended that there should be public enlightenment and environmental awareness training for the populace. Additionally, Evinemi and Afon (2016) recommended continuous enlightenment programs for all health institutions' managers and waste management officers. Also, Owojori et al. (2020) recommended environmental awareness to change staff and students' perceptions and attitudes towards environmental sustainability in the university. Kerscher (2019) discussed the successful education of primary and secondary schools in Germany on topical plastics waste. Accordingly,

educating the populace on plastic recycling results in the citizenry imbibing recycling behavior as a necessary way of life.

There is no support for waste management in Romania's waste management system (Nastase et al., 2019). Nastase et al. (2019) also discovered that waste operators did not want to take the additional financial burden of separating waste because they did not have any incentives. Nastase et al. found that the bins provided for waste separation were insufficient. Mattoo et al. (2020) showed that for the disposal of biomedical waste in Pakistan, continuous training or awareness programs were necessary for hospital workers to safely handle and segregate biomedical waste. Therefore, developed and developing countries should target waste managers with ongoing awareness programs, especially in handling sensitive waste such as biomedical and hazardous waste.

Educational strategies are another way to foster plastic recycling behavior in students. Schools can use strategies such as teaching students aged 9-12 about plastic recycling during the school timetable during non-academic hours (So & Chow, 2019). Some of these strategies involved showing plastic recycling videos during lunch hours and training students to be trainers of other students (So & Chow, 2019). So & Chow went further to include the parents of the students in plastic recycling projects and, by so doing, created an awareness of plastic recycling among the parents. Cheung et al. (2018) found that using plastic recycling bins and poster intervention changed university students' recycling behavior on the participating campus. The positive impact of a community's recycling behavior through these identified education strategies can improve segregation and the level of generated plastic waste that is recycled (Tiew et al., 2019).

Hence, plastic recycling education should be part of the curriculum at all levels of the education system in countries.

Plastic waste segregation at the source of plastic waste disposal is central to the success of the plastic recycling process (Banks et al., 2020; Chow et al., 2016). Plastic recycling quality is affected when all plastics are discarded into a single recycling bin, increasing the plastic recycling business's cross contamination and operation cost (Chow et al., 2016). Chow et al., 2016 engineered a new eight-compartment plastic waste bin to facilitate plastic recycling and sorting at the source. Consequently, this provides educators insight into problem-solving on the environmental issue concerning plastic waste (Chow et al., 2016). Banks et al. (2020) found that universities can achieve a 66.7% diversion of plastic waste through better sorting at the waste bin, higher than the current diversion rate of 48%. The National Institutes of Health (NIH) established the green labs' program, promoting NIH laboratory personnel's awareness and participation in sustainable laboratory practices (Banks et al., 2020). The program has an excellent database of green-lab supplies and equipment and offers tips and tricks on greening your lab (Banks et al., 2020). Thus, recycling education in countries must include knowledge of the segregation of the different plastic waste streams and standardized plastic waste sorting systems.

Monetary incentives and economic and environmental benefits can drive recycling behavior. Households in Pakistan have good recycling attitudes; however, monetary benefits drive their recycling behavior, environmental benefits, and recycling opportunities (Abbasi & Sheikh, 2016). Furthermore, the authors discovered that social

norms and government initiatives do not drive households' recycling behavior (Abbasi & Sheikh, 2016). Meng et al. (2019) discovered that the five most significant factors affecting recycling behavior are *publicity and education, accessibility to recycling facilities, accessibility to classification facilities, willingness to participate in classification, and residents' environmental awareness*. Consequently, there may be some relationship between an incentive system and recycling behavior. Also, public awareness and education may be crucial to recycling behavior.

Challenges of Plastic Recycling

There are many barriers to the effective plastic recycling process. Satapathy (2017) found most influential divers in these barriers to plastic recycling in India are the amount of scrap, the use of additives, and toxic gas. The amount of scrap available is a challenge because many plastic recycling businesses compete for the available plastic waste that is properly segregated, washed, and ready for utilization by the plastic recycling processes. Ahmed et al. (2018) presented an illustrative diagram of the machines used for the different stages of plastic recycling, including cutters, crushers, shredders, plastic segregating machines, and low-cost plastic recycling machines. As well, the plastic recycling process can be mechanical or thermo-chemical. Additives impact plastic recycling by changing the used plastic properties back to the original state. Therefore, the amount of scrap, additives, and toxic gas can be a solid challenge to effective plastic recycling.

The by-product of using additives is a toxic gas that represents health challenges for workers and environmental safety disposal concerns. The health and safety of workers

who handle waste and recyclables are paramount, and waste management must develop waste collection and recycling operations that guarantee workers' safety and health (Ragossnig & Schneider, 2017). Hence, identified barriers in plastic recycling significantly impact the profitability of a plastic recycling business (Satapathy, 2017). The waste managers in plastic recycling need to consider product design, technical equipment for processing plastic waste, social issues, organizational structure for plastic recycling, and recycled products' marketability (Ragossnig & Schneider, 2017). Accordingly, mitigating toxic gases arising from the plastic recycling process and using additives and technical and managerial organization of plastic recycling businesses leads to profitability.

Barriers to plastic recycling in the hospitality business need concerted focus from waste managers because of the high volume of plastic waste generated (Ramirez & George, 2019). Ramirez and George (2019) identified the barriers to plastic recycling in the hospitality business as “perceived high capital costs, doubts of return on investments, lack of time, require too much management, and limited interest/knowledge” (p. 11). Conversely, Ramirez and George listed the motivators for plastic recycling in the United States hospitality industry: “potential cost savings, increased market share and image, improvement, acquiring competitive advantage, intrinsic motivation, and enhanced employee morale” (p. 11). Actors in the plastic recycling sector must mitigate the barriers to achieving EU plastic recycling targets (Baran, 2020). Therefore, barriers to plastic recycling negatively impact profitability. Also, encouraging the motivators to plastic recycling may positively impact the profitability of plastic recycling businesses.

There is also a need to increase the European capacity to sort and recycle facilities to accommodate increased quantities of plastic waste (Baran, 2020). Schut (2017), in the article on the challenges of recycling problem packages, found that recycling tiny, rigid plastic bottles and containers is tricky. The reason is that these items are less than the 2-inch square area for trommels found in the material recovery facility (MRF) sorting machines (Schut, 2017). To address this problem, the sorting lines of established material recovery facilities have deployed robots and artificial intelligence to identify these tiny pods that pass through the sorting machines in the material recovery facility (Schut, 2017). Thus, increasing the plastic sorting and recycling facilities will increase the amount of plastic waste recycled. The use of robotic arms and artificial intelligence addresses the issues of small sizes of plastic waste bottles.

Recycling plastic labels made from polyvinyl chloride (PVC) is challenging because recyclers cannot recycle plastic labels (Kristina et al., 2018). In 2018 in Indonesia, only plastic bottle wastes made from high-density polyethylene (HDPE) and polyethylene terephthalate (PET) were recycled (Kristina et al., 2018). The innovative solution deployed in this case study was plastic labels as a fuel mixture for its incinerator and oil heater in the recycling plant PT LJF in Indonesia (Kristina et al., 2018). Colombijn (2020) discussed the informal sector of waste pickers' conditions, how they produce wastewater from washing their plastic waste, and its environmental effects. Hence, plastic waste streams such as PVC that are difficult to recycle can fuel recycling plants, and waste managers must improve informal waste pickers' work conditions.

Additionally, plastic recyclers distance themselves from these informal waste pickers and the negative social norm they represent. Still, they benefit from the low prices these waste pickers offer for plastic waste bottles in Indonesia (Colombijn, 2020). Finally, the author mentioned a complicated network of different recycling business actors, and no person has complete control (Colombijn, 2020). Thus, actors in waste management should formalize cooperation between plastic recyclers and informal waste pickers.

The barriers to recycling in Nova Scotia, Canada, had to do with a lack of enabling infrastructure to support recycling agricultural plastic waste (Muise et al., 2016). The farmers were not ready to leave their core farming task to provide agricultural plastic waste (APW) transportation from their farms to recycling facilities. The farmers were, however, positively disposed of the recycling of APW. Muise et al. recommended that the solution was for the farmers and stakeholders to jointly sponsor a means for transportation and segregation of APW. Consequently, transporting plastic waste to recycling businesses can increase farmers' plastic recycling.

The supply chain of plastic recycling will be of interest in this study to understand how plastic recycling businesses get their waste plastics. In the study, I sought to understand the suppliers of plastic waste to plastic recycling businesses and what strategies to use to improve plastic waste collection for the plastic recycling business. Satapathy (2017) identified the challenge with the supply chain of waste plastics in India and various other challenges to plastic recycling, which indicate that strategies are needed to overcome these barriers. Additionally of interest are the sales of recycled products and

strategies used by competing businesses in the plastic recycling sector. Also, new plastic recycling businesses will impact profitability because plastic recycling businesses may be competing for the same suppliers and buyers.

The waste management sector actors, such as waste pickers, scrap dealers, and preprocessors, lack financial resources, and plastic molders do not have managerial expertise (Abbasi & Sheikh, 2016). Subsequently, the informal sector of waste management experiences high patronage by waste pickers and scrap dealers because it does not require high investment or managerial expertise (Abbasi & Sheikh, 2016). Thus, the informal sector in waste management exists because it does not need any expertise, and actors do not need any investment to make money from supplying plastic waste to plastic recycling businesses.

Business Strategies

On the strategies of small businesses for applying Industry 4.0, Müller (2019) used the conceptual framework of Industry 4.0 and the business model canvas for his research. The author used a target sample of 22 CEOs in the German industrial sector. The author found that the use of Industry 4.0 in small and medium-scale businesses impacts plastic recycling businesses more than the clients patronizing the services of the plastic recycling business. However, the plastic recycling business finds integrating Industry 4.0 in its plastic recycling process challenging (Müller, 2019). Turner and Endres (2017) used the conceptual framework of systems theory, chaos theory, and complexity theory to study small businesses' business success rates focusing on three coffee shops in Duval County, Florida. Turner and Endres found that networking,

effective business plans, and market differentiation strategies contribute to business success. Hence, business leaders can utilize such business strategies to achieve business success.

For business sustainability, a business leader must build customer relationships, find, and follow his passions (Warren & Szostek, 2017). Also, employing sound financial management and enhancing business knowledge impacts businesses' sustainability (Warren & Szostek, 2017). Zwane et al. (2019) showed that planning, leading, and organizing activities shaped new small restaurants' organizational architecture that survived the first five years of operating in Durban, South Africa. The authors discussed that staff's multiskilling helped the business be resilient to operational and customer changes. Zwane et al. (2019) also mentioned that business managers used ambidextrous leadership with their employees, hiring them for desired values and using them for specific goals. Therefore, small businesses can remain sustainable and profitable by business owners using relationship management with customers, practicing sound financial management, structuring the business, and applying ambidextrous leadership with multiskilled staff.

Gerig (2018) concluded that implementing business strategies in plastic recycling contributes to business success, sustainability, and profitability. The author found that small business organizations (SBOs) in the participating mortgage organizations succeeded by effectively using continuing education and training, communication and networking, and setting goals and planning. Kerdlap et al. (2020) recommended that preprocessors and recyclers should improve communication between the end-of-life

actors. The plastic recycling business can benefit from strategic partnerships (Ahmed et al., 2018). The percentage of generated waste recycled is low at 9% (Evinemi & Afon, 2016; Geyer et al., 2017). Subsequently, business leaders should undertake public awareness campaigns on plastic recycling in developing nations. Accordingly, there is a need to improve the recycling business's profitability by increasing the percentage of generated waste recycled in developing nations through business strategies.

Automation in plastic recycling is desirable, and it can improve efficiency substantially. Automation also allows for innovation since waste managers can program plastic recycling processes to produce various recycled plastic. Automation enables mechanical separators, cutters, washers, and shredders (see Ahmed et al., 2018; Cioca et al., 2018; Nascimento et al., 2019). The safety levels in automated industries are higher, and the production rates are more efficient. However, automation as a business strategy is not prevalent in developing nations like Nigeria because of the constant energy challenge (Nnaji, 2015). Thus, automation as a strategy is desirable. Still, depending on the world's region, automation could be challenging to implement because of the burden of machine maintenance, spare parts, and constant energy challenges.

Waste managers must consider some crucial factors regarding recovering and recycling plastic waste. Mwanza et al. (2018) discovered the strategy for recovering and recycling plastic solid waste, the essential considerations for the plastic manufacturer and recyclers of plastic solid waste in Zambia. The most important factors are listed as follows: (a) ensuring material applicability in manufacturing processes, (b) the cost of acceptable alternative forms of disposal compared to recycling, (c) creating closer

engagements of recyclers with one another along the supply chain, (d) efficiency of the municipality, private waste contractors or informal waste collectors in waste collection, and (e) enforcement of producer responsibility regulations to encourage the collection of plastic wastes (Mwanza et al., 2018). Consequently, waste managers can extend these same principles to other developing nations for a successful plastic waste recycling process that positively impacts business profitability.

Three critical success factors exist for the reusable plastic packaging (RPP) system: top management commitment, lean support, and optimized inventory management (Gardas et al., 2019). As such, the organizational structures in the waste management sector and the interrelationships between the waste management and the production sectors also affect the level of plastic recycling achieved (Ragossnig & Schneider, 2017). Hence, organizational structure, leadership, and effective relationships between waste managers and the production sector are essential for successful plastic recycling businesses.

Alternatives to Plastic Recycling

There are other alternatives to plastic recycling, which I explore in the subsequent review. Rujnić-Sokele and Pilipović (2017) examined the use of biodegradable plastics as an alternative to plastic recycling. Biodegradable plastics are alternatives for use in areas with high plastic waste, such as catering (Rujnić-Sokele & Pilipović, 2017).

Biodegradable plastics consist of compostable materials made from starch material.

However, they are cost-intensive, and the global production of biodegradable plastics is low. Wei and Zimmermann (2017) proposed an alternative to plastic recycling by using

different identified enzymes to degrade plastic or change its molecular structure. Thus, the other options for plastic recycling are biodegradable plastics and enzymes that can degrade plastic waste.

Bioplastics can be categorized into three groups: "(a) bio-based or partially bio-based materials, such as polyethylene (PE), polypropylene (PP), or polyethylene terephthalate (PET) and bio-based technical performance polymers, such as polytrimethylene terephthalate (PTT) or thermoplastic polyester elastomers (TPC-ET), which are non-biodegradable plastics; (b) plastics that are simultaneously bio-based and biodegradable, such as polylactic acid (PLA), polyhydroxyalkanoates (PHA) or polybutylene succinate (PBS), starch and starch blends; and (c) fossil-based plastics that are biodegradable, such as polybutylene adipate terephthalate (PBAT)" (Paço et al., 2019, p. 415). Another category of plastics is oxo-biodegradable plastics, which is controversial (Rhodes, 2018). The controversy surrounding oxo-biodegradable plastics is that it does not biodegrade completely (Rhodes, 2018). It disintegrates into microplastic fragments harmful to the environment, especially marine life, like petroleum-based plastics (Rhodes, 2018). Therefore, there are different types of bioplastics; some are biodegradable, others are partially biodegradable, and oxo-biodegradable plastic disintegrates into microplastics harmful to marine life.

The incineration of plastic waste is another alternative to plastic recycling. However, incineration contributes to carbon emissions and attracts an increasing incineration cost in Antwerp, Belgium (De Weerd et al., 2020). Dumping plastic waste in landfills is a cheaper option for plastic recycling, but it adds to environmental pollution

(Avolio et al., 2019). Chen et al. (2019) found that automotive shredder residue incineration causes the highest environmental burden versus benefit in terms of the impact on human toxicity potential. The chemical recycling substituting purified terephthalic acid (PTA) and ethylene glycol leads to a lower environmental impact per 1 tonne of PET waste (Rickert et al., 2020). However, this option has the challenge of managing the toxic discharge from the chemicals. Waste managers in Belgium encourage plastic recycling by taxing incineration, reducing incineration, and growth of plastic waste (De Weerd et al., 2020). Therefore, mechanical plastic recycling is a better option when compared to all other alternatives of incineration and chemical recycling of plastic waste.

Waste managers use microbial enzymes to degrade plastic waste, but managing by-product disposal is challenging. Austin et al. (2018) showed that the bacteria *ideonella sakaiensis* 201-F6 exhibited the rare ability to grow on PET as a significant carbon and energy source. Paço et al. (2019) identified *mucor rouxii* as having viable biological agents for plastics' biodegradation. However, the biodegradation of PET by these bacteria produces a by-product called PETase. Austin et al. (2018) showed PETase degrades another semi-aromatic polyester, polyethylene-2,5-furandicarboxylate (PEF). PEF is an emerging bioderived PET replacement with improved barrier properties. The findings show that the areas for further research are protein engineering to increase the performance of PETase and develop its biodegrading properties of synthetic polymers. Samrak et al. (2020) posited that bioengineering strategies could reduce the crystallinity issues associated with PET waste and cause PET hydrolyzing enzymes' operating

temperatures to increase in the EU. Samrak et al. discussed the progress of enzyme bioengineering research for new PET biocatalysts. Samrak et al. also explained the current mechanisms for degrading plastics using enzymes. Hence, researchers are currently perfecting the biodegradation of plastics using enzymes and bioengineering enzymes to address crystallinity issues.

Waste managers use plastic waste for manufacturing products such as flood barriers, roof tiles, block tiles, and road construction. Ondruska et al. (2017) used recycled plastic waste to construct flood barriers. The authors then pressure-tested the constructed flood barriers to certify their use as replacements for existing flood barriers. The plastic flood barriers are from recycled waste polypropylene (PP) and polyethylene (PE) plastics (Ondruska et al., 2017). The challenge with these newly constructed flood barriers, which are ready for mass production in the Slovak Republic, is the price to stamp the recycled waste plastics on the flood barriers, a mixture of recycled plastic and metal (Ondruska et al., 2017). Ondruska et al. are confident that the unit price will be competitive. The use of propylene diene monomer (EPDM) as a compatibilizer in the blend of polypropylene (PP) and polyethylene (PE) leads to the improvement of the chemical and mechanical properties of the mixed blend used in extruder injection molding for recycled products (Hanna, 2019). Kaliyavaradhan et al. (2019) discovered that the proper mix design adjustment to accommodate waste materials could produce sustainable controlled low-strength material (CLSM) with acceptable plastic properties. Therefore, researchers identified many alternative uses of plastic waste in different industries, but what is not clear is if these options are commercially viable.

However, plastic waste used in the manufacture of Greentile, a slanted green roof type, and plastic waste used to power recycling plants is commercially viable. Furthermore, Ragaert et al. (2020) discovered they could use a sink fraction plastic waste stream to manufacture Greentile for slanted green roofs. To achieve this, the authors treated the plastic waste stream to remove the PVC and non-ferrous metal. Usually, plastic recyclers incinerate the PVC from plastic waste streams because plastic recycling plants cannot recycle PVC. Kristina et al. (2018) dealt with this similar challenge of what to do with the PVC plastic waste stream by including the PVC plastic label as fuel for the plastic recycling plant PT LJF in Indonesia. Ragaert et al. used a recycling approach to bring a complex plastic waste stream from incineration to recycling. Nagy and Kuti (2016) discussed the harm of incineration or energy recovery of plastic waste and its harm to the environment. Thus, the identified alternative for plastic waste streams, such as the Greentile roofs, is commercially viable. Still, the plastic waste stream treatment of PVC and non-ferrous metals could create another waste disposal challenge. Also, PVC waste as a fuel in the recycling plants creates environmental emission concerns.

Incinerated plastic waste creates environmental concerns, and waste managers must be innovative in addressing these concerns (Nagy & Kuti, 2016). One way to address emissions from incineration is through monitoring and control (Nagy & Kuti, 2016). Nagy and Kuti (2016) further explained incineration's human and environmental risks. Chen et al. (2019) found that incineration of automotive shredder residues was the main contributing factor, accounting for 79% of the total contribution of recovered energy's environmental impact. Also, aluminum and plastic recycling contribute the most

to abiotic depletion and photochemical ozone creation potentials (Chen et al., 2019). Incinerated ashes of solid fuels and municipal household waste contain heavy metals (Horák et al., 2019). Khatib et al. (2019) researched using a certain amount of plastic waste in reinforced concrete without compromising its strength. The combination of gases emitting from waste incineration to generate electricity and recycling recyclables results in greater GHG emission benefits than the volume of emissions from not combining the two processes (Xin et al., 2020). Therefore, waste managers can apply innovations to counter the harmful emissions from incinerating plastic waste. Waste managers must also find safe ways to dispose of the heavy metals in incinerated plastic waste ash.

The different techniques for transforming waste plastics into oils are thermochemical treatment/thermal cracking/pyrolysis, hydrocracking/hydrogenation, and catalytic degradation/catalytic pyrolysis (Sikdar et al., 2020). Waste managers can use the pyrolysis process on plastic waste containing polyethylene (PET) to produce 1-olefins and n-paraffins (Sikdar et al., 2020). The products of this process contain heavy metals and need further treatment. Sikdar et al. (2020) then subjected the heavy fraction hydrocarbon to hydrotreating conditions using a hydrotreating catalyst. Sikdar et al. converted heavy fraction hydrocarbon into a high viscosity indexed lubricating oil composition using a dewaxing isomerization catalyst. Sikdar et al. found that waste plastic-based pyrolyzed oils mitigate plastic pollution and use petroleum products. Hence, waste managers can use many chemical processes to transform waste plastics into oils.

Thermal conversion is another technology that the system user can implement in the existing system to convert waste into chemicals, fertilizers, oils, and other useful

products (Mapari et al., 2020). Consequently, researchers identified chemical options for plastic recycling, such as converting plastic waste by thermal, hydro, and catalytic processes to oils, are viable options with inherent chemical complexities. Waste managers can use the products of these chemical processes for lubricating oils and in agriculture.

Bioplastics are a suitable replacement for conventional plastics because they do not negatively impact the environment due to their biodegradability (Gardas et al., 2019). Bioplastic sources are renewable biomass sources such as vegetable oil, pea, and corn starch (Gardas et al., 2019). Bioplastics are reusable and adaptable, have no carbon footprint, GHG emission is 30% less than conventional plastics, and manufacturers use them to construct shipping containers, reducing damages (Gardas et al., 2019). However, bioplastics are not cheap to produce, so they cannot replace conventional plastics until a technological breakthrough can reduce production costs.

Faraca et al. (2019) discovered that advanced mechanical recycling provided the most considerable savings in the highest number of impact categories, including global warming potential, compared to simple mechanical recycling and resulted in the lowest total costs (negative costs). Furthermore, the authors demonstrated that a high quality of recycled plastic leads to environmental savings and profit (Faraca et al., 2019). Lotfian et al. (2019) found that waste managers can reduce the injection rate of coal, a reducing agent, to use plastic materials as a substitution in metallurgical processes. Therefore, advancements in science have improved mechanical recycling to lower recycling costs

and discovered alternative uses of waste from electrical and electronic equipment in metallurgical processes.

Analysis of Plastic Recycling Themes

One area for research is the business strategy aspect of plastic recycling, for which peer-reviewed journals are not readily available. My literature review's limitations in the research studies are the sample sizes and possibly funding limitations restricting their research's reach and extent. The different regions' needs vary depending on income bracket, GDP per capita, disposal income, and government initiatives in plastic recycling. Business leaders generally have a supply chain challenge of sourcing used plastic for their plastic recycling business (see Milios, Christensen, et al., 2018; Satapathy, 2017). Moreover, there is an added cost of waste collection cost that is part of plastic recycling businesses' operating costs. Hence, I explored the business strategy aspect of plastic recycling businesses in Nigeria because of an existing research study gap.

Additionally, businesses must have optimal plastic recycling levels to be profitable. Local, regional, and global challenges to plastic recycling deter plastic recycling businesses from optimal levels. The regions covered in my literature review for plastic recycling include India, Peru, Iran, Pakistan, Indonesia, Europe, the United States of America, Kenya, the United Kingdom, Croatia, Brazil, Nigeria, the Asia Pacific, and the Pacific island country. So there is a focus on developing nations and overcoming these countries' challenges to increase plastic recycling levels through recycling businesses. A critical look at these regions shows us that developed nations have overcome most of the challenges facing developing nations. For example, the focus in

developed countries is on automating the plastic recycling business to maximize efficiency (Nascimento et al., 2019; Milios, Christensen, et al., 2018; Satapathy, 2017; Torres & Cornejo, 2016). Thus, optimal plastic recycling levels increase profitability for plastic recycling businesses.

Accordingly, my research question is, what strategies do small business managers use to improve profitability in the plastic recycling industry? Thus, my business problem will require rich data from small and medium-scale plastic recycling businesses. Yee et al. (2017) used qualitative research in their study on patient safety using ICTs. Similarly, I used the qualitative research methodology. Saunders et al. (2019) recommended qualitative research when the researcher is interested in rich data from study participants. Subsequently, I chose a multicase study because it suits my business problem, allowing me to explore business strategies, reach data saturation, and use data triangulation. Hence, my chosen research and interview questions helped me discover business strategies in Nigeria's plastic recycling industry.

The alternatives to plastic recycling are useful to examine. In the literature review, we have presented alternatives to plastic recycling such as the use of biodegradable plastic, biorefinery of plastic wasted in oil fuel, conversion of plastic waste to electrical energy, conversion of plastic waste into flood barriers by stamping the plastic waste on a metal form, conversion of plastic waste into plastic brick tiles or green roof tiles, use of plastic waste in pillars to increase their textile strength, use of plastic waste in road construction and the use of PVC to fuel a plastic recycling plant (see Austin et al., 2018; Khatib et al., 2019; Kristina et al., 2018; Ondruska et al., 2017; Rujnić-Sokele &

Pilipović, 2017; Satchatippavarn et al., 2016; Wei & Zimmermann, 2017). A further look at these alternatives reveals that they are expensive and not sustainable for the use of small and medium businesses. However, the listed alternatives to plastic recycling provide a more environmentally friendly solution than incinerating plastic waste without controlled emission and dumping plastic waste in landfills (Avolio et al., 2019; Nagy & Kuti, 2016). Therefore, considering an alternative to plastic recycling is the cost factor versus the environmental benefits.

Furthermore, there are some differences between mechanical and chemical plastic recycling. Mechanical plastic recycling undergoes the typical processes of separating, washing, drying, shredding, re-granulating, and compounding (Ahmed et al., 2018). The chemical plastic recycling processes are not alike, but the types of chemical plastic recycling are purification, decomposition, and conversion. The mechanical recycling process uses additives for certain types of plastic, and the toxic gaseous emission has safety concerns for workers. Chemical plastic recycling relies more on chemicals, so chemical by-product disposal represents environmental concerns (Jiang et al., 2020). Chemical plastic recycling is more hazardous, and recycling businesses using chemicals must have a high safety standard. In contrast, chemical plastic recycling is more suitable for a certain type of plastic but may not be commercially viable for some chemical recycling types (Jiang et al., 2020). Hence, mechanical and chemical plastic recycling is feasible for plastic recycling, but the waste manager must consider the ideal recycling method for different plastic waste streams.

Consequently, the conceptual framework of the study is transformational leadership, which researchers use to determine how a leader's idealized influence, intellectual stimulation of followers, inspirational motivation, and individual consideration of employees will lead to an increased level of profitability of plastic recycling businesses (Boukamcha, 2019; Mahdikhani & Yazdani, 2020; Roibu et al., 2019; Tănase, 2020). The premise is that business leaders who use transformational leadership can bring about their business's profitability by inspiring employees to innovate and cultivate a sense of business ownership (McManus, 2019). Accordingly, transformational leadership as the lens of the study can help me discover the strategies that business owners of plastic recycling businesses use to improve profitability.

Lastly, the plastic recycling research topic has a social change significance. The improved plastic recycling level of the plastic recycling industry addresses the growing problem of plastic environmental pollution. This industry also employs the community through the value-added chain created by plastic recycling businesses (Milius, Christensen, et al., 2018). The community enjoys the benefits of employment opportunities through waste segregation and collection. Likewise, job opportunities for hired hands and technicians increase as businesses increase plastic recycling levels (Satapathy, 2017). Therefore, improving the profitability of plastic recycling businesses is a win-win for social change impact.

The main driver for any research topic should be its contribution to social change (Schirmer et al., 2016). Subsequently, improving the profitability of plastic recycling businesses increases their financial well-being, which raises their sphere of influence.

The organization can give back to society because they have additional finance from its annual profit (Yuan et al., 2020). The plastic recycling businesses must ensure that they do not pollute the environment and carry out corporate social responsibility to communities located in their operational areas. Ensuring that our environment is not polluted and remains sustainable is also a social change driver because waste managers must conserve environmental resources in such a manner as to transfer wealth to the next generation. Therefore, it will be challenging for a plastic recycling business to render social responsibility if it is not doing well financially, so increasing the profitability of plastic recycling businesses is vital to social change and social responsibility.

Transition

The objective of this study was to understand the strategies small business managers in the plastic recycling industry use to improve profitability. In Section 1, I explored the following issues: background of the problem, problem statement, purpose statement, nature of the study, the research question and interview questions, the conceptual framework, and literature review.

Section 2 contains the discussion on the role of the researcher, the research method, the research design, the population and sampling, data collection instruments, the data analysis, and the reliability and validity of the study. In Section 3, I discussed the presentation of the study's findings, professional applications, implications for social change, and recommendations for future studies.

Section 2: The Project

I used a qualitative multiple case study to explore the strategies that small plastic recycling business managers used to improve the profitability of their business in Southwest Nigeria. In this section, I discuss the purpose of the study, my role as a researcher, the participants, and the research method and design. Additionally, my discussion includes ethical concerns, the data collection process, and the study's reliability and validity.

Purpose Statement

The purpose of this qualitative multiple case study was to explore strategies small business managers in plastic recycling businesses use to improve profitability. The target population comprises nine business owners from nine small plastic recycling businesses in the Lagos state of Nigeria who implemented strategies to improve their business profitability. The implication for positive social change includes the potential to improve the business practices of plastic recycling businesses in Nigeria. Consequently, improving business practices should positively impact profitability, expand existing businesses, and lead to more job opportunities. Likewise, increased profitability creates more wealth for the plastic recycling businesses to contribute to society through community projects, sponsorship for social entrepreneurship programs, and the potential to support educational scholarship programs in the businesses' communities.

Role of the Researcher

The role of the researcher includes collecting data, analyzing the data, selecting the appropriate research method, and designing and managing the research process to

inculcate ethical considerations and eliminate personal bias to the barest minimum (Hargis, 2020). As a researcher, my role was to develop an interview guide, find and establish contact with interviewees, get their informed consent, conduct an interview with the participant and record the interviews with reliable recording devices. Furthermore, my role as a researcher was transcribing recorded interviews, identifying the different themes from my data collection, analyzing the results with Nvivo software, and presenting my findings.

My interest in the research came from environmental concerns about dumping plastic waste in landfills, waterways, and major cities and towns. Geyer et al. (2017) stated that there would be about 12,000 Mt of plastic waste by 2050 with the status quo of plastic production and waste management. Plastic waste is not biodegradable, and indiscriminate dumping harms marine life. Consequently, the environmental concerns led to a further desire to venture into the plastic waste recycling business to address the environmental problem. I do not have a relationship with the research topic, participants, or the research area.

I adhered to the ethical standards stipulated in the Belmont report, which abides with the principles of respect for the person, beneficence, and justice (National Commission for the Protection of Human Subjects in Biomedical and Behavioral Research, 1979). I treated my participants with respect, beneficence, and justice. Anabo et al. (2019) presented an article on applying the Belmont report to online research showing that the concept and application of justice were implicit and varied from the original report. To address researcher bias in the interpretation of data and mitigate a

personal lens's effect, I used multiple data sources, interview protocol, member checking of data, and data triangulation. These various instruments ensure research validity (Yin, 2018). Interview protocols (see Appendix A) ensured that I adhered to the interview questions and did not introduce bias or derail the interview's objective. The interview protocol provides a guide for using interview questions (see Appendix B) during the semistructured interviews. The researcher can send the interview questions in advance to the participants to increase the quality of their responses. Wadams and Park (2018) stated that the researcher could mitigate against bias by using bracketing, unstructured interviews, diverse peer review, thinking inductively, investigator responsiveness, and critical reflexivity. Before I commenced data collection, I ensured that I received institutional review board (IRB) approval to begin the fieldwork, which involved data collection through semistructured interviews. I ensured data saturation in my data collection process. I also confirmed that my research participants' selection was through reliable trade organizations such as the plastic manufacturers' association and chambers of commerce, including plastic recycling businesses.

Participants

Research participants must meet an eligibility requirement based on established selection criteria (Fernández et al., 2018; Malesela, 2020). The research participants for the study worked at small or medium-scale plastic recycling businesses that have been in business for at least 5 years. The business owners were managing directors in plastic recycling plants with work experience of no less than 5 years and at least 25 years of age. The managing directors are strategic decision makers in the plastic recycling business.

The plastic recycling plants should also have an established supply chain for sourcing plastic waste and clients to sell their recycled products.

A researcher uses many strategies to gain access to participants and ensure successful data collection during the project's fieldwork phase (Peltoniemi & Suomi, 2019; Sharafizad, 2018). I selected my research participants from the chambers of commerce and industry for plastic recycling companies in Nigeria, then narrowed down the regions to southwest Nigeria. Akinso (2018) and Townsend (2019) also used similar research approaches to access their participants. I also searched for a plastic manufacturing association for plastic recycling businesses that meet small and medium-scale recycling businesses. Furthermore, my strategy to reach research participants was through emails and phone calls. I used the emails to send consent forms to the research participants, who gave their consent for interviews through emails. I scheduled interviews with my research participants according to my interview protocol. I similarly selected plastic recycling businesses based on publications, Facebook, and internet search providing information about plastic recycling businesses applying innovative strategies in plastic recycling.

Research Method and Design

Research Method

Research methods are the strategies, processes, or techniques used to collect data or evidence for analysis to uncover new information or create a better understanding of a topic (Strijker et al., 2020). The research methods available to a researcher are qualitative, quantitative, and mixed methods (Huyler & McGill, 2019). One main reason

for choosing a qualitative method is that there is no rich data on the practices of plastic recycling businesses and the strategies used by their business owners to improve profitability in Nigeria. Therefore, through this research, I sought the strategies used by business managers to improve the plastic recycling business's profitability to provide rich contextual data that otherwise would not be provided by a quantitative method. Busetto et al. (2020) used the qualitative approach to research how to use and assess qualitative methods. Ingram et al. (2019) also used qualitative methods to assess the integration of a health promotion intervention into primary care to reduce cardiovascular disease risk among underserved populations with diabetes in Sonora, Mexico.

A qualitative method was more aligned with the research question: What strategies do small business managers in plastic recycling businesses use to improve their profitability? A strategy is an approach used to achieve the desired result. Thus, a qualitative method was the best way to understand business managers' real-life phenomena in making strategic decisions to improve the recycling business's profitability.

Researchers use the qualitative method to apply inductive inference and known premises to develop untested conclusions (Azungah, 2018). Qualitative researchers use data collection to explore a phenomenon, identify themes, and create a conceptual framework. The research philosophy can be pragmatism (Clarke & Visser, 2019). The researcher starts with the problem and aims to contribute practical solutions that inform future researchers (Saunders et al., 2019). Additionally, qualitative research is realistic since qualitative researchers explore the phenomena in natural settings. Therefore, the

qualitative method was the most suited for my research because it aligned with the research question and the phenomenon intended for the study: the strategies used by small plastic recycling business owners to improve profitability.

A quantitative researcher uses empirical data to support or disprove a theory (Al Busaidi, 2020). The quantitative method consists of independent variables and dependent variables. The researcher distributes questionnaires by the determined sample size in some quantitative research. The researcher must develop the questionnaires on the independent and dependent variables. The researcher then extracts the data from collected questionnaires and analyzes the data using tools like SPSS to establish a relationship between the independent and dependent variables. I did not choose the quantitative research method because empirical data does not address my research question, which requires rich data on what strategies business owners use to improve plastic recycling businesses' profitability. The mixed method consists of qualitative and quantitative research methods (Ramlo, 2020). Using the mixed method, the researcher combines empirical and rich textual data. However, my research objective did not require combining rich data with numeric data to explain the phenomenon to be studied.

Research Design

There are many different qualitative research designs that a researcher can use. Common qualitative research designs include case studies, narrative, ethnography, and phenomenology (Tomaszewski et al., 2020). A case study is an in-depth inquiry into a topic or phenomenon in a real-life setting (Chowdhury et al., 2020). I used the case study design to research strategies that small business managers use to increase profitability.

The researcher can use a case study inductively or deductively. A case study can be exploratory, explanatory, or descriptive (Saunders et al., 2019). I selected the exploratory case study design for this study.

A case study can have a single case or multiple case studies. Researchers select multiple case studies to ascertain if the researcher can replicate findings across cases (Yin, 2018). A researcher using a case study captures the case's complexity and changes over time. It addresses the contextual and the conditions that interact with the case. A case study can explain how a planned intervention or ongoing initiative functions. Additionally, in a case study, the researcher must triangulate evidence from multiple data types (e.g., interviews and documentation) to confirm and collaborate findings (Yin, 2018). Consequently, I used the multiple case study approach because I wanted to collect rich data, and a multiple case study enabled me to achieve data saturation.

There are other qualitative research designs, including (a) ethnography, (b) narrative, and (c) phenomenology. Ethnography entails studying cultures or the group's social world (Saunders et al., 2019). Ethnography is the written account of people or an ethnic group. Researchers using an ethnographic design implement a more interpretive and naturalist focus by studying the people's language to write up cultural accounts (Kian & Beach, 2019; Saunders et al., 2019). The ethnographic design is time consuming, and the researcher's involvement is intense because he has to do some grounding with this approach (Saunders et al., 2019). Therefore, I did not use ethnography because I am not studying people's cultures or their social work but exploring strategies to improve the profitability of plastic recycling businesses.

The narrative design involves storytelling and a personal account that interprets an event or sequence. Researchers using narrative inquiry seek to preserve chronological connections and sequence events as the narrator tells (Saunders et al., 2019). A narrative case study allows a researcher to analyze the linkages and relationships naturally and socially constructive explanations to understand people's complex processes and make sense of their organizational realities (Nowak-Dziemianowicz, 2020; Saunders et al., 2019). The narrative design is generally associated with small purposive samples because of its intensive and time-consuming nature (Saunders et al., 2019). It is likely to generate large amounts of data from interview scripts and observational notes (Saunders et al., 2019). Thus, I did not use the narrative case study because I researched a personal account of the events' sequence and the chronological linkages to these events.

The phenomenological research design focuses on the participants' lived experiences and is a strand of interpretivism philosophy (Sweet & Parker, 2019). The research design also focuses on participants' lived experiences and recollections and interpretations of those experiences (Saunders et al., 2019). Phenomenological researchers are also concerned with generating meaning and gaining insight into those phenomena. Ceylan and Çetinkaya (2020) used phenomenology for their medical research on maternity nurses' views on barriers to early breastfeeding initiation. The focus of the study is on lived experiences of mothers breastfeeding their babies. Tugce and Demirkaya (2020) used phenomenology for their academic research on the role and importance of social studies in gifted students' education. The focus of the study was on the lived experiences of talented students in their education. Hence, I did not use

phenomenology because I am not researching the participants' lived experiences, which is common in the social and health sciences.

Data saturation occurs when a researcher's analysis of additional data collected from a new participant does not change the researcher's understanding of the phenomenon (Tran et al., 2017). I ensured data saturation by collecting data until the information was repeated (see Yazdani et al., 2020). Consequently, I used multiple case studies to triangulate themes across different case studies and determine when there is a repetition of data (see Saunders et al., 2019; Smith, 2018). I coded my data, member-checked with the participants on the research interpretations, and shared my feedback. Additionally, I adhered to an interview protocol to guarantee the collection of relevant information to the research question. These techniques can help the data collection process reach saturation (Lowe et al., 2018; Saunders et al., 2019). I knew I had reached data saturation when the analysis of data collected from a new participant added no new information to the strategies used by business owners to improve the profitability of their recycling business.

Population and Sampling

There are more than 100 plastic recycling businesses in Nigeria. However, statistics on the number of plastic recycling businesses are not readily available. Townsend (2019) used a multicase study of six waste management businesses to study leadership strategies to reduce operational costs in Liberia's waste management businesses. Similarly, Akinso (2018) used a multiple case study of three soy processing entrepreneurs to research the successful strategies for the survival of business owners in

Nigeria. Therefore, the sample size for this exploratory, multiple case study consisted of nine small plastic recycling businesses in southwest Nigeria. I selected the southwest of Nigeria because it has a larger concentration of plastic recycling businesses. In addition, the southwest of Nigeria is one of the manufacturing hubs of Nigeria. The criteria for selection of the participants were (a) business owners of plastic recycling plants, (b) have a work experience of no less than 5 years, (c) at least 25 years of age, and (d) strategic decision makers in the plastic recycling business. The plastic recycling plants had an established supply chain for sourcing plastic waste and clients to sell their recycled products.

Saunders et al. (2019) used many nonprobability sampling techniques: quota sampling, purposive sampling, volunteer sampling, and haphazard sampling. Quota sampling is a nonrandom sampling technique mainly using structured interviews as a survey strategy (Saunders et al., 2019). Researchers use this sampling technique for typically large sample sizes that necessitate the population's division and calculated quota for each group. Purposive sampling is a technique where the researcher uses his judgment to select cases that best answer the research question (Basri et al., 2020; Saunders et al., 2019).

There are different types of purposive sampling. The type of purposive sampling can be the extreme case, heterogeneous case, homogenous case, critical case, typical case, and theoretical case (Saunders et al., 2019). Researchers use purposive sampling normally for small sample sizes, where they can select informative cases. Volunteer sampling techniques have to do with the participants' volunteering, called a snowball

sampling technique, or where the participants volunteer themselves, called a self-selection volunteer sampling technique (Mattalia et al., 2020). The haphazard sampling technique involves selecting the participant haphazardly because they are available, not based on any organizational principles regarding the research question. The haphazard sampling technique is known as the convenience sampling technique. Olorunshola (2019) used purposive sampling for two similar small maritime businesses to study small business sustainability strategies in the maritime industry in Lagos, Nigeria. The relevance of this study is that I conducted my study in a similar location in Nigeria. Thus, purposive sampling could also apply to my study. Likewise, Seid (2020) used nonprobability purposive sampling to research strategies for sustaining minority-owned small businesses. Hence, I used the nonprobability purposive homogenous sampling technique for my research. The purposive homogenous sampling technique is useful for an in-depth focus research type, has reasonable costs associated with its use, and the researcher specifies the selection criteria.

Data saturation is when the researcher experiences no new data in the collected data, and there is a repetition of information in the collected data (Guest et al., 2020; Lowe et al., 2018). No new theme emerges from the data collection process (Lowe et al., 2018). By using a multicase study, a researcher ensures that he can achieve data saturation by comparing data for homogenous case studies of plastic recycling businesses. Using techniques such as member checking improved the data's quality and enabled the researcher to achieve data saturation. Additionally, I used field notes from my semistructured interviews. Also, strict adherence to the interview protocol ensured

that I asked the interviewees the same questions. The information provided by participants at the interview sessions allowed me to conduct methodological triangulation. Data saturation can be thematic or theoretical (see Carmichael & Cunningham, 2017; Guest et al., 2020; Lowe et al., 2018). Townsend (2019) used a thematic data saturation technique to research leadership strategies for reducing operational costs in waste management businesses in Liberia. Shirley et al. (2018) used thematic saturation to study cessation-related information, motivation, and behavioral skills in smokers living with HIV. Consequently, I used thematic saturation for my research, member checking, field notes, and the use of semistructured interviews to address my research question.

Ethical Research

The informed consent process involves the participant accepting the informed consent form in Appendix D and listed in the study's table of content. I requested informed consent through email or a signed consent form for a face-to-face interview. I explained to the participant that his participation was voluntary and that he could withdraw at any stage. I explained to the participant that his involvement contributes to the existing body of knowledge on plastic recycling in Nigeria. I also let him know that the interview sessions take about 30 minutes of his time to answer interview questions. Also, I sent the interview question to him before the interview date. Van Nuil et al. (2020) found five themes associated with the consent process in clinical studies, and they are (a) words and regulation, (b) reimbursement, suspicions, and joining, and (c)

responsibilities. Finally, I delivered the participants' consent form after receiving IRB approval and an IRB number.

Before I commenced the fieldwork, which consisted of getting signed consent forms and interviewing participants, I received my IRB approval number 10-18-21-10024367 from Walden University. The IRB approval meant that I had the approval to interview participants. The IRB approval also implies that I am committed to following ethical interview guidelines found in the Belmont Report (Office of Human Research Protections, 1979).

I let the participants know they are at liberty to withdraw from an interview. Whenever they felt they could not continue the interview, the participant indicated they were no longer willing to participate, and I terminated the interview. I also let them know there is no penalty for deciding not to continue. Likewise, I informed them they had privacy and would make their own decisions.

I did not provide any incentive or compensation for participating in the study. I did not offer any incentive to the participant because this is a qualitative study where the participant is known. An incentive, such as a cash gift, to participate may violate the Belmont Report's principles (Office of Human Research Protections, 1979). However, I informed the participants that I would share the findings of my study with them.

The guiding ethical document for researchers is the Belmont Report (Office of Human Research Protections, 1979). This document bounds the researcher to treat participants in research with justice, respect, and beneficence. I treated my participant with respect and ensured the transparency and integrity of all participants. I did not

coerce them into participating in the study or give a false impression of any direct or indirect benefits from participating in the research.

I stored my participants' interview data in a home safe for 5 years to protect my participants' rights. My final document included the final Walden IRB number 10-18-21-1004367. Also, the study document did not include the participants' names or other information to identify the individual or his organization. I used codes to identify the participants, such as P1, P2, P3, P4, and P5. I used codes to identify their businesses, such as B1, B2, B3, B4, and B5.

Data Collection Instruments

I am the primary collection instrument for my research. Qualitative data collection instruments are the mediums through which the researcher answers the research question (Saunders et al., 2019). The participant answers the research question through structured, semistructured, or nonstructured interviews. Researchers for rich, in-depth data favor semistructured interviews. Structured interviews are used mainly for survey research, where the same questions are in a standardized format (Saunders et al., 2019). For example, Cheung et al. (2018) used a semistructured interview to study the train-the-trainer design for green ambassadors in an environmental education program on plastic waste recycling. Nascimento et al. (2019) used semistructured interviews for their study on exploring industry 4.0 technologies to enable circular economy practices in a manufacturing context. Similarly, I used semistructured interviews (see Appendix A and Appendix B) to collect data on the research strategies business owners of plastic recycling businesses use to improve profitability.

To improve this study's reliability and validity, I sent the final report of my findings to the participants to review and verify that the results were correct. I also triangulated data across different cases, cross-checking my field notes and audio recordings. Hamilton (2020) used member checking, triangulation, and peer review in his research on rigor in qualitative research, evaluating strategies among underrepresented rural communities. I reduced bias in the interview process by adhering to the interview protocol. I also utilized peer reviews of my study to improve the study's reliability and validity.

Data Collection Technique

My research question is, what strategies do small business managers in the plastic recycling industry use to improve profitability? Ssemugabo et al. (2020) used semistructured interviews in their study on household solid waste management status in Kuala Lumpur, Kenya. Similarly, to address my research question, I used semistructured interviews. I was the primary data collection instrument for my research. Participants provided answers to the research question through interview questions. I did not collect secondary data from the participants on the company's sales and revenue, business plans, and annual reports because they are unreliable for small businesses in Nigeria. Johnson et al. (2018) used an interview protocol for their study on estimating on-farm food loss at the field level. Similarly, I followed the interview protocol in Appendix A.

I ensured that interviews occurred in a quiet place with a door and were free of distraction, where my participant could be at ease. Saunders et al. (2019) recommended that a researcher conduct interviews with participants in an office free of distraction. I

scheduled the interviews conveniently for the participant. The interviews took no longer than 30 min. Before the interview occurred, the participant provided a signed consent form indicating a willingness to participate in the interview. I briefed the participant on his right to leave the interview at any time with no penalty. I maintained eye contact with the participant throughout the interview and used open-ended and follow-up questions. I employed interview skills such as shifting focus to come back to the question.

The advantages of using semistructured interviews are getting rich data that the researcher can analyze for themes and carry out coding. With the additional information gathered on the business, the researcher can ascertain the business's financial state and the length of time the company has been in operation. The disadvantage of this data collection technique is that the participants may not be factual in their responses to the interview questions. The company can also exaggerate documents such as annual reports to show higher profits than realized.

I protected my participants' confidentiality by ensuring that I did not include their names in my study. I used codes for the participants. I followed a checklist in my interview protocol, such as ensuring that my recording device was working and having a backup recorder in case of failure. I confirmed that I had a journal for the interview to capture the participants' body language. Nation et al. (2020) used the member checking technique to validate data in their research on improving water resilience through environmental education. Similarly, I member checked the summary of the transcribed interviews with the participants for correctness.

Data Organization Technique

Audio recordings are part of the collected data to study intensive triangulation of qualitative research and quantitative data to improve recruitment to randomized trials (Rooshenas et al., 2019). Lusambili et al. (2020) identified audio recordings as part of their research on disrespectful maternity care in Kenya. Consequently, the electronic data collected from my interview included transcribed audio recordings of my semistructured interviews. I used reflective journals and labeling to keep track of records. The labeling system involves using the codes for the participants and dates to save electronic copies of Microsoft word and excel files of transcribed scripts. The electronic copy of interview data was password-protected, such as field notes, summarized transcribed interviews in Excel, and transcribed interview notes in Microsoft Word. I stored the electronic data in an external hard disk, which I kept in a dedicated home safe. After 5 years, I will destroy the external hard disk.

Data Analysis

The researcher can view data analysis as the process of giving meaning to the collected data (Yin, 2018). A qualitative researcher carries out data analysis using the triangulation approach. Data triangulation consists of four different types: Data triangulation, investigator triangulation, theory triangulation, and methodological triangulation (Abdalla et al., 2018; Yin, 2018). Data triangulation is used by the research when there are multiple data sources (Saunders et al., 2019). The researcher uses theory triangulation when the data analysis is for different views of the same data set (Yin, 2018). The investigator triangulation involves analyzing data sets from different

evaluators (Yin, 2018). The researcher uses methodological triangulation to explore the various case study methods, such as transcribed participants' responses, open-ended questions, field notes, observations, and secondary data (Yin, 2018).

A researcher can use methodological triangulation to confirm findings, increase validity and enhance understanding of studied phenomena (Saunders et al., 2019; Yin, 2018)). In the methodological triangulation used by Nwanna-Nzewunwa et al. (2019), they compare and contrast information obtained using the surgeon overseas' personnel infrastructure procedure equipment and supplies (PIPES) tool with information obtained simultaneously via three other methods: time and motion study (T&M); provider focus group discussions (FGDs); and a retrospective review of hospital records. Through qualitative data analysis, Walton et al. (2020) used methodological triangulation to develop a unidimensional abbreviated version of the pain catastrophizing scale (PCS). Similarly, I used methodological triangulation for my qualitative research on the strategies business owners of small plastic recycling use to improve profitability.

There are five different steps for the analysis of data: (a) collecting data, (b) grouping data, (c) regrouping data based on themes, (d) evaluating the information, and (e) recognizing emergent themes (Yin, 2018). Birt et al. (2016) recommended using synthesized member checking where participants can cross-check interview data after the interview. The authors posited that this method leads to high-quality research. Similarly, I commenced my data analysis by transcribing my recorded interviews and member checking the summarized transcribed interview responses with the participant to ensure I correctly captured their responses.

The thematic analysis identifies themes from transcribed interviews, field notes, secondary data, and information websites (Saunders et al., 2019; Vaismoradi & Snelgrove, 2019). It involves the researcher coding collected data for themes and patterns based on the research topic (Saunders et al., 2019). P. Navarrete-Hernandez and Navarrete-Hernandez (2018) used thematic analysis to analyze 40 in-depth interviews of waste pickers forming recycling cooperatives in their study of waste pickers. Similarly, I used thematic analysis to analyze company information on the website and audio recordings from semistructured interviews with small plastic recycling business owners.

The next stage is removing redundant data and verbiage that may not provide meaningful information (Saunders et al., 2019). Following this stage is coding the data into themes and subthemes and then grouping the information into respective themes and subthemes (Saunders et al., 2019). The researcher then compares these themes with the conceptual framework to determine the research's findings or conclusions (Saunders et al., 2019; Yin, 2018). Consequently, the final themes and subthemes become the study's findings on completing these processes.

I used the NVivo software version 12 Pro to code, group my data, identify emerging themes, and determine when there are no new themes. Other researchers used the NVivo software successfully in other qualitative research (Hawryluck et al., 2019; Olubiyi et al., 2019). Bergeron and Gaboury (2020) recommended using NVivo for realist evaluations. Additionally, computer-aided software ensured that the data analysis was efficient and there was no error in the data analysis stage. The transcribed interview responses were in Microsoft word and an input file into NVivo software. Likewise, I

extracted secondary information from the company website and put it in a Microsoft Word file used as an input file on NVivo.

Researchers can use thematic grouping systems to identify and categorize themes. Applying a thematic grouping system, Costantino et al. (2108) identified important interagency collaboration features in their study of enablers and barriers to interagency collaboration from senior managers, executive staff perspectives, and social network analysis. Similarly, I created an excel file that identifies and categorizes the different themes. I created a column for all participants summarizing each participant's response to the interview questions in themes. According to my literature review's various themes, I did the references in a theme column named T1, T2, T3, T4, T5, T6, and T7. I linked the themes from participants P1 to P9, such as P1 to T3, P4 to T5, P3 to T1, and P5 to T2. Consequently, I had a thematic grouping system to categorize themes emerging from the data analysis. Furthermore, the thematic grouping system helped create a new theme cell, if needed, from new studies published since writing the proposal.

Reliability and Validity

Reliability is the ability to replicate a study and maintain consistency in the study (Saunders et al., 2019). Validity depends on how accurate the analysis of the results is and if the research findings are generalizable (Saunders et al., 2019). Saunders et al. (2019) stated that reliability and validity are essential in qualitative research for making judgments about the research. Reliability is when a researcher can demonstrate that other researchers achieved similar results by repeating the data collection process (Yin, 2018).

Therefore reliability means that another researcher can replicate my study and that I maintained consistency in my study.

Reliability

Dependability. An alternative quality criterion for reliability is dependability (Saunders et al., 2019). Dependability involves capturing all changes to produce reliable research that other researchers can understand and evaluate (Saunders et al., 2019). Raskind et al. (2019) used a triangulation, member checking, and interview guide to verify their study's reliability in analyzing qualitative data analysis practices in health behavior research and education. Similarly, I ensured the dependability of my study by member checking of data interpretation, transcript review, pilot test, interview questions validated by experts, interview protocol, participant observation protocol, data evidence, and developing a study database (Saunders et al., 2019; Trochim, 2020; Yin, 2018). I also achieved data saturation to ensure the dependability of the findings.

Validity

Qualitative study validity denotes my findings' credibility, transferability, and confirmability (Saunders et al., 2019; Yin, 2018). Additionally, I achieved data saturation in my study to ensure the findings' credibility, transferability, and confirmability.

Credibility. The credibility criteria involve establishing that qualitative research results are credible or believable from the participant's perspective in the research (Saunders et al., 2019). Credibility is an alternative quality criterion for internal validity (Saunders et al., 2019). The main emphasis is to ensure that the participant agrees that the collected data represents the information he provided through the semistructured

interview (Saunders et al., 2019). Raskind et al. (2019) used a triangulation, member checking, and interview guide to verify their study's credibility in reviewing qualitative data analysis practices in health education and health behavior research. Similarly, I ensured credibility in this study by using member checking, triangulation, peer debriefing, data, analysis, rigor, and participants' interpretations.

Transferability. Transferability refers to how qualitative research results can be generalized or transferred to other contexts or settings (Trochim, 2020). Transformability is an alternative quality criterion for external validity (Saunders et al., 2019). I ensured transferability in this study by providing a detailed description of my research questions, design, context, findings, and interpretations. I also ensured transferability by adhering to the research design's data collection and analysis techniques, interview protocol, participant observation protocol, and data saturation.

Confirmability. Confirmability involves corroborating or confirming results with peers and researchers (Trochim, 2020). To ensure confirmability in this study, I searched for and described negative instances that contradict prior observations (Trochim, 2020). Ellis (2019) recommended an audit trail to strengthen the confirmability of qualitative research. Consequently, I performed a data audit to examine, analyze, eliminate bias, and lead sound judgments. I also asked probing questions during interviews, questioning from different perspectives and triangulating to enhance confirmability.

Data Saturation. I ensured I reached data saturation using member checking of participants' interview scripts and data triangulation. Member checking on my participants entails my calling them back to clarify these responses to summarized

transcribed interview scripts. I interviewed as many participants as needed to reach data saturation. I defined a target sample for five. However, I reached data saturation after nine participants. Yin (2018) stated that data triangulation reinforces the case study's construct validity by creating evidence that converges. Also, Yin (2018) posited that many sources provide a comparative analysis of the same phenomenon. I used multiple data sources and approaches to analyze data, ensuring that I achieved data saturation.

Transition and Summary

Section 2 contains information on the purpose statement, role of the researcher, participants, research method, research design, population and sampling, ethical research, data collection instruments, data collection technique, data organization technique, data analysis, and reliability and validity assessment. In Section 3, I discussed the presented findings, application to professional practice, implications for social change, recommendations for action, recommendations for further research, reflections, and conclusion of the study.

Section 3: Application to Professional Practice and Implications for Change

The purpose of this qualitative multiple case study was to explore strategies small business owners in plastic recycling businesses use to improve profitability. I conducted semistructured interviews with nine participants who had at least 5 years of work experience in implementing strategies to improve the profitability of their plastic recycling business. The data collection process included semistructured interviews and transcribing and coding the recorded interviews. I used the interview protocol and member checking in the field study phase. I then analyzed the data using the NVivo 12 software. I did methodological triangulation with company websites, information of businesses on the internet, such as company Facebook and Instagram sites, and business information in the chambers of commerce and corporate affairs commission. The data triangulation showed that the information provided by the participants was correct. Most participants did not offer company annual reports, business plans, or sales reports. From the data analysis, three themes emerged: (a) strategies for sourcing plastic waste, (b) strategies for managing workers, and (c) business strategies.

Presentation of Findings

One research question guided this doctoral qualitative study: What strategies do small business owners in the plastic recycling industry use to improve profitability? The participants of this study shared experiences of what they are doing successfully to improve the profitability of their plastic recycling business. Some participants are involved in the full value chain of plastic recycling, consisting of plastic waste collection, separating plastic waste, washing, crushing, baling into units, treating the plastic waste,

pelletizing, and producing recycled plastic products. Fifty-six percent of the nine participants produce and sell plastic recycled products. Forty-four percent of the nine participants collect plastic waste, separate the plastic, wash, crush, bale it into units, and sell or export it to plastic manufacturers or plastic recycling businesses.

The nine participants were business owners of plastic recycling businesses. The participants were eligible to participate because they had been in business for more than 5 years and had successfully implemented strategies to improve the profitability of their plastic recycling business. However, an exception to this was participant P1, who had 4 years experience but was included in my target sample because he had achieved considerable success in his plastic recycling business in less than 5 years. Participant P1 also possessed a master's degree in international business and management from the United Kingdom and was a suitable participant for the study. P1 also exports plastic waste out of Nigeria. The interview duration was from 12-20 min. Data saturation occurred after interviewing the ninth participant when there were no new themes or information to be gained.

The threshold for a major theme was 65%, and the threshold for a minor theme was 30%. From the data analysis, three major themes emerged: (a) strategies for sourcing plastic waste, (b) strategies for managing workers, and (c) business strategies. Seventy-eight percent of the respondents brought up the major theme of strategies for sourcing plastic waste, 56% brought up the point on the subtheme of plastic waste collection, and 33% mentioned the subtheme of processing and transporting plastic waste. Sixty-seven percent of the respondents brought up the major theme of strategies for managing

workers, 33% brought up the point on the subtheme of training, and 44% mentioned the subtheme of motivation. One hundred percent of the respondents discussed the major theme of business strategies, 56% mentioned machines and technology, 44% talked about periodic business reviews, and 33% discussed marketing subthemes.

Theme 1: Sourcing Quality Plastic Waste is a Challenge

Seventy-eight percent of the participants talked about the major theme of strategies for sourcing plastic waste to improve the profitability of their plastic recycling business. Plastic waste is the main raw material for plastic recycling. The disposal of plastic waste in the environment is harmful because plastic does not degrade. The life span for plastic degradation is at least 500 years (Priya et al., 2022). Even though plastic waste is available, collecting it as a raw material has inherent challenges. Collection and disposal centers are well established in developed western nations. These facilities are not available in developing countries such as Nigeria. Aikowe and Mazancová (2021) found that policymakers in Nigeria need to introduce waste segregation management practices such as recycling bins in a Nigerian university and campaigns for waste sorting and recycling activities. The university researchers' findings reflect a microcosm of the underdeveloped collection centers in Nigeria. The plastic recycler has to set up a collection system for the plastic waste that the plastic recycling business will use, which mainly involves transporting plastic waste to the location of the plastic recycling business. The research findings show that how plastic recyclers source, handles, transport, and process plastic waste has a lot to do with the improved profitability of their plastic recycling business. Table 1 provides all interviews' key terms relating to strategies

for sourcing plastic waste. Combined, the frequency of terms referring to strategies for sourcing plastic waste equaled 28.48% of all the participants' responses.

Table 1

Participant References to Strategies for Sourcing Plastic Waste

Reference	Frequency	Weighted percentage	Similar Words
collection	21	5.54	aggregation, collection, gather
raw	19	5.01	material, materials, plastic waste
waste	17	4.48	trash, plates, PET, PEP, PPT, PP, PVC
buying	14	3.69	buy, suppliers, free, cheap, cheaper
bottles	13	3.43	bottle, bottles, water, drinks
baling	10	2.64	bales, units, pack, compact
transportation	10	2.38	transport, truck, vehicles
segregation	5	1.31	segregation, separation, components, types

Plastic Waste Collection

Fifty-six percent of the nine participants discussed their strategies to source their plastic waste to acquire cheap plastic waste. Satapathy (2017) identified sourcing quality plastic waste as one of the key challenges for plastic recycling businesses. Table 2 provides all interviews' key terms relating to plastic waste collection. Combined, the frequency of terms referring to plastic waste collection equaled 17.68% of all the participants' responses.

Table 2*Participant References to Subtheme Plastic Waste Collection*

Reference	Frequency	Weighted percentage	Similar Words
collection	19	6.11	collection, gather, sourcing
bottles	9	2.89	bottle, bottles
material	7	2.25	raw, materials
competition	5	1.61	challenge, competitive
buying	5	1.61	buy, buying
PET	4	1.29	PET, PVC
free	3	0.96	free, loose
cheap	3	0.96	cheap

P1 established collection centers at different locations, ensuring his plastic recycling business has cheap plastic waste. P1 captured the importance of collecting plastic waste so that it is readily available at a cheap cost:

Basically, where the problem is in the collection, the collection is not done much. So, to improve your profitability, you have to focus on the collection aspect of your business. So, you have to really focus on the collection, so you have to invest in the collection, because if you have your own collection, then you have the raw material. And that means profitability too is quite stable. So, the area of focus where we pay so much attention is the collection. So, if you really want to improve the profitability, I will say the strategy is to focus on your collection.

P2 used a synergy with his waste management company to acquire free plastic waste:

So then, if you spend your money on getting raw materials, then your profitability will not be high. So, we do not buy them. What we do is we are also into waste management, so in all our clients, once we pick their waste, we do waste

segregation. We sort out their plastics and aluminum cans from the source, then bind them separately and keep them.

P6 buttressed this same approach of sourcing free or cheap plastic waste:

So that is what we use now, so if we buy some from the factories, we can do two runs, and he packs up to a tonne, or someone says come to my house and come and pick up the plastics, and he goes and picks it up. But like I said, finding more people that are not looking for incentives, or maybe cash, then cheaper incentives, ultimately getting the products for free and now investing in logistics and manpower, is more like the major reason for getting some profit.

The interview responses from participants P1, P2, and P6 show that business owners must be innovative about collecting plastic waste for the recycling business. The cheaper a business owner can source plastic waste, the lower their business expenses and the more profits they can generate. Plastic recyclers collect waste by purchasing good quality plastic waste. They process the waste through separation, washing, and shredding and then sell it to plastic manufacturers or full-scale plastic recycling businesses. Therefore, the strategies used by the participants improved the profitability of their plastic recycling business by lowering the business expenses for purchasing plastic waste.

Additionally, only participant P6 discussed social entrepreneurship as a strategy where the business owner identifies a social need and finds a way to solve this need. Palacios-Marqués et al. (2019) found that distinctive marketing competencies mediate the relationship between the degree of implementation of social entrepreneurship and organizational performance. P6 commented that they educate people about waste disposal

and the harm to the environment and teach them about separating plastic waste.

Participant P6 said that when she renders this kind of service to the environment, they can collect plastic waste-free from the community.

But I think the first thing is to be a social entrepreneur. If you seek more as a social entrepreneur and focus more on what you give to the community, that works out better. Also, if I had to start all over, I would do it differently. I will go to the different neighborhoods. Though we were doing that and educating them, I think self-regulation of encouraging people to separate their waste in their homes and finding as many people that are not looking for incentives that buy into your business model. So, you will literally be spending money on logistics and buying fuel for the truck.

P9 used a verification process for the quality of supplied plastic waste and assigned a percentage purity to what they received from the supplier, then paid the suppliers based on the purity and weight of the plastic.

First of all, you have to know the materials you take. Because some of them that you are bringing from the dump, the strategy they use there is they pick a lot of impurities. So, they put a lot of PVCs that add weight to the product. So, when you take it, let's assume they give you 3 tonnes, and the impurities inside the raw material might be almost one-third. So, if you do not calculate well and remove the right percentage you are supposed to remove, you automatically have a loss. You will lose. So, you have to check the product they gave to you, analyze it very

well, and put your percentage very well. With those strategies, you are able to increase and make your profits.

P7 stated that the main strategy of plastic recycling is sourcing the plastic waste cheap:

You know the key raw material is recycled waste, right. So the main strategy to get profitable is to get that raw material, recycled waste, which is either plastic, nylon, or whatever it is very cheap. Because that determines how much you will make from it. If you get the material expensive, with the market value, the recycling and end product and end-users might not be able to buy the product because it will be very expensive. So, the key strategy is the raw materials, recycled plastics, and waste, which is a bit cheaper.

Once more, participants P6, P7, and P9 demonstrate that the business owner must be innovative in the strategies they deploy to acquire cheap and quality plastic waste. No business wants to lose money paying for waste that has impurities, and no business owner wants to incur high business expenses collecting plastic waste because impure plastic waste or expensive plastic waste will erode business profits. Consequently, a plastic recycling business owner must have an effective strategy that ensures that they purchase quality and cheap quality waste, as shared by participants P6, P7, and P9.

Processing and Transporting Plastic Waste

Thirty-three percent of the nine participants discussed their strategies to process and transport their plastic waste to reduce treatment and transportation costs. Whatever treatment or processing the plastic recycler applies to the plastic waste improves the quality or characteristics of the plastic waste. Suppose the plastic recycler can separate

the impurities from the plastic waste at the source. In that case, the plastic recycler reduces the work workers do in the factory to filter the impurities from the plastic waste. If the particle sizes of plastic waste fractions were standardized, the preprocessors could minimize their transport costs, and recyclers could avoid fine particles and shredder steps (Maisel et al., 2020). Also, suppose the plastic recycler can separate the plastic into the different types of waste streams at the source. It follows that he reduces workers' separation in the plastic recycling factory. Dijkgraaf and Gradus (2020) found that in the Netherlands, the combination of post separation of plastic and unit-based pricing has an insignificantly small price effect on plastic waste. However, this may be because the separation of plastic waste in the Netherlands is high compared with developing countries (see Dijkgraaf and Gradus, 2020). Hence, processing plastic waste at the source improves profitability by reducing the expenses the plastic recycling business will incur in processing and treating the plastic waste in the factory.

Similarly, if the plastic waste is washed and shredded into small cuttings, it adds to the value of the plastic waste (see Cioca et al., 2018; Maisel et al., 2020). Therefore, the purified plastic waste, separated into the different waste streams, and compacted into unit bales, attracts more cost than plastic waste, which has not undergone any plastic waste treatment process. Table 3 provides key terms relating to the processing and transportation of all interviews. Combined, the frequency of terms referring to processing and transporting plastic waste equaled 33.81% of all the participants' responses.

Table 3*Participant References to Subtheme Processing and Transporting Plastic Waste*

Reference	Frequency	Weighted percentage	Similar Words
baling	5	7.35	bales, baling
transportation	4	5.88	transport, transportation
suppliers	3	4.41	suppliers
waste	3	4.41	waste
aggregating	2	2.94	aggregating, aggregation, mix
load	2	2.94	load, lot
quantities	2	2.94	quantities
segregation	2	2.94	segregation, separation

P3 stated that plastic waste recyclers transporting their plastic waste must aggregate and compact the waste in baling units to reduce the transportation volume space. By compressing the plastic waste, the recycler maximizes the amount of plastic waste that can be transported per trip, thereby reducing the cost spent on transportation:

We deal on PPT. And then the transportation, how you transport your raw material, which is the waste bottle makes a lot of sense in your profitability. If you, because it is bulky stuff, so if you do not compact it into baling units, to aggregate the weight, into a very good weight, you might load one tonne of PET bottles in the entire truck, truckload, because it's very massive in terms of space, which amounts to nothing. So, aggregation where baling is a way to achieve big quantities with lower transportation. You need to have your raw materials compacted into baling units into bales, so you will be able to load enough quantities inside the truck before delivering it to your site. That is one way you

can maximize profitability, having control over cheaper transportation by aggregating and baling your plastics into bales.

Furthermore, P4 captured the subtheme of processing the waste plastic, saying it is going to be a lot more expensive to transport nonprocessed plastic waste:

So, the people that are collecting these plastics are collecting them together. And what we need is just one of the components, which is polypropylene, PP. And the first thing we try to do is to ensure that the suppliers know what we need and that they do proper segregation to ensure that what they bring to us is what we need. Unfortunately, they have to crush the plastic before they bring it to us because it is going to be a lot more expensive for them to bring it as it is, because of the transportation and all that. So, we try as much as possible to encourage them to bring exactly, what we need, one way or another, so we don't need to do too much work.

P4 also provided clarification on the need to separate waste and transport your plastic waste:

Then we also have our vehicles that go to get these materials from wherever they are and anytime when they are available. Once you depend on people supplying your vehicles, maybe the time you need to get a vehicle, the vehicle may not be available, or the driver may not be willing to go to wherever you need, could be inside the bush and all that. And then the waste minimization, like I said, the suppliers are supposed to do proper segregation, and sometimes they do not do that. Sometimes even some of the suppliers deliberately add some unusable waste

because there is some waste that you hardly find any use for. Some of the plastic they don't have a need for it. Some of them stuff the supplies because you buy based on tonnage. You weigh whatever is being supplied to you. So, if you are not careful, you have taken may be up to 45%, 60% of waste these things are not useable to you, and then you end up with waste that you have to find a way of managing. We also try to recover because, in the process of our own, we have to do our own processes, we have to separate, to ensure that we have the right kind of material, so we need to do our separation by washing or whatever method we chose to use, but in the process of doing this separation, we also need some of your waste, some of your real material into the waste, so we need to do recovery of some of the material you can get from the waste, what it is supposed to be, our supposed waste before we get to the final one that we are going to dispose of.

These are some of the ways we try to improve our profitability.

Participant P9 mentioned that bulk buying is another way to improve your profitability.

Instead of buying the plastic waste in small quantities, which will cost more transportation, it is better to buy in bulk:

To add to what he is saying, the secret of this business is bulk buying. Because do you know why I say it is bulk buying? For example, you want to load a certain amount. You pay the same amount for a truck for the distance to go, and supply is to come and bring. It is the same amount you pay when you know the number of materials. Highest when it comes to offloading, maybe the expenses of offloading and everything, highest additional maybe because of the quantity, the additional,

maybe extra 5k or 10k little you add, to the money you add to who will offload.

So, when you deal with bulk, you make lesser expenses in bulk. You spend more money than when you buy bit by bit.

Participant P9 further emphasized that the profitability of the business depends on the separation of impurities at the source:

How I overcame all these things like I told you before, is immediately I discovered the secret of the business, which is these impurities and all the rest. So, now, if I am crushing, I am crushing the rightful material. Then if they bring 10 tons and I crush 10 tons, I know that I will produce 9 tons or 9.5 tonnes or 9.2 tonnes. So, the loss, you will not have any loss at all. This is the key challenge, so the key challenge is to ensure you watch over the product they are bringing you. Once you are able to tighten up that particular area automatically, you will not have any challenges again. You will start making your profit; even though you are there or you are not there, the business will be moving.

In their responses, participants P3, P4, and P9 mentioned that impurities in plastic waste contribute to increased transportation costs by making the plastic waste heavier. Also, when the plastic waste is not properly segregated and shredded into small bits, it increases transportation costs by the volume space it occupies in the trucks. Also, it is better to bulk buy your plastic waste to decrease your transportation cost. Bulk buying will reduce the number of trips you load a truck to your factory by optimizing the loading capacity of the truck. Owning your transportation truck implies that the plastic recycler can access quality and cheap plastic waste from different locations faster, improving

business turnover time. The treatment of plastic waste lowers transportation costs. Reducing transportation costs reduces your business expenses. Sourcing plastic waste locations close to your factory will reduce your transportation costs. Consequently, processing plastic waste and reducing transportation costs improve the profitability of plastic recycling businesses.

Links to the Literature. Satapathy (2017) discovered a shortage of quality plastic waste in the plastic recycling business. Satapathy recommended that waste managers pay attention to the supply chain for plastic waste and clients that generate plastic waste. Most participants mentioned how they sourced plastic waste, as follows: (a) P1 established plastic waste collection centers, (b) P4 and P6 mentioned having their vehicles transport the plastic waste, and (c) P4, P6, and P7 discussed bailing the plastic waste into units to maximize transportation space, and (e) P9 presented bulk buying of plastic waste as a strategy to reduce transportation costs. Also, P9 emphasized the importance of source separation of impurities from plastic waste. Olusunmade et al. (2019) calculated plastic waste's energy potential in Nigeria and recommended that waste recyclers treat plastic waste as a resource. Plastic waste segregation at the source of plastic waste disposal is central to the success of the plastic recycling process (Banks et al., 2020; Chow et al., 2016). Plastic managers must have their recycling plants close to collection centers for plastic waste and handle plastic waste as a resource.

Furthermore, Cioca et al. (2018) found that a mechanical separation facility (MRF) is more advantageous because they bring about more economic benefits by reducing operating costs and improving return on investment (ROI). Standardized

particle sizes of plastic waste fractions can minimize transport costs (Maisel et al., 2020). Some participants mentioned that waste segregation is also key to improving profitability by reducing the plastic recycler's cost to separate the plastic waste into different plastic waste streams and remove impurities. Therefore, separating plastic waste impacts the profitability of a recycling business.

Eriksen et al. (2019) discovered a higher recovery rate with increased source segregation and MRF efficiencies to about 17% of 100% plastic waste. Owojori et al. (2020) recommended using three or more color-coded bins for recyclable, compostable, and trash at the academic and administrative buildings to facilitate recycling and partnering with waste recyclers to collect plastic waste. Zhang et al. (2020) found waste characterization to be an influencing factor of recycling potential. Consequently, existing literature supports the findings that separating plastic waste and processing it, such as washing, compacting, shredding, and transportation, contributes to improved profitability of the plastic recycling business.

Links to the conceptual framework. Corporate entrepreneurship is a construct with many facets and consists of new business venturing, innovativeness, self-renewal, and proactiveness (Boukamcha, 2019). The strategies used by plastic business recyclers based on the theme of sourcing plastic waste show that most business owners exhibited innovation, self-renewal, and proactiveness in collecting and securing a sustainable supply of cheap quality plastic waste. Tănase (2020) found that transformational leadership affects organizational innovation components of creativity, employee voice, and knowledge sharing. Tănase also emphasizes that transformational leadership

positively impacts innovation in any organization by making workers creative. Seventy-eight percent of participants used a different innovative transformational leadership approach to secure their supply of plastic waste. Plastic waste is the major raw material for any plastic recycling business.

For example, P1 established collection centers with collection teams, P6 designed a cage for a self-styled medium-sized truck, and P9 bought plastic waste in bulk to reduce transportation costs. Also, P4 compacts his plastic waste into baling units and segregates and washes the plastic waste at the source. When participant P4 processes at source, the business reduces transportation and separation costs. Hence, most participants exhibited transformational leadership styles of innovation in the subtheme strategies for sourcing plastic waste: plastic waste collection and processing and transportation of plastic waste.

Theme 2: Managing Workers Improves Profitability

Sixty-seven percent of the nine participants addressed the major theme of strategies for managing workers towards improving the profitability of their plastic recycling business. P2 discussed what they do with their staff and how they ensure that their performance leads to the profitability of the plastic recycling business:

Human resources are one of the most challenging aspects of any business. You know, but what we do is we look at those who studied related courses and then bring them in, and then do a kind of training and induction for them. And then what also motivates employees is if you have their interest at heart. So, once in a while, we give bonuses and end-of-year awards to the best staff. We also issue

them job descriptions to ensure they know what they are employed to do and then train them.

Table 4 provides key terms relating to strategies for managing workers for all interviews. Combined, the frequency of terms referring to strategies for managing workers equaled 27.51% of all the participants' responses.

Table 4

Participant References to Strategies for Managing Workers

Reference	Frequency	Weighted percentage	Similar Words
staff	26	9.47	employees, Nigerians, indigenes, people
train	24	6.14	mentor, training, empower, induction
motivate	16	5.47	incentive, motivate, motivation
bonuses	10	4.24	incentive, awards, money, overtime, pocket
loyalty	2	0.73	loyalty
output	2	0.73	output
interest	2	0.73	interest

Training. Thirty-three percent of the nine participants discussed training workers as a strategy to improve the profitability of their business. Training of the staff is a crucial subtheme. The trained staff knows as much as the business owner, so they can make an informed decision to move the company forward. Panagiotakopoulos (2020) found that small business management training positively impacted organizational performance, which translated to increased profitability, improved staff productivity, and low staff turnover. Trained staff also implies that the utilized machinery for the plastic recycling process does not break down due to operator error, costing the company huge amounts of money to repair or replace. Trained staff can also identify the different plastic waste streams, such as PET, PP, and PVC, and ensure proper identification, separation, and

aggregation. Table 5 provides key terms relating to training for all interviews. Combined, the frequency of terms referring to training equaled 35.41% of all the participants' responses.

Table 5

Participant References to Subtheme Training

Reference	Frequency	Weighted percentage	Similar Words
train	12	12.50	train, trained, training
learning	6	6.25	know, learning, teaching
staff	6	6.25	staff, workers
machine	4	4.17	machine, machines
human	2	2.08	human, man
induction	2	2.08	induction
indigenes	1	1.04	indigenes
people	1	1.04	people

P4 mitigates the challenges of workers spoiling sophisticated plastic recycling machinery by training them:

On efficient machines, we try to train our staff very well. In the beginning, for every machine we import, especially these sophisticated ones, we try to get somebody from the manufacturers to man the machine at the onset, then to train our staff very well to ensure that they get the best out of the machines.

Sometimes, we keep the expatriate staff for a long time to make sure that we don't have a situation where the people are deliberately trying to sabotage you.

Participant P7 used training as the main strategy for getting informal plastic waste pickers to supply plastic waste to his business.

Because one thing is that you have to train them and make sure that they are basically trained all the time because plastics have different things. When I first started right, most people were based on PP injection, which is plastic, bucket, basins, and pans. That is what we were buying then. Then nobody knows about the cover, right. Nobody knew that chair was very good then. Chairs were like so anybody you tell to buy chairs was saying no, I do not want cover, and I do not want chairs, they are not PP. So, because of my training and my understanding of plastic recycling, I found out that covers are very good. So, I had to train my staff that they crushed covers differently and buckets, basins, and pans differently. Then as time goes on, I found out that the chairs are very good, and the batteries are very good. So, all these things, I think the most important one is people you train, and you keep on learning, by learning new things, learning different things. Now we find that bottled water can be used for clothes with fiber. So there is so much about plastics that we do not know about, so no matter what you do, you cannot face on one or stay on one because if you stay on one, a lot of people come to you invariably, so you learn different things, you learn different ways and different materials on how to make different materials, how to use it to maximize your profit, so there are a lot of different things. So, another thing is to train your staff, because if your staff does not know what you know, right, then it will be difficult to maximize your profits because they keep on making mistakes all the time. But when they know what you know, you will find out that, basically, it is like a stretch word test.

Participant P7 responded from the point of view of training as continuous learning. Staff training is a continuous process if the business owner expects to get high performance from them. Another facet of training is mentoring. The business owner may not know all the aspects of the business and may need to be mentored by a resource person or expert in plastic recycling. Participant P8 discussed meeting a resource Chinese lady on social media who guided him on the needed machines for plastic recycling:

And basically, I met a Chinese lady who actually helped me a lot. And with the guidance of the machinery part of the business. To be honest, I had no knowledge of any machine before starting out with recycled plastics. So, I met with this Chinese lady, I have never met her up till now in person, but she has helped me a lot with guidance and so many things over WhatsApp. We were just communicating. So she advised me on all the machines to buy, and we took her advice. And then, going to the companies supplying the previous material also opened my eyes, and I now saw many things from there.

It is also good to note that most manufacturers of plastic recycling machines offer training to staff on how to operate their machines. In the case of participant P8, the manufacturer was a Chinese company. The same point of training operators of plastic recycling machines was mentioned earlier by participant P4. Trained staff will make fewer mistakes and cause fewer losses for the company. Trained staff can operate automated machinery that requires high staff literacy. Therefore a trained staff will increase the profitability of a plastic recycling business.

Motivation. Forty-four percent of the nine participants discussed their strategies to motivate workers to improve their business's profitability. Motivation is an essential subtheme to strategies for managing workers because staff needs the motivation to perform at a high level. Noviarita et al. (2021) discovered that leadership discipline, motivation, and wages significantly affect employee performance. The high performance of staff leads to higher profitability for the business. Staff needs to be motivated through end-of-year bonuses, additional pay for meeting certain targets, and the business owners showing individual interests in their personal affairs. Table 6 provides key terms relating to motivation for all interviews. Combined, the frequency of terms referring to motivation equaled 33.81% of all the participants' responses.

Table 6

Participant References to Subtheme Motivation

Reference	Frequency	Weighted percentage	Similar Words
motivate	15	8.28	incentive, motivation, inspire
staff	10	5.92	staff
bonuses	4	1.78	bonuses, incentive, incentives
awards	2	1.18	awards
empower	2	1.18	empower, empowering
loyalty	2	1.18	loyalty
money	2	1.18	money
overtime	1	0.59	overtime

Participant P1 stated that the main motivation for his staff is finance, putting extra money in their pocket:

To be honest, it is just by setting goals, basically by setting goals and having a team, a recruitment team. So, we set goals for them, and then we just physically

add pressure on them and make sure that we achieve these goals. To motivate them to achieve this, we put incentives. We can tell you your target is 100 tonnes this month, and if you do above 100 tonnes, we will give you NGN 2 for every kg supplied or NGN 5 for every kg supplied. So as Nigerians, the main motivator is finance, so once you can put money into the next man's pocket, he will try to do the best that he can do. So, these are the little ways in which we use to set goals for my teams by using incentives to achieve them.

Participant P2 captured this motivation of staff as the end-of-year bonuses:

And then what also motivates employees is if you have their interest at heart. So, once in a while, we give bonuses and end-of-year awards to the best staff.

P4 says that the most effective strategy a plastic recycling business owner can use is a motivated staff:

I think the most effective is staff because you can't do without the staff. If you have problems with physical equipment, that is what you need to work on. If you don't have good staff, you cannot go anywhere. Staff motivation is the most important thing if you have motivated staff prepared to go out of their way to ensure that the operations are working well. Then part of what we do is to pay based on output and not just pay them because they are coming to work. So, if you motivate them, you pay them higher when their output is higher, then they do everything they can do to ensure that they give you the best. So, staff motivation, I think, is the most effective and is at the center of everything that we have discussed.

P5 stated that they implement a recovery plan when they are falling behind in their quarterly targets by motivating staff for higher productivity through incentives:

Sometimes we will be able to recover in the next quarter, you know, by giving some incentive to staff by doing overtime or what have you.

From the responses of P1, P2, P4, and P5, I conclude that motivated staff will increase the profitability of a plastic recycling business by giving a higher output or performance on their jobs. A motivated worker will innovate and commit to the profitability of the business. Motivated workers are less likely to steal from the company, be involved in fraudulent activities, or be unproductive. Motivated staff will deliver more output and are more likely to innovate the business process. Business owners can incentivize workers to deliver more results and find new clients for the business. Therefore, motivated workers bring about increased profits for plastic recycling businesses.

Links to the literature. Faisal et al. (2018) concluded that students could learn recycling behavior using training strategies for K-12 students for plastic recycling entrepreneurship. Nastase et al. (2019) also discovered that waste operators did not want to take the additional financial burden of separating waste because they did not have any incentives. Mattoo et al. (2020) showed that for the disposal of biomedical waste in Pakistan, continuous training or awareness programs were necessary for hospital workers to safely handle and segregate biomedical waste. The literature shows that training and financial motivation are important in recycling plastic waste. Workers in plastic recycling perform better in identifying and separating plastic waste.

Similarly, workers operating plastic recycling machines perform better if trained and motivated. There is less operator error and breakdown of plastic recycling machines, and they are motivated to increase their production of recycled plastic waste. Gerig (2018) found that small business organizations (SBOs) in the participating mortgage organizations succeeded by using continuing education and training, communication and networking, and setting goals and planning effectively. Trained recycling plant operators are empowered to run cutting-edge machines that consume less energy and increase productivity. Advanced machines are automated, and only trained, and literate workers can operate them. Consequently, training and motivation of plastic recycling workers lead to improved business profitability.

Links to the conceptual framework. The fourth aspect of transformational leadership is individualized consideration stimulation (Bass, 1985). A summary of the transformational leadership used by plastic recycling business owners is as follows: participant P4 pays workers based on output and trains his machine operators, participant P1 gives financial incentives to his workers to meet targets and trains them to run the collection centers, participant P2 trains his workers, gives end-of-year bonuses and shows individualized interest, participant P5 gave incentives of overtime to workers for a recovery plan, participant P7 trains his workers to identify the right plastic waste and to separate the different plastic waste streams. A resource person mentored participant P8 on acquiring the right plastic recycling equipment. Boukamcha (2019) found that when transformational leaders stimulate workers intellectually and motivate them inspirationally, the workers demonstrate innovativeness, proactiveness, and new business

venturing. Accordingly, 67% of the participants identified the training and motivation of workers as essential to improving the profitability of the plastic recycling business.

Mahdikhani and Yazdani (2020) found that transformational leadership positively impacts service quality and improves team performance. Mahdikhani and Yazdani also found that improved performance positively impacts service quality. Roibu et al. (2019) also found that even though transactional leadership is more prevalent, transformational leadership is desirable for the innovation and sustainability of Romanian hotels in the long term. Therefore, 67% of participants used individualized consideration stimulation of transformational leadership, training, and motivating their workers to improve the profitability of their plastic recycling business.

Theme 3: Develop Effective Business Strategies

One hundred percent of the nine participants discussed strategies the plastic recycling business used to improve its profitability. These business strategies are adaptable to other sectors because the strategies have to do with sound business decisions that the businesses must make in any business context and environment. Braun et al. (2019) found that businesses need a delicate balance of strategy and business models for long-term competitive advantage and profitability. The authors also found that a business cannot use strategy at the expense of the business model and vice versa. One hundred percent of the nine participants implemented different business strategies to achieve the goal of improved profitability: (a) participant P1 used business partnership, participant P2 synergized by pooling funds from other waste management businesses, (b) P3 used a strategy of marketing their recycled product and outsourcing plastic waste supply, and

participant P4 used investment in equipment, such as a truck and plastic waste processing machines, (c) participant P5 used quarterly business reviews and new technology conference center, and participant P6 used investment in a truck, (d) participant P7 used a business strategy of equipment, energy-reducing machinery, and market relocation in the face of stiff competition for plastic waste collection, and (e) P8 used a business strategy of investment in equipment with backward integration and P9 used bulk buying and selling plastic waste in higher-end markets. Consequently, the emerging subthemes under the business strategy theme were machines and technology, periodic business reviews, and marketing. Table 7 provides key terms relating to business strategies for all interviews. Combined, the frequency of terms referring to business strategies equaled 21.35% of all the participants' responses.

Table 7

Participant References to Business Strategies

Reference	Frequency	Weighted percentage	Similar Words
machines	41	5.80	compactor, pelletizing, vehicles, washing, automation, baling, telecoms, crush, truck
review	34	4.29	quarterly, KPIs, margin, monthly, turnover bottomline, cash flow, revenue
cost	27	2.87	cost, price, delta, higher, percentage, tripled
product	19	2.71	output, production, products, profitable
market	18	2.06	location, outsource, virgin, customers
funding	12	1.50	funding, funds
operations	11	1.05	engage, performance, processes, working
light	9	1.07	power, energy

Machines and technology. Fifty-eight percent of the nine participants talked about using machines and technology to improve their business's profitability. The use of

the right equipment and technology positively impacts the profitability of a plastic recycling business. The equipment used in plastic recycling is cost-driven, such as plastic waste separating machines, compactors, steam washers, crushers or shredders, pelletizers, and plastic manufacturing machines. However, if the business owner acquires suitable plastic recycling machines, it improves the profitability of their businesses. In the agricultural sector in Sweden, Parvin et al. (2022) showed that intermediate machinery size maximized farmers' net revenue. Table 8 provides key terms relating to machinery and technology for all interviews. Combined, the frequency of terms referring to machinery and technology equaled 18.02% of all the participants' responses.

Table 8

Participant References to Subtheme Machines and Technology

Reference	Frequency	Weighted percentage	Similar Words
machines	11	4.91	Machine, machines, machinery
light	8	2.90	Power, energy, light, supply
operations	6	1.71	operations, processes, processing
washing	5	2.23	wash, washing
telecoms	6	2.69	telecoms, conferencing
vehicle	4	1.79	vehicle, vehicles
shredders	2	0.90	shredders, shred
automation	2	0.89	automation, cutting edge

P3 mentioned the impact of these types of equipment on his recycling business profitability:

We need to bale into 50 kg bales. Ordinarily, 50 kg may take a very wide space if it is not baled. When you compact them into something that has to have a good weight and smaller space, it will add up to your profitability. Now, another way

you can improve profitability is by cleaning, by having a clean end product, because it is a waste, it is exposed. So, you have to have a washing system that cleans the waste before you move it to crush. You need to clean your product because you are priced according to the cleanliness of your product. If your product is dirty, the person you are selling it to has to do the cleaning, which means spending extra money. You need to keep people buying your goods cheaper.

All of this involves money. The compacting technology has to make you get a coil baling machine or compactor, something to compress, mostly, into a unit. The baling machine has a kind of steel rope that binds the whole unit into something that you will be able to lift. So, you need to spend money to acquire that, the challenge there is the money to buy the equipment, and it is a specialized kind of business altogether because you can even contract it out and give the people to do the baling for you. Then, you pay them based on what they can be able to bale. It is a value chain on its own.

P4 discussed using the right kind of machines with low energy utilization, high output, and less labor as key strategies for improved profitability:

Also, our operations have to be efficient. You are working in a very competitive environment, so if your operations are not sound, you will likely have a lot of wastage along the way, and then the output will not be as much as you want. Then in sourcing our machinery, we need to ensure that the right type of machine is purchased, which helps to give you higher output and savings on power. These

machines consume a lot of power. If you don't get the right sort, then you gain a lot in electricity, and the output may not be as much as the one that is more efficient and effective. This also helps to lower the labor cost. Some equipment may require more people to man them, but if you get the right type of machine, you are going to have better profitability. Then we also have our own vehicles that go to get these materials from wherever they are and anytime when they are available. Once you depend on people supplying your vehicles, maybe the time you need to get a vehicle, the vehicle may not be available, or the driver may not be willing to go to wherever you need, could be inside the bush and all that.

P5 acquired dedicated state-of-the-art teleconference equipment to communicate with clients online during the Covid-19 period when businesses lost customers. The internet services they had were epileptic, and communicating with the customers in the pandemic period was essential to avoid losing them:

For the Covid, we use telecoms. For the telecoms epileptic service, I now have a more powerful network which we call the line of sight, which we put in our company, a dedicated gathering point for conference calls.

P6 attributed the improvement in profitability due to the mini double-truck she purchased and modified to have a cage behind to transport plastic waste:

I have bought four trucks since I started, so now I use mine. I bought this new mini come to school, so whatever they come with it, the bus part of it and the truck part of it. So, the back of it, I built like a cage, that you can see what is inside. So that is what we use now, so if we buy some from the factories, we can

do two runs, and he packs up a tonne, or someone says come to my house and to come and pick up the plastics, and he goes and picks it up.

So, like I said, we are not reinventing the wheel. And in the industry, at some point, some people were considering setting up logistics companies to take care of it. But with the quality of drivers they had then, it was impossible to make it work. So, this model of buying a small truck so I can go to homes and go to offices to pick up. And I think it is working, and I see the performance in the car and do not treat it as a dump.

P8 stated that machines tripled their revenue and enabled them to get into the recycling of new plastic waste streams such as PET bottles:

Yes, it helped us a lot because it wasn't easy with the machines. You know, the situation of the country, it was not easy bringing the machines down here to Nigeria from China. But when we bought the machines, it helped us a lot because we could do so many things that we were not doing before. We bought shredders and crushers and pelletizing machine. And then the Chinese people also advised me, why don't you buy a film blowing machine that you can convert this waste that you are recycling into other things? So, it is amazing how we did that because we can buy, for example, a waste now from, let's say, from pure water or sachet water waste, and we can convert it into bin nylon, you know, these trash bags. This is just a small example that I have given you, but we can do 50 more with the waste.

Yes, buying those machines has tripled our revenue, to be honest with you. It has tripled our revenue, yes. It was a good choice. One thing I like about also is where I am operating; in some of our plants, you see plastic waste, and people are picking it up and delivering it to us.

Yes, there's a new technology in the world that I'm compacting this, you know, PET bottles, like water bottles. It is called PET, now, the world is accepting it, and we have invested a lot that people are not aware of that. I think it is something that people should think about because right now, as we are talking, we have imported the washing lines for those kinds of PET bottles and some other kinds of machines that we can shred and make into flex. And you won't believe it. We plan to export it to the United States of America and Turkey in Europe, so imagine it. I think exporting Nigerian work to the USA is a great achievement.

Accordingly, participants P3, P4, and P5 stated that machines and technology contributed to increased profits in their recycling businesses. The appropriate machines and technology increase profits by reducing manpower and increasing the efficiency and accuracy of the recycling processes. Machines can separate waste and reduce labor for manual separation. Machines will shred and wash the plastic waste, detect impurities, and reduce plastic waste supplier cheating. Machines will enable higher production and a larger recycling scale, leading to improved profitability. Using technology, business owners can move online to a wider market and overcome the challenges of pandemics such as Covid-19. Thus, using machines and technologies by plastic recycling businesses improves business profitability. However, machines and technology are expensive, so

businesses will have to start small or have access to some financing to acquire machinery and technology.

Periodic business reviews. Forty-four percent of the participants identified business reviews as a strategy for improving profitability. Participant P5 has quarterly business reviews, where they review performance against certain key performance indicators. At the beginning of a business year, participant P5 develops a short-term plan of 1 to 2 years and a long-term plan of 1 to 5 years. Key performance indicators are important because it helps a company know how successful it is in achieving its goals (Sederavičiūtė, 2020). Participant P4 has an accounts department that determines the overall production costs, which they subtract from sales revenue to determine their profits. So, if the recycling business can achieve a certain production target in the period under review, it has improved its profitability. Participants P9 and P1 used monthly targets and goal setting, respectively. Participant P9 uses monthly targets to drive profitability, so he establishes the target the business must achieve to realize certain profitability. P1, on the other hand, establishes a target within a given period for his collection team, and if they achieve these targets, they earn bonuses. Table 9 provides key terms relating to the periodic business reviews for all interviews. Combined, the frequency of terms referring to periodic business reviews equaled 21.60% of all the participants' responses.

Table 9*Participant References to Subtheme Periodic Business Reviews*

Reference	Frequency	Weighted percentage	Similar Words
production	11	4.40	product, production, profit, profitable
goals	9	3.00	end, goals, target
funding	8	3.20	funding, funds
money	7	2.80	money
business	5	1.80	business, businesses, line
review	4	1.60	review
cost	3	1.20	cost
quarterly	3	1.20	quarterly

P5 captured the business strategy of business reviews as follows:

Ok, we have monthly and quarterly review processes. We have the quarterly business review that we do in our company. Like I told you, we set targets on a quarterly, monthly, and yearly basis. To a 5, 3, 1 year plan, that is 5-year long-term plan, 70% term up, but you know they are run at 100 terms per month. So, we have KPIs and key performance indicators. With the KPI, for instance, we will say that we shall make this bottom line, we will get 15% profit margin, just for example, and during the process, let's say 10%, then we say what is happening. It is not only in percentage, but we also have what percentage of our capacity we are utilizing. We have a capacity that we are meeting, let's say we are to produce 50 tonnes in a month, and we are producing less than that, of course, it affects our bottom-line and our turnaround time, I mean the turnover, it affects it. Therefore, we may still be looking to see them, but our KPIs will show it if it is at a reduced capacity. Another KPI that we set for ourselves is the turnaround time. So, we say

that we must produce 50 tonnes in a month, if we are now producing the 50 tonnes in 2 months, definitely affect our bottom-line. We have monthly will give us 30 days review, but then KPI, which is the quarterly own will now say target over actual versus actual, how have we done it. And then what will be our recovery process for the next quarter?

The major thing is the quarterly review process. Yes, because you are there for the money, so this one when we do a review, sometimes we find out that one product is doing better than the other. So, although we have said that we should produce X percentage of this product and Y percentage of the other product, Z percentage of the other, if we know that one of those products is doing better, we will review our percentage production. So, the thing is flexibility while still keeping our eyes on the ball. So, we cannot afford to be rigid, so we have a long-term view, but we have to manage the short-term output. Currently, for us to be in the business, we have to be flexible, you know, still keeping our eyes on the ball.

P9 captured this subtheme of periodic business reviews in his following explanation. In his case, the periodic business reviews are monthly:

So, like I wanted to tell you before, the profitability of any business is that you must have a target. I used to give myself that I must achieve 40 to 50 tonnes before the month runs to an end. And you know this business is a business of 5 naira, 3 naira business. Do you understand me? Let us assume that you have 10 tonnes in a month, and out of the 10 tonnes, you do your expenses; you do your maintenance, you pay your workers, and you will see that the product that you

have at hand cannot give you anything, but with your targets for the month, ok say, if you times 10 naira times 50 tonnes.

P1 also establishes goals which he reviews with his collections team monthly, which he presented in the following:

To be honest, it is just by setting goals, basically by setting goals and having a team, a recruitment team. So, we set goals for them, and then we just physically add pressure on them and make sure that we achieve these goals. To motivate them to achieve this, we put incentives. We can tell you your target is 100 tonnes this month, and if you do above 100 tonnes, we will give you NGN 2 for every kg supplied or NGN 5 for every kg supplied.

For participant P4 the accounts department performs the periodic business reviews:

At the end of the day, we have an accounts department that checks the cost of our operations viz-a-viz the production. I have told you that each process, like the material we are buying, assesses what we are recovering from, but of course, the actual, by the time you finish washing, you need to put these things into various processes, and you get the final product. So, at the end of the day, what have you recovered from what you have paid for, and then how much you are getting from the whole thing? For the vehicles, for instance, you want to check the maintenance cost, how much are we spending on maintenance, how much are we spending on sundry costs, and are we getting value for our money? And then, of course, the machines, are we getting a lot of damages on our machines, how long

do you use your machines without having damages. These are some of the ways we try to check so how much profit are we getting out of this at the end of the day.

Participants P1, P4, P5, and P9 mentioned that periodic business reviews contribute to improved business profitability. A business needs to know if they are profitable or running at a loss. The periodic business reviews allow them to assess their performance for the period under review. From these reviews, they will know if they are running behind on established KPIs and may need to recover in the next business review period. Some participants review monthly by setting a monthly target and evaluating if they met those targets. Every business must know if they are improving its profitability or losing money. They need to evaluate if their implemented business strategy is improving their profit. The more businesses review their performance, the more opportunity it has to revise, reinvent or innovate what it is doing to be more profitable.

Marketing. Thirty-three percent of the nine participants mentioned the various market strategies to improve their business's profitability. The participants P3, P4, P5, P7, and P8, who participate in the full value chain of plastic recycling, manufacture recycled plastic products that they sell to clients. The implication is that they have to sell their recycled product and realize sales revenue from selling these products. However, only participants P3 and P7 of the nine participants discussed marketing their recycled plastic products. A study on US commercial banks by Chen (2020) showed that marketing contributes to a bank's profitability. Table 10 provides key terms relating to marketing for

all interviews. Combined, the frequency of terms referring to marketing equaled 22.13% of all the participants' responses.

Table 10

Participant References to Subtheme Marketing

Reference	Frequency	Weighted percentage	Similar Words
price	8	5.37	cost, price, prices
reduce	8	4.03	concentrate, contract, reduced
product	4	2.68	product, profitability
business	3	2.01	business
location	4	2.01	location, place
market	3	2.01	market, marketing
materials	3	2.01	materials, raw
outsource	3	2.01	outsourcing

P3 specifically discussed the marketing of plastic recycling products in outsourcing some recycling processes such as baling and supplies of plastic waste. So that they could focus on the core business of manufacturing recycled products and marketing their recycled product to clients:

You can outsource most of the time-consuming activities that divide your core business and your profitability. You can have a target cost of raw materials, and you contract it out and have an effective supply chain. Then concentrate on your product and the marketing, your product, and the sales, then it will give very strong profitability.

We can conclude from the comments from participant P3 that plastic recyclers must have a market to sell their recycled plastic waste, and they must compete to have a share of this market.

P7 discussed relocating to a virgin market when the competition is stiff regarding plastic waste collection. Participant P7 considered relocating the market to collect his plastic waste based on the stiff competition with other plastic recycling businesses. The plastic recycling business should have an established market of plastic waste suppliers. P7 narrates what he did to ensure that he has an established market for plastic waste supply:

When I was in Lagos, it was so bad that everybody was into it, then in 2010 and 2009, there wasn't anybody doing it. Around 2012 it was so competitive that everybody was doing it; even the Chinese came to Nigeria and started recycling plastic. They took over all the dumps in Lagos state and were taxing them. So, what I had to do was to travel to the north, Nasarawa, Keffi. So, I started to get my recycling materials from there. So, like how do you say, I became a new thing as well, over there, right. So, that is what you do is to keep on moving.

Do not stay in one place. When you stay in one place, you find that many people will compete with you. And if you try to compete with some people, you will lose a lot of money. That is the business, you can make a lot of money, and you can lose a lot of money. You keep persisting, and you have to manage your strategies and watch the effectiveness of how your strategies work, you make sure either you make money or you lose money. So, when you find out that the competition is becoming too much, instead of going and fighting, like if you have money, you can stay and fight, like I have done some time in the past. But sometimes, you

cannot fight a Chinese man with dollars to buy raw materials when you have naira. So, what you have to do is to go to a different location.

Participant P5 adjusted the prices of their recycled product downwards to ensure that they kept their customers, or market share, during the Covid-19 period:

But the major strategy is to keep our long-term customers and reduce the price for them so that our delta is small during our pandemic period. We have to keep our customers; that is our approach.

The market where a participant buys plastic waste or sells recycled plastic products is important to business profitability, as demonstrated by participants P3, P7, and P5 in their interview responses. If a market is saturated, a business owner is faced with rising demand for plastic waste and may have to look elsewhere for plastic waste. Participant P7 relocated from one market to another in the face of stiff competition to ensure they could still source plastic waste at a low price. In the face of the pandemic, participant P5 adjusted his pricing to avoid losing his market share of recycled plastic products. Participant P3 stated that it would be more profitable to outsource plastic waste collection to a market of plastic waste suppliers. At the same time, they focus on the selling of their recycled plastic products. All these market considerations are also driven by whether the recycler is a full-scale plastic recycler, the market location, or if they are only involved in the collection and resale to another market. Consequently, the marketing strategies to buy and sell plastic waste and recycled plastic products are the key to improved profits for plastic recycling businesses.

Links to literature. Turner and Endres (2017) found that networking, effective business plans, and market differentiation strategies contribute to business success. Gerig (2018) concluded that implementing business strategies in plastic recycling contributes to business success, sustainability, and profitability. Automation enables mechanical separators, cutters, washers, and shredders to be more productive and profitable (see Ahmed et al., 2018; Cioca et al., 2018; Nascimento et al., 2019). The existing literature review corroborates the findings of the subthemes under business strategies: machines and technology, periodic business reviews, and marketing.

Links to the conceptual framework. The third aspect of transformational leadership is intellectual stimulation, which refers to leaders' challenge to their followers to look at different perspectives to innovate and think outside the box (Bass, 1985). Andersen et al. (2018) found that transformational leadership has a positive association with the degree of shared understanding of professional quality, positively associated with a high level of professional quality. Ghasabeh (2021) showed that transformational leadership positively contributes to knowledge management. Bednall et al. (2018) found that knowledge sharing mediates the relationship between transformational leadership and innovative behavior. Therefore, using a transformational leadership style, the participants positively impacted professional quality, knowledge management, and innovative behavior in their plastic recycling businesses.

Furthermore, Yang and Yang (2019), in their study on the relationship between transformational leadership and product and process innovation, made specific findings on the interrelation between transformational leadership and competitive environment

process innovation. The authors found that there should be more process innovation in a moderately competitive environment. Still, there should be less process innovation and stronger adoption of transformational leadership in a fiercely competitive environment. Participants P1 and P7 stated that the plastic recycling market is quite competitive. Accordingly, all participants have adopted transformation leadership in the different business strategies, such as investment in machines, transport vehicles, vehicle modification, market relocation to a virgin market, establishing collection centers in different locations, use of IT technology, marketing of the recycled product, and outsourcing of plastic waste collection and use of machinery to process plastic waste. Hence, all the participants adopted transformational leadership styles in implementing the business strategies they used to improve the profitability of their plastic recycling business.

Application to Professional Practice

There is a hiatus of information on what business owners of small and medium enterprises in the plastic recycling business do in developing nations to improve their profitability. For instance, there is no available data on strategies used by recycling business owners to overcome low power supply and the lack of funding. The findings of this study encourage many more entrepreneurs to venture into plastic recycling with a shared knowledge from the research of what they can do to improve their profitability and what they must avoid for sustainability. Plastic recycling businesses that are struggling can benefit from the research by acquiring new strategies to deploy towards improving the profitability of their business.

Successful plastic waste collection has a lot of impact on the plastic recycling business. So how the plastic recycling business collects plastic waste is instrumental to the business's success. The findings of my study focus on plastic waste collection, how to establish teams, how to motivate the suppliers, and how to generate social goodwill that could lead to your collecting plastic waste for free from the community. The study also provides strategies to mitigate the sharp practices of plastic waste suppliers and use suitable equipment. The study's findings can help a plastic recycling business owner become more successful in collecting plastic waste.

Furthermore, the environmental concern is a weightier issue in developing nations because of underdeveloped plastic waste collection centers and separation units. Not many plastic recycling businesses or existing ones are thriving as they should, which is one reason plastic recycling is low in African countries (Babayemi et al., 2019). Consider that the profitability of a plastic recycling business directly impacts the environment's well-being by reducing the amount of dumped plastic in the environment. The rich text provided by this study may persuade a business entrepreneur to go beyond the business plan, financial investment, and projected earnings to understand the intricate dynamics of plastic recycling and what he needs to do to be profitable. Consequently, the study contributes to practical knowledge to make plastic recycling businesses profitable to achieve a chain effect for conserving the environment from dumped plastic waste.

Another important aspect is the management of plastic recycling workers as a resource for the plastic recycling businesses. The findings show that business owners should improve the use of transformational leadership to manage their workers. The

research provides information that staff training and motivation inspire the workers to higher performance. Also, the findings show that plastic recycling business owners intellectually inspire their workers towards innovation by using cutting-edge technology in the plastic recycling business. The results also show that a plastic recycling business owner can participate in some aspects of the plastic recycling value chain if the owner does not have the necessary capital for machinery to produce recycled plastics. He can start small and develop to a level where he can acquire machinery for full-scale plastic recycling, i.e., begin as a plastic collection and processing center and then graduate to a recycled plastic manufacturer. Therefore, the study provides information on managing plastic recycling workers to improve profitability.

Implications for Social Change

The improved profitability of plastic recycling businesses from the findings of researched strategies is beneficial to many areas. The first direct benefit is that recycling businesses improve their profitability, enabling them to expand their business. Expanding their businesses means the recycling business can employ more plastic workers. Their wages can be improved, giving the workers a better standard of living and allowing them to contribute more financially to society. Informal waste pickers can participate more in the value chain. Rather than be a nuisance to society because of their lack of education, they can pick up plastic waste, supply it to plastic waste recyclers, and make a living for themselves. Therefore, plastic recycling businesses with increased profitability can reduce unemployment rates in developing nations by increasing the employment of workers in plastic recycling businesses.

The plastic recycling business consists of many value chains. Plastic waste collection is one value chain, and plastic waste treatment is another value chain. Also, the manufacturing of recycled plastic products is a third value chain, and the selling of recycled plastic products is the fourth value chain. When plastic recycling businesses are doing well, they engage more plastic waste suppliers in collecting plastic waste. Some people may decide only to treat the plastic waste, separate, wash, compact, and shred. The plastic recyclers that manufacture engage more hands to run the plastic recycling plants and more distributors to distribute their recycled waste products. Accordingly, there is a ripple effect from the contribution of the different value chains in plastic recycling that translates to empowering more people, providing a means of livelihood for many, and generating communal wealth.

Furthermore, when the plastic recycling businesses are more profitable, they have more revenue to commit to corporate social responsibility, such as scholarships for the less privileged and contributing industrial silos for waste disposal in strategic locations for plastic waste disposal. For example, in many local governments in Nigeria, the state government has failed to provide adequate waste disposal silos. If plastic recycling businesses can do this, they will address the eyesore caused by the disposal of plastic waste on the roads. The provision of plastic waste disposal silos can encourage the plastic recycling behavior of the populace. Thus, the plastic recycling businesses can contribute to the education of orphans through scholarship facilities. They can also assist the state government in providing industrial waste silos and encouraging plastic waste recycling behavior.

The ripple effect of plastic recycling businesses improving their profitability is reduced plastic waste dumping in the environment. The citizens immediately begin to see plastic waste as a resource. They become conscious of dumping plastic waste indiscriminately if they can collect it and sell the plastic waste to suppliers for small amounts of money. The citizenry can become involved in mitigating the environmental problem of plastic dumping because they see that they can gain something from collecting plastic waste and selling it at a small token to plastic recyclers. Consequently, another direct impact of improved profitability of profitable plastic recycling businesses is the reduction of plastic waste dumping through plastic recycling.

Recommendations to Action

The study's findings show the strategies of plastic recycling business owners in Nigeria. The study's results showed that the plastic recycling business owners had to be innovative and adaptive to improve their profitability. No business owner used the same strategy showing the complex environment for businesses in developing nations such as Nigeria. A large percentage of participants, 67%, used a transformational leadership style to motivate and inspire their plastic recycling workers. However, all the participants displayed the innovation aspect of transformational leadership in their business strategies. From the nine-participant plastic recycling business owners, I derive my recommendations from the three themes discovered in the study: (a) strategies for sourcing plastic waste, (b) strategies for managing workers, and (c) business strategies.

The recommendations from my study are as follows: (a) plastic recycling business owners should find the best location to collect their plastic waste and develop a quality

check process, (b) plastic recycling business owners should treat their plastic waste and transport it at the cheapest cost, (c) plastic recycling business owners should utilize or improve the use of transformational leadership with their workers, (d) plastic recycling business owners should invest and utilize plastic recycling machines, and new technologies in their plastic recycling process, (e) plastic recycling business owner should have periodic business reviews to ensure improved profitability of their business, and (f) plastic recyclers should develop a market for their recycled products with an adaptable pricing model.

The results of this study apply to plastic recycling business owners, waste managers, environmental policymakers, plastic manufacturers, managers of collection plastic waste centers, and local state governments. The results of this study are also applicable to business entrepreneurs seeking to invest in start-ups for plastic recycling and for recycling businesses that need better strategies to improve their profitability. Additionally, the study results apply to educational institutions teaching students about plastic waste behavior and entrepreneurship in plastic waste recycling.

I will disseminate the results of this study to local, regional, and global businesses in plastic recycling to provide a shared knowledge of strategies that plastic recyclers utilize in complex environments to improve the profitability of their business. Also, I plan to share the study's findings with others through seminars, conferences, workshops, and online podcasts. I plan to share with owners of plastic recycling businesses through mentor programs and consultancy with business entrepreneurs seeking to invest in plastic recycling. In addition, I will share my results with environmentalists interested in curbing

plastic waste dumping in developing countries and associations of environmental waste managers, who can adopt some of the findings to promote plastic recycling businesses.

Recommendations for Further Research

The main purpose of this qualitative multiple case study was to identify the strategies used by small business owners of plastic recycling businesses to improve their profitability. The study's findings showed that some business owners used transformational leadership to motivate and train their workers to improve profitability. Also, the study's findings show that all the business owners exhibited the innovative aspects of transformational leadership: (a) deploying business strategies for the collection of plastic waste, (b) investing in and use of plastic recycling machines, and (c) pricing and marketing of plastic recycled products to improve their business profitability.

Two main challenges that resonated with most participants are funding and epileptic power supply. Therefore, one area for further research is the impact of funding and power in improving the profitability of plastic recycling businesses in Nigeria. Another area to consider for future research, even though only one participant used it, is the impact of business partnerships in plastic recycling in improving the profitability of the plastic recycling business. In this case, the target sample would be those plastic recycling businesses that achieve profitability through business partnerships. A third area to consider for research is whether it is more profitable for plastic recycling businesses that manufacture recycled plastic to outsource the collection and treatment of the waste plastic to concentrate on the production and sales of recycled plastics.

Furthermore, future qualitative researchers can target different states in Nigeria, not only southwest Nigeria. Also, researchers can carry out further research in other African countries such as Ghana, South Africa, and Egypt to get more regional strategies that plastic recycling business owners use to improve their profitability. A qualitative researcher could expand the interview questions to cover worker performance and productivity. To mitigate against participants not being truthful in the interview responses, the researcher could educate the participant on the importance of research findings to business practice and how it could help other businesses improve profitability. Future researchers could conduct quantitative research to establish the relationship between independent variables, such as transformational leadership and profitability, with a mediating role of dependent variables, such as motivation and training. A researcher could consider conducting mixed methodology research to combine rich text with statistics and numbers.

Reflections

The doctoral journey has shaped me into a scholar, understanding how to present my facts with available research and contribute to the existing body of knowledge through research. The doctoral journey is the most difficult undertaking to date for me. I found the data collection quite challenging. The business owners I targeted for my interviews were too busy, and it took weeks of persistence to secure an appointment with any of them for an interview. The data collection phase took quite a while to complete. The learning point was that through persistence and determination, any goal is achievable.

My writing style has evolved due to this doctoral program. My writing has become fluid and scholarly. I am more confident writing on any topic and can organize my thoughts much better than before I started the program. I benefitted tremendously from the constructive criticism and feedback from my chair, 2nd member, and URR. I would also say that I was weak in using citations before starting the doctorate program, but today I feel confident finding and using citations.

I started a new function twice during this program within the same company, so it was a difficult challenge to balance the work with the academic requirements of the doctorate program. In the initial period of the program, the demands placed quite a strain on my family life. I had to take off one semester to achieve a better balance. Consequently, completing the program for me represents a personal victory and achievement. Additionally, completing the doctoral process has been fulfilling because I sometimes wondered if I would ever get to the finish line.

Before starting the doctorate program, I considered starting a plastic recycling business. I am so glad I took this research topic because, with my research results, I can avoid the pitfalls of plastic recycling and apply my researched strategies toward running a successful small-scale plastic recycling business. Suppose I had started a plastic recycling business without the study findings; I may not have succeeded because plastic recycling profits can be marginal if you do not apply suitable strategies. Therefore, I consider this study a win-win in every aspect.

Conclusion

The purpose of this qualitative multiple study is to explore the strategies business owners of small plastic recycling businesses have successfully used to improve the profitability of their business. I conducted my study in the southwest and southeast of Nigeria, with seven plastic recycling business owners in the southwest and two from the southeast. The business owners shared the strategies they have successfully used throughout the lives of their businesses to improve profitability. I used NVivo to organize and analyze the data that I collected from the nine participants and discovered the following themes: (a) strategies for sourcing plastic waste, (b) strategies for managing workers, and (c) business strategies.

The findings of the research are consistent with most of the current literature. The recycling business owners need to increase the use of a transformational leadership style to manage the plastic recycling workers. The plastic recycling business owner uses transformational leadership to remain innovative in the business strategies deployed and remain profitable by constant innovation in the collection and processing of plastic waste. As has been shown by most participants using transformational leadership, they are most likely to use machinery and technology to increase the profitability of the recycling business. As a transformational leader, a business owner is constantly learning and training his workers to improve the profitability of his plastic recycling business.

Potential professional applications for this study include: (a) providing strategies that recycling businesses can use to improve their profitability, (b) providing practical information on how plastic recyclers can collect plastic waste profitably, (c) providing

information that encourages more plastic waste recyclers to invest in plastic recycling, (d) reduce plastic waste dumping by improving plastic waste recycling, (e) encourage more plastic recycling by increasing the participation in the different value chains of plastic recycling, (f) offer available data to teach students at tertiary and secondary level how to become entrepreneurs from plastic waste, and (g) improve plastic recycling behavior among the citizenry. Plastic recycling is one way to combat the menace of plastic waste dumping in our environment and the oceans. Plastic recycling businesses improve and sustain their profitability if the business owners use the researched strategies from my study.

References

- Abbasi, M. N., & Sheikh, N. A. (2016). Attitudes and motivations towards plastics recycling: A multi-tier supply chain approach. *Pakistan Journal of Social Sciences*, 36(2), 705-722. <http://bzu.edu.pk/research.asp>
- Abdalla, M. M., Oliveira, L. G. L., Azevedo, C. E. F., & Gonzalez, R. K. (2018). Quality in qualitative organizational research: Types of triangulation as a methodological alternative. *Administração: Ensino e Pesquisa*, 19(1), 66-98. <https://doi.org/10.13058/raep.2018.v19n1.578>.
- Ahmed, A., Duong, V., & Farook, O. (2018). Go green environmental initiative for recycling plastic bottles with progressive entrepreneurship partnership. *Journal of Strategic Innovation & Sustainability*, 13(5), 102-110. <https://doi.org/10.33423/jsis.v13i5.163>
- Aikowe, L. D., & Mazancová, J. (2021). Plastic waste sorting intentions among university students. *Sustainability*, 13(14), 1-14. <https://doi.org/10.3390/su13147526>
- Akan, O. D., Udofia, G. E., Okeke, E. S., Mgbachidinma, C. L., Okoye, C. O., Zoclanclounon, Y. A. B., Atakpa, E. O., & Adebajo, O. O. (2021). Plastic waste: Status, degradation and microbial management options for Africa. *Journal of Environmental Management*, 292, 1-12. <https://doi.org/10.1016/j.jenvman.2021.112758>

- Akinso, A. (2018). *Successful strategies for the survival of business owners in Nigeria*. (Publication No. 6434) [Doctoral Dissertation, Walden University]. ScholarWorks.
- Al Busaidi, H. (2020). Examining the relationship between the accreditation of engineering programmes and institutional performance. *Quality Assurance in Education: An International Perspective*, 28(3), 179-192. <https://doi.org/10.1108/QAE-10-2019-0098>
- Alzahrani, J. (2019). The impact of e-commerce adoption on business strategy in Saudi Arabian small and medium enterprises (SMEs). *Review of Economics and Political Science*, 4(1), 73-88. <https://doi.org/10.1108/REPS-10-2018-013>
- Anabo, I. F., Elexpuru-Albizuri, I., & Villardón-Gallego, L. (2019). Revisiting the Belmont Report's ethical principles in internet-mediated research: Perspectives from disciplinary associations in the social sciences. *Ethics & Information Technology*, 21(2), 137–149. <https://doi.org/10.1007/s10676-018-9495-z>
- Andersen, L. B., Bjørnholt, B., Bro, L. L., & Holm-Petersen, C. (2018). Achieving high quality through transformational leadership: A qualitative multilevel analysis of transformational leadership and perceived professional quality. *Public Personnel Management*, 47(1), 51-72. <https://doi.org/10.1177/0091026017747270>
- Anderson, V. (2017). Criteria for evaluating qualitative research. *Human Resource Development Quarterly*, 28(2), 125-133. <https://doi.org/10.1002/hrdq.21282>

- d'Ambrières, W. (2019). Plastics recycling worldwide: Current overview and desirable changes [Special Issue 19]. *Field Actions Science Reports*, 19, 12-21.
<http://journals.openedition.org/factsreports/5102>
- Asari, M., Tsuchimura, M., Sakai, S., Tsukiji, M., & Sagapolutele, F. (2019). Analysis of mismanaged plastic waste in Samoa to suggest proper waste management in Pacific island countries. *Waste Management & Research: The Journal of the International Solid Wastes & Public Cleansing Association*, 37(12), 1207-1216.
<https://doi.org/10.1177/0734242X19867391>
- Austin, H. P., Allen, M. D., Donohoe, B. S., Rorrer, N. A., Kearns, F. L., Silveira, R. L., Pollard, B. C., Dominick, G., Duman, R., El Omari, K., Mykhaylyk, V., Wagner, A., Michener, W. E., Amore, A., Skaf, M. S., Crowley, M. F., Thorne, A. W., Johnson, C. W., Woodcock, H. L.,...Beckham, G. T. (2018). Characterization and engineering of a plastic-degrading aromatic polyestrase. *Proceedings of the National Academy of Sciences of the United States of America*, 115(19), E4350-E4357. <https://doi.org/10.1073/pnas.1718804115>
- Austria, Philippines: UNIDO promotes e-waste management in the Philippines. (2018, June 28). *Mena Report*. <https://www.unido.org/news/unido-promotes-e-waste-management-philippines>
- Avolio, R., Spina, F., Gentile, G., Cocca, M., Avella, M., Carfagna, C., Tealdo, G., & Errico, M. E. (2019). Recycling polyethylene-rich plastic waste from landfill reclamation: Toward an enhanced landfill-mining approach. *Polymers*, 11, 1-13.
<https://doi.org/10.3390/polym11020208>

Ayodele, T. R., Ogunjuyigbe, A. S. O., Durodola, O., & Munda, J. L. (2020). Electricity generation potential and environmental assessment of bio-oil derivable from pyrolysis of plastic in some selected cities of Nigeria. *Energy Sources Part A: Recovery, Utilization & Environmental Effects*, 42(10), 1167-1182.

<https://doi.org/10.1080/15567036.2019.1602226>

Azizah, S. N., Nurhayati, S., Anggraeni, A. I., & Helmy, I. (2020). The impact of transformational leadership on innovative capability: Mediating role of employee optimism. *Management Science Letters*, 11(2), 435-440.

<https://doi.org/10.5267/j.msl.2020.9.025>

Azungah, T. (2018). Qualitative research: Deductive and inductive approaches to data analysis. *Qualitative Research Journal*, 18(4), 383-400.

<https://doi.org/10.1108/QRJ-D-18-00035>

Babayemi, J. O., Ogundiran, M. B., Weber, R., & Osibanjo, O. (2018). Initial inventory of plastics imports in Nigeria as a basis for more sustainable management policies. *Journal of Health and Pollution*, 8(18), 1-15.

<https://doi.org/10.5696/2156-9614-8.18.180601>

Babayemi, J. O., Nnorom, I. C., Osibanjo, O., & Weber, R. (2019). Ensuring sustainability in plastics use in Africa: Consumption, waste generation, and projections. *Environmental Sciences Europe*, 31(1), 1-21.

<https://doi.org/10.1186/s12302-019-0254-5>

- Badr, M., & Ijaz, M. (2021). The exponentiated exponential burr xii distribution: Theory and application to lifetime and simulated data. *PLoS ONE*, *16*(3), 1–20.
<https://doi.org/10.1371/journal.pone.0248873>
- Banks, M., Metz, M., & Smyth, D. S. (2020). The sustainability challenges facing research and teaching laboratories when going green. *Environment*, *62*(2), 4-13.
<https://doi.org/10.1080/00139157.2020.1708166>
- Baran, B. (2020). Plastic waste as a challenge for sustainable development and circularity in the European Union. *Ekonomia i Prawo*, *19*(1), 7-20.
<https://doi.org/10.12775/EiP.2020.001>
- Basri, H., Evadianti, Y., & Hernawan, W. (2020). Impact of Krakatau festival on the tourism growth in Lampung Province, Indonesia. *Utopia y Praxis Latinoamericana*, *25*, 137-145. <https://doi.org/10.5281/zenodo.3774593>
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. Free Press.
- Bednall, T. C., E. Rafferty, A., Shipton, H., Sanders, K., & J. Jackson, C. (2018). Innovative behaviour: How much transformational leadership do you need? *British Journal of Management*, *29*(4), 796–816. <https://doi.org/10.1111/1467-8551.12275>
- Bello, U., Yusuf, A. H., Isichei, E. E., & Abubakar, I. A. (2019). Corporate social responsibility and profitability of Nigerian Bottling Company Plc. Kaduna. *Management Research & Practice*, *11*(2), 64-76. <http://www.mrp.ase.ro/>
- Bergeron, D. A., & Gaboury, I. (2020). Challenges related to the analytical process in realist evaluation and latest developments on the use of NVivo from a realist

- perspective. *International Journal of Social Research Methodology*, 23(3), 355-365. <https://doi.org/10.1080/13645579.2019.1697167>
- Bilali, H. E. (2019). The multi-level perspective in research on sustainability transitions in agriculture and food systems: A systematic review. *Agriculture*, 9(4), 1-24. <https://doi.org/10.3390/agriculture9040074>
- Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation?. *Qualitative Health Research*, 26(13), 1802-1811. <https://doi.org/10.1177/1049732316654870>
- Bonsu, S., & Twum-Danso, E. (2018). Leadership style in the global economy: A focus on cross-cultural and transformational leadership. *Journal of Marketing & Management*, 9(2), 37-52. <http://www.gsmi-ijgb.com>
- Boukamcha, F. (2019). The effect of transformational leadership on corporate entrepreneurship in Tunisian SMEs. *Leadership & Organization Development Journal*, 40(3), 286-304. <https://doi.org/10.1108/LODJ-07-2018-0262>
- Braun, M., Latham, S., & Cannatelli, B. (2019). Strategy and business models: Why winning companies need both. *Journal of Business Strategy*, 40(5), 39-45. <https://doi.org/10.1108/JBS-01-2019-0005>
- Brooks, A. L., Wang, S., & Jambeck, J. R. (2018). The Chinese import ban and its impact on global plastic waste trade. *Science Advances*, 4, 1-7. <https://doi.org/10.1126/sciadv.aat0131>
- Burns, J. M. (1978). *Leadership*. Harper & Row.

- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, 2(1), 1-10.
<https://doi.org/10.1186/s42466-020-00059-z>
- Bush II, T. (2019). *Reducing operational costs in the trucking industry to increase profitability*. (Publication No. 8646) [Doctoral dissertation, Walden University]. ScholarWorks.
- Cakmak, A. (2018). *Internationalization strategies of service sector small and medium enterprises in Turkey* (Publication No. 5996) [Doctoral dissertation, Walden University]. ScholarWorks.
- Carmichael, T., & Cunningham, N. (2017). Theoretical data collection and data analysis with gerunds in a constructivist grounded theory study. *Electronic Journal of Business Research Methods*, 15(2), 59-73. <http://www.ejbrm.com/>
- Ceylan, S. S., & Çetinkaya, B. (2020). Views of maternity nurses relating to barriers in early initiation of breastfeeding: A qualitative study. *Journal of Pediatric Research*, 7(3), 199-206. <https://doi.org/10.4274/jpr.galenos.2019.72692>
- Chidepatil, A., Bindra, P., Kulkarni, D., Qazi, M., Kshirsagar, M., & Sankaran, K. (2020). From trash to cash: How blockchain and multi-sensor-driven artificial intelligence can transform circular economy of plastic waste? *Administrative Sciences*, 10(23), 1-16. <https://doi.org/10.3390/admsci10020023>
- Chen, K. (2020). The effects of marketing on commercial banks' operating businesses and profitability: Evidence from US bank holding companies. *International*

Journal of Bank Marketing, 38(5), 1059–1079. <https://doi.org/10.1108/IJBM-08-2019-0301>

Chen, Y., Ding, Z., Liu, J., & Ma, J. (2019). Life cycle assessment of end-of-life vehicle recycling in China: A comparative study of environmental burden and benefit. *International Journal of Environmental Studies*, 76(6), 1019-1040.

<https://doi.org/10.1080/00207233.2019.1618670>

Cheung, T. Y., Fok, L., Cheang, C., Yeung, C. H., So, W. W., & Chow, C. (2018).

University halls plastics recycling: A blended intervention study. *International Journal of Sustainability in Higher Education*, 19(6), 1038-1052.

<https://doi.org/10.1108/IJSHE-10-2017-0175>

Cheung, Y. T., Chow, C.-F., & So, W. W.-M. (2017). A train-the-trainer design for green ambassadors in an environmental education programme on plastic waste recycling. *International Research in Geographical & Environmental*

Education, 27(1), 24-28. <https://doi.org/10.1080/10382046.2017.1285138>

Chow, C., So, W. W., & Cheung, T. (2016). Research and development of a new waste collection bin to facilitate education in plastic recycling. *Applied Environmental Education and Communication*, 15(1), 45-57.

<https://doi.org/10.1080/1533015X.2016.1141723>

Chowdhury, M. S., Ahmmed, F., & Hossain, M. I. (2020). Methodological dilemma in microfinance research: Applicability of a qualitative case study design.

Qualitative Report, 25(2), 271-290. <http://nsuworks.nova.edu/tqr/>

- Cioca, L. I., Ferronato, N., Viotti, P., Magaril, E., Ragazzi, M., Torretta, V., & Rada, E. C. (2018). Risk assessment in a materials recycling facility: Perspectives for reducing. *Resources*, 7, 1-10. <https://doi.org/10.3390/resources7040085>
- Clarke, E., & Visser, J. (2019). Pragmatic research methodology in education: Possibilities and pitfalls. *International Journal of Research & Method in Education*, 42(5), 455-469. <https://doi.org/10.1080/1743727X.2018.1524866>
- Colombijn, F. (2020). Secrecy at the end of the recycling chain: The recycling of plastic waste in Surabaya, Indonesia. *Worldwide Waste*, 3(1), 1-10
<https://doi.org/10.5334/wwwj.43>
- Costantino, K., Long, J., Hansen, S., Miller, E., & Eastwood, J. (2018). Qualitative exploration of enablers and barriers to interagency collaboration from the perspectives of senior managers and executive staff including social network analysis. *International Journal of Integrated Care (IJIC)*, 18, 1–2.
<https://doi.org/10.5334/ijic.s2338>
- Dhanalakshmi, T. (2019). Cost benefit and economic return on productivity of reuse and recycle in Ernakulam. *Productivity*, 60(3), 264-273.
<https://doi.org/10.32381/PROD.2019.60.03.4>
- De Lucia, C., & Paziienza, P. (2019). Market-based tools for a plastic waste reduction policy in agriculture: A case study in the south of Italy. *Journal of Environmental Management*, 250(1), 1-8. <https://doi.org/10.1016/j.jenvman.2019.109468>
- De Weerd, L., Sasao, T., Compernelle, T., Van Passel, S., & De Jaeger, S. (2020). The effect of waste incineration taxation on industrial plastic waste generation: A

panel analysis. *Resources, Conservation & Recycling*, 157, 1-9.

<https://doi.org/10.1016/j.resconrec.2020.104717>

Dijkgraaf, E., & Gradus, R. (2020). Post-collection separation of plastic waste: Better for the environment and lower collection costs? *Environmental & Resource Economics*, 77(1), 127–142. <https://doi.org/10.1007/s10640-020-00457-6>

Ellis, P. (2019). The language of research (part 20): Understanding the quality of a qualitative paper (2). *Wounds UK*, 15(1), 110-111. <http://www.wounds-uk.com>

Engward, H., & Goldspink, S. (2020). Lodgers in the house: Living with the data in interpretive phenomenological analysis research. *Reflective Practice*, 21(1), 41-53. <https://doi.org/10.1080/14623943.2019.1708305>

Eriksen, M. K., Damgaard, A., Boldrin, A., & Astrup, T. F. (2019). Quality assessment and circularity potential of recovery systems for household plastic waste. *Journal of Industrial Ecology*, 23(1): 156-168. <https://doi.org/10.1111/jiec.12822>

Evinemi, O. T., & Afon, A. O. (2016). Solid waste storage, collection and disposal practices in private health institutions in Ibadan, Nigeria. *Management Research & Practice*, 8(4), 53-62. <http://mrp.ase.ro/>

Ezeudu, O. B., & Ezeudu, T. S. (2019). Implementation of circular economy principles in industrial solid waste management: Case studies from a developing economy (Nigeria). *Recycling*, 4(4), 1-18. <https://doi.org/10.3390/recycling4040042>

Faisal, U., Gopakumar, T. P., & Muneer, T. K. (2018). Sustainable student entrepreneurship scheme in plastic waste management for K-12 educational

institutions. *International Management Review*, 14(2), 11-17.

<http://www.usimr.org/>

Faraca, G., Martinez-Sanchez, V., & Astrup, T. F. (2019). Environmental life cycle cost assessment: Recycling of hard plastic waste collected at Danish recycling centres. *Resources, Conservation & Recycling*, 143, 299–309. [https://doi-](https://doi.org/j.resconrec.2019.01.014)

[org/j.resconrec.2019.01.014](https://doi.org/j.resconrec.2019.01.014)

Fernández, F. C., Serrano-Ibáñez, E. R., Ruiz-Párraga, G. T., Ramírez Maestre, C., Esteve, Z. R., & López, M. A. E. (2018). Effective therapies for the treatment of complex posttraumatic stress disorder: A qualitative systematic review. *Salud Mental*, 41(2), 81-90. <https://doi.org/10.17711/SM.0185-3325.2018.013>

<https://doi.org/10.17711/SM.0185-3325.2018.013>

Foschi, E., & Bonoli, A. (2019). The commitment of packaging industry in the framework of the European strategy for plastics in a circular economy. *Administrative Sciences (2076-3387)*, 9, 1-13.

<https://doi.org/10.3390/admsci9010018>

Gabriel, D. S., Isnandar, D., & Jeremia, A. (2018). Plastic packaging material value conservation and evident of the consumers' acceptance. *Key Engineering Materials*, 773, 390-385.

<https://doi.org/10.4028/www.scientific.net/KEM.773.390>

Gall, M., Wiener, M., Chagas de Oliveira, C., Lang, R. W., & Hansen, E. G. (2020). Building a circular plastics economy with informal waste pickers: Recyclate quality, business model, and societal impacts. *Resources, Conservation &*

Recycling, 156, 1-11. <https://doi.org/10.1016/j.resconrec.2020.104685>

- Gardas, B. B., Raut, R. D., & Narkhede, B. (2019). Identifying critical success factors to facilitate reusable plastic packaging towards sustainable supply chain management. *Journal of Environmental Management*, 236, 81–92.
<https://doi.org/10.1016/j.jenvman.2019.01.113>
- Gaskins, T. J. (2019). *Strategies for small business survival for longer than 5 years* (Publication No. 8919) [Doctoral dissertation, Walden University]. ScholarWorks.
- Genç, A., Zeydan, O., & Sarac, S. (2019). Cost analysis of plastic solid waste recycling in an urban district in Turkey. *Waste Management & Research: The Journal of the International Solid Wastes & Public Cleansing Association, ISWA*, 37(9), 906-913. <https://doi.org/10.1177/0734242X1985>
- Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, use, and fate of all plastics ever made. *Science Advances*, 3, 1-5. <https://doi.org/10.1126/sciadv.1700782>
- Gerig, S. (2018). *Skills that small business owners use to succeed beyond 5 years* (Publication No. 6132)[Doctoral Dissertation, Walden University]. ScholarWorks.
- Ghasabeh, M. S. (2021). Transformational Leadership: Implementing a Cultural Approach in Organizations. *The Journal of Values-Based Leadership*, 14(1), 1-15.
<https://scholar.valpo.edu>
- Goldstein, J. (2017). A pyrrhic victory? The limits to the successful crackdown on informal-sector plastics recycling in Wenan County, China. *Modern China*, 43(1), 3-35. <https://doi.org/10.1177/0097700416645882>

- Guest, G., Namey, E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. *PLoS ONE*, *15*(5), 1-17.
<https://doi.org/10.1371/journal.pone.0232076>
- Hanna, E. G. (2019). Recycling of waste mixed plastics blends (PE/PP). *Journal of Engineering Science & Technology Review*, *12*(2), 87-92.
<https://doi.org/10.25103/jestr.122.12>
- Hamilton, J. B. (2020). Rigor in qualitative methods: An evaluation of strategies among underrepresented rural communities. *Qualitative Health Research*, *30*(2), 196-204. <https://doi.org/10.1177/1049732319860267>
- Hargis, H. (2020). Recorded participant ethnography in family homes: Children, social class, and the role of the researcher. *BMS: Bulletin de Methodologie Sociologique (Sage Publications Ltd.)*, *146*(1), 37-55.
<https://doi.org/10.1177%2F0759106320908221>
- Hassanpour, M. (2015). A survey of economic indices of plastic wastes recycling industry. *Iranian Journal of Health, Safety and Environment*, *2*(4), 366-373.
<http://www.ijhse.ir>
- Hawryluck, L., Kalocsai, C., Colangelo, J., & Downar, J. (2019). The perils of medico-legal advocacy in ICU conflicts at the end of life: A qualitative study of what happens when advocacy and best interests collide. *Journal of Critical Care*, *51*, 149-155. <https://doi.org/10.1016/j.jcrc.2019.02.013>
- Horák, J., Kuboňová, L., Bajer, S., Dej, M., Hopan, F., Krpec, K., & Ochodek, T. (2019). Composition of ashes from the combustion of solid fuels and municipal waste in

households. *Journal of Environmental Management*, 248. 1-6.

<https://doi.org/10.1016/j.jenvman.2019.109269>

Horvath, B., Mallinguh, E., & Fogarassy, C. (2018). Designing business solutions for plastic waste management to enhance circular transitions in Kenya.

Sustainability, 10, 1-20. <https://doi.org/10.3390/su10051664>

Huang, Q., Chen, G., Wang, Y., Chen, S., Xu, L., & Wang, R. (2020). Modelling the global impact of China's ban on plastic waste imports. *Resources, Conservation & Recycling*, 154, 1-12.

<https://doi.org/10.1016/j.resconrec.2019.104607>

Huyler, D., & McGill, C. M. (2019). Research design: Qualitative, quantitative, and mixed methods approaches, by John Creswell and J. David Creswell. Thousand Oaks, CA: Sage publication, Inc. 275 pages, \$67.00 (Paperback). *New Horizons in Adult Education & Human Resource Development*, 31(3), 75–77.

<https://doi.org/10.1002/nha3.2025>

Ingram, M., Denman, C. A., Cornejo-Vucovich, E., Castro-Vasquez, M. D. C., Aceves, B., Ocejó, A. G., & De Zapien, J. G. (2019). The meta salud diabetes implementation study: Qualitative methods to assess integration of a health promotion intervention into primary care to reduce CVD risk among an underserved population with diabetes in Sonora, Mexico. *Frontiers in Public Health*, 7.

<https://doi.org/10.3389/fpubh.2019.00347>

Jang, Y.-C., Lee, G., Kwon, Y., Lim, J., & Jeong, J. (2020). Recycling and management practices of plastic packaging waste towards a circular economy in South

Korea. *Resources, Conservation & Recycling*, 158, 2-11.

<https://doi.org/10.1016/j.resconrec.2020.10479>

Jiang, H., Liu, W., Zhang, X., & Qiao, J. (2020). Chemical recycling of plastics by microwave-assisted high-temperature pyrolysis. *Global Challenges*, 4(4).1-4

<https://doi.org/10.1002/gch2.201900074>

Johnson, L. K., Dunning, R. D., Gunter, C. C., Creamer, N. G., Bloom, J. D., & Boyette, M. D. (2018). Estimating on-farm food loss at the field level: A methodology and applied case study on a North Carolina farm. *Resources, Conservation &*

Recycling, 137, 243-250. <https://doi.org/10.1016/j.resconrec.2018.05.017>

Kaliyavaradhan, S. K., Ling, T., Guo, M., & Mo, K. H. (2019). Waste resources recycling in controlled low-strength material (CLSM): A critical review on plastic properties. *Journal of Environmental Management*, 241, 383–396.

<https://doi.org/10.1016/j.jenvman.2019.03.017>

Kegler, M. C., Raskind, I. G., Comeau, D. L., Griffith, D. M., Cooper, H. L. F., & Shelton, R. C. (2019). Study design and use of inquiry frameworks in qualitative research published in “health education & behavior.” *Health Education &*

Behavior, 46(1), 24-31. <http://doi.org/10.1177/1090198118795018>

Kehinde, O., Ramonu, O. J., Babaremu, K. O., & Justin, L. D. (2020). Plastic wastes: Environmental hazard and instrument for wealth creation in Nigeria. *Heliyon*,

6(10), 1-7 <https://doi.org/10.1016/j.heliyon.2020.e05131>

Kerdlap, P., Purnama, A. R., Low, J. S. C., Tan, D. Z. L., Barlow, C. Y., & Ramakrishna, S. (2020). Environmental evaluation of distributed versus centralized plastic

waste recycling: Integrating life cycle assessment and agent-based modeling. *Procedia CIRP*, 90, 689–694.

<https://doi.org/10.1016/j.procir.2020.01.083>

Kerscher, U. (2019). Towards a sustainable future? The EU policies concerning plastics and their didactical potential for primary and secondary teaching. *Discourse & Communication for Sustainable Education*, 10(1), 47-62.

<https://doi.org/10.2478/dcse-2019-0005>

Khatib, J., Jahami, A., Elkordi, A., & Baalbaki, O. (2019). Structural performance of reinforced concrete beams containing plastic waste caps. *Magazine of Civil Engineering*, 91(7), 73-79. <https://doi.org/10.18720/MCE.91.7>

Khoo, H. H. (2019). LCA of plastic waste recovery into recycled materials, energy and fuels in Singapore. *Resources, Conservation & Recycling*, 145, 67–77.

<https://doi.org/10.1016/j.resconrec.2019.02.01>

Kian, M., & Beach, D. (2019). Implications of ethnography research method in educational and health Studies. *Social Behavior Research & Health*, 3(2), 419-427. <http://sbrh.ssu.ac.ir/>

Kim, J., & Jeong, S. (2017). Economic and environmental cost analysis of incineration and recovery alternatives for flammable industrial waste: The case of South Korea. *Sustainability*, 9, 1-16. doi:10.3390/su9091638

King, E. D. (2019). State preemption and single-use plastics: Is national intervention necessary? *Sustainable Development Law & Policy*, 20(1), 31-32.

<https://www.wcl.american.edu/org/sustainabledevelopment>

- Kodzhebash, A., & Krivence, A. (2018). Transport and logistic components of waste management strategies in the context of implementing resource-saving and environmental policy. *Economy, Ecology, Society*, 2(4), 91–102.
<https://doi.org/10.31520/2616-7107/2018.2.4-9>
- Kristina, H. J., Christiani, A., & Jobiliong, E. (2018). The prospects and challenges of plastic bottle waste recycling in Indonesia. *IOP Conference Series: Earth & Environmental Science*, 195, 1-5. <https://doi.org/10.1088/1755-1315/195/1/01202>
- Kumar, M., Barve, A., & Yadav, D. K. (2019). Analysis of barriers in implementation of Goods and Service Tax (GST) in India using interpretive structural modelling (ISM) approach. *Journal of Revenue & Pricing Management*, 18(5), 355–366.
<https://doi.org/10.1057/s41272-019-00202-9>
- Lebreton, L., & Andrady, A. (2019). Future scenarios of global plastic waste generation and disposal. *Palgrave Communications*, 5, 1-11. <https://doi.org/10.1057/s41599-018-0212-7>
- Lin, C., & Nakamura, S. (2019). Approaches to solving China's marine plastic pollution and CO₂ emission problems. *Economic Systems Research*, 31(2), 143-157.
<https://doi.org/10.1080/09535314.2018.1486808>
- Lotfian, S., Lennartsson, A., & Jokilaakso, A. (2019). Sustainable management of the plastic-rich fraction of WEEE by utilization as a reducing agent in metallurgical processes. *Applied Sciences*, 20, 4224. <https://doi.org/10.3390/app9204224>
- Lonca, G., Lesage, P., Majeau-Bettez, G., Bernard, S., & Margni, M. (2020). Assessing scaling effects of circular economy strategies: A case study on plastic bottle

- closed-loop recycling in the USA PET market. *Resources, Conservation & Recycling*, 162. 1-9. <https://doi.org/10.1016/j.resconrec.2020.105013>
- Lowe, A., Norris, A. C., Farris, A. J., & Babbage, D. R. (2018). Quantifying thematic saturation in qualitative data analysis. *Field Methods*, 30(3), 191-207. <https://doi.org/10.1177/1525822X17749386>
- Lumpkin, G. T., Bacq, S., & Pidduck, R. J. (2018). Where change happens: Community level phenomena in social entrepreneurship research. *Journal of Small Business Management*, 56(1), 24-50. <https://doi.org/10.1111/jsbm.12379>
- Lusambili, A. M., Naanyu, V., Wade, T. J., Mossman, L., Mantel, M., Pell, R., Ngetich, A., Mulama, K., Nyaga, L., Obure, J., & Temmerman, M. (2020). Deliver on your own: Disrespectful maternity care in rural Kenya. *PLoS ONE*, 15(1), 1-17. <https://doi.org/10.1371/journal.pone.0214836>
- Maciąg, M. (2019). Engagement of executive outcomes in Sierra Leone: Utility assessment. *Security and Defence Quarterly*, 27(5), 57-71. <https://doi.org/10.35467/sdq/112110>
- Maghmoumi, A., Marashi, F., & Houshfar, E. (2020). Environmental and economic assessment of sustainable municipal solid waste management strategies in Iran. *Sustainable Cities and Society*, 59(1), 1-7. <https://doi.org/10.1016/j.scs.2020.102161>
- Maisel, F., Chancerel, P., Dimitrova, G., Emmerich, J., Nissen, N. F., & Schneider-Ramelow, M. (2020). Preparing WEEE plastics for recycling: How optimal particle sizes in pre-processing can improve the separation efficiency of high

quality plastics. *Resources, Conservation & Recycling*, 154, 1-10.

<https://doi.org/10.1016/j.resconrec.2019.104619>

Mahdikhani, M., & Yazdani, B. (2020). Transformational leadership and service quality in e-commerce businesses : The role of trust and team performance. *International Journal of Law and Management*, 62(1), 23-46. <https://doi.org/10.1108/IJLMA-12-2018-0290>

Malesela, J. M. L. (2020). Midwives perceptions: Birth unit environment and the implementation of best intrapartum care practices. *Women and Birth*, 34(1), <https://doi.org/10.1016/j.wombi.2020.04.003>

Mapari, R., Narkhede, S., Navale, A., & Babrah, J. (2020). Automatic waste segregator and monitoring system. *International Journal of Advanced Computer Research*, 10(49), 172–181. <https://doi.org/10.19101/IJACR.2020.1048053>

Mattalia, G., Stryamets, N., Pieroni, A., & Söukand, R. (2020). Knowledge transmission patterns at the border: Ethnobotany of Hutsuls living in the Carpathian Mountains of Bukovina (SW Ukraine and NE Romania). *Journal of Ethnobiology & Ethnomedicine*, 16(1), 1-40. <https://doi.org/10.1186/s13002-020-00391-3>

Mattoo, A. M., Hameed, S., & Butt, A. M. (2020). Healthcare waste management: Current knowledge, attitude and practices “a study at secondary and tertiary care hospitals”. *Pakistan Journal of Medical Research*, 58(4), 187-192. <https://pjm.r.org.pk>

Mazhandu, Z. S., Muzenda, E., Mamvura, T. A., Belaid, M., & Nhubu, T. (2020).

Integrated and consolidated review of plastic waste management and bio-based

- biodegradable plastics: Challenges and opportunities. *Sustainability*, 12(8360), 8360. <https://doi.org/10.3390/su12208360>
- McManus, S. (2019). *Using transformational leadership to reduce employee turnover in hospital organizations* (Publication No. 9212) [Doctoral Dissertation, Walden University]. ScholarWorks.
- Meister, L. (2018). On methodology: How mixed methods research can contribute to translation studies. *Translation Studies*, 11(1), 66-83. <https://doi.org/10.1080/14781700.2017.1374206>
- Meng, X., Tan, X., Wang, Y., Wen, Z., Tao, Y., & Qian, Y. (2019). Investigation on decision-making mechanism of residents' household solid waste classification and recycling behaviors. *Resources, Conservation & Recycling*, 140, 224–234. <https://doi.org/10.1016/j.resconrec.2018.09.021>
- Miftari, V. (2018). Transformational leadership communication in developing countries' business environment. *Tarih Kültür ve Sanat Araştırmaları Dergisi*, 7(2), 259-264. <https://doi.org/10.7596/taksad.v7i2.1436>
- Milios, L., Christensen, L. H., McKinnon, D., Christensen, C., Rasch, M. K., & Eriksen, M. H. (2018). Plastic recycling in the Nordics: A value chain market analysis. *Waste Management*, 76, 180-189. <https://doi.org/10.1016/j.wasman.2018.03.034>
- Milios, L., Davani, A. E., & Yu, Y. (2018). Sustainability impact assessment of increased plastic recycling and future pathways of plastic waste management in Sweden. *Recycling*, 3, 1-21. <https://doi.org/10.3390/recycling3030033>

- Morgan, T. V. (2018). A creative communication on ecological issues in Nigeria. *Visual Communication, 17*, 451-460. <https://doi.org/10.1177/1470357218779105>
- Mrowiec, B. (2018). Plastics in the circular economy (C.E.). *Ochrona Srodowiska i Zasobów Naturalnych, 29*(4), 16-19. <https://doi.org/10.2478/oszn-2018-0017>
- Muise, I., Adams, M., Côté, R., & Price, G. W. (2016). Attitudes to the recovery and recycling of agricultural plastics waste: A case study of Nova Scotia, Canada. *Resources, Conservation & Recycling, 109*, 137-145. <https://doi.org/10.1016/j.resconrec.2016.02.011>
- Müller, J. M. (2019). Business model innovation in small- and medium-sized enterprises: Strategies for industry 4.0 providers and users. *Journal of Manufacturing Technology Management, 30*(8), 1127-1142. <https://doi.org/10.1108/JMTM-01-2018-0008>
- Murchison, L., Brohawn, K., Fanscali, C., Beesley, A. D., & Stafford, E. (2019). The unique challenges of afterschool research: A practical guide for evaluators and practitioners. *Afterschool Matters, 29*, 28-35. <http://www.niost.org>
- Mwanza, B. G., Mbohwa, C., & Telukdarie, A. (2018). Strategies for the recovery and recycling of plastic solid waste (PSW): A focus on plastic manufacturing companies. *Procedia Manufacturing, 21*, 686-693. <https://doi.org/10.1016/j.promfg.2018.02.172>
- Nagy, Á., & Kuti, R. (2016). The environmental impact of plastic waste incineration. *AARMS: Academic & Applied Research in Military & Public Management*

Science 15(3), 231-37. <https://folyoiratok.uni-nke.hu/nyomtatásban-megjeleno-egyetemi-folyoiratok/aarms/current-issues>

Nakatani, J., Konno, K., & Moriguchi, Y. (2017). Variability-based optimal design for robust plastic recycling systems. *Resources, Conservation & Recycling*, 116, 53-60. <https://doi.org/10.1016/j.resconrec.2016.09.020>

Nascimento, D. L. M., Alencastro, V., Quelhas, O. L. G., Caiado, R. G. G., Garza-Reyes, J. A., Lona, L. R., & Tortorella, G. (2019). Exploring industry 4.0 technologies to enable circular economy practices in a manufacturing context. *Journal of Manufacturing Technology Management*, 30(3), 607-627. <https://doi.org/10.1108/JMTM-03-2018-0071>

Nastase, C., Chaşovschi, C. E., State, M., & Scutariu, A. (2019). Municipal waste management in Romania in the context of the EU: A stakeholders' perspective. *Technological & Economic Development of Economy*, 25(5), 850-876. <https://doi.org/10.3846/tede.2019.10295>

Nation, M., Thomas, S., Combs, S., Daniels, E., Talamas, C., & Vignet-Williams, G. (2020). Improving water resilience through environmental education. *Journal of Sustainability Education*. <http://www.journalofsustainabilityeducation.org/>

National Commission for the Protection of Human Subjects in Biomedical and Behavioral Research. (1979). *The Belmont report: Ethical principles and guidelines for the protection of human subject's research*. Washington, DC: National Institutes of Health. <http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm>

- Navarrete-Hernandez, P., & Navarrete-Hernandez, N. (2018). Unleashing waste-pickers' potential: Supporting recycling cooperatives in Santiago de Chile. *World Development*, *101*, 293-310. <https://doi.org/10.1016/j.worlddev.2017.08.016>
- Neto, G. C. O., & Correia, J. M. F. (2019). Environmental and economic advantages of adopting reverse logistics for recycling construction and demolition waste: A case study of Brazilian construction and recycling companies. *Waste Management & Research: The Journal of The International Solid Wastes and Public Cleansing Association, ISWA*, *37*(2), 176-185. <https://doi.org/10.1177/0734242X18816790>
- Noorhan, F. P., Kiyoshi, D., & Akbar, A. (2016). Integrated index in consideration of appropriate plastic recycling system in waste bank operation. *MATEC Web of Conferences* *78*, 1-11. <https://doi.org/10.1051/mateconf/20167801018>
- Nnaji, C. C. (2015). Status of municipal solid waste generation and disposal in Nigeria. *Management of Environmental Quality: An International Journal*, *26*(1), 53-71. <https://doi.org/10.1108/MEQ-08-2013-0092>
- Noviarita, H., Ahmad, R. B., & Fautau, I. (2021). The impact of leadership, motivation, discipline, and wages on the performance of sharia bank employees. *Economica: Jurnal Ekonomi Islam*, *12*(1), 141–174. <https://doi.org/10.21580/economica.2021.12.1.7285>
- Nowak-Dziemianowicz, M. (2020). Critical narrative research in education: Theoretical premises and examples of inquiry. *Przegląd Badań Edukacyjnych*, *1*(30), 147-159. <https://doi.org/10.12775/PBE.2020.008>

- Nwanna-Nzewunwa, O. C., Ajiko, M. M., Motwani, G., Kabagenyi, F., Carvalho, M., Feldhaus, I., Kirya, F., Epodoi, J., Dicker, R., & Juillard, C. (2019). Identifying information gaps in a surgical capacity assessment tool for developing countries: A methodological triangulation approach. *World Journal of Surgery*, 43(5), 1185-1192. <https://doi.org/10.1007/s00268-019-04911-5>
- Office of Human Research Protections. (1979). The Belmont Report. <https://www.hhs.gov/ohrp>
- Okpara, D. A., Kharlamova, M., & Grachev, V. (2021). Proliferation of household waste irregular dumpsites in Niger Delta region (Nigeria): unsustainable public health monitoring and future restitution. *Sustainable Environment Research (2468-2039)*, 31(1), 1-10. <https://doi.org/10.1186/s42834-020-00077-1>
- Olorunshola, Y. C. (2019). *Small business sustainability strategies in the maritime industry in Lagos, Nigeria* (Publication No. 8212) [Doctoral Dissertation, Walden University]. ScholarWorks.
- Olubiyi, O., Smiley, G., Luckel, H., & Melaragno, R. (2019). A qualitative case study of employee turnover in retail business. *Heliyon*, 5(6), 1-8. <https://doi.org/10.1016/j.heliyon.2019.e01796>
- Olukanni, D. O., Pius-Imue, F. B., & Joseph, S. O. (2020). Public perception of solid waste management practices in Nigeria: Ogun state experience. *Recycling*, 5(8), 1-16. <https://doi.org/10.3390/recycling5020008>
- Olusunmade, O. F., Yusuf, T. A., & Ogunnigbo, C. O. (2019). Potential for energy recovery from municipal plastic wastes generated in Nigeria. *International*

Journal of Human Capital in Urban Management, 4 (4), 295-302.

<https://doi.org/10.22034/IJHCUM.2019.04.05>

Ondruska, J., Soos, L., Cacko, V., & Onderova, I. (2017). Construction of anti-flood barriers solved by recycling of waste plastics. *MM Science Journal*, 1696-1699

https://doi.org/10.17973/MMSJ.2017_02_2016144

Owojori, O., Edokpayi, J. N., Mulaudzi, R., & Odiyo, J. O. (2020). Characterisation, recovery and recycling potential of solid waste in a university of a developing economy. *Sustainability*, 12(5111), 1-17. <https://doi.org/10.3390/su12125111>

Oyake-Ombis, L., van Vliet, B. J. M., & Mol, A. P. J. (2015). Managing plastic waste in East Africa: Niche innovations in plastic production and solid waste. *Habitat International*, 48, 188-197. <https://doi.org/10.1016/j.habitatint.2015.03.019>

Paço, A., Jacinto, J., da Costa, J. P., Santos, P. S. M., Vitorino, R., Duarte, A. C., & Rocha-Santos, T. (2019). Biotechnological tools for the effective management of plastics in the environment. *Critical Reviews in Environmental Science & Technology*, 49(5), 410–441. <https://doi.org/10.1080/10643389.2018.1548862>

Palacios-Marqués, D., Garcia, M. G., Sánchez, M. M., & Mari, M. P. A, (2019). Social entrepreneurship and organizational performance : A study of the mediating role of distinctive competencies in marketing. *Journal of Business Research*, 101, 426-432. <https://doi.org/10/1016/j.jbusres.2019.02.004>

Panagiotakopoulos, A. (2020). Exploring the link between management training and organizational performance in the small business context. *Journal of Workplace Learning*, 32(4), 245–257. <https://doi.org/10.1108/JWL-10-2019-0121>

- Parvin, N., Coucheney, E., Gren, I.-M., Andersson, H., Elofsson, K., Jarvis, N., & Keller, T. (2022). On the relationships between the size of agricultural machinery, soil quality and net revenues for farmers and society. *Soil Security*, 6.
<https://doi.org/10.1016/j.soisec.2022.100044>
- Peltoniemi, T., & Suomi, R. (2019). Eliminating medicine waste in a Finnish university hospital: A qualitative study. *Journal of Pharmaceutical Policy & Practice*, 12(1), 1-7. <https://doi.org/10.1186/s40545-019-0188-8>
- Priya, A., Dutta, K., & Daverey, A. (2022). A comprehensive biotechnological and molecular insight into plastic degradation by microbial community. *J Chem Technol Biotechnol*, 97, 381-390. <https://doi.org/10.1002/jctb.6675>
- Qu, S., Guo, Y., Ma, Z., Chen, W.-Q., Liu, J., Liu, G., Wang, Y., & Xu, M. (2019). Implications of China's foreign waste ban on the global circular economy. *Resources, Conservation & Recycling*, 144, 252–255.
<https://doi.org/10.1016/j.resconrec.2019.01.004>
- Ragaert, K., Huysveld, S., Vyncke, G., Hubo, S., Veelaert, L., Dewulf, J., & Du Bois, E. (2020). Design from recycling: A complex mixed plastic waste case study. *Resources, Conservation & Recycling*, 155, 1-8.
<https://doi.org/10.1016/j.resconrec.2019.104646>
- Ragossnig, A. M., & Schneider, D. R. (2017). What is the right level of recycling of plastic waste? *Waste Management & Research*, 35(2), 129–131.
<https://doi.org/10.1177/0734242X16687928>

- Ramirez, A., & George, B. (2019). Plastic recycling and waste reduction in the hospitality industry: Current challenges and some potential solutions. *Economics, Management and Sustainability*, 4(1), 6-20. <https://doi.org/10.14254/jems.2019.4-1.1>
- Ramlo, S. E. (2020). Divergent viewpoints about the statistical stage of a mixed method: Qualitative versus quantitative orientations. *International Journal of Research & Method in Education*, 43(1), 93-111. <http://doi.org/10.1080/1743727X.2019.1626365>
- Raskind, I. G., Shelton, R. C., Comeau, D. L., Cooper, H. L. F., Griffith, D. M., & Kegler, M. C. (2019). A review of qualitative data analysis practices in health education and health behavior research. *Health Education & Behavior*, 46(1), 32-39. <https://doi.org/10.1177/1090198118795>
- Ribeiro, E. P., de Oliveira, U. R., César, A. S., & Fernandes, V. A. (2021). Evaluation of medicine reverse logistics practices in hospitals. *Sustainability*, 13(3496), 1-14. <https://doi.org/10.3390/su13063496>
- Ren, H., Zhou, W., Guo, Y., Huang, L., Liu, Y., Yu, Y., Hong, L., & Ma, T. (2020). A GIS-based green supply chain model for assessing the effects of carbon price uncertainty on plastic recycling. *International Journal of Production Research*, 58(6), 1705-1723. <https://doi.org/10.1080/00207543.2019.1693656>
- Rhodes, C. J. (2018). Plastic pollution and potential solutions. *Science Progress*, 101(3), 207–260. <https://doi.org/10.3184/003685018X15294876706211>

- Rickert, J., Cerdas, F., & Herrmann, C. (2020). Exploring the environmental performance of emerging (chemical) recycling technologies for post-consumer plastic waste. *Procedia CIRP*, 90, 426–431. <https://doi.org/10.1016/j.procir.2020.01.111>
- Roibu, S., Nica, A., & Hornoiu, R. (2019). Transformational or Transactional Leadership? The impact of Romanian leadership styles on hotel employees commitment to business excellence. *Quality Access to Success*, 20(171), 44-48. <http://www.srac.ro/calitatea>
- Rooshenas, L., Paramasivan, S., Jepson, M., & Donovan, J. L. (2019). Intensive triangulation of qualitative research and quantitative data to improve recruitment to randomized trials: The QuinteT approach. *Qualitative Health Research*, 29(5), 672-679. <https://doi.org/10.1177/1049732319828693>
- Ross, S. A., & Cheah, L. (2019). uncertainty quantification in life cycle assessments: exploring distribution choice and greater data granularity to characterize product use. *Journal of Industrial Ecology*, 23(2), 1-21. <https://doi.org/10.1111/jiec.12742>
- Rowe, P., Eksioglu, B., & Eksioglu, S. (2017). Recycling procurement strategies with variable yield suppliers. *Annals of Operations Research*, 249(1/2), 215-234. <https://doi.org/10.1007/s10479-015-1872-y>
- Rujnić-Sokele, M., & Pilipović, A. (2017). Challenges and opportunities of biodegradable plastics: A mini review. *Waste Management & Research: The Journal of The International Solid Wastes And Public Cleansing Association, ISWA*, 35(2), 132-140. <https://doi.org/10.1177/0734242X16683272>

- Santander, P., Cruz Sanchez, F. A., Boudaoud, H., & Camargo, M. (2020). Closed loop supply chain network for local and distributed plastic recycling for 3D printing: A MILP-based optimization approach. *Resources, Conservation & Recycling*, 154, 1-17. <https://doi.org/10.1016/j.resconrec.2019.104531>
- Samrak, N. A., Jia, Y., Sharshar, M. M., Mu, T., Yang, M., Peh, S., & Xing, J. (2020). Recent advances in biocatalysts engineering for polyethylene terephthalate plastic waste green recycling. *Environment International*, 145(1), 1-18. <https://doi.org/10.1016/j.envint.2020.106144>
- Satapathy, S. (2017). An analysis of barriers for plastic recycling in the Indian plastic industry. *Benchmarking: An International Journal*, 24(2), 415-430. <https://doi.org/10.1108/BIJ-11-2014-0103>
- Satchatippavarn, S., Martinez-Hernandez, E., Leung Pah Hang, M. Y., Leach, M., & Yang, A. (2016). Urban biorefinery for waste processing. *Chemical Engineering Research & Design: Transactions of the Institution of Chemical Engineers Part A*, 107, 81-90. <https://doi.org/10.1016/j.cherd.2015.09.022>
- Saunders, M. N. K., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson Education Unlimited.
- Schirmer, B. R., Lockman, A. S., & Schirmer, T. N. (2016). Identifying evidence-based educational practices: Which research designs provide findings that can influence social change? *ScholarWorks*, 6(1), 33-42. <https://doi.org/10.5590/JERAP.2016.06.1.03>

- Schut, J. H. (2017). The challenge of recycling “problem” packages: Plastic packaging innovations can be clever and address various user needs, but they also occasionally cause headaches for recyclers. Here are 3 case studies. *Plastics Engineering*, 6, 26-29. <http://www.plasticsengineering.org>
- Sederavičiūtė, Ž. (2020). Are alternative to assessing the financial performance of companies. *Science & Studies of Accounting & Finance: Problems & Perspectives / Apskaitos Ir Finansu Mokslas Ir Studijos: Problemos Ir Perspektivos*, 14(1), 58–66. <https://doi.org/10.15544/ssaf.2020.06>
- Seid, T. (2020). *Strategies for sustaining minority-owned small businesses* (Publication No. 9692) [Doctoral Dissertation, Walden University]. ScholarWorks.
- Shirley, D., Thibodeau, L., Catz, S. L., McCoy, K., Jorenby, D. E., Safdar, N., & Sosman, J. M. (2018). Cessation-related information, motivation, and behavioral skills in smokers living with HIV. *AIDS Care*, 30(2), 131-139. <https://doi.org/10.1080/09540121.2017.1367088>
- Sharafizad, J. (2018). Informal learning of women small business owners. *Education & Training*, 60(1), 82-103. <https://doi.org/10.1108/ET-01-2017-0006>
- Sikdar, S., Siddaiah, A., & Menezes, P. L. (2020). Conversion of waste plastic to oils for tribological applications. *Lubricants*, 8(8), 1-32. <https://doi.org/10.3390/lubricants8080078>
- Smith, G. (2018). *Strategic working capital sourcing strategies for the survival of small businesses* (Publication No. 6808) [Doctoral Dissertation, Walden University]. ScholarWorks.

- So, W. W. M., & Chow, S. C. F. (2019). Environmental education in primary schools: A case study with plastic resources and recycling. *Education 3-13*, 47(6), 652-663. <https://doi.org/10.1080/03004279.2018.1518336>
- Strijker, D., Bosworth, G., & Bouter, G. (2020). Research methods in rural studies: Qualitative, quantitative and mixed methods. *Journal of Rural Studies*, 78(1), 262-270. <https://doi.org/10.1016/j.jrurstud.2020.06.007>
- Subin, R. P., Jeyanthi, S., & Rajesh, S. (2015). An approach for real time plastic waste segregation. *Applied Mechanics & Materials*, 787, 138-141. <https://doi.org/10.4028/www.scientific.net/AMM.787.138>
- Šupuković, V., Merkaš, Z., & Gajić, Z. (2019). Operational leverage as a source of profitability of business in Croatia. *Economy & Market Communication Review*, 9(1), 222-232. <https://doi.org/10.7251/EMC1901222S>
- Ssemugabo, C., Wafula, S. T., Lubega, G. B., Ndejjo, R., Osuret, J., Halage, A. A., & Musoke, D. (2020). Status of household solid waste management and associated factors in a slum community in Kampala, Uganda. *Journal of Environmental & Public Health*, 1, 1-11. <https://doi.org/10.1155/2020/6807630>
- Sweet, B., & Parker, E. C. (2019). Female vocal identity development: A phenomenology. *Journal of Research in Music Education*, 67(1), 62-82. <https://doi.org/10.1177/0022429418809981>
- Tănase, M. (2020). Influence of transformational leadership on innovation in organizations. *Network Intelligence Studies*, 8(15), 81-89. <http://nis.bxb.ro/>

- Tang, C., Zhu, Y., Blackley, S. V., Plasek, J. M., Wan, M., Zhou, L., Ma, J., & Bates, D. W. (2019). Visualizing literature review theme evolution on timeline maps: Comparison across disciplines. *IEEE Access, Access, IEEE*, 7, 90597-90607. <https://doi.org/10.1109/ACCESS.2019.2925706>
- Tarun, K., Sreelakshmi, K., & Peeyush, K. P. (2019). Segregation of plastic and non-plastic waste using convolutional neural network. *IOP Conference Series: Materials Science & Engineering*, 561, 1-7. <https://doi.org/10.1088/1757-899X/561/1/012113>
- Tansel, B. (2020). Increasing gaps between materials demand and materials recycling rates: A historical perspective for evolution of consumer products and waste quantities. *Journal of Environmental Management*, 276, 1-10. <https://doi.org/10.1016/j.jenvman.2020.111196>
- Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative Nursing*, 7(3), 155-163. <https://doi.org/10.5281/zenodo.2552022>
- Tiew, K., Basri, N. E. A., Deng, H., Watanabe, K., Zain, S. M., & Wang, S. (2019). Comparative study on recycling behaviors between regular recyclers and nonregular recyclers in Malaysia. *Journal of Environmental Management*, 237(1), 255-263. <https://doi.org/10.1016/j.jenvman.2019.02.033>
- Tomaszewski, L. E., Zarestky, J., & Gonzalez, E. (2020). Planning Qualitative Research: Design and Decision Making for New Researchers. *International Journal of Qualitative Methods*, 19, 1-7. <https://doi.org/10.1177/1609406920967174>

- Torres, F. G., & Cornejo, H. (2016). The need for technical improvement in the plastics recycling industry in middle-income countries: The Peruvian case. *Progress in Rubber, Plastics & Recycling Technology*, 32(4), 201-212.
<https://doi.org/10.1177/147776061603200402>
- Townsend, R. E. (2019). *Leadership strategies for reducing operational costs in waste management businesses in Liberia* (Publication No. 8025) [Doctoral Dissertation, Walden University]. ScholarWorks.
- Tran, V., Porcher, R., Tran, V., & Ravaud, P. (2017). Predicting data saturation in qualitative surveys with mathematical models from ecological research. *Journal of Clinical Epidemiology*, 82, 71–78.
<https://doi.org/10.1016/j.jclinepi.2016.10.001>
- Trochim, W. M. K. (March 10, 2020). Knowledge base [Internet webpage].
<https://conjointly.com/kb/>
- Tugce, C. U., & Demirkaya, H. (2020). The role and importance of social studies in the education of gifted students. *Journal of History, Culture & Art Research / Tarih Kültür ve Sanat Arastirmalari Dergisi*, 9(2), 25-39.
<https://doi.org/10.7596/taksad.v9i2.2344>
- Turner, S., & Endres, A. (2017). Strategies for enhancing small business owners' success rates. *ScholarWorks*, 16(1), 34-49. <https://doi.org/10.5590/IJAMT.2017.16.1.03>
- Vaismoradi, M., & Snelgrove, S. (2019). Theme in qualitative content analysis and thematic analysis. *Forum: Qualitative Social Research*, 20(3), 1-14.
<https://doi.org/10.17169/fqs-20.3.3376>

- Van Nuil, J. I., Nguyen, T. T. T., Le Nguyen, T. N., Nguyen, V. V. C., Chambers, M., Ta, T. D. N., Merson, L., Nguyen, T. P. D., Hoang, M. T. V., Parker, M., Bull, S., & Kestelyn, E. (2020). Researcher and study participants' perspectives of consent in clinical studies in four referral hospitals in Vietnam. *BMC Medical Ethics*, *21*(4), 1-12. <https://doi.org/10.1186/s12910-020-0445-z>
- Vargas, M. A. d. O., & Mancía, J. R. (2019). The importance and earnest of the researcher in pointing out the study limitations. *Revista Brasileira De Enfermagem*, *72*(4), 832-833. <http://doi.org/10.1590/0034-7167-2019-720402>
- Wadams, M., & Park, T. (2018). Qualitative research in correctional settings: Researcher bias, western ideological influences, and social justice. *Journal of Forensic Nursing*, *14*(2), 72-79. <https://doi.org/10.1097/JFN.0000000000000199>
- Wagner, S., & Schlummer, M. (2020). Legacy additives in a circular economy of plastics: Current dilemma, policy analysis, and emerging countermeasures. *Resources, Conservation & Recycling*, *158*. 1-12. <https://doi.org/10.1016/j.resconrec.2020.104800>
- Walton, D. M., Mehta, S., Seo, W., & MacDermid, J. C. (2020). Creation and validation of the 4-item BriefPCS-chronic through methodological triangulation. *Health & Quality of Life Outcomes*, *18*(1), 1-9. <https://doi.org/10.1186/s12955-020-01346-8>
- Wang, C., Zhao, L., Lim, M. K., Chen, W., & Sutherland, J. W. (2020). Structure of the global plastic waste trade network and the impact of China's import Ban. *Resources, Conservation & Recycling*, *153*, 1-12. <https://doi.org/10.1016/j.resconrec.2019.104591>

- Warren, G. E., & Szostek, L. (2017). Small business strategies for sustainability beyond 10 years. *ScholarWorks*, 16(1), 111-122.
<https://doi.org/10.5590/IJAMT.2017.16.1.07>
- Wei, R., & Zimmermann, W. (2017). Microbial enzymes for the recycling of recalcitrant petroleum-based plastics: How far are we? *Microbial Biotechnology*, 10(6), 1308-1322. <https://doi.org/10.1111/1751-7915.1271>
- Xin, C., Zhang, T., Tsai, S., Zhai, Y., & Wang, J. (2020). An empirical study on greenhouse gas emission calculations under different municipal solid waste management strategies. *Applied Sciences*, 10(5), 1-23.
<https://doi.org/10.3390/app10051673>
- Yang, H., & Yang, J. (2019). The effects of transformational leadership, competitive intensity and technological innovation on performance. *Technology Analysis & Strategic Management*, 31(3), 292–305.
<https://doi.org/10.1080/09537325.2018.1498475>
- Yazdani, S., Andarvazh, M. R., & Afshar, L. (2020). What is hidden in hidden curriculum? A qualitative study in medicine. *Journal of Medical Ethics & History of Medicine*, 13(4), 1-11. <https://doi.org/10.18502/jmehm.v13i4.2843>
- Yee, K. C., Wong, M. C., & Turner, P. (2017). Qualitative research for patient safety using ICTs: Methodological considerations in the technological age. *Studies in Health Technology and Informatics*, 241, 36–42. <https://doi.org/10.3233/978-1-61499-794-8-36>
- Yin, R. K. (2018). *Case study research: Design and methods* (6th ed.). Sage.

- Yuan, Y., Lu, L. Y., Tian, G., & Yu, Y. (2020). Business strategy and corporate social responsibility. *Journal of Business Ethics*, 162(2), 359-377.
<https://doi.org/10.1007/s10551-018-3952-9>
- Yulianeu, A., Ferdinand, A. T., & Purnomo, R. (2020). The analysis of transformational leadership models in improving the MSME's performance in the East Priangan-West Java Indonesia. *Talent Development & Excellence*, 12(3), 3268-3288.
<http://www.iratde.com>
- Zhang, D., Hao, M., Chen, S., & Morse, S. (2020). Solid waste characterization and recycling potential for a university campus in China. *Sustainability*, 12(3086), 1-19. <https://doi.org/10.3390/su12083086>
- Zhen, L. (2020). A bi-objective model on multiperiod green supply chain network design. *IEEE Transactions on Systems, Man, and Cybernetics: Systems, Systems, Man, and Cybernetics: Systems*, *IEEE Transactions on, IEEE Trans. Syst. Man Cybern, Syst*, 50(3), 771–784. <https://doi.org/10.1109/TSMC.2017.2690444>
- Zheng, T., Ardolino, M., Bacchetti, A., & Perona, M. (2021). The applications of Industry 4.0 technologies in manufacturing context: A systematic literature review. *International Journal of Production Research*, 59(6), 1922–1954.
<https://doi.org/10.1080/00207543.2020.1824085>
- Zwane, M., Kanyangale, M., & Ndoro, T. (2019). Shaping the organizational architecture for SME survival: A case of nascent small restaurants in Durban. *African Journal of Hospitality, Tourism and Leisure*, 8, 1-17. [http://: www.ajhtl.com](http://www.ajhtl.com)

Appendix A: Interview Protocol

- I. Introduce self to the participant(s).
- II. Present consent form, go over contents, answer questions and concerns of participant(s).
- III. Participant signs the consent form.
- IV. Give the participant a copy of the consent form.
- V. Turn on the recording device.
- VI. Follow the procedure to introduce participant(s) with pseudonym/coded identification, and note the date and time.
- VII. Begin the interview with Question 1, and follow through to the final question.
- VIII. Follow up with additional questions.
- IX. End interview sequence; discuss member checking with the participant(s).
 - a. Thank the participant(s) for their parts in the study.
 - b. Reiterate the participant's contact number for the follow-up questions and concerns from participants.
- X. End protocol. Concluded the interview.

Appendix B: Interview Questions

The open-ended semistructured interview questions are as follows:

1. What strategies do you use to improve profitability in your plastic recycling business?
2. What key challenges did you encounter in using the strategies?
3. How did you overcome the key challenges?
4. How did you assess the effectiveness of the strategies for improving the profitability of your plastic recycling business?
5. What strategies have been most effective in improving profitability in your organization's plastic recycling business?
6. What other information on strategies for improving your organization's plastic recycling business's profitability can you provide?

Appendix C: Introductory Letter

Date

Dear (Participant Name),

Chukwudi Amene
[address redacted]

November 1, 2021

Dear Sir/Madam:

Based on the requirement for my doctoral research at Walden University, I would like to invite you to participate in a research study I am conducting to explore strategies small business owners of plastic recycling businesses use to improve their profitability. I am contacting you to participate because you are a small scale plastic recycling business in Southwest Nigeria. The data collected will be confidential, and participation is voluntary.

If you are willing to participate in the study, please review the enclosed consent form carefully and let me know if you have any questions. As a researcher, my role is to ensure each participant understands all aspects of the research before the participant consent to the interview. The interview should last about 20 minutes and includes questions about your strategies and experiences as a small plastic recycling business owner. I will record the interview, and you will have the opportunity to review the transcribed interview for accuracy before inclusion in the study. Your participation is valuable for the success of the study. Thank you for your time and cooperation.