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ABSTRACT

This research explores the factors currently influencing the sustainability of the steelpan manufacturing industry in Trinidad and Tobago. Emphasis is placed on factors such as the availability of labour, availability of funding for machinery and raw materials, access to funding, the effectiveness of education and training programs for steelpan manufacturing, and the availability of raw materials. Using qualitative inquiry methods, a total of five steelpan artisans and two managers of steelpan manufacturing companies were interviewed. The perspectives of these industry professionals were compiled and referenced throughout this Caribbean Studies Project.

The research emphasizes that in order to maintain Trinidad and Tobago's steelpan manufacturing industry, the availability of labour, access to funding, effective education/training programs and access to raw materials are essential.

Keywords: Steelpan Manufacturing, Steelpan Artisan, Steelpan Manufacturing Industry, 55-gallon steel drum, Steelpan Tuner, Steelpan Builder.

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INTRODUCTION

The Steelpan, also called the Steel drum, is classified as an idiophone according to Hornbostel–Sachs classification of instruments (Instrument classification). The instrument was invented in Trinidad and Tobago and was credited to be made by the late Winston "Spree" Simon in the 1930s; his experimentation with metal tins and pans resulted in the creation of the first steelpan that could play an entire melody on its own (Much).

To date, the Steelpan is the only acoustic instrument to be created in the 20th century (Roberts). The instrument is now a vital part of Trinidad and Tobago's cultural landscape, as well as a distinct symbol of the nation's heritage. Additionally, due to the continued growth of the steelpan manufacturing industry in Trinidad and Tobago, a small number self-employed steelpan artisans and companies have emerged to cater to the growing local and foreign markets. However, looking into the sustainability of the steelpan manufacturing industry in Trinidad and Tobago, it is evident that the future growth and development of the industry is influenced by an array of challenges.

Thesis Statement

The availability of labour, access to adequate funding, availability of effective training and internship programmes, and the availability of materials and equipment influence the sustainability of the steelpan manufacturing industry. This study analyses and explores these factors as they relate to the steelpan manufacturing industry in Trinidad and Tobago.

Rationale

There is not much literature that addresses the importance of keeping the steelpan manufacturing industry sustainable. As a pannist, I believe that the industry represents more than just the production of high-end musical instruments; it provides a symbol of identity and embodies a legacy that is deeply intertwined in the history and culture of Trinidad and Tobago. Maintaining the sustainability Trinidad and Tobago's steelpan manufacturing industry goes well beyond economic viability; it also includes the preservation of craftmanship and artisanal skills.

I believe that it is important to examine and explore the factors which can negatively impact the sustainability of the steelpan manufacturing industry, because it can help to raise more awareness of the impacts of these factors on the industry if there is no intervention to solve these challenges. Additionally, the information shared in this study can help entities such as Pan Trinbago and The Ministry of Trade and Industry understand where faults may exist in the current industry, to implement focused mitigation measures. The content in this study is also of great benefit to the steelpan manufacturing labour force which is comprised of steelpan builders, tuners and other skilled and semi-skilled labourers as well as other entities that include the Ministry of Education, National Training Agency and the Pan in Schools Coordinating Council, as it can foster more collaboration in finding solutions to the existing challenges in the industry.

Parameters

This study focuses on factors influencing the sustainability of the steelpan manufacturing industry in Trinidad and Tobago. For this reason, the information for this study was sourced from:

1. Reputable steelpan builders and tuners with over five years of experience, operating in Trinidad and Tobago.
2. Steelpan manufacturing course facilitators operating over 5 years in Trinidad and Tobago.
3. Managers of well-known steelpan manufacturing companies in Trinidad and Tobago operating for over a year.

Methodology

Data for this study was collected and compiled using a combination of primary and secondary sources. The collection of data from primary sources was done via the use of both online and face-to face interviews which were conducted with well-known steelpan artisans Juma Simmons, Kayle Noel, Augustus Peters, Ronald Matthews and Jim Phillip, steelpan manufacturing course facilitator/educator Kayle Noel and the managers of steelpan manufacturing companies Akua Leith and Michael Cooper (refer to appendix C for sample interview). The interviews for this study were conducted over the period 11th November, 2023 to 27th March, 2024 utilizing pre-interview questionnaires which were completed by the interviewees prior to their interview, and an actual interview which featured the use of both closed and open-ended questions. Secondary sources of information included books, newspaper articles, Calypso lyrics, and various websites which contained beneficial information.

Objectives

The objectives of this study are to:

1. Examine how the availability of funding can impact the sustainability of the steelpan manufacturing industry in Trinidad and Tobago.
2. Investigate and evaluate the effectiveness of existing education and training programs for steelpan manufacturing.
3. Evaluate the role of the availability of labour and its influence on the sustainability of the steelpan manufacturing industry, considering factors such as workforce demographics, skill levels and production efficiency.
4. Investigate the challenges associated with access to raw materials and equipment within the steelpan manufacturing industry in Trinidad and Tobago.

Chapter Outline

This thesis contains three chapters.

1. Chapter one is titled “Introductions and Background to the Steelpan Manufacturing Industry.” This chapter is centred on the historical background of steelpan manufacturing, the steelpan manufacturing process, the development of the steelpan manufacturing industry in Trinidad and Tobago, as well as background information on the persons interviewed for this study.
2. Chapter two is entitled “Current Prevailing Challenges in the Steelpan Manufacturing Industry.” It presents an overview of the challenges currently affecting the performance of the industry.
3. Chapter three, titled “Presentation and Analysis of Data,” is essentially an analysis of the data collected throughout the study.
4. Chapter four, the Conclusion, features an overview of findings the of this study and will highlight the areas that require further research.

Literature Review

There are many sources with information that directly relate to steelpan manufacturing. Available sources include books, newspaper articles, theses and calypso lyrics. The books explored were based on steelpan manufacturing, highlighting areas such as tools needed, drum size, the steelpan manufacturing process and the way in which sound is produced by the steelpan. The first book explored was *"Steel Pan Tuning: A Handbook for Steel Pan Making and Tuning"* written by Swedish physicist and pannist Ulf Kronman. This book provides a comprehensive breakdown of the steps associated with making a steelpan and contains details on the tools needed for steelpan manufacturing, as wells as pertinent information on layouts, measurements and development trends (Kronman). On the other hand, the second book *"Secrets of The Steelpan"* written by Anthony Achong, a former professor at the University of The West Indies focused on the science and technology aspect of steelpan tuning and also included information about the operation of the instrument i.e. how the sound is produced. Patrick Mc Neilly's *"Hands on Steel Pan"* mentioned the ways in which the methods of making a steelpan were becoming more refined in comparison to the earlier stages of the instruments' creation. Additionally, it makes mention of the increase in the range of tools used by steelpan artisans as well as improvements in the appearance of the instruments. In this regard, Mc Neilly wrote that "The instruments no longer look basic and in a crude form, but rather chromed and uniquely hand crafted, a gem." Although the information explored in these books relate to steelpan manufacturing, these sources tend to focus on how to make a steelpan and do not go into the factors influencing the sustainability of the steelpan manufacturing industry of Trinidad and Tobago.

The articles explored were taken from the websites of well-known newspapers, Trinidad and Tobago Newsday and The Daily Express. The first article is titled “Panland Survives Tough Times”– This article was written by Julien Neaves, in 2020 and it is centred on well-known steelpan manufacturing company, Panland. While the article makes mention of financial challenges, a factor explored in this study, the challenge was outlined in relation to Panland and not Trinidad and Tobago’s steelpan manufacturing industry as a whole. The second article “A New Factory for Pan” was written by Michelle Loubon, and was published in the on the Daily Express website. This article covers the introduction of Musical Instruments of Trinidad and Tobago Company Limited (MITTCO) to the steelpan manufacturing industry. While the article mentions the importance of steelpan artisans, chrome factories and artisans who make steelpan accessories such as mallets, cases and stands, it does not go the sustainability of the industry or outline any of the challenges prevailing in Trinidad and Tobago’s steelpan manufacturing industry.

The lyrics of popular calypsos “Pan in Danger” by well-known calypsonian, Dennis Franklyn Williams (Merchant) and “Mr Pan Maker” by Leroy Calliste (Black Stalin) were focused on steelpan manufacturing and challenges being faced in the industry. The song “Pan in Danger” placed emphasis on the lack of appreciation for the steelpan in Trinidad and Tobago at the time, with the line “The whole world knows about it, and is we invent it, so why should we disregard it” referring to the period where the steelpan was becoming globally recognised. However, in the song, Merchant also questions the reason why the instrument was still suffering. Also highlighted in the song was the fact that foreign steelpan manufacturing industries were being set up.

Stalin's "Mr Pan Maker" mentions that the future of the steelpan rests within the hands of the steelpan tuners and builders. Although the song mostly focuses on the steelpan manufacturing process, Stalin highlighted the importance of building the steelpan manufacturing industry. While the information embedded in these lyrics were relevant to this study, they were not focused on the factors influencing the sustainability of the steelpan manufacturing industry and did not outline any specific challenges being faced at that time.

In addition to books, newspaper articles and calypso lyrics, three theses were explored. The first thesis titled *"Acoustics and Manufacture of Caribbean Steelpans"* by Soren Maloney of the University of Texas was focused on steelpan manufacturing, but was geared toward finding new ways to improve current steelpan manufacturing methods in the Caribbean, and does not go into the challenges being faced the steelpan manufacturing industry in Trinidad and Tobago. However, "*Microphone Techniques and Sound Production Considerations for the Double Seconds Steelpan"* written by former student Natasha Joseph, deals with resonance, the amplification techniques used and how hanging the pans contribute to the sound produced. However, this study was focused specifically on the double second steelpan. The third thesis explored was titled *"The Absence of Standardization of Mid-range Steelpan Instruments and its Effects on Steelpan Players in Trinidad and Tobago."* This study was written by Nicholan Garcia, another former student from The University of The West Indies. While this study is related to the steelpan manufacturing, it focused specifically on the layout of the notes in relation to the mid-ranged pans as well as other characteristics like placement of boreholes and does not go into the topic of steelpan manufacturing or the sustainability of the industry.

In exploring these sources, some were found to be closely related to steelpan manufacturing while others were not. However, none of the sources mentioned examined the

factors influencing the sustainability of the steelpan manufacturing industry. In addition, it was found that while there is existing literature covering the making of the steelpan and some which mention the importance of artisans in the industry, none of these writings speak of the availability of labour in the current industry or go into the effectiveness of the education and training initiatives available for steelpan manufacturing in Trinidad and Tobago. Furthermore, while there is a collection of books and articles on steelpan manufacturing outlining the size of the drums needed for steelpan manufacturing, they do not speak of the availability of the drums required. Sources explored even highlighted the existence of financial hardship, but did not expand this challenge to include the entire steelpan manufacturing industry in Trinidad and Tobago.

CHAPTER ONE

Introduction and Background to Steelpan Manufacturing

This chapter will provide information on the historical background of the steelpan manufacturing industry, as well the process associated with making a steelpan. In addition, it will include introductory information on the various interviewees, highlighting key characteristics such as their educational backgrounds and training as it relates to steelpan manufacturing, as well as their geographical area of operation.

Historical Background of Steelpan Manufacturing

In order to fully understand the challenges faced in the steelpan manufacturing industry, one must firstly understand how the steelpan came to be what it is today. When the enslaved Africans were brought to Trinidad by the French colonists, fragments of their culture such as African drums were brought with them ("Steelpan History and Development"). These drums were often used for communication purposes, but were later integrated into the carnival celebrations held by the African slaves, as they were not able to be a part of the "official" celebrations held by the French colonists ("The history of Trinidad and Tobago Carnival"). Additionally in 1877, African drumming was banned by the French colonist in an attempt to further suppress the culture of the African people. Eventually, Tamboo Bamboo emerged and took the place of the African drums in the 1890s ("Tamboo Bamboo"). However, Tamboo Bamboo was later swapped out for metal tins and pans, prior to the birth of the steelpan in the 1930s ("History of the steelpan").

The Steelpan Manufacturing Process

Steelpan manufacturing refers to the process by which raw materials such as 55-gallon steel drums are converted to steelpan instruments, using specialised machinery and labour (Steelpan manufacturing). Understanding the steelpan manufacturing process is imperative to this study because it provides an insight on what is required to make a steelpan, and gives a greater context as to why it is important to safeguard Trinidad and Tobago's steelpan manufacturing industry. There are 11 steps which are crucial in successfully creating the wide variety of steelpan instruments known today (Lewis and Ameerali). These steps include:

1. Choosing the drum – According to Noel, "the selected drum needs to have certain characteristics, such as the right thickness, and structural integrity, in order to be crafted into a high-quality steelpan." The standard drum used today is a 55-gallon drum (Caribbean Steel Bands).
2. Identifying and marking the centre – This process helps to ensure symmetry and balance in the note distribution and makes the grooving and tuning process easier (Phillip).
3. Sinking the drum – A combination of hammering techniques is used to transform the convex surface of the drum into a concave shape (Noel). Traditionally, the hammering was done by hand however, some steelpan artisans now utilize pneumatic hammers.
4. Counter sinking the drum – Adjusting the overall depth of the drum to achieve more uniformity and balance.
5. Grooving – A technique used to separate and define each note (Noel).

6. Cutting the drum – Trimming off excess material to refine the shape and size of the drum.
7. Cutting the skirt length – Cutting around the perimeter of the drum to achieve the desired length.
8. Burning or tempering the drum – Applying heat to the drum to relieve internal stress and improve structural integrity. Following this, the drums are then sprayed or splashed with water.
9. Tuning the steelpan – According to Noel "at this stage you just want to put pitches on the pan." This process is always done by hand.
10. Buffing and Polishing – Cleaning and polishing the pans before chroming or painting.
11. Fine tuning or blending the steelpan – Ensures that each note is accurately tuned for quality assurance.

The Steelpan Manufacturing Labour Force

In the early stages of steelpan manufacturing, the key labourers needed was a steelpan builder and a steelpan tuner (Steelpan manufacturing). However, the growing demand for steelpan instruments both regionally and internationally has caused a drastic need for the expansion of the steelpan manufacturing labour force in Trinidad and Tobago (Steelpan manufacturing). The creation of high-quality steelpan instruments is heavily dependent on having a labour force comprised of both of skilled and semi-skilled labourers. Thus, it is both important and necessary to explore the roles and functions of these labourers to place more emphasis on the skills needed to help the industry run effectively.

Having specific knowledge and competence in a particular field is referred to as being skilled. The skilled workers in the steelpan manufacturing industry include:

- Pan Builder/Artisan – responsible for carrying out roles that include cutting the drum and drafting the notes (Steelpan Manufacturing and Tuning).
- Pan Groover – creates lines or indentations which are used to outline and separate the notes on the steelpan (Steelpan Manufacturing and Tuning).
- Pan Tuner – responsible for pre-tuning the pan before it is sent for chroming and painting (Leith).
- Master Tuner- responsible for the final tuning and refining of what was done at the pre-tuning stage to ensure quality assurance (Leith).

The term semi-skilled worker refers persons who do not have or need extensive training or specialised abilities. The semi-skilled workers in Trinidad and Tobago's steelpan manufacturing industry include:

- Pan Workshop Helper/Apprentice – these apprentices work under the supervision of an experienced steelpan artisan (Steelpan Manufacturing and Tuning).
- Sinker – specialised in hammering techniques used to sink the drum.

For more information on the steelpan manufacturing workforce, please see the article titled "Steelpan Manufacturing and Tuning" by the National Training Agency.

Biographical Data

Within Trinidad and Tobago, there are various private steelpan manufacturer throughout the country; some of whom singlehandedly manufacture and tune the finished instruments, while others work as part of a team. There are also a few larger steelpan manufacturing companies which possess the machinery and workforce for mass production and export of the instruments, both regionally and internationally. All of the individuals interviewed for the completion of this study possess a wealth of knowledge regarding steelpan manufacturing, as well as a clear understanding on what is needed to ensure that Trinidad and Tobago's steelpan manufacturing industry remains sustainable. For these reasons, understanding the background of these individuals as it relates to steelpan manufacturing is necessary, because it helps to justify why these individuals are deemed as credible sources.

The private steelpan manufacturers interviewed for the duration of this study include:

- Ronald Matthews

Matthews operates a steelpan manufacturing company in the town of Arima, providing both steelpan building and steelpan tuning services (Matthews). He was born on September 20th, 1962 and is a Trinidadian national. Matthews also an alum of both The University of Trinidad and Tobago (UTT) and The University of The West Indies (UWI). In 1987, Matthews took part in the Pan Development Unlimited Worksop which was facilitated by Mr Barry Yates (Matthews). Shortly after he completed this workshop, he proceeded to take part in the basic pan making and pan tuning workshop at Casablanca Panyard, Belmont in 1989, where he was tutored by Oscar Williams (Matthews). In addition to this, Matthews also took part in the advanced pan tuning programme held at the Pandemonium Panyard, which was also located in Belmont, and

was tutored by Denzil Hernandez in 1993 (Matthews). In 2007, he acquired his certificate in music from UWI and his certificate in advanced steelpan tuning from UTT (Matthews).

- Kayle Noel

Kayle Noel was born on July 11th, 1987 and is a Trinidadian national (Noel). He studied at both UTT and UWI and received his training in steelpan manufacturing from UWI Faculty of Engineering, Jimi Phillip's Steelpan manufacturing facility, UTT, Metal Industry Company, Panmax Studios and Terrance Sheppard Pan Manufacturing facilities (Noel). Noel is both a steelpan builder and tuner, as well as a full-time musician with the National Steel Symphony Steel Orchestra of Trinidad and Tobago (NSSOTT), and a part-time lecturer at UTT (Noel). Currently, Noel works independently and conducts business in the city of Port of Spain (Noel).

- Augustus Peters

Augustus Peters was born in Trinidad and Tobago on August 17th, 1986. His pursuit of a career in steelpan manufacturing began in 2010 at the University of Trinidad and Tobago, where he acquired his training in advanced steelpan tuning. Peters also received additional training through the Pan in Schools Coordinating Council pan tuning course, where he was tutored by Jim Philip. He is now both a steelpan tuner and builder operating out of the East-West corridor, Trinidad where he manufactures and sells steelpans independently.

- Juma Simmons

Juma Simmons, born August 3rd, 1985, in Trinidad and Tobago, is a well-known steelpan tuner and builder (Simmons). His career in the field of steelpan manufacturing began with formal schooling at The University of Trinidad and Tobago in 2009, where he acquired both theoretical and hands-on knowledge on steelpan manufacturing (Simmons). In 2010, Juma began training at

Panland, where he was mentored by renowned steelpan artisan Mario Joseph (Simmons). This apprenticeship helped him improve his talents and abilities which allowed him to refine his craft. Though he is younger than most of his peers in the business, Juma is regarded as a highly experienced steelpan artisan and currently provides full tuning and manufacturing services in the Port of Spain area.

- Jim "Jimi" Phillip

Jim Phillip, born November 1st, 1951, is a well-known steelpan innovator and tuner (Phillip). His career in steelpan manufacturing began in 1967, where he was trained and mentored by top tuner, Wallace Austin (Phillip). While Phillip has a passion for the craft, he stated that it is not an easy thing to do, as it is very labour intensive (Phillip). However, despite this factor, Phillip continued to work at his craft, which lead to the craftsmanship and invention of many high-end instruments and accessories which include the collapsable pan stands, portable cello pans, as well as the development of tools specifically used to make steelpans. Phillip's company is currently located in Chaguanas, Trinidad and offers a wide variety of steelpan manufacturing services (Phillip).

There are two larger steelpan manufacturing companies operating in Trinidad and Tobago. For the purpose of this study, the Managers/Presidents of the following companies were interviewed:

- Panland Trinidad and Tobago Limited

Panland is a steelpan manufacturing company which was first established in 1993, known then as Trinidad and Tobago Instruments limited (Cooper). According to Cooper, "The company was rebranded in 2006, and became known as Panland Trinidad and Tobago

Limited." Panland is situated in Laventille, Trinidad and has been in operation for over 17 years (Cooper). The company currently produces a wide variety of steelpan instruments and accessories, inclusive of the miniature steelpan; a popular steelpan souvenir and musical instrument. The company's president and chief executive officer (C.E.O) is Michael Cooper.

Before Panland was founded, Cooper served as the former C.E.O of the Neal and Massy Group of Companies, which was regarded as one of the largest private sector groups in the Caribbean region (Cooper). He currently holds a Bachelor of Science Degree in Engineering from the University of the West Indies, as well as a Masters of Science Degree from Case Western Reserve University (Cooper). Although he holds a prominent background in engineering, Cooper has made many contributions to the steelpan fraternity. These contributions range from founding Panland Trinidad and Tobago to serving as the chairman of the Laventille Steelband Festival Foundation, and earning numerous awards for his leadership which served as a positive highlight for the steelpan manufacturing industry (Cooper).While Cooper did not have an extensive educational background in steelpan manufacturing, he stated that he has learned a lot along the way and that his company is responsible for training many of the tuners and builders who are now popular today (Cooper).

- Musical Instruments of Trinidad and Tobago Company Limited (MITTCO)

MITTCO is a steelpan manufacturing company that was established on August 11th 2022, which is now globally known as World Steelpan Day. The company was founded based on the vision of Director, Akua Leith who wanted to create a steelpan manufacturing ecosystem which would focus on creating high quality steelpan instruments, while providing year-round employment for steelpan craftmanship (Leith). Since being established, MITTCO

has supplied numerous schools and conventional steelbands with high quality steelpan instruments locally, and continues to export steelpan instruments both regionally and internationally (Leith).

Before MITTCO was established, Leith worked briefly at Panland and went on to earn his BA in Musical Arts from the UWI, and later received a Fulbright scholarship to pursue his masters in steelpan performance and conducting at the Northern Illinois University. After receiving his masters, Leith returned to Trinidad and served as the Artistic Director and Conductor of the National Steel Symphony Orchestra of Trinidad and Tobago (Leith). Akua has since steeped down from this position in order to direct all of his focus to MITTCO, as he believes it is what was necessary to ensure MITTCO's continued success (Leith).

CHAPTER TWO

Current Prevailing Challenges in the Steelpan Manufacturing Industry

Breakdown of Prevailing Challenges

There are numerous challenges which are currently affecting Trinidad and Tobago's steelpan manufacturing industry. These challenges range from a lack of raw materials which are necessary for the production of steelpan instruments, decrease in the availability of labour in the steelpan manufacturing industry due to the aging workforce, the struggle to secure adequate funding for materials, tools and machinery and the effectiveness of existing training and education programs for steelpan manufacturing. Despite the instruments' resilience and enduring global appeal, the future growth and development of the industry remains threatened by the existence of these challenges.

The Availability of Raw Materials

A primary challenge explored in this chapter is the availability of raw materials. In order to successfully run steelpan manufacturing company, steelpan artisans need to have 55-gallon steel drums readily available, which would allow them to craft steelpan instruments of superior quality. Although there is a steel drum factory located in East Trinidad, the supply of drums for steelpan manufacturing is not always consistent (Noel). This drum factory is run by Pan Trinbago, the governing body for steelpan in Trinidad and Tobago; However, according to Noel, "the drums are not of the best quality for steelpan manufacturing." Also sharing this view were popular steelpan tuners, Juma Simmons, Augustus Peters and Ronald Matthews. As a result, steelpan tuners and builders have started sourcing drums from foreign suppliers, in search of better-quality drums and a consistent supply (Noel). In addition, some steelpan tuners such Ronald Matthews highlighted that there are recycled drums which are being used. However,

these were used to store chemicals and, as a result, the drums may contain harmful residue which have caused some steelpan artisans to become ill (Matthews). Also adding to this was Juma Simmons, who stated that he had a fellow colleague who fell ill from using those drums, but he eventually died (Simmons). Matthews also shared that sometimes artisans have no choice but to use the toxic drums if it is all that is available to them (Matthews). Also, in an interview with Simmons, he shared that he was currently in London in search of a supplier for drums, which further highlights that there is a lack of raw materials in Trinidad and Tobago (Simmons). In addition, well-known steelpan innovator Jim Phillip, stated that he has started using metal sheets to make his pans, when he is unable to acquire drums (Phillip). According to Phillip, "he simply uses whatever is available to him at the time" (Phillip).

This issue poses an even bigger challenge for steelpan manufacturing companies such as MITTCO and Panland, as these companies are mass producing steelpan instruments on a much larger scale than that of smaller, private owned steelpan manufacturing companies. Prior to the start of MITTCO's operations, the Director of Business, Akua Leith, had been made aware of the drum shortage; yet, he maintained a positive perspective. Currently, MITTCO's day to day operations are unaffected by the drum shortage in Trinidad and Tobago, as the company has managed to successfully acquire drums from a Japanese drum factory, and have since maintained that relationship (Leith). However, while the company's supply of drums is consistent at this time, Leith stated that there have been challenges which have caused some minor issues along the way with their current supplier (Leith). Some of these challenges include:

- The language Barrier- this caused a breakdown in communication between MITTCO and their supplier (Leith).

- Currency- in order to purchase the drums from Japan, the company needed to have Japanese currency readily available (Leith). But, according to Leith, “the currency was not always easy to acquire.”
- Shipping- because the drums were coming from Japan, it took some time before they were received (Leith).

Although these challenges have caused some minor issues with the company’s supply, Leith stated that as challenges arise, the company learns and improves where necessary (Leith).

Regarding Panland, the company's President, Michael Cooper, stated that “as a result of the drum shortage, Panland has resorted to acquiring drums from different suppliers around the region.” This highlights Panland's difficulties in maintaining a steady supply, causing reliance on different suppliers to meet their manufacturing needs.

The Availability of Labour

Another challenge explored in this study was the availability of labour in Trinidad and Tobago’s steelpan manufacturing industry. This factor poses a significant threat to the future of the steelpan manufacturing industry, because without artisans, there is no industry. According to Leith “there is a gap of almost 60 years between the older artisans who are either on their way to retirement or already retired, and the few younger artisans who are taking over from them.” This means that the current labour force is aging and there are not enough new artisans being added to the labour force to help to bridge the gap. Leith stated that while there have been strides towards training and apprenticeship, new artisans are simply not being added to the labour force fast enough. Also, according to Leith “there are not many persons who can make a steelpan of good quality; however, the few that can, are overbooked and overworked.” To paint an even clearer

picture of how limited steelpan artisans and tuners are in the industry, Leith revealed that although MITTCO employs the majority of artisans and tuners in the industry, the few that are not hired by MITTCO are called in and paid to do specific jobs, to help the company complete large orders (Leith). This is not only practiced at MITTCO; in fact, this is a common practice in the industry specifically, during peak times e.g. Carnival season, due to the lack of labourers available. Additionally, the lack of labour does not stop at artisans and tuners; it also affects the production and availability of steelpan accessories (Noel). Some of the essential steelpan accessories needed by the steelpan manufacturing companies include:

- Collapsable steelpan stands – these stands are used to hang the pans and steelpan artisans use these stands as part of their packaging of the finished product specifically, for individual orders. However, they are also requested by some steelbands. Currently, there are few persons who make these collapsable stands in Trinidad and Tobago. One such person is steelpan innovator, tuner and builder, Jim Phillip who was the first to create the collapsable pan stand. But, according to Noel, "due to the high demand, they are not always available when needed."
- Pan cases – these are used to protect the instruments. Currently pan cases are made by local supplier, Sarah's Pan Case.

The Effectiveness of Education and Training Programs for Steelpan Manufacturing

Another pressing issue which can negatively impact the future growth and development of the steelpan manufacturing industry in Trinidad and Tobago is the effectiveness of the education and training programs available for steelpan manufacturing. Although there are some training

programs already in place, not enough steelpan tuners and builders are being produced. Some of the steelpan manufacturing training programs currently available include:

- Introduction to Steelpan Manufacturing – this course is available at the University of Trinidad and Tobago, and it is taught by well-known steelpan artisan, Kayle Noel; the course is available to any student who is interested in taking it (Noel). According to Noel, "there have been some students who have shown great potential, but none of the students continue with the craft after completing the course." Noel also stated that the reason for this could be that students take the course because they simply need the credit, and not because they are actually interested in pursing a career in steelpan manufacturing. However, he shared that the course is very hands on and that students get the opportunity to apply the skills learnt, as the course progresses (Noel).
- Steelpan Construction – this programme is currently available through the Youth Training and Education Partnership Programme (YTEPP). This course provides students with both theoretical and practical knowledge associated with steelpan manufacturing. However, it has not produced any new steelpan artisans to add to the labour force, and not many people take the course. According to Simmons, the reason for this could be that after completing courses like these, persons who may actually be interested in furthering themselves in the field do not have the resources to do so, which causes them to become discouraged (Simmons).
- Steelpan manufacturing – this course is available through the MIC Institute of Technology. This programme is yet another programme that has not produced any new artisans in the last 5 years.

- There are also secondary schools which offer steelpan manufacturing as a Continuous Vocational Qualification. For example, Chaguanas North Secondary School.

All of the programmes mentioned above are currently available to interested students. In addition, some institutions, such as YTEPP and the MIC Institute of Technology, offer a small stipend to the course participants. If all of these programmes are readily available, why are there no new artisans?

The Availability of Funding

The final challenge explored in this study was the availability of funding. In order to successfully run a steelpan manufacturing company, steelpan artisans need adequate funding to be able to purchase raw materials and machinery. In interviewing various steelpan artisans and the managing directors of different steelpan manufacturing companies in Trinidad and Tobago, it was found that one of the challenges faced in starting a steelpan manufacturing company is acquiring funding. While there is a steelpan manufacturing grant available to steelpan artisans through the Ministry of Trade and Industry, only those with steelpan manufacturing companies operating for a minimum of 2-3 years are eligible (steelpan manufacturing). According to Simmons, "while the grant can greatly benefit steelpan manufacturing companies and artisans, those who are just starting out are still left without access to adequate funding." This issue has caused some new artisans to either discontinue the trade or work for other tuners in the industry, as they are unable to start their own companies (Simmons). Simmons, who always wanted to own his own company stated that he worked for others and did private jobs until he had acquired enough capital to start his own company. Benefitting from the grant were steelpan artisans

Ronald Matthews, Kyle Noel and Jim Phillip, who shared the view that the grant available through the Ministry of Trade and Industry is extremely beneficial to all artisans able access the grant (Matthews et al).

While funding for smaller, private owned companies is a challenge throughout the industry, it is an even bigger issue when it comes to larger companies such as MITTCO and Panland. According to Leith, "When MITTCO was in search of funding, the company was denied loans and investments by all of the banks in Trinidad and Tobago." This caused some delay in the development of the company however, Leith stated that the company later received funding from the HADCO Group of Companies which allowed MITTCO to become what it is today. Regarding Panland, Cooper stated that the company was fortunate enough to acquire funding through the Neal and Massy Group of Companies, as a result of his longstanding relationship with them at the time.

The content of this chapter helps to place emphasis on the need for collaborative efforts to foster sustainability in the steelpan manufacturing industry in Trinidad and Tobago. Factors such as the lack of raw materials, an aging workforce, the effectiveness of education and training programs and access to funding can hinder the growth and development of the steelpan manufacturing Industry. Thus, it is imperative that more collaboration, innovation and strategic partnerships occur in order to safeguard the future of the steelpan manufacturing industry of Trinidad and Tobago

CHAPTER THREE

Presentation and Analysis of Data

This chapter provides a thorough examination of the data gathered for the completion of the study. With the focus of this study being the factors influencing the sustainability of the steelpan manufacturing industry in Trinidad and Tobago, the analysis is centred on four key elements: the availability of raw materials, availability of labour, the effectiveness of steelpan manufacturing education and training programs, and the availability of funding for steelpan manufacturing. Due to the limited number of steelpan artisans and professionals in the industry, the data in this chapter will be represented utilizing a series of tables to outline the qualitative insights gathered from the industry professionals. In addition, this chapter will offer a comprehensive understanding of the industry's dynamics; by exploring how the availability of raw material can impact production capabilities, as well as how the availability of labour can pose a significant threat for the future growth and development of Trinidad and Tobago's steelpan manufacturing industry. Additionally, it explores the effectiveness of education and training programs for steelpan manufacturing available in Trinidad and Tobago, and their influence skill development, and outlines prevalence of challenges associated with accessing funding for machinery, tools and materials in the steelpan manufacturing industry.

In order to successfully complete this study, preliminary data was collected utilizing questionnaires which consisted of both closed and open-ended questions. Figure 1 below shows the result for the steelpan artisans and steelpan manufacturing companies who are currently experiencing an inconsistent supply of 55-gallon drums for steelpan manufacturing in Trinidad and Tobago.

Name of Steelpan Artisan	Consistent Supply of Drums (Yes/No)
Juma Simmons	No
Augustus Peters	No
Kayle Noel	No
Jim “Jimi” Phillip	No
Ronald Matthews	No
Name of Steelpan Manufacturing Company	Consistent Supply of Drums (Yes/No)
MITTCO	Yes
Panland	No

Figure 1. Table showing the consistency in the drum supply

Figure 1 provides a clear representation of the availability of drums for steelpan manufacturing among both individual artisans and two well-known steelpan manufacturing companies.

Artisan Perspective:

From the table above, it is shown that all the artisans interviewed for this study reported a that they had a lack of a consistent drum supply for steelpan manufacturing. This table clearly indicates that accessing raw materials is a challenge that is prominent among steelpan artisans within Trinidad and Tobago’s steelpan manufacturing industry.

Company Perspective:

From Figure 1 above, it is clearly shown that MITTCO is the only steelpan manufacturing company who reported a consistent drum supply. This provides an indication that MITTCO has managed to establish reliable channels from which they procure drums, enabling the company to have a steady flow of raw materials. In contrast to MITTCO, Panland reported that the company does not have a consistent supply of drums.

Implications:

Having a consistent drum supply can lead more efficient production and contribute to higher customer satisfaction levels. On the other hand, a lack of a consistent supply drums for steelpan manufacturing can contribute to production delays and can also hinder competitiveness. According to Noel "Not having drums and even steelpan accessories like pan stands, has caused him to sometimes have to delay export orders until he has gathered the necessary materials." In addition, Peters stated that in order to try to mitigate this issue he has resorted to bulk purchasing material. Peters also stated that "It is better to have the material even if it may not be needed at the time." In relation to this, steelpan artisan Ronald Matthews added that he had tried to bring artisans together to purchase container loads of drums which would be split amongst the artisans who collaborated on the project (Matthews). However, he has since been unsuccessful in this endeavour, claiming that while some steelpan artisans expressed interest in pursuing this project, others were not (Matthews). According to Matthews "They were not focusing on the bigger picture."

Overall Industry Landscape:

Figure 1 underscores the prevalence of a drum shortage in Trinidad and Tobago's steelpan manufacturing industry. While MITTCO has managed to attain a consistent drum supply, the majority of individual artisans and the second steelpan manufacturing company explored in this study (Panland), reported that they encounter challenges in acquiring drums for steelpan manufacturing. Furthermore, in chapter two it was shown that steelpan artisans have resorted to sourcing drums from foreign suppliers, further emphasizing that Trinidad and Tobago is in need of a consistent supply of drums – Additionally it would greatly benefit both companies and artisans if the drums are available locally, since it would eliminate shipping costs as well the

challenge of accessing foreign currency to purchase drums. Thus, highlighting the need for industry-wide collaboration to find solutions to address this issue.

Name of Steelpan Artisan	Access to funding (Yes/No)
Juma Simmons	No
Augustus Peters	No
Kayle Noel	Yes
Jim "Jimi" Phillip	Yes
Ronald Matthews	Yes
Name of Steelpan Manufacturing Company	Access to funding (Yes/No)
MITTCO	Yes
Panland	Yes

Figure 2. Table showing the availability of funding for steelpan manufacturing in Trinidad and Tobago.

Access to funding for Steelpan Artisans:

According to Figure 2, steelpan artisans Kayle Noel, Jim Phillip, and Ronald Matthews reported that they have access to funding. These individuals stated that they were able acquire financial support through the steelpan manufacturing grant provided by the Ministry of Trade and Industry. On the other hand, Juma Simmons and Augustus Peters stipulated a lack of access to financial assistance for machinery, tools and materials. These findings reflect that the availability to funding is a challenge for some artisans in the steelpan manufacturing industry.

Access to funding for Steelpan Manufacturing Companies:

As reflected in Figure 2, both MITTCO and Panland reported that they had access to funding. However, these companies did not acquire their funding through the same channels as the steelpan artisans; their funding came as a result of investments from private companies such as the Neal and Massy Group of Companies and the HADCO Group of Companies.

Implications:

It is crucial that steelpan artisans and steelpan manufacturing companies have access to funding to acquire machinery, tools and raw materials for steelpan manufacturing. With access to funding, companies and artisans will be better able acquire more machinery, invest in equipment upgrades and meet their production demands. Thus, it is important to address the existing disparities in funding to contribute to a more sustainable steelpan manufacturing industry.

Name of Steelpan Artisan	Need for More Steelpan Artisans (Yes/No)
Juma Simmons	Yes
Augustus Peters	Yes
Kayle Noel	Yes
Jim "Jimi" Phillip	Yes
Ronald Matthews	Yes
Name of Steelpan Manufacturing Company	Need for More Steelpan Artisans (Yes/No)
MITTCO	Yes
Panland	Yes

Figure 3. Table showing the need for more steelpan artisans in Trinidad and Tobago.

Artisan Perspective:

From the table above, it was found that all of the listed steelpan artisans expressed a need for more steelpan artisans to be added to the steelpan manufacturing labour force.

Company Perspective:

Both MITTCO and Panland indicated that there is a need for more steelpan artisans.

Aging Steelpan Manufacturing Workforce:

Although it is not represented in the table, the reasoning for the call for more steelpan artisans was found to be as a result of the aging workforce within the steelpan manufacturing industry of Trinidad and Tobago. According to Leith, the experienced artisans are heading into retirement age and some artisans have already retired (Leith). This further highlights the need to attract and train interested individuals to become steelpan artisans.

Implications:

These findings present an indication of the labour shortage existing in Trinidad and Tobago's steelpan manufacturing industry. This shortage in labour can hinder production and affect the growth of the industry. Thus, it is imperative that industry professionals collaborate with each other to find ways to mitigate this challenge

Name of Steelpan Manufacturing Training Program	New Artisans Being Produced
Introduction to Steelpan Manufacturing (UTT)	No
Steelpan Construction (YTEPP)	No
Steelpan manufacturing (MIC)	No
steelpan manufacturing (CSEC)	No

Figure 4. Table reflecting the effectiveness of steelpan manufacturing education and training programmes.

Effectiveness of Training Programs:

Figure 4 above indicates that none of the training programs listed are currently producing new steelpan artisans.

Impact on The Steelpan Manufacturing Labour Force:

The table above is focused on the addition of new steelpan artisans to the steelpan manufacturing labour force in Trinidad and Tobago. This shortage of artisans in the labour force can contribute to a decline production as well as burn out amongst the few artisans operating in the industry.

Evaluation and Adaptation of Training Programs:

Due to the lack of new steelpan artisans being produced by the listed steelpan manufacturing training programs, it is important to evaluate and adapt these programs to align with the needs of the steelpan manufacturing industry. By revising the curriculum of these programs, incorporating modern manufacturing techniques, and allowing opportunity for hands-on experience the effectiveness of these programs can potentially be enhanced. However, marketing steelpan manufacturing as a viable career option to the younger generation can also help to mitigate this issue (Leith). In essence, the effectiveness of steelpan manufacturing training programs plays a crucial role in safeguarding the sustainability of Trinidad and Tobago's steelpan manufacturing industry.

All of the challenges explored in this study were found to be prevalent in in Trinidad and Tobago. The findings of this chapter provide a greater insight of the challenges being faced in the steelpan manufacturing industry. However, while these challenges threaten the future growth and development of Trinidad and Tobago's steelpan manufacturing industry, there has not been any notable change or new collaborations geared toward mitigating these challenges.

CONCLUSION

This study explored the factors which influence the sustainability of the steelpan manufacturing industry in Trinidad and Tobago. Highlighted were factors such as the availability of raw materials, availability of labour, the effectiveness of existing education and training programs and access to adequate funding.

In this Caribbean studies project, the method used to collect data was qualitative research which allowed for crucial information to be derived from the knowledge and expertise of several credible industry professionals who possess a wealth of knowledge and experience from working in the steelpan manufacturing industry. The data collected in the interviews conducted during this study served as the main source of information and has had a strong influence on the results of the study.

The interviews conducted with well-known steelpan artisans and the managing directors of steelpan manufacturing companies such as MITTCO and Panland resulted in confirmation that Trinidad and Tobago are suffering a drum shortage and this has led most steelpan manufacturers to seek a foreign supply of 55-gallon drums. The results of the interviews conducted also brought to light the state of the steelpan manufacturing labour force as it relates to the availability of labour, highlighting that there is a grave need for more steelpan artisans in the current labour force. In addition to the state of the labour force, the education and training programs were also a topic discussed in the interviews conducted. From these interviews, it was found that steelpan manufacturing training programs are available through a number of credible institutions as which included The University of Trinidad and Tobago. However, the issue still remains that there are not any new steelpan artisans being added to the labour force. One source concluded that a way

to mitigate this challenge is to do more to market steelpan manufacturing as a viable career option to the younger generation. Also included in the findings from the interviews was the concern for the availability of adequate funding for machinery and raw materials. While it was found that there is one grant currently available for steelpan manufacturing through the Ministry of Trade and Industry, it was revealed that new tuners and builders are not able to benefit from the grant if they have not been operating for 2-3 years. In addition, in an interview conducted with Akua Leith, managing director of MITTCO, it was revealed that his company was denied by all of the banks during the period where the company was trying to source funding.

In analysing the findings of this thesis, it was found that there were some areas which called for further research. These areas include an investigation of the steelpan accessory industry which includes pan sticks, cases, and pan stands, the existence of burn-out in the steelpan manufacturing industry which would focus on how the current work load affects steelpan manufacturers and their livelihoods, and lastly the ways in which steelpan manufacturing training programs can be improved.

The findings in this study have provided a thorough understanding on the current factors influencing the sustainability of the steelpan manufacturing industry in Trinidad and Tobago. The content explored in this study may be utilized by steelpan artisans, steelpan manufacturing companies and government entities throughout Trinidad and Tobago to better understand the impact of the challenges facing the industry as well as allow for all professionals in the industry a to have starting point to foster further research and collaboration, to create strategies and solutions in the future.

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APPENDIX A

Sample of Pre-Interview Questionnaire for Steelpan Manufacturing Companies

1. Please state your name, birth date and nationality.
2. Please indicate where you studied (kindly include dates).
3. Do you have any experience as a steelpan tuner or builder?
4. Please state your company's name and your position.
5. Please state how long your company has been in operation (provide dates).
6. Please indicate the name of the company or companies from which your raw materials are sourced.
7. Please indicate the type of interview you would like to have.
8. Kindly provide the information for your most preferred mode of contact.

APPENDIX B

Sample of Pre-Interview Questionnaire for Steelpan Artisans

1. Please state your name, birth date and nationality.
2. Please indicate where and when you received your training in steelpan tuning or steelpan manufacturing.
3. Please indicate if you are a steelpan tuner, builder or both.
4. Please indicate the geographical area in which you primarily conduct business.
5. Please indicate the type of interview you would like to have.
6. Kindly provide the information for your most preferred mode of contact.

APPENDIX C

Sample Interview of Interview Questions

1. What inspired you to start a steelpan manufacturing company?
2. What were some of the challenges you faced while pursuing this endeavor?
3. How did you overcome these challenges?
4. Have you had any challenges which arise from the existence of local competition? If yes, how do you address these challenges?
5. Can you comment on any challenges that your company faces with regards to accessing raw materials?
6. Do you have any concerns regarding the sustainability of current supply chains for the raw materials used in your business?
7. Are there any challenges in maintaining a skilled workforce?
8. Can you comment on the current state of the skilled labor force in relation to the industry?
9. Do you currently have measures in place for recruitment and retention of skilled workers?
10. Are there any government policies that directly affect your business?
11. Did you encounter difficulty in acquiring funding to start your business? How did you overcome these challenges?
12. To what extent do you collaborate with other sectors and organizations?
13. Can you list the key raw materials which are crucial for the day-to-day operation of your business?
14. Can you comment on how your facility ensures a reliable and consistent supply of these materials year-round?

15. Do you make use of any local suppliers?
16. To what extent do you rely on the mentioned local suppliers and how does availability of these resources impact your manufacturing process?
17. Can you comment on how global market trends can affect the availability of raw materials needed and their cost?
18. What strategies do you have in place to monitor these changes, and what are the methods used to respond to any possible disruption in supply?
19. Does your company currently provide any in-house training programs or host collaborations with educational institutions to foster growth in the labor force?
20. Regarding product output, are there any factors which cause fluctuations in demand?
21. Does your company receive and government subsidies or incentives?
22. If yes, to what extent do these incentives contribute to the success of your business and export activities?
23. Regarding tourism, are there any collaborative efforts with the tourism industry to promote and showcase the steelpan to foster more export activity?